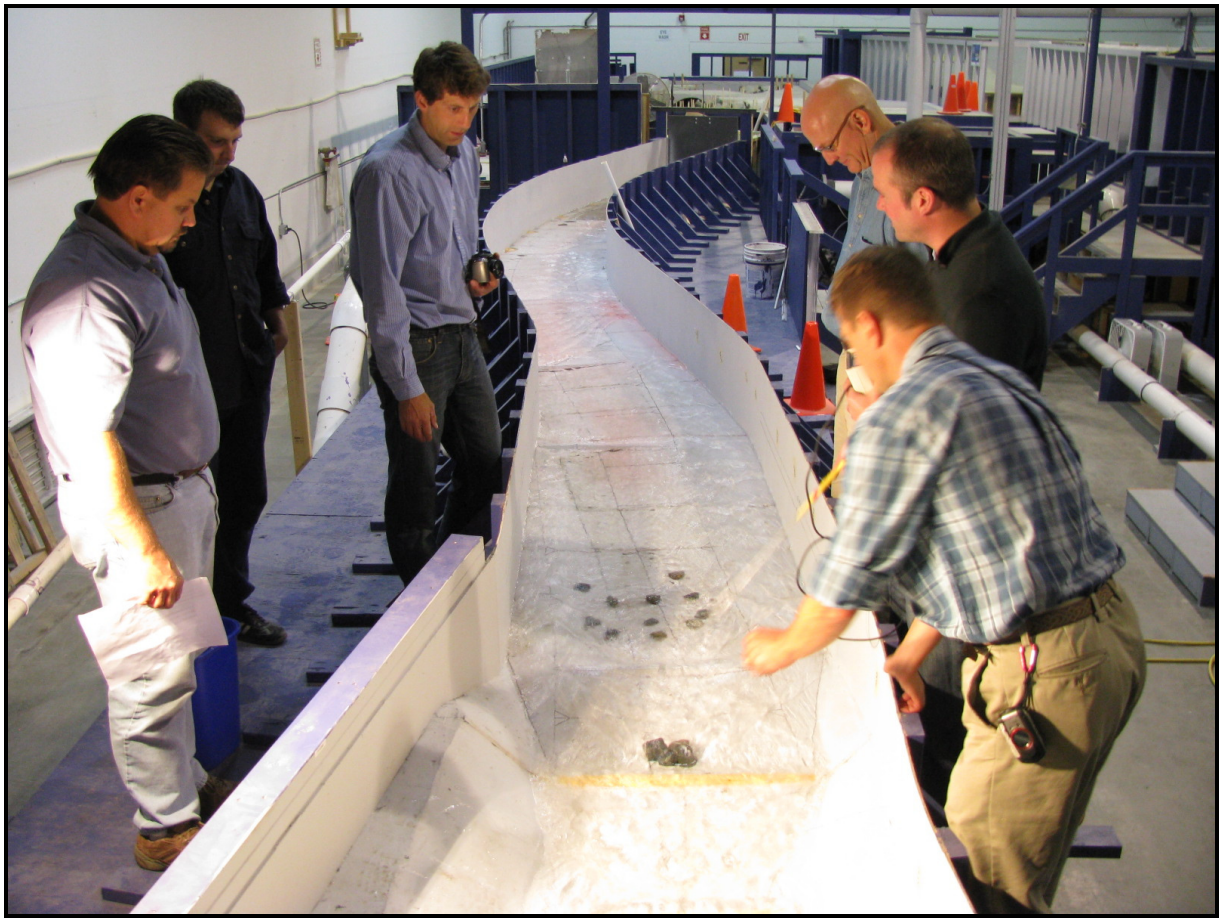
APPENDIX 3-4

Project 4: City of Goleta,
San Jose Creek Capacity Improvement and Fish Passage Project

- Physical Hydraulic Model of Fish Passage Improvements
- Bengal Engineering Technical Memorandum – Geotechnical Investigation and Recommendations
- Design Concept and HEC-RAS Results Presentation
- Design Drawings
- Mitigated Negative Declaration
- Steelhead Assessment Report
- Hollister Bridge Structural Capacity Evaluation
- Hollister Bridge Funding Letter
- Letters of Support
- Proposed Santa Barbara County IRWM Data Management System, Application for Prop 84 Planning Grant, Round 1, Santa Barbara County, IRWM Plan 2012, Task 4: Establish Data Management System, pp. 51, September 28, 2010

SAN JOSE CREEK FLOOD CONTROL CHANNEL

PHYSICAL HYDRAULIC MODEL OF FISH PASSAGE IMPROVEMENTS



PREPARED FOR: CITY OF GOLETA, CA

PREPARED BY: NORTHWEST HYDRAULIC CONSULTANTS INC

NOVEMBER, 2010

City of Goleta, California

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Northwest Hydraulic Consultants conducted this work in collaboration with Bengal Engineering, who is providing Civil and Structural engineering services to the City for the construction plans and specifications for channel improvements.

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INTRODUCTION

Northwest Hydraulic Consultants (NHC) accomplished the physical hydraulic modeling work to develop fish passage improvements to the current design for the overall flood control channel for San Jose Creek, which flows through the City of Goleta, California. The channel has been impassable to anadromous steelhead and other upstream migrating fishes since the original concrete lined channel was constructed earlier in the 20th century to protect Goleta from recurrent flooding. NHC conducted this work both directly for the City of Goleta and as a subconsultant to Bengal Engineering, a Civil and Structural engineering firm located in Goleta, California that is concurrently preparing the final design for the flood control channel improvement project.

SAN JOSE CREEK CHARACTERISTICS

The San Jose Creek watershed covers approximately 6,000 acres with elevations ranging from sea level to 2900 ft near the summit of San Marcos Pass in the Santa Ynez Mountains of the South-Central coast of California. San Jose Creek flows generally southward a total distance of about 8 to 10 miles to discharge into the Pacific Ocean near the city of Goleta, California. The watershed of San Jose Creek is characterized by steep and mountainous headwaters over a 4 to 6 mile reach, with a moderate gradient hillslope reach below that for perhaps 2 miles, then a shallow gradient reach extending perhaps 1 mile to its discharge point into the lagoon at Goleta Slough. The stream is subject to widely varying flows unique to the Southern California environment. Heavy winter rainstorms occasionally result in very flashy and high peak flows, while summer and fall are very dry, resulting in most of the lower reaches of the stream becoming ephemeral. Flood events are characterized by high peak flows occurring over short periods of time (from one to three days, typically), with stream flows typically returning to very low base flows. On approximately a decadal cycle, the watershed annual runoff total ebbs and rises with larger eastern Pacific Ocean annual temperature swings and storm development.

San Jose Creek discharge has been measured by the US Geological Survey (USGS) gage 11120500 (San Jose Creek nr Goleta, CA) since about 1941. The gage site is about 1.5 miles upstream of the concrete flood control channel project reach, and the catchment area above the gage is about 5.5 mi^2 (http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11120500&PARAmeter_cd=00065,00060). The highest peak flow recorded at the gage is 2,520 cfs on 4 March, 2001. Statistical data for peak flow gauging are available at two locations and summarized in the following table[1].

Return Period	Statistical Peak Flow (cfs)	
(years)	USGS Gage 111202500	USGS Gage 111202510
2	407	601
5	1,020	1,340
10	1,590	2,020
20	2,240	2,820
50	3,210	4,080
100	4,040	5,210
500	6,220	8,480

PROJECT DESCRIPTION

The lower reaches of San Jose creek are urbanized and there has been a history of flooding through this reach, most notably in the vicinity of the Hollister Avenue Bridge, resulting in the inundation of portions of Old Town Goleta. The lower mile of the stream channel was straightened and channelized with concrete lining in the mid-20th century to provide flood relief for the community.

Investigations to date have focused on the concrete-lined channel downstream of Hollister Avenue and the existing bridge at Hollister Avenue, which separates the

[1] Penfield & Smith Report "San Jose Creek Preliminary Hydrology and Research Report", prepared for the City of Goleta, May 25, 2007

natural channel reach above the bridge from the lower, concrete channel reach. The concrete-lined channel was designed and constructed during the period from 1963 to 1964 and was designed for a discharge of 3,300 cfs that would correspond to a current return period of somewhat over 25 years. However, higher flows in the channel break out over the west bank towards Kellogg Avenue, resulting in flooding as described above. Since the initial channel construction, the Hollister Bridge was widened, which somewhat decreased the hydraulic capacity of the channel under the bridge, and a new light duty bridge was constructed just downstream of Hollister Avenue which includes structural elements and a hanging sewer line that intrude into the flow area and freeboard of the channel.

The points of specific concern found to impact the ability to contain flood flows in the channel were:

- Insufficient conveyance capacity under the Hollister Avenue Bridge with possible causes being transition between subcritical flow to supercritical flow, and size of opening (i.e. the opening just isn't large enough).
- Containing flood flows upstream of Hollister Avenue tended to have the effect of raising water surface elevations.
- Passing flows greater than 3,300 cfs downstream of Hollister Avenue (without improvements) introduced overbank discharge from the upstream natural channel into the surrounding neighborhoods and prevented local drainage from entering the channel.
- Downstream controls (near the old drive-in along Kellogg Avenue) are impacted by tidal influences, especially during large, low-pressure Pacific storms.

The same concrete paving and steep channel slope providing the efficient conveyance of flood flows have unfortunately all but prevented upstream migrating steelhead from reaching upstream spawning and rearing grounds in the mountainous headwater reaches. The existing concrete channel has been identified as a barrier to upstream migration of anadromous fish, including endangered Southern California

steelhead. Recent interest in restoring native steelhead runs to the South Central Coast of California has focused efforts on removing or remediating these passage barriers. As part of the proposed channel improvement project, the City desires to incorporate fish passage features into the flood control channel design.

The points of specific concern found to be responsible for the barrier to upstream fish migration include:

- At all but high tide, the exit portion of the existing channel is not readily accessible to upstream migrating fish due to insufficient depth and high flow velocity
- At low flows, the flow depth on the concrete apron through the upper 2500 feet of the flood control channel is too shallow for fish to navigate
- At all other flows the flow velocity on the concrete apron through the entire length of the flood control channel is too high for fish to navigate the length of the concrete channel reach

PROPOSED CHANNEL IMPROVEMENTS

As part of the Old Town Goleta redevelopment, numerous alternatives have been considered to eliminate flooding along this portion of San Jose Creek. Those alternatives include:

- Re-routing portions of the flood flows to adjacent creek channels.
- Constructing floodwalls along Kellogg Avenue where it is adjacent to the creek.
- Constructing floodwalls upstream of Hollister Avenue to contain the breakout.
- Replacing Hollister Avenue Bridge to improve capacity.
- Routing some of the overflow to the Old San Jose Creek Channel (found to only have a capacity of 300 cfs).
- Modifying the channel under Hollister Avenue Bridge to improve capacity.
- Extending the concrete-lined channel upstream of the Hollister Avenue Bridge to improve approach conditions in increase capacity.

- Constructing additional culverts under Hollister Avenue to supplement the capacity at Hollister Avenue Bridge.
- Modifying the concrete-lined channel section to a rectangular shape to carry more flow.
- Modifying the concrete-lined channel section to provide additional flow area under Hollister Avenue Bridge.

The most current design alternative proposed includes reconstruction of the existing trapezoidal shaped concrete lined channel with vertical sidewalls and an articulated concrete mattress invert. Vertical sidewalls would be constructed with vertical bored piles and precast concrete waler panels. The invert would be graded to the desired configuration and paved with articulated concrete mattress material underlain with filter fabric and free-draining material to permit the typically high groundwater to flow into the channel. Overall width of the proposed channel is 50 feet, widening to 55 feet under Hollister Avenue. The invert slope of the channel varies throughout the length of the project, with the upstream 2000 feet or so much steeper than the nearly flat slope of the lower 2000 feet along Kellogg Avenue. The proposed fish passage improvements to the flood control channel are an integrated feature of the proposed capacity improvement design for the facility. These fish passage improvements consist of a lowered portion of the channel invert, with trapezoidal shaped precast weirs spaced at regular 100 foot intervals throughout the entire length of the channel. The fish passage portion of the channel will have a top width of 30 feet and a bottom width of 15 feet, with a sloping right (descending) sidewall, and a vertical left (descending) sidewall formed by the left main channel sidewall. Weirs have center (or perhaps located off to one or the other side) slots that can be fitted with temporary bulkheads if necessary to pond water during exceptionally low flows, or removed to permit sediment to pass and allow the channel to drain during the summer. The weirs and channel configuration are designed to ensure that minimum depth in the fish passage channel through all fish passage flows meets or exceeds NOAA Fisheries criteria. The vertical fall across each weir is limited to NOAA Fisheries criteria.

STUDY OBJECTIVES

In order to assess the effectiveness and viability of the various channel design alternatives presented to date for providing effective fish passage through the concrete flood control channel, a physical hydraulic model study was conducted. The main objective of the model study was to evaluate the hydraulic performance of the modified channel geometry over the expected range of operating conditions. Specific areas of interest included evaluation of the effects of modifying the channel on channel capacity (conveyance) and sediment accumulation, and assessing the fish passage conditions within the modified channel. In addition, the model was used to demonstrate the hydraulic characteristics of the proposed channel improvements to various stakeholders involved in the project.

Previous numerical computer hydraulic modeling accomplished to date had identified the reach in the vicinity of Hollister Avenue and the upstream 1000 feet or so of the curving reach of the channel to be the most critical in terms of all of the above issues noted. Agency comments on proposed design modifications have focused on fish passage and flood capacity within this reach and in the vicinity of the Hollister Avenue bridge crossing. Therefore, the physical model focused on this reach, enabling a logical extension of the results to the less critical downstream reach.

PHYSICAL MODEL DESCRIPTION

The physical hydraulic model test facility for evaluating fish passage improvements for the San Jose Creek flood control channel was a 1:18 undistorted scale flume model, constructed at NHC's Seattle laboratory. The model was constructed to adequately provide for an evaluation of the detailed performance of the proposed channel improvements, based on the channel dimensions, flow rates and study objectives. The flume model was constructed to accommodate about an 800 ft long (prototype) channel reach, extending from Sta 66+00 (approximately upstream of

Hollister Avenue Bridge) to Sta. 58+00. It was used to evaluate the hydraulic characteristics of various fish passage modifications to be made in the final design of the modified flood control channel. In addition, it was used to qualitatively evaluate the sediment transport and hydraulic design of the channel and bridge transition section critical to the performance of the modification alternative. The model was constructed of plywood and acrylic materials, waterproofed to contain simulated channel flows, at geometrically scaled dimensions to simulate the prototype within Froude scale law for open channel flows.

SIMILITUDE AND SCALE

General Model Scale

Accurate simulation of prototype (actual) conditions require that the hydraulic model be dynamically similar to the prototype. Dynamic similarity of fluid motion requires geometrically similar simulation boundaries and macro- and micro-scale flow patterns between model and prototype. In addition, the individual fluid particles must experience similar ratios of forces acting upon them. These force ratios are intentionally dimensionless, and are defined as:

Froude Number: $$F = \frac{U}{\sqrt{gL}} = \frac{InertialForce}{GravityForce}$$

Euler Number: $$E = \frac{\Delta P}{\rho U^2} = \frac{\mathrm{Pr}\,essureForce}{InertialForce}$$

Reynolds Number: $$R = \frac{UL}{\nu} = \frac{InertialForce}{ViscousForce}$$

Weber Number: $$W = \frac{U^2}{\sigma / \rho L} = \frac{InertialForce}{SurfaceTensionForce}$$

where: U = characteristic flow velocity

g = gravitational acceleration
L = characteristic length
ρ = fluid density
ΔP = difference in pressure
ν = kinematic viscosity of fluid medium
σ = surface tension of the fluid medium

Achieving complete dynamic similitude between model and prototype requires all these force ratios to be equal. However, this cannot be achieved at any scale except 1:1 (i.e. model dimensions = prototype dimensions). Thus, in order to gain advantage by modeling structures and processes at reduced geometric scale, it is necessary to select from these force ratios which are the most dominant in the particular fluid motion of interest in the modeling effort. At the same time, the force ratios of lesser importance are examined to ensure that they remain within a range that would not adversely affect the particular fluid motion of interest. Generally, for free surface (i.e. open channel-type) flows, the gravity forces dominant the fluid motion processes, while the surface tension and pressure forces are of lesser importance. The viscous forces, while important when the flow is within the laminar flow range and a turbulent flow boundary layer is not developed, become less important where a turbulent flow boundary layer is developed. Therefore, the Froude number (ratio of inertial to gravity forces) must be equal between model and prototype, so long as the Reynolds number (ratio of inertial to viscous forces) for both model and prototype fall within the turbulent flow range, even if they are not equal.

$$\frac{F_P}{F_M} = F_{Ratio} = 1$$

where P = 'prototype'
M = 'model'

Froude similitude, therefore, is of greatest importance where gravity forces dominate the fluid motion. However, as indicated above, flow resistance through viscous shear and turbulence may also play a significant role in the fluid motion. Typically, these forces are important where microscale turbulent flow formations are of interest, or where fixed boundaries influence the development of macro scale fluid motion or where interaction with fixed boundaries are important in the simulation of energy losses. The Reynolds number is the important dimensionless parameter where flow resistance or viscous forces play such an important role. Proper simulation of flow resistance on fixed boundaries or microscale turbulence requires that the flow field be either fully turbulent or fully laminar (see Moody's diagram for a graphic description of turbulent Reynolds number). To ensure that this condition is met, the geometrically scaled roughness 'height' (i.e. the physical size of roughness on the fixed boundary) must produce a similar 'friction coefficient 'f' for model and prototype. Moody's diagram shows that 'f' is relatively constant for flows above the critical Reynolds number range which represents 'turbulent' flow. Hence, if the Reynolds number of both model and prototype flow is above the turbulent flow range, one can be assured that the energy losses induced by friction and viscous forces is properly simulated.

$$\frac{R_P}{R_M} = R_{Ratio} = 1$$

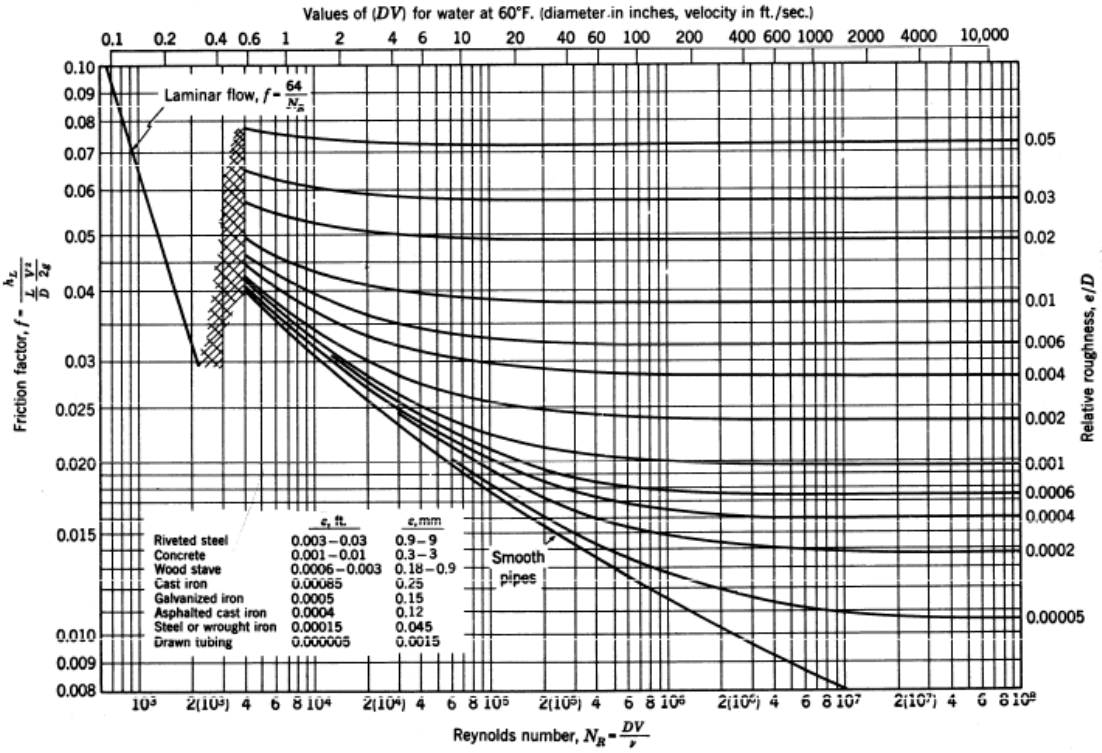

Fig 1. Moody diagram

As discussed above, it is impossible to satisfy both the Froude and Reynolds similitude criteria at anything different than a scale of 1_M:1_P., unless different fluid mediums are used (a generally impractical, though not impossible approach). However, so long as the both the Model and Prototype Reynolds numbers are at or above the turbulent flow range (see Moody's diagram again), correct simulation can be attained[2].

The San Jose Creek physical model scale of 1:18 (undistorted) was selected in order to meet two basic objectives; 1) construct the model with readily available materials and modeling mediums, and 2) to achieve a practical footprint for the model test

2 ASCE (2000). Hydraulic Modeling, Concepts and Practice. ASCE Manuals and Reports on Engineering Practice

bed that is economical for the client. Several important additional considerations were made in the selection of the 1:18 scale ratio:

- 1:18 geometric scale provides for a maximum model discharge of about 3.8 cfs, or about the capacity of one large centrifugal pump
- 1:18 geometric scale allows the use of conventional scaled sediment particles from the d_{100} through the d_{50} size range, and readily available materials of lesser density for the d_{50} and smaller particle size range
- 1:18 geometric scale permits the model test bed to fit conveniently within the available laboratory space
- 1:18 geometric scale allows client and agency visitors to readily observe flow patterns and hydraulic characteristics without distortion
- 1:18 geometric scale permits the use of inexpensive and efficient data collection devices (e.g. Nixon propeller meter)

The scaled relationships between model and prototype parameters are shown in the table below for the selected 1:18 scale.

Model Scale Relationships

Parameter	Relationship	Value	Prototype	Model
Length	L_M/L_P	1:18	18 ft	1 ft
Velocity	$(L_M/L_P)^{1/2}$	1:4.243	4.243 fps	1 fps
Time	$(L_M/L_P)^{1/2}$	1:4.243	4.243 minutes	1 minute
Discharge	$(L_M/L_P)^{5/2}$	1:1,374.62	1,375 cfs	1 cfs

Note: M = model, P = prototype

Moveable Bed Particle Scaling

Accurate simulation of particle motion generally is treated qualitatively in physical modeling. Of interest, typically, are general deposition and scour patterns, distribution of material, and the effects on hydraulic roughness when sediment is present in the model test bed. The primary process of concern is the incipient particle motion, where the viscous forces that entrain sediment particles into the flow

field are simulated. The sediment transport rate once the individual particles are entrained is usually less important. As a result, the specific gravity and particle size necessarily constrain the simulation of sediment movement in the physical model. Shields developed a dimensionless parameter that represents the ratio of bed shear stress (induced by viscous shear on the bed) to the submerged weight of individual particles. In moveable bed physical modeling, the Shields parameter for both model and prototype particles should be above that which would indicate particle entrainment.

$$\theta = \frac{\rho u_*^2}{g\Delta\rho d}$$

where ρ = fluid density

u_* = particle shear velocity

gΔρ = submerged specific weight of particle

d = particle diameter

Since it is the viscous force which is responsible for particle entrainment, and fully turbulent flow will entrain particles of various size ranges, depending on the effective viscous shear occurring at the bed boundary, we can scale sediment movement with the following relationship.

$$\sqrt{\theta_M / \theta_P} = \frac{L_M / L_P}{\sqrt{\left(L_M / L_P\right) \cdot \left(d_M / d_P\right) \cdot \left(\Delta\rho / \rho\right)_R}} = 1$$

Where θ = Shields parameter (for model or prototype)

L_M / L_P = Length scale ratio (model to prototype)

d_M / d_P = particle diameter ratio (model to prototype)

$\left(\Delta\rho/\rho\right)_R$ = particle density ratio (model to prototype)

If the same type of material is used in the model as exists in the prototype, the particle density ratio will be equal to 1. Hence, the particle diameter ratio must be the same as the Length ratio (i.e. model geometric scale ratio). As long as the particle Reynolds number is within the 'fully turbulent' flow range (i.e. particle Reynolds number > 60), this relationship holds. However, if the particle Reynolds number in the model falls below this range, then model particles of the same material as exist in the prototype cannot be used to simulate that particle size range and smaller. If the particle Reynolds number in the model falls below the turbulent flow range, then a lighter material (i.e. smaller density) is typically used, in a size range that permits the particle Reynolds number criterion to be met for the particular density ratio of the material considered. In modeling applications where some of the sediment particle scaling allows use of the same material density as exist in the prototype and some of the sediment particle scaling requires use of lighter materials, the total mix of model materials will consist of particles of varying densities. The San Jose Creek model simulation model material mixture is of this type, with crushed walnut shell and quartz sand comprising the scaled particle gradation.

MODEL MEASUREMENT AND INSTRUMENTATION

The following controls and instrumentation were provided for the study:

Flow Rates - The model flow was circulated with multiple laboratory pumping systems. Intermediate to high flows (up to 5,000 cfs prototype) were circulated using a single large centrifugal laboratory pump supplying flow through an 8-inch supply pipe. For low flows (up to 300 cfs prototype) a single small submersible laboratory pump supplying flow through a 2-inch pipe was used. The 8-inch supply line was controlled using a butterfly valve, while the 2-inch supply line was controlled using a ball valve. Large discharges into the model test bed could be regulated using the 8-inch butterfly valve (if the large pump was operating) and monitored using a

standard fixed orifice plate and an acoustic Doppler flow meter attached to the supply pipe just upstream of the butterfly control valve. Small discharges into the model test bed could be regulated using the 2-inch ball valve (for only small pump flows) and monitored using a vertical manometer arrangement reading the head differential observed over a 45 degree V-notch weir supplied by the 2-inch supply pipe. The precision of flow measurement is approximately ± 2% of the specified discharge.

Water Levels - Measurements of the water surface elevations in the model test bed were made using a point gage, and with a manometer board connected to multiple static pressure taps at various locations throughout the model test bed channel. The precision of the water level measurements is reported to the nearest 0.1 ft prototype. Figure 2 shows the locations of the pressure taps in the model.

Water Depths – Measurements of the water depth at various locations throughout the model were made using either a simple depth gauge or a point gage by simply zeroing the gage on the model test bed channel invert and then raising it to the water surface to observe the reading. The precision of the water depth measurements is reported to the nearest 0.1 ft prototype.

Velocities – Velocity measurements throughout the model test bed were made using a Nixon propeller meter and hand-held digital readout. The accuracy of velocity measurements is estimated to be within $\pm$ 0.1 ft/sec (prototype).

TEST PROGRAM

STUDY APPROACH

The study was conducted in two phases: model construction, under a direct contract with the City of Goleta, and model testing, under a subcontract with Bengal Engineering. Basic modeling tasks were conducted as follows:

Model Initialization & Calibration

The model test bed was run at a few of the seven (7) baseline flows discussed below in order to calibrate instruments.

Model Testing of Proposed Channel Design

Evaluation of the proposed channel improvements at up to seven (7) discharges (up to the 100-year flood, as shown in the table below) to determine performance of the proposed design with respect to channel conveyance (capacity), sediment transport characteristics, and fish passage conditions through the reach. In addition, water levels in the channel were collected to correlate with the HECRAS numerical modeling previously conducted for the proposed design.

	Recurrence Interval (yrs)	Discharge (cfs)
Fish Passage Flows	------	3
	-----	50
	-----	150
Flood Flows	Annual high flow	300
	2 year event	600
	10 year event	2000
	100 year event	5300

Design Development Testing

This phase of testing could be used to evaluate the performance of the existing channel geometry, refinement of the proposed design to improve performance, or evaluation of alternative geometries, as required.

TEST PARAMETERS

As indicated above, the particular detailed measurements collected from the model test bed included flow velocities, water depths, water surface elevations, and qualitative dye traces from one or more pools within the modeled reach. More specifically, detailed velocity and depth collection for Baseline Testing and Final Design Testing are described in the table below.

Data Collection Program

	Recurrence Interval (years)	Discharge (cfs)	Velocity Data Collection Points	Flow Depth Data Collection Points	Sediment Data Collection
Fish Passage Flows	-------	3	- 9 points in pool between weirs at Sta 5700 and Sta 5800 (3 u/s end of pool, 3 d/s of pool, and 3 in the middle) - same in pool btwn weirs at Sta 5900 and Sta 6000, - same in pool under bridge btwn weirs at Sta 6183 and Sta 6297, - same in pool above bridge btwn weirs at Sta 6297 and Sta 6368	Same as for velocity points	None (sediment not moving at this flow)
	-------	50	Same as above	Same as for velocity points	Qualitative observations
	-------	150	Same as above	Same as for velocity points	Qualitative observations
	Annual	300	Same as above	Same as for velocity points	Qualitative observations
Flood Flows	2 yr	600	Same as above	Same as above	Scaled sediment gradation & load
	10 yr	2000	Same as above	Same as above	Scaled sediment gradation & load
	100 yr	5300	Same as above	Same as above	Scaled sediment gradation & load

TEST RESULTS

Model testing results are briefly presented in the summary and tables below. Fully detailed measurements, photos, and videos for Initial Design Testing, Baseline Testing, and Final Design Testing are presented in Appendix 2, 3, and 4, respectively.

INITIAL DESIGN TESTING

The initial design consisted of a fish channel averaging about 2.75 feet deep, with a 30 foot top width and 10 foot bottom width, with weirs about 1.5 feet in height, varying in elevation by 0.75 feet successively, and positioned 100 feet apart longitudinally throughout the channel. The fish channel was positioned along the left (descending) vertical wall of the flood control channel downstream of Hollister Avenue. The centerline of the fish channel transitioned to the center of the flood control channel as it passed through the Hollister Avenue Bridge and up to the natural channel interface above the bridge. The fish channel varied somewhat in depth to accommodate a desired 0.75 foot elevation differential between weirs, giving a typical slope of 0.75ft/100ft, whereas the flood control channel slope varied through the modeled reach.

An abbreviated Initial Testing data collection program was accomplished on the initial design in order to supply the state and federal resource agencies with information to help with further design recommendations. These data included a few velocity data points at critical locations within a typical pool arrangement, water depths, and a few dye trace tests, as well as photos and video. Results of the Initial Design Testing program are summarized as follows (Detailed results contained in Appendix 2):

Initial Design Testing Summary Observations

Flow (cfs)	Location in Pool	Velocity (fps)	Depth (ft)	Comments
3	upstream	5.7-6.6	0.9-1.2	All flow passes through center slot
	mid pool	<2-2.8	1.35-1.47	Depth a little too shallow below weirs
	downstream	<2-2.5	1.47-1.68	Velocities low except below weirs, velocity high through pools upstream of bridge (not acceptable)
50	upstream	2.5-6.2	1.4-1.7	Flow over weir
	mid pool	2.2-4.1	1.9-2.1	Depth acceptable
	downstream	2.0-2.9	2.1-2.3	Velocities low except immediately below weirs, especially on sloping apron, velocity high through pools upstream of bridge (not acceptable)
150	upstream	4.5-7.6	1.6-1.9	Flow over weir and on driving apron
	mid pool	3.1-4	2.3-2.4	Depth acceptable
	downstream	2.8-3	2.4-2.7	Velocities ok except below weirs and on sloping apron, velocity high through pools upstream of bridge (not acceptable)
300	upstream	3.9-7.9	2.1-2.7	Flow over weir and on driving apron
	mid pool	3.7-7.4	2.7-2.9	Depth acceptable, except on right sloping apron below weirs
	downstream	2.6-5	2.8-3.2	Velocity a little high mid pool, but high below weirs and through all pools upstream of bridge (not acceptable)
600	upstream	7.8-12.6	3.0-3.6	Considerable flow on driving apron
	mid pool	7.5-12.6	2.8-3.8	Depth ok, but hydraulic jump swept out below weirs
	downstream	4.3-9	3.0-4.0	Velocity too high throughout, especially upstream of bridge Sediment clears steadily from pools, more quickly along right slope
2000	upstream	11-18	4.5-5.7	Sediment clears rapidly from most pools, except immediately upstream of weirs in limited areas
	mid pool	11-18	5.1-7.1	
	downstream	11-16	4.4-7.4	

BASELINE TESTING

Following communication of these results to the resource agencies, a more detailed Baseline Testing program was conducted to provide more thorough mapping of flow velocities and depths and to more fully characterize the hydraulic jumps forming below each weir at varying discharges. Results of the Baseline Testing program were, generally (Detailed results contained in Appendix 3):

Baseline Testing Summary Observations

Flow (cfs)	Location in Pool	Velocity (fps)	Depth (ft)	Comments
3	upstream	5.7-6.6	0.9-1.2	All flow passes through center slot
	mid pool	<2-2.8	1.35-1.47	Depth a little too shallow below weirs
	downstream	<2-2.5	1.47-1.68	Velocities low except below weirs, velocity high through pools upstream of bridge (not acceptable)
50	upstream	2.5-6.2	1.4-1.7	Flow over weir
	mid pool	2.2-4.1	1.9-2.1	Depth acceptable
	downstream	2.0-2.9	2.1-2.3	Velocities low except immediately below weirs, especially on sloping apron, velocity high through pools upstream of bridge (not acceptable)
150	upstream	4.5-7.6	1.6-1.9	Flow over weir and on driving apron
	mid pool	3.1-4	2.3-2.4	Depth acceptable
	downstream	2.8-3	2.4-2.7	Velocities ok except below weirs and on sloping apron, velocity high through pools upstream of bridge (not acceptable)
300	upstream	3.9-7.9	2.1-2.7	Flow over weir and on driving apron
	mid pool	3.7-7.4	2.7-2.9	Depth acceptable, except on right sloping apron below weirs
	downstream	2.6-5	2.8-3.2	Velocity a little high mid pool, but high below weirs and through all pools upstream of bridge (not acceptable)
600	upstream	7.8-12.6	3.0-3.6	Considerable flow on driving apron
	mid pool	7.5-12.6	2.8-3.8	Depth ok, but hydraulic jump swept out below weirs
	downstream	4.3-9	3.0-4.0	Velocity too high throughout, especially upstream of bridge Sediment clears steadily from pools, more quickly along right slope

2000	upstream	11-18	4.5-5.7	Sediment clears rapidly from most pools, except immediately upstream of weirs in limited areas
	mid pool	11-18	5.1-7.1	
	downstream	11-16	4.4-7.4	
5300	upstream	17-24	6.3-9.8	Clearance below low chord of proposed new Hollister Avenue bridge at least 3 feet above water surface Sediment clears rapidly from most pools, except immediately upstream of weirs in limited areas
	mid pool	19-24	5.9-7.1	
	downstream	14-24	6.2-10	

DEMONSTRATION VISIT TESTING

Following the Baseline Testing, on September 23, 2010, a model demonstration and working visit was conducted, in which the originally proposed channel configuration and six possible simple modifications to the originally proposed configuration were evaluated. The demonstration visit was intended to provide direct observation by a team of individuals from Federal, State, County, and City organizations involved in the San Jose Creek design process. Attendees included NHC staff; Steve Wagner, the engineering manager from the City of Goleta; Jon Frye, the acting director of the Santa Barbara County Flood Control District engineering department; Marcin Whitman, a hydraulic engineer from the California Department of Fish and Game; and Matt McGoogan, a fisheries biologist from the National Ocean and Atmospheric Administration's Fisheries Service (NOAA Fisheries; formerly the National Marine Fisheries Service). Six potential modifications to the initial design were added (one alternative in each pool) to the pools between successive weirs within the downstream 500 feet (prototype) of the modeled reach. The group observed the model in operation through a range of flows, and compared the hydraulic characteristics of the fish passage channel for each of the potential modifications to the originally proposed geometry. Conclusions drawn from the visit led to the recommendation that the final selected channel configuration include a fish channel with a 30 foot top width, 2.75 foot depth, 15 foot bottom width, and 2 foot high weirs spaced every 100 feet throughout the upstream 2000 feet of the project reach, and spaced every 200 feet throughout the downstream 2000 feet of the project reach. Additional details on the demonstration visit are provided in the memorandum summary of the visit, which is attached in Appendix 1.

The alternatives observed during the demonstration visit consisted of the following:

- Alt. 1 Widen fish passage channel base to 20 feet (hold top width same at 30 feet)
- Alt. 2 Intermediate low dikes 1 ft high extending out from vertical left wall 10 ft across base of fish channel, spaced 25 feet apart
- Alt. 3 Velocity cover wedge-type corner elements (of various sizes: 1) 2ft high x 4ft long x 2ft wide, 2) 2ft high x 4ft long x 4ft wide, 3) 3ft high x 6ft long x 6ft wide)
- Alt. 4 Add second slot to weirs 10 feet out from left vertical channel wall
- Alt. 5 Low curb-type chevron ridges 1 ft high applied to right fish channel slope, spaced about 25 feet apart
- Alt. 6 Raise weir heights to 2 feet (from original 1.5 ft high)

These modifications were evaluated during the Demonstration visit, along with a few simple changes to the Alt. 3 velocity cover corner wedges, as well as the addition of slightly higher and additional weirs above the Hollister Avenue Bridge. Subsequent to the Demonstration Visit, a Final Design alternative configuration consisting of 2 ft high weirs, a 15 foot wide base on the fish channel, and two 'wedge' elements 3ft high x 6ft long x 6ft wide per pool, spaced 15 ft and 65 ft downstream of each weir along the vertical left wall of the channel was recommended. In addition, the upstream end of the fish channel from the downstream side of Hollister Avenue Bridge was realigned, resloped, and three additional weirs were added to make the fish channel follow the left vertical sidewall of the channel through the bridge and then following the left sloping revetment sidewall upstream of the bridge to join the existing natural channel upstream. The upstream 30 feet or so of the articulated mattress forming the fish channel invert would be lowered an additional 3 feet below the downstream pool invert and pre-buried with native bed material to ensure against excessive scour to damaging depths in this reach. Recommendations for Final Design arising from the Demonstration Visit were:

- Make entire upstream 2000 ft of fish passage channel 2.75 ft deep x 30 ft top width and 15 ft base width
- Make all weirs 2.0 ft high, with one center slot 12" wide (with bulkhead guides)
- Make all weirs above Station 4100 spaced 100 feet apart, except through and above Hollister Avenue Bridge
- Make all weirs between sewer line crossing and station 4100 spaced 200 feet apart
- Make all weirs between sewer line crossing and station 4100 of a type that can break loose or rotate away during extreme flood events (i.e. 100 year event)
- Hold fish passage channel hard against left (descending) flood control channel wall upstream of station 4100 and through Hollister Avenue bridge
- Lower the upstream 30 feet or so of the fish passage channel invert above Hollister Avenue Bridge 3 feet and bury with native bed material to permit natural scour to redistribute sediment

FINAL DESIGN TESTING

Final Design Testing included the above-mentioned modifications to the entire channel (with the exception of the 15 ft wide fish channel base, which was only applied to the upstream 300 prototype feet of the project reach). The same velocity, depth, and water surface elevation data collection program initiated in the baseline testing was conducted on the Final Design, but data collection was limited to a sample 'typical' pool between stations 5700 and 5800, and in the upstream reach through and upstream of Hollister Avenue to the upstream end of the project reach. However, since low flow testing showed that the design would easily meet passage criteria, the 3 cfs flow was eliminated for efficiency. Sediment tests were not conducted for extreme high flow (5,200 cfs) or for low fish passage flows (3, 50, and 150 cfs), with testing instead focused on the upper limits of fish passage flows (300 and 600 cfs) and the 10 year flood event (2,000 cfs), at which sediment is expected

to be moving through the channel. Results of the Final Design Testing program were, generally (more detailed data provided in Appendix 4):

Final Design Testing Summary Observations

(Downstream Typical Pool Station 5700 to 5800)

Flow (cfs)	Location in Pool	Velocity (fps)	Depth (ft)	Comments
50	upstream	2.4-3.3	2.4	Flow over weir
	mid pool	2.0-2.5	2.7	Depth acceptable
	downstream	2.0-2.8	2.9	Velocities low and acceptable throughout pools
				Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
150	upstream	2.6-3.0	2.6	Flow over weir and on driving apron
	mid pool	2.4-2.8	3.0	Depth acceptable
	downstream	2.4-2.9	3.2	Velocities low and acceptable throughout pools
				Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
300	upstream	4.1-4.9	3.0	Flow over weir and on driving apron
	mid pool	3.0-3.7	3.5	Depth acceptable
	downstream	3.0-3.7	3.8	Velocities low and acceptable throughout pools
				Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
600	upstream	4.5-7	3.8	Flow over weir and on driving apron
	mid pool	3.2-5	4.1	Depth acceptable
	downstream	3.7-4.1	4.5	Velocities low and acceptable throughout pools, but somewhat higher below weirs
				Hydraulic jump forms on toe of weir, except on far right sloping apron (acceptable except for far right side)
				Velocity cover provided in lee of corner wedges
2000	upstream	--	--	Velocity and depth data not collected
	mid pool	--	--	Sediment clears steadily from pools, esp. on right and left sides, with minor deposits just upstream of weirs
	downstream	--	--	
5300	On weir crest	--	6.2-6.3	Water surface elevation measured at peak of waves
				Depth measured on top of weir crests and at peaks of waves
	mid pool	--	8.3-8.7	
	downstream	--	--	Velocity data not collected
				Sediment data not collected

(Hollister Bridge Upstream Station 6183 to 6327)

Flow (cfs)	Location in Pool	Velocity (fps)	Depth (ft)	Comments
50	upstream	1.9-3.3	2.4-2.9	Depth acceptable
	mid pool	2.0-2.5	2.9	Velocities low and acceptable throughout pools
	downstream	1.8-3.3	2.7-3.3	Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
150	upstream	2.2-4.1	2.7-3.2	Depth acceptable
	mid pool	2.1	3.2	Velocities low and acceptable throughout pools
	downstream	1.9-3.3	2.9-3.5	Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
300	upstream	2.4-6.4	3.3-3.8	Depth acceptable
	mid pool	3.3	3.6	Velocities acceptable throughout pools, though somewhat higher below last 2 weirs at Sta 6327 & Sta 6357
	downstream	2.4-5.2	3.5-4.2	Hydraulic jump forms on toe of weir (acceptable)
				Velocity cover provided in lee of corner wedges
600	upstream	2.9-9.3	3.6-4.2	Depth acceptable
	mid pool	4.5	4.4	Velocities acceptable throughout pools, though somewhat higher below last 2 weirs at Sta 6327 & Sta 6357
	downstream	4.1-7.2	4.2-5.0	Hydraulic jump forms on toe of weir (acceptable), except for far right sloping apron
				Velocity cover provided in lee of corner wedges
2000	upstream	7.8-12.6	3.0-3.6	Considerable flow on driving apron
	mid pool	7.5-12.6	2.8-3.8	Depth ok, but hydraulic jump swept out below weirs
	downstream	4.3-9	3.0-4.0	Velocity too high throughout, especially upstream of bridge
				Sediment clears steadily from pools, more quickly along right slope
5300	On weir crest	--	6.2-6.3	Water surface elevation measured at peak of waves
				Depth measured on top of weir crests and at peaks of waves
	mid pool	--	8.3-8.7	
	downstream	--	--	Velocity data not collected
				Sediment data not collected

Bengal Engineering, Inc.

TECHNICAL MEMORANDUM

Date: January 4, 2010

To: Rosemarie Gaglione, P.E.
Capitol Improvement Program Manager
City of Goleta, California

Subject: Geotechnical Findings and Recommendations for Type Selection for the San Jose Creek Capacity Improvement Project, Goleta, California

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1.0 INTRODUCTION

This technical memorandum summarizes our geotechnical findings and recommendations in support of the type selection process for the above-referenced project. The project involves increasing the capacity of a segment of the existing San Jose Creek (SJC) flood control channel in the City of Goleta, California. Bengal Engineering, Inc., was retained by the City to provide engineering design services, including geotechnical, leading to the facilities type selection for the subject project. This report was prepared in accordance with the scope of work outlined in our proposal dated, August 7 2009.

2.0 PROJECT LOCATION

The location of the project site is shown in the attached Figure 1. The latitude and longitude coordinates of the northern and southern limits of the project alignment are about (34°26'8", 119°49'9") and (34°25'0", 119°49'34"), respectively.

3.0 PROJECT DESCRIPTION

The subject project will improve the reach of SJC starting from just upstream (north) of the Hollister Avenue Bridge and ending at a location approximately 4,100 feet to the south. The purpose of the improvement is to increase the flow capacity of the creek from the current 20-year (return period) storm event level to 100-year storm event level. Additionally, the proposed creek improvements are to provide for a fish passage for steelhead trout.

Bengal's scope of work at this time is limited to developing and recommending a conceptual engineered improvement system for the purpose of type selection by considering the purpose of the project, and needs and requirements of the City of Goleta and the County of Santa Barbara. These needs and requirements relate to various project developments, design and construction issues, including cost, schedule. right-of-way, site conditions such as the existing developments adjacent to the creek, geologic, geotechnical and seismic conditions, analysis and design methodology, constructability, maintenance, environment and aesthetics. Design requirements

and guidelines of the United States Army Corps of Engineers (USACE), for the types of improvements under considerations, are applicable to this subject project.

The proposed capacity improvements are to be developed by reviewing available existing site and design information, and conducting additional analysis and design work, as necessary. The channel capacity improvement will be achieved by removing the existing concrete lining and increasing flow capacity by combinations of widening and deepening the existing channel cross sections and/or steeping the channel side slopes, as necessary, based on considerations of the various influencing factors.

4.0 SITE DESCRIPTION

The subject creek alignment traverses through a developed area of the City and runs in a general north-south direction. The creek flows from high ground on the north and drains to the low lying Goleta Slough on the south. Existing low ground surface elevation of the general area alongside the creek alignment ranges from about 40 feet near Hollister Avenue to about 10 feet near the southern end. Surface elevation of the bottom of the exiting concrete-lined channel varies from about 28 feet near Hollister Avenue to about 3 feet at the southern end of the project alignment.

SR-217 (Ward Memorial Boulevard) and Kellogg Avenue run parallel to and abut the east and western creek boundaries, respectively, along a majority of the project alignment. Private and commercial developments occupy the properties adjacent to the creek from Hollister Ave to about 1000 feet to the south along the west side and about 500 feet to the south along the east side. A single span bridge structure, designated as the “Sizzler Bridge”, crosses over the channel at a location about 100 feet to the south of the existing Hollister Avenue Bridge. The Hollister Avenue Bridge, which also crosses over the subject section of the creek, is a two-span structure supported by two abutments and a bent, all founded on pile foundations.

5.0 SCOPE OF WORK

The scope of work for this geotechnical investigation includes review of available existing geotechnical information, performing additional site exploration and geotechnical analysis and evaluation, as necessary, in order to be able to support the type selection process. Our scope of work also includes preparation of this technical memorandum summarizing the geotechnical findings and recommendations used in support of the Type Selection.

Summary findings and recommendations presented in the memorandum are based on our preliminary assessment of the site geotechnical and seismic conditions for the purpose of type selection. This assessment is based on review and understanding of:

- The project history, requirements, constraints and pertinent available existing geotechnical reports provided by the City.

- Pertinent USACE general requirements and guidelines, the state-of-practice and the evolving knowledge and understanding regarding site characterization, data analysis, evaluations and interpretation, and design concepts, methodologies and procedures for the types of improvement systems and components thereof, under considerations for the subject project. A list of references is provided at the end of this memorandum.

- A geotechnical site investigation consisting of site reconnaissance visits, field exploration and laboratory testing. Results of the field and laboratory testing are presented in Appendices A and B of this memorandum.

- Preliminary review and interpretation of the available subsurface data, including those obtained during the current site investigation.

- Identification, and preliminary analysis and evaluation, of the major geotechnical design, including seismic, and construction issues for the proposed improvements.

6.0 SITE EXPLORATION

Our site investigation consisted of a total of eight (8) deep (60 to 100 ft) Cone Penetration Test (CPT) soundings, six (6) relatively shallow (18 to 34 feet) CPT soundings and eleven (11) 50 to 80-foot deep mud rotary borings. Shear wave velocities of the subsurface soils were measured at the location of two of the CPT sounding for use in the seismic hazard analysis, and excess pore pressure dissipation tests were conducted at the locations of the six (6) shallow CPTs. The locations of the CPT soundings and borings are shown in the attached Plate 1 in Appendix A. The CPT and the borings logs are included in Appendix A of this memorandum.

Representative samples of the site soils retrieved from the mud rotary borings were tested in the laboratory to aid in their classification and to determine relevant soil strength and deformation parameters, and corrosion potential. Results of the laboratory tests are included in Appendix B of this report.

Field exploration and laboratory tests for the subject project were conducted in accordance with the applicable USACE, ASTM or the State of California standard test methods.

7.0 SUBSURFACE CONDITIONS

7.1 Site Geology

The project area is located within the Goleta coastal plain, near the western terminus of the Transverse Ranges geomorphic province. The Goleta coastal plain is a relatively narrow, low-lying swath of land between the Santa Ynez Mountains to the north and the Santa Barbara Channel to the south. Within the project area, the coastal plain is underlain by Quaternary-age and older alluvial soils overlying Tertiary-age sedimentary rocks

7.2 Soil Conditions

The subsurface soil conditions along the subject creek alignment can be summarized as follows:

- The project alignment is underlain by alluvial soils to the maximum explored depth of about 100 feet below ground surface on or near the creek banks.

- The soil profiles to the depths explored consist of interbedded layers of predominantly cohesionless soils. These soil layers are composed of mainly Sand (SP), Silty sand (SM), and Silt (ML) with little to no clay, and minor thin layers of borderline Silt/Clay (CL-ML) and Silty clay (CL).

- The thickness of the interbedded soil layers varies from a few inches to less than a few feet, with highly variable distribution along the alignment.

- The upper layers of cohesionless soils at the site, extending to depths of about 30 to 45 feet below existing ground surface, are mostly loose to medium dense.

- The extent as well as the layer thickness of the underlying coarse-grained soils (SP and SM), generally increase with depth. In general, the density of the underlying coarse-grained soils ranges from dense to very dense.

- The Plasticity Index (PI) of the fine-grained soil samples tested in the laboratory ranges mainly from 0.0 to 10, the majority falling within the range of 0.0 to 5. The fines content of these samples ranges mostly from about 60 to 80 percent with about 7 to 10 percent clay. The fines content of the coarse-grained soils (e.g., SP and SM) tested in the laboratory ranged from 10 to 40 percent with less than 10 percent clay.

- The fine-grained soils with little or no plasticity (e.g., ML and CL-ML soils), at the site are generally loose to medium dense. The consistency of the fine-grained site soils that can be classified as Clay (CL) is generally soft to medium stiff. The density or consistency of the fine-grained soils at the site remains relatively uniform to the maximum explored depths.

- The drained strengths of the majority of the soil samples tested in the laboratory are characterized with little or no cohesion and effective friction angle ranging mainly from 25 to 35 degrees, with a majority falling within the range of 29 to 31 degrees.

- The fine-grained soil samples tested in the laboratory exhibited medium compressibility. Site soils are not considered prone to collapse or swelling due to wetting.

- Based on observations during the current field exploration, and review of the available existing data, the depth to the groundwater table along the subject creek alignment is estimated to vary from about 16 feet below existing ground surface along the bank near the upstream (northern) limit to about nine (9) feet near the downstream (southern) limit. This range of the groundwater depth corresponds to conditions when there is little or no active creek flow for extended periods of time.

- Groundwater depths along are likely to fluctuate with seasonal or yearly variations in precipitations, run-off and other hydro-geologic conditions and, more significantly, with the depth and duration of flow within the creek. Future developments and use or management of groundwater in the general area are

additional factors that would affect the long-term groundwater depths along the creek alignment.

8.0 SEISMIC HAZARDS

The results of our preliminary review, analysis and evaluation of the potential seismic hazards along the project alignment, including design ground motions per USACE requirements and guidelines, and soil liquefaction and related hazards such as loss of soil strength and lateral spreading are summarized below:

- The project site, being located in a seismically active area of Southern California, is susceptible to significant hazard due to seismic ground shaking and related hazards. The alignment, however, is not considered prone to surface fault rupture hazard since no known fault crosses it.

- The closest identified seismic source from the site is the Mission Ridge fault system (USGS, 2008). This oblique-reverse fault system is located at an estimated site-to-rupture surface distance of about 0.4 to 0.5 km from the project alignment. However, based on our preliminary Probabilistic Seismic Hazard Analysis (PSHA), the North Channel Slope, a thrust fault located at a site-to-rupture surface distance of about 9.1 to 9.3 km from the alignment, is contributing most to the seismic hazard at the site.

- Based on a preliminary analysis utilizing the web-based USGS 2009 PSHA Interactive Deaggregation tool (Peterson et al, 2008, with 2009 revisions), the Peak Ground Acceleration (PGA) at the site for an estimated initial average soil shear velocity (V_{S30}) of 750 feet/sec (230 m/sec) for the upper 100 feet of soils (i.e., non-liquefied site conditions) is estimated to be about 0.27g and 0.7g corresponding to the OBE and MDE events, respectively. This USGS probabilistic ground motion analysis tool uses the recently developed Campbell and Bozorgnia (2008) and Chiou and Youngs (2008) ground motion attenuation relationships. The Effective Peak Ground Accelerations (EPGA) at the site are the same as the above PGA values, the OBE is the Operating Basis Earthquake event and the MDE is the Maximum Design Earthquake event as defined in EM 1110-2-2100 (USACE, 2005). The OBE and the MDE events are defined as the occurrences of seismic ground motions at the site of magnitudes that have return periods of 144-year and 950-year, respectively. The modal earthquake magnitudes M for both events are 7.01, as shown in the attached Figures 2 and 3.

- Our preliminary analysis indicated that most of the Silt (ML) layers and some of the Sand/Silty sand (SP/SM) layers within the explored depths are susceptible to liquefaction during earthquakes. For an earthquake of magnitude M=7.01, the liquefaction hazard at the site can be considered to be low for PGA < 0.2g, moderate to high for PGA = 0.2g to 0.35g and very high for PGA>0.35g.

- The potentially liquefiable, predominantly fine-grained soils (e.g., ML) with little or no plasticity at the site extend to the maximum explored depth of 100 feet,

although the extent of such liquefiable soils decreases with depth, especially below about 40 to 45 feet.

- Due to the excess pore pressure or liquefaction induced reduction in the soil stiffness and strength, it is estimated that in the event of liquefaction due to the modal earthquake of magnitude M= 7.01 the PGA at the site should not exceed 0.35g. Therefore, for the liquefied soil site conditions the PGA at the site can be estimated, somewhat conservatively with respect to the potential liquefaction related hazards, to be 0.27g and 0.35g for the OBE and MDE events, respectively.

- Based on the above design ground motions and the site conditions, the ground surface and un-supported slopes along the alignment, if any, are considered prone to significant seismically induced ground settlement and lateral spreading, respectively, following the design seismic events.

- Due to the fines content, including the clay fraction, the majority of the liquefied soil layers at the site are likely to retain some shear strength even after the complete or full liquefaction of the potentially liquefiable soil layers.

- The ground along the alignment is likely to experience significant post-earthquake settlement in the event of liquefaction. However, differential settlement along the alignment should be relatively low.

- Structure foundations constructed at the site are prone to reduction in both the axial and lateral bearing capacities during the design seismic events due to development of excess pore water pressure in the foundation soils, including liquefaction.

- The extent and the severity of soil liquefaction and related hazards generally increase from northern end of the subject alignment to the southern end.

- Due to the close proximity to the coastline and the presence of near as well distant submarine faults, tsunami hazards exist for the majority, if not all, of the project alignment

- Ground improvement to eliminate or reduce the liquefaction hazards at the site is not a recommended option due to the project length and extensive presence of liquefiable soils.

- The proposed design approach is to resist large seismic events based on capacity, not deformation. The probability of the design seismic event, in particular the MDE event, is very low The chance of a simultaneous occurrence of such a seismic event and a significant flood, including the design flood, should be extremely rare, if not improbable. Inclusion of “deflection” as a design criterion for large seismic events for this particular structure would increase construction cost significantly.

9.0 DESIGN RECOMMENDATIONS

Based on the above preliminary findings on the site soils and seismic hazards, and considering USACE design requirements, the right of way constraints, constructability, aesthetics, cost and the project type, we recommend that a flexible, soldier pile supported cantilever wall with pre-cast concrete panel lagging and cast-in-place architectural facing be used to support the sides of the widened channel. We also recommend using steel H beam reinforced drilled shafts as the soldier pile for the retaining walls. Retaining walls should be provided with adequate back-drains with filters to facilitate drainage and prevent migration of the retained soils.

Furthermore, due to the soil conditions and potential seismic hazards, we recommend that the channel bottom be lined with a relatively flexible and free-draining system such as articulated revetment, whenever feasible, based on flow characteristics and other hydraulic considerations. Where flow conditions are critical with respect to scour or other hydraulic conditions, the channel bottom may be lined with reinforced concrete provided adequate subgrade drainage with filters are included or, alternatively, the potential effects of groundwater seepage and hydrostatic uplift pressures are considered, in the design.

Subgrade drainage and prevention of soil migration are considered important design issues for the subject project. Subsurface drainage and filters should be designed by considering the fine-grained and non-plastic nature of the anticipated subgrade level along the channel alignment. Such soils are highly susceptible to piping, erosion and scour.

9.1 STATIC DESIGN RECOMMENDATIONS

Retaining walls should be designed in accordance with requirements and guidance provided in the USACE documents EM 1110-2-2100, EM 1100-2-2502 and EM 110-2-2504, These documents either specified or provide recommendations on the stability or failure mechanisms that need to be analyzed, the load combinations and the soil or material resistances to be used in the analysis, the required reliability or the minimum factors of safety (FS) for each of the various combinations of loads and resistances and, in some cases, the analysis or design methodologies to be followed. The proposed retaining wall should be designed to provide adequate FS against the following failure modes due to the combinations of static (usual or service), design flood, drawdown and seismic loads specified in Table B-18 of the EM 1110-2-2100:

- Global or slope stability of the wall-retained soil-foundation system.
- Bearing failure of the wall foundations, in this case the soldier piles.
- Lateral (sliding and rotational) failures of the wall.
- Structural failure of the wall components

The recommended factor of safety for active pressure (FSA) is 1.0 and that for the passive soil resistance (FSP) varies from 1.10 to 1.25 for the various combinations of loads specified in Table B-18 of the EM 1110-2-2100. These factors of safety are applied in the analysis and design in accordance with the procedure recommended in the EM 1110-2-2504 since the proposed soldier pile was is of the same type as sheet pile wall for the purpose of design.

The following preliminary recommendations are provided for the above stability analyzes and design of the recommended soldier pile wall system for the purpose of feasibility analysis and type selection.

9.1.1 Soil Parameters

The following average soil design parameters are recommended for both the foundation and the in-situ retained soils.

- Average total unit weight = 125 pcf
- Average effective or drained cohesion, c' =0.0 psf
- Average effective or drained angle of friction, ϕ' = 30^o

9.1.2 Groundwater

The following groundwater conditions are recommended for the various loading conditions specified in USACE EM 1110-2-2100 for the analysis and design of such retaining walls:

Operating conditions:

- 3.0 feet about mud-line on the retained (soil) side.
- 0.0 feet on the channel side.

Flood conditions:

- At design flood level (DFL) or (d_{DFL}) corresponding to the 100-year design storm on the channel side. Here, d_{DFL} is height of the water surface above the mud-line.
- At mud-line level on the retained side.

Drawdown conditions:

- 2/3 of d_{DFL} above the mud-line on the retained side.
- At mud-line level on the channel side.

9.1.3 Soil Corrosivity

Based on the soil corrosivity tests performed on three representative samples of the site soils, the corrosion potential of the common construction material is considered low along the subject alignment.

9.2 SEISMIC DESIGN RECOMMENDATIONS

The recommended additional seismic loading and soil resistance parameters to be used for the seismic analysis and design of the proposed retaining wall are presented in the tables in Attachment 1 of this report.

These recommendations were developed based on:

- The applicable USACE design ground motion and wall seismic stability analysis and design requirements.

- The current best practices and state of knowledge on seismic philosophy, approach and design procedures.

- Our preliminary analysis and evaluation, for both the OBE and MDE events, of the liquefaction potential of subsurface soils, the EPGA for both non-

liquefied and liquefied site conditions, the estimated excess pore pressures and the corresponding reduction is soil strength at the instant of the initiation of liquefaction, when predicted, during ground shaking, and residual strength of the fully liquefied soils for the post-liquefaction/shaking ground stability (e.g., lateral spreading) and wall seismic stability analysis.

In providing these recommendations, we also considered the following initial findings from our limited analysis:

- The existing channel side slopes constructed at an approximate gradient of 2:1 (Horizontal: Vertical) or steeper are considered prone to lateral spreading following liquefaction of the site soils during both the OBE and MDE events.

- The channel sides, when supported by the proposed retaining walls, are not considered prone to lateral spreading during both OBE and MDE events due to the additional lateral resistance provided by the soldier piles that are analyzed and designed in accordance with the USACE requirements and the recommendations provided herein.

- No significant axial bearing capacity is required for the soldier pile walls. Therefore, the potential reduction in soil strength due to liquefaction is not considered a significant design issue for the axial design of the piles.

- Liquefaction-induced downdrag, if any, is not considered a significant issue at the site since the soldier piles installed at the anticipated depths are likely to behave as friction piles. For friction piles, downdrag induced by the surrounding settling soil is essentially a pile settlement issue. The piles will be designed to provide adequate post-liquefaction axial resistance by neglecting the axial resistance provided by the liquefiable soil layers.

- Lateral pile capacity is likely to be significantly reduced by soil liquefaction. Detailed stability analysis should be performed to determine pile capacity for the three different seismic loading and soil resistance combinations during both the OBE and MDE events, as per recommendations provided in Attachment 1.

- Due to the close proximity to the coastline and the presence of near as well as distant submarine faults, tsunami hazards exist for the majority, if not all, of the project alignment.

No design criteria or requirements related to the seismically induced deformations or movements are provided in the above-referenced USACE publications pertaining to the seismic design of retaining walls. This is in line with the current design philosophy that seismic design, in particular for the safety level earthquake event, needs to provide only for life safety. That is, structures need to be designed to prevent total collapse or failures during the design seismic event in order to prevent loss of life. Therefore, it is not necessary to design structures to limit seismically induced deformation or movement to values less than those corresponding to collapse or failure of the structures. Traditional design practice does not generally require any explicit analysis or estimation for retaining wall deformations. Instead, limited or acceptable

deformations are ensured by specifying relatively high factors of safety against the various modes of failure or stability.

For the subject project, USACE specifies a minimum FS of 1.1 in order to provide some margin of safety against structure collapse during the MDE event. However, such a low FS implies that such structures, if subjected to the design ground motion due to the MDE, are likely to experience significant distress requiring extensive repair or even replacement. On the other hand, the specified minimum FS against structure collapse is 1.25 for the OBE event. This higher factor of safety is to ensure limited wall movements. In this case, some damage requiring limited repair may be expected.

Based on the above discussion, it is our opinion that seismic ground or structure deformations are not required to be considered explicitly in the seismic design of the proposed retaining wall, provided the USACE specified minimum stability requirements or FS against collapse for both the OBE and MDE events are met.

10.0 CONCLUSIONS

Based on the results of our site investigation and the analysis presented herein for the type selection, it is our opinion that the proposed improvements of the creek flow capacity for a 20-year design flood event to a 100-year design flood event, while providing for a fish passage for the steelhead trout, are feasible provided recommendations provided herein are considered in the design and construction.

Additional geologic, geotechnical and seismic review and analyses are necessary to develop recommendations that would be necessary to design the various elements of the improvement systems. Such recommendations should be developed and provided to the designers once the type selection is completed.

11.0 LIMITATIONS

Preliminary findings and recommendations provided herein are based on limited review and analysis of the available data, and for the purpose of the feasibility study or structure type selection only. Additional review, interpretation, analysis and updated geotechnical and seismic design recommendations are necessary for the final analysis and design of the proposed facilities.

Our preliminary analysis and evaluation of the subsurface conditions, and the recommendations provided were based on field exploration and laboratory testing at isolated locations and depths, and interpolation and extrapolations of the soil conditions between the exploration locations and depths. Data gathered by others for the subject project was also utilized.

This technical memorandum was prepared in accordance with generally accepted geotechnical practices at this time in Southern California. We make no other warranty, either implied or expressed.

We appreciate this opportunity to be of service to the City of Goleta. If you have any questions or we can be of any further assistance, please do not hesitate to contact us.

Sincerely,

BENGAL ENGINEERING, INC.
Goleta, California

Attachments:

1. Attachment 1 Preliminary Design Recommendations on Groundwater and Seismic Design of the Soldier Pile Supported Channel Side Retaining Wall.
2. Figures and Plates
3. Appendix A: CPT and Borings Logs
4. Appendix B: Results of the Laboratory Testing

ATTACHMENT 1

Preliminary Design Recommendations on Groundwater and Seismic Design of the Soldier Pile Supported Channel Side Retaining Wall.

ATTACHMENT 1

Date: January 4, 2010

Project: San Jose Creek Capacity Improvement Project
City of Goleta, California

Subject: Preliminary Geotechnical Recommendation for the Seismic Design of the Soldier Pile Supported Channel Side Retaining Wall

A. Segments Definition

Segments	Stations	
	From	To
SEG-1	21+35	50+00
SEG-2	50+00	58+00
SEG-3	58+00	61_89

B. Wall Height, Design Flood Water Depth and Depth to Ground Water for Operating Conditions

Segments	Wall Height (H)	Storm Water Depth for Q_{100} (h_{DFL})	Operating Ground Water	
			Depth below Backfill Surface (d_w)	Height above Creekbed (h_w)
SEG-1	10’	8’	8’	2’
SEG-2	13’	8’	10’	3’
SEG-3	16’	9’	13’	3’

C. Summary of Preliminary Seismic Ground Motion and Liquefaction Hazard Analysis

Design Ground Motion Hazard					
OBE (Return Period= 144 years)			MDE (Return Period= 950 years)		
EPGA (g)		Modal Earthquake Magnitude, M	EPGA (g)		Modal Earthquake Magnitude, M
No Liquefaction	Liquefaction		No Liquefaction	Liquefaction	
0.27	0.27	7.01	0.7	0.35	7.01

Preliminary Overall Liquefaction Hazard (Earthquake Magnitude, M=7.01)			
EPGA(g)	<0.20	0.20 - 0.35	>0.35
Liquefaction Potential	Low	Moderate to High	Very High
Design Earthquake Event	N/A	OBE	MDE

D. Parameters for the Seismic Design of the Soldier Pile Retaining Wall

Case (a): No Liquefaction Seismic Lateral Soil Pressure Due to k_h=(2/3)EPGA and No Reduction in Soil Strength				
Segments	OBE k_h=0.18g		MDE k_h = 0.47g	
	Design Soil Parameters	Total Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Total Seismic Lateral Soil Force Component (ΔP_{ae}), kips/ft
SEG-1	c=0.0, ϕ = 30°, γ_t=125 pcf,	0.75	c=0.0, ϕ = 30°, γ_t=125 pcf	3.05
SEG-2		1.27		5.15
SEG-3		1.92		7.8

Case (b): Liquefaction Initiation Seismic Soil Lateral Pressure Due to k_h =(2/3) EPGA and Reduced Soil Strength at Liquefaction Initiation						
Segments	OBE k_h=0.18g			MDE k_h=0.25g		
	Design Soil Parameters	Average Excess Pore Pressure Ratio, ($\Delta u/\sigma'_{vo}$)	Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Average Excess Pore Pres. Ratio, ($\Delta u/\sigma'_{vo}$)	Total Seismic Lateral Soil Force Component (ΔP_{ae})
SEG-1	c=0.0, ϕ = 30°, γ_t=125 pcf	+0.5	0.75	c=0.0, ϕ = 30°, γ_t=125 pcf	+0.5	1.25
SEG-2			1.27			2.11
SEG-3			1.92			3.20

Case (c): Post-Liquefaction Seismic Soil Lateral Pressure Due to k_h =0.0 and Residual Strength for Liquefied Layers						
Segments	OBE k_h=0.0g			MDE k_h=0.0g		
	Design Soil Parameters	Excess Pore Pressure Ratio ($\Delta u/\sigma'_{vo}$)	Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Excess Pore Pressure Ratio ($\Delta u/\sigma'_{vo}$)	Seismic Lateral Soil Force Component (ΔP_{ae})
SEG-1	c=0.0, ϕ = 15°, γ_t=125 pcf	≈1.0	0.0	c=0.0, ϕ = 10°, γ_t=125 pcf	≈1.0	0.0
SEG-2	c=0.0, ϕ = 15°, γ_t=125 pcf		0.0	c=0.0, ϕ = 10°, γ_t=125 pcf		0.0
SEG-3	c=0.0, ϕ = 20°, γ_t=125 pcf		0.0	c=0.0, ϕ = 15°, γ_t=125 pcf		0.0

Symbols and Abbreviations:

EPGA= Effective Peak Ground Acceleration defined in EM 1110-2-2100

k_h = Seismic coefficient for wall seismic stability evaluation (as per EM 1110-2-2100)

Δu = Estimated excess pore water pressure due to ground shaking

σ'_{vo} = Initial effective overburden pressure

FIGURES AND PLATES

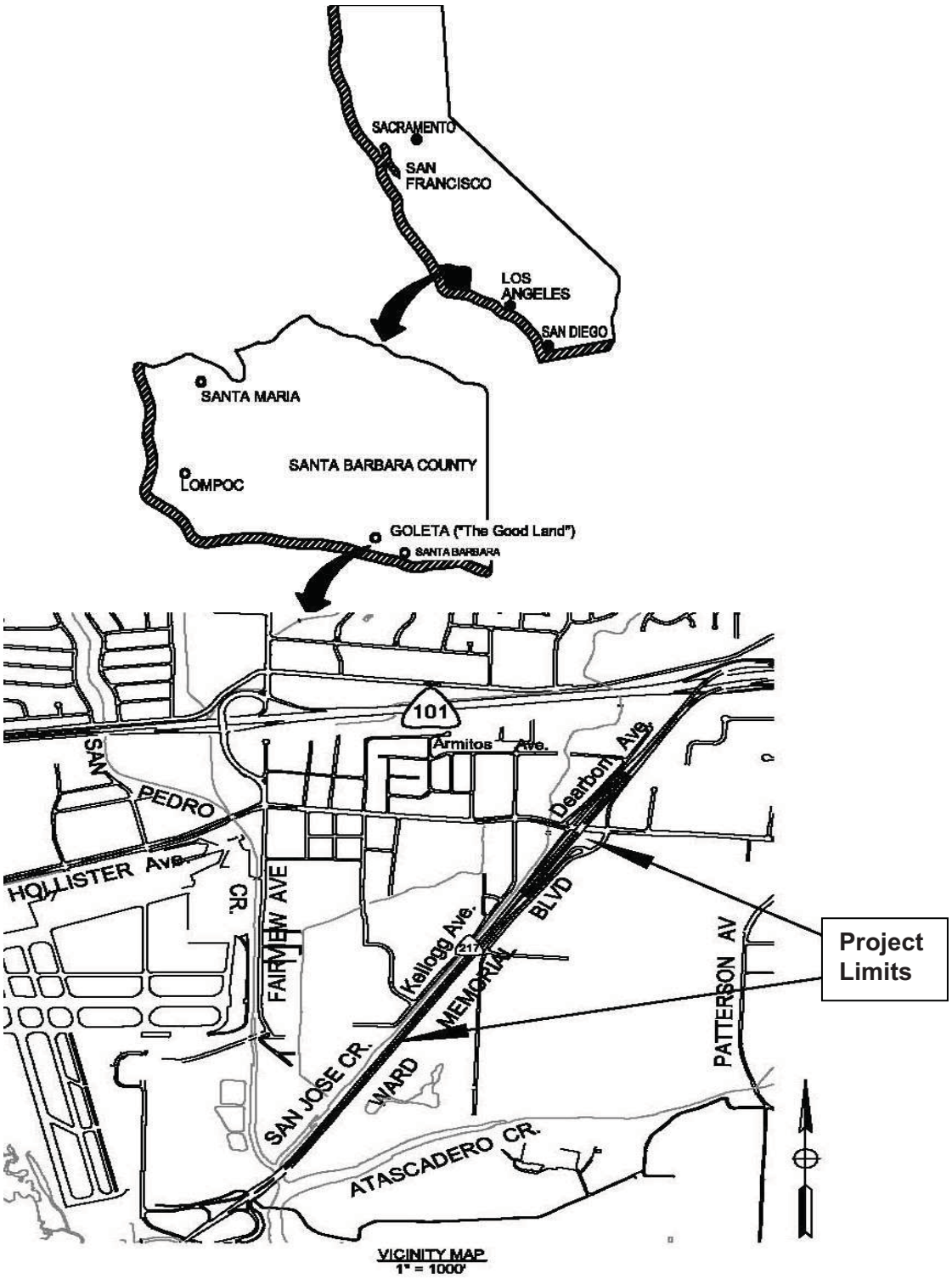


Figure 1. Site Location Map and Project Limits

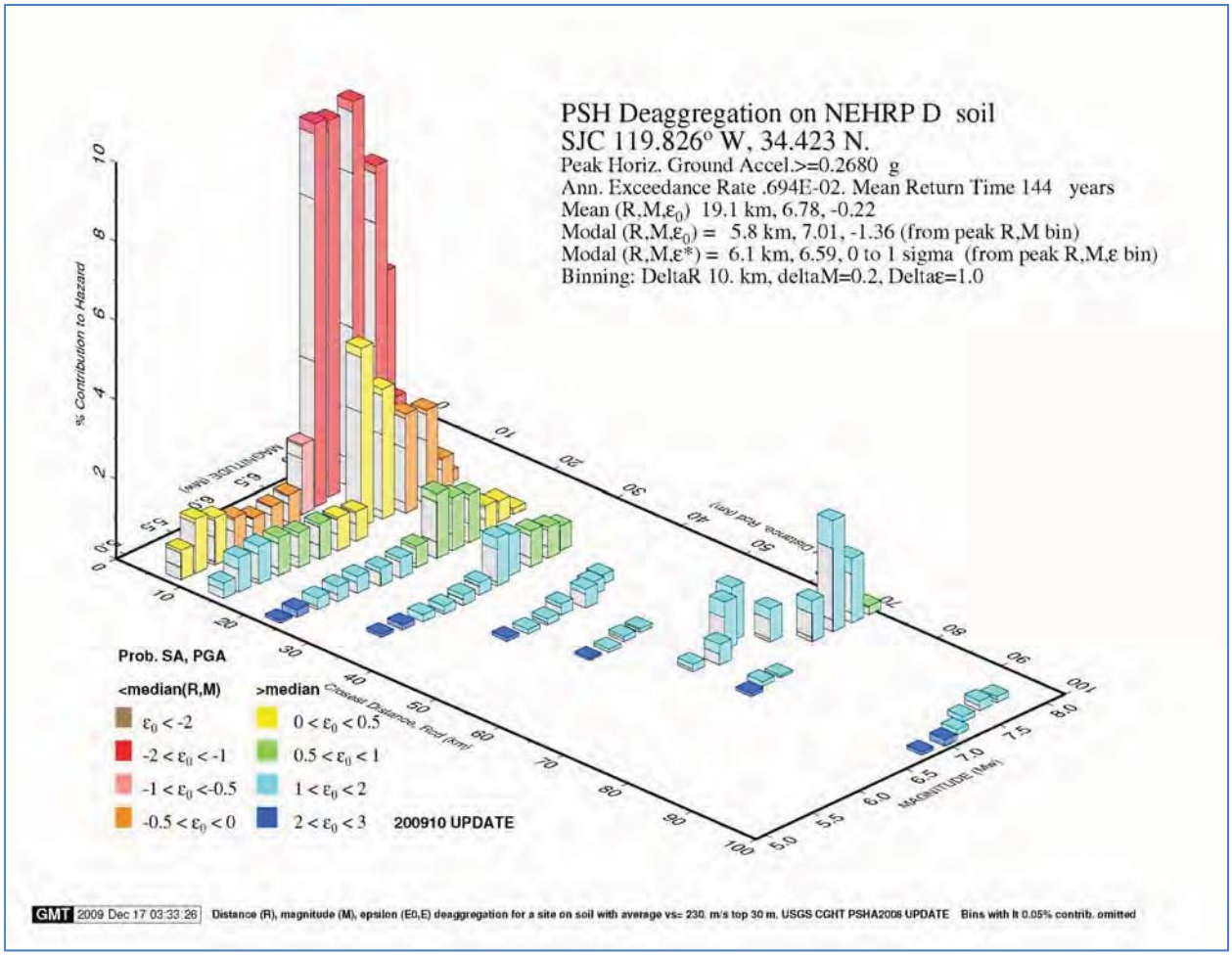


Figure 2. Results of Ground Motion Deaggregation for the OBE Event (Return Period = 144 yrs) for Both Non-Liquefied and Liquefied Site Conditions.

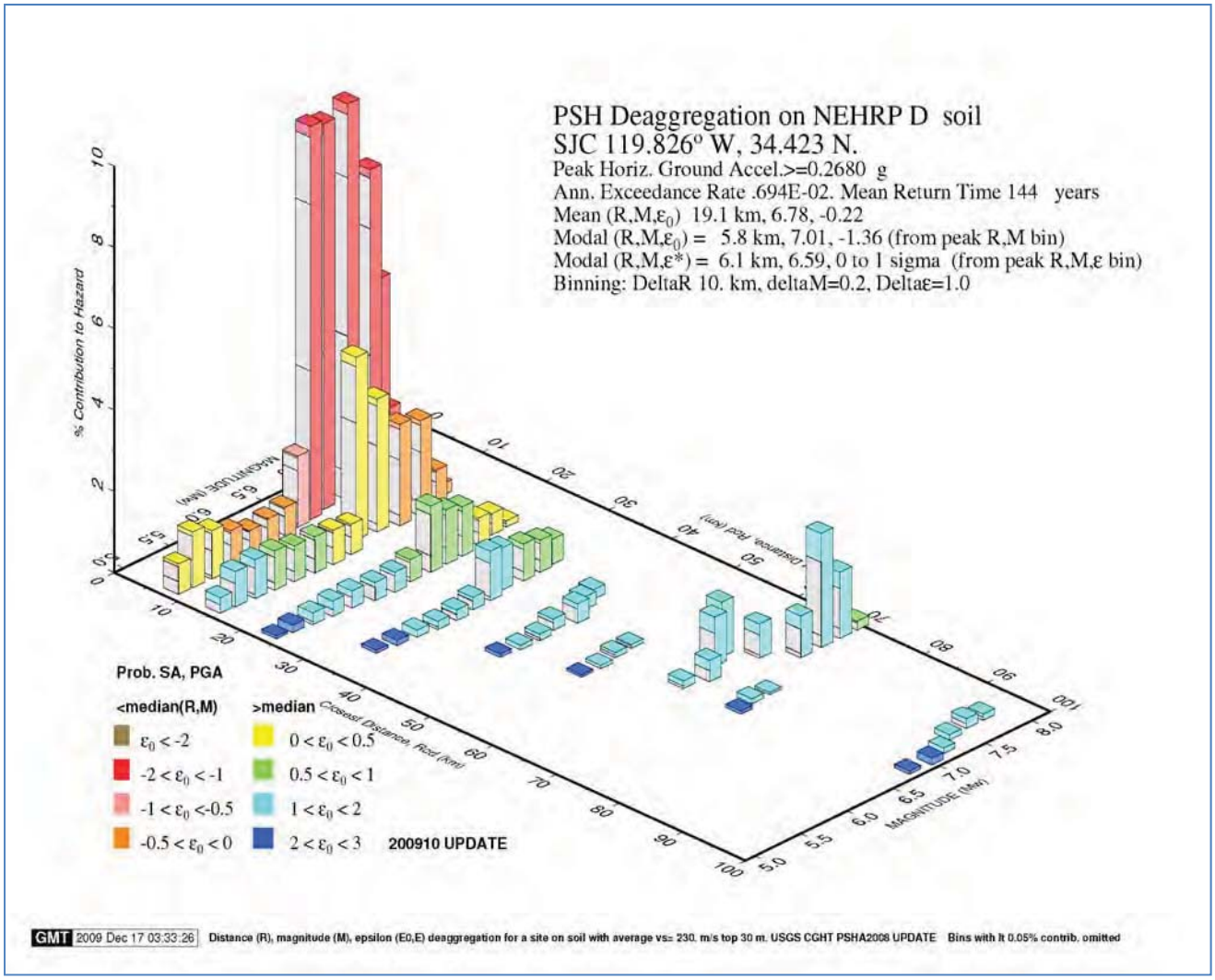
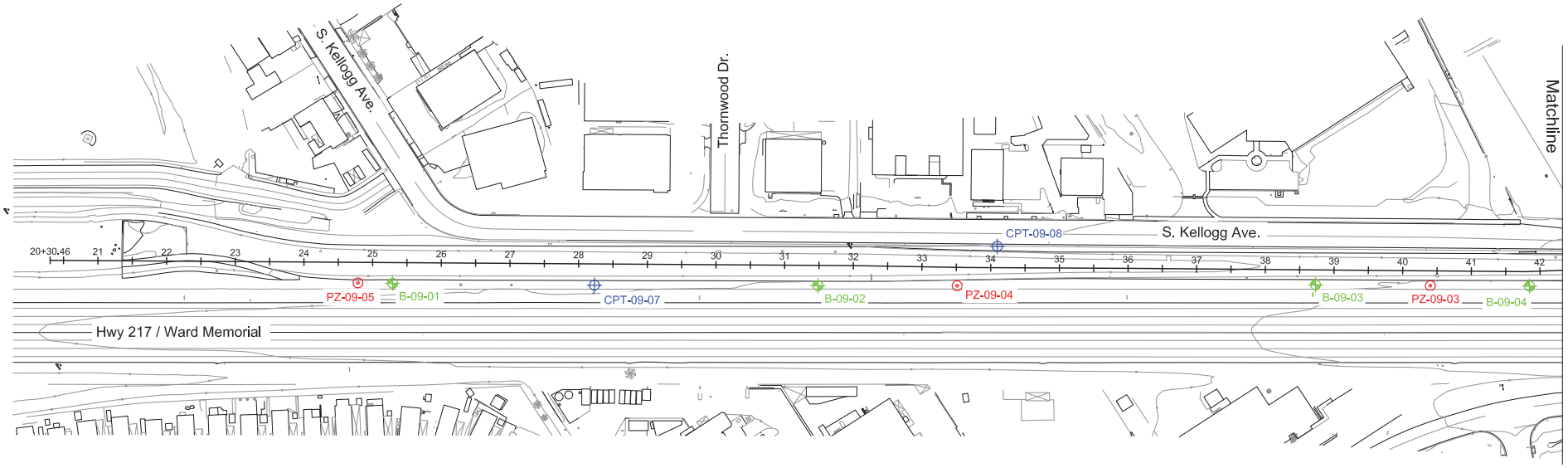


Figure 3. Results of Ground Motion Deaggregation for the MDE Event (Return Period = 949 yrs) for the Non-Liquefied Site Conditions. (Note: The upper bound PGA for the liquefied site condition was estimated to be about 0.35g for the MDE Event).



SCALE: 1" = 150'

LEGEND

B-09-01 = Approximate boring location

CPT-09-01 = Approximate CPT location

PZ-09-01 = Approximate Piezometer/Permeability Test Location

Bengal Engineering, Inc.
250 Big Sur Drive, Goleta, CA 93117
(805) 563-0788

City of Goleta

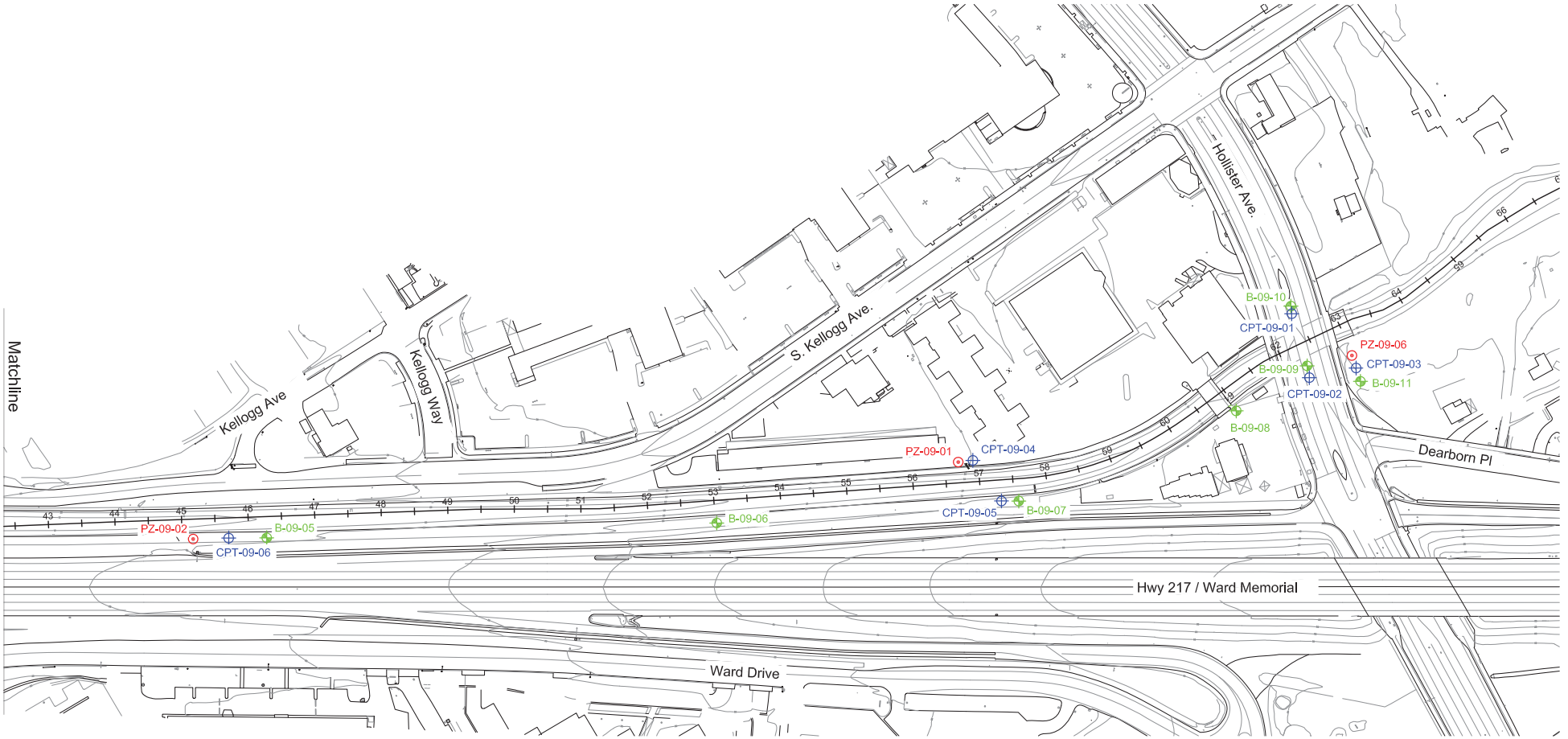
San Jose Creek Capacity Improvement Project

Goleta, CA

Subsurface Exploration Location Plan

January, 2010

Plate 1A



SCALE: 1" = 150'

LEGEND

B-09-01 = Approximate boring location

CPT-09-01 = Approximate CPT location

PZ-09-01 = Approximate Piezometer/Permeability Test Location

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San Jose Creek Capacity Improvement Project

Goleta, CA

Subsurface Exploration Location Plan

January, 2010

Plate 1B

SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT

USACE-Design Criteria

- **Wall Category (Retaining vs. Flood Wall)**
- **Load Condition Categories**
  - **Usual** **<= 10 years**
  - **Unusual** **> 10 <= 300 years**
  - **Extreme** **> 300 years**

Site Information

  - **Well defined**
  - **Ordinary**
  - **Limited**

- **Critical vs. Normal Structures**
- **Earthquake Loads**
  - **Operational basis earthquake (OBE) {144-yr return}**
  - **Maximum design earthquake (MDE) {950-yr return}**
  - **Maximum Credible Earthquake (MCE) {Deterministic}**

USACE-Design Criteria

- **Loading Cases and Combinations for Retaining Wall**

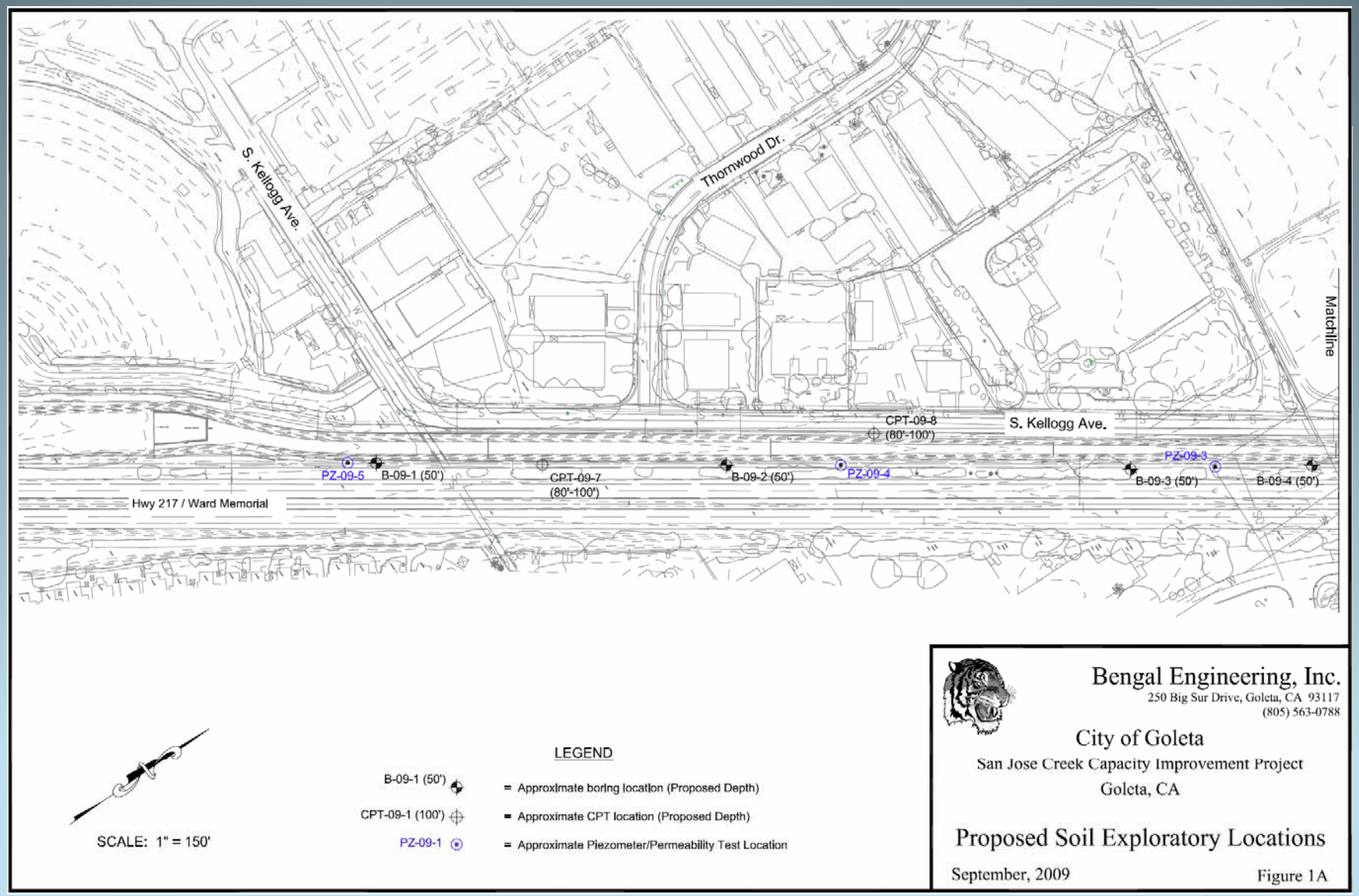
Load Cases	Loading Description	Classification	FSP*	FSA**
1	Construction Condition	Unusual (UN)	1.25	1.0
2	Design Flood Loading	Unusual (UN)	1.25	1.0
3	Drawdown Loading	Usual (U)	1.50	1.0
4a	Normal Operating + OBE	Unusual (UN)	1.25	1.0
4b	Normal Operating + MDE	Extreme (E)	1.10	1.0

*FSP: Factor of Safety for Passive Pressure
**FSA: Factor of Safety for Active Pressure

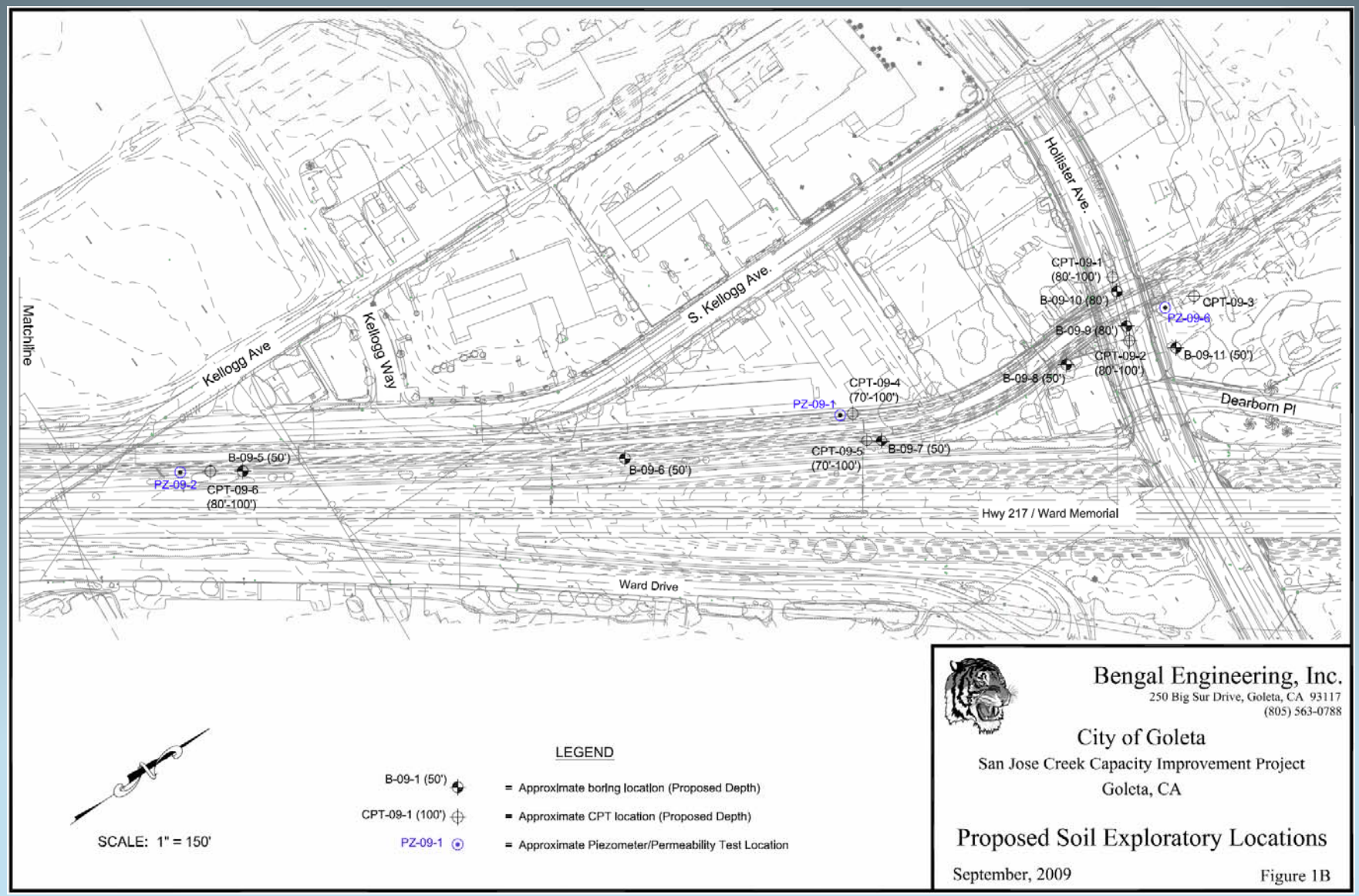
USACE-Design Criteria

- **System Stability Checks**
  - Deep-seated failure
  - Rotational failure
  - Structural failure
  - Structural Failures of (i) Piles, and (ii) Facing
  - Hydraulic Capacity Failure
  - Scour
  - Sediment Transport
  - Accommodate Fish passage
  - Repair
- **Deflection**
- **Soil-Structure Interaction**
- **Channel Maintenance**

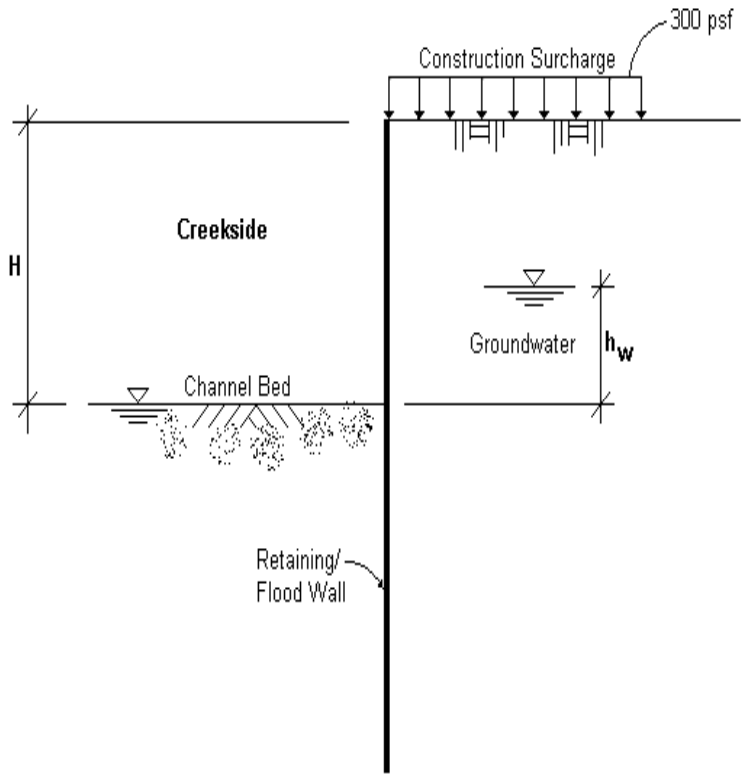
Soil Explorations



Soil Explorations

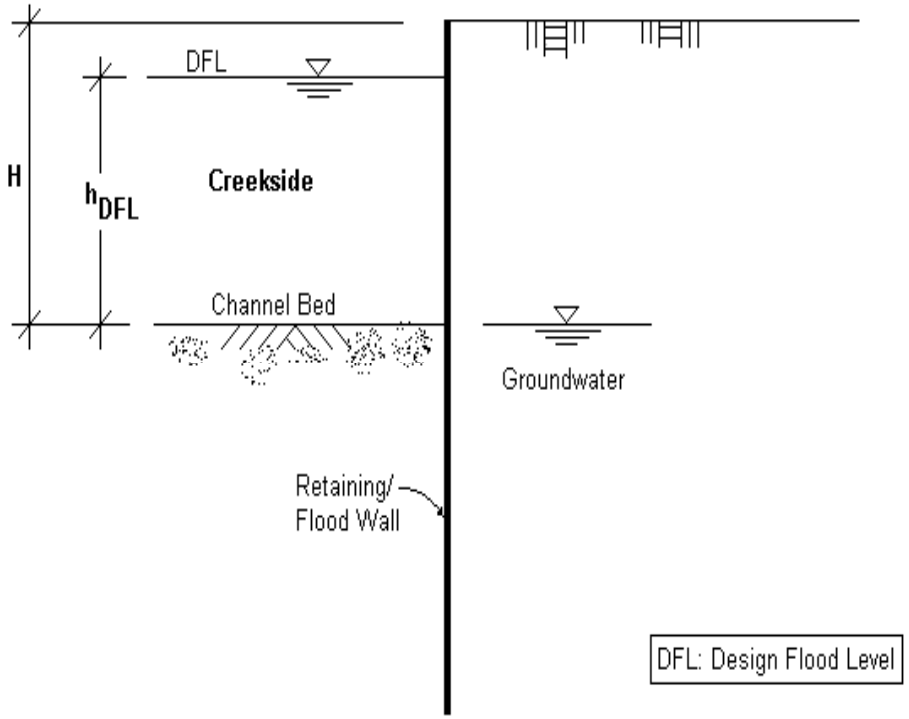


USACE-Loading Criteria



Load Condition 1: Construction Condition

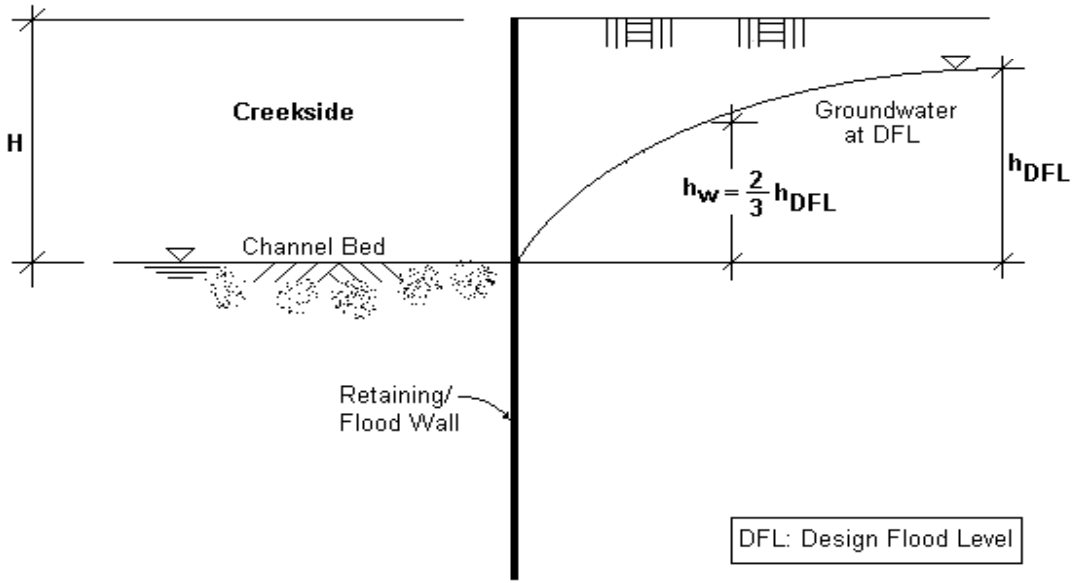
- Structure Complete
- Backfill in place
- Channel Empty
- Construction Surcharge



Load Condition 2: Design Flood Loading

- Structure Complete
- Backfill in place
- Water level at max. DFL
- Low Groundwater Level at Backfill

USACE-Loading Criteria

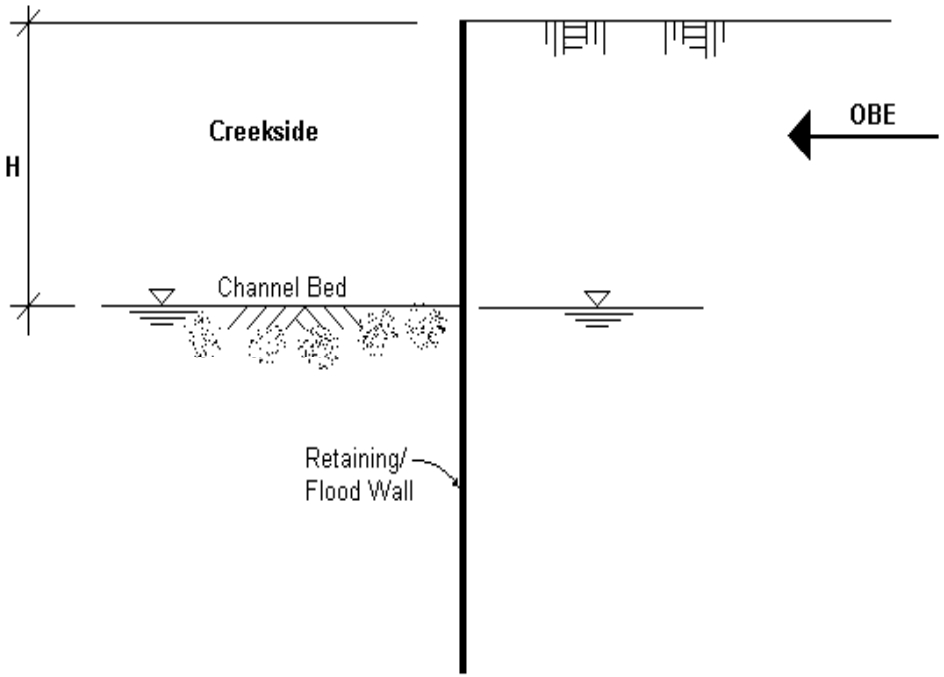


Load Condition 3: Drawdown Loading

- Structure Complete
- Backfill in place
- Channel Empty
- Highest Groundwater Level

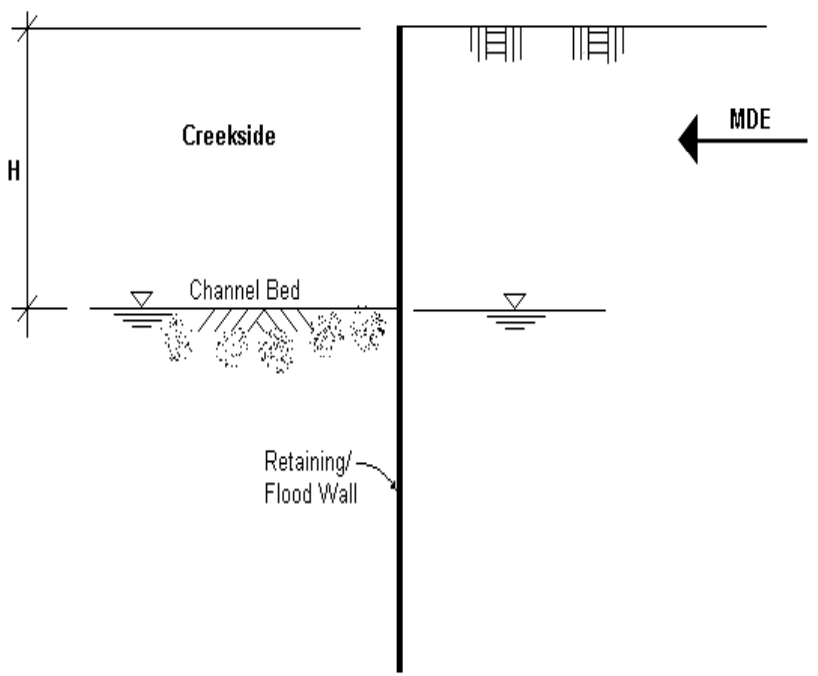
(Ground water at backfill will show a drawdown due to seepage and drainage to the creek. Assume 2/3rd the height of max. groundwater level)

USACE-Loading Criteria



Load Condition 4a: Normal Operating + OBE

- Structure Complete
- Backfill in place
- Channel at Mean Annual Operating Level
- Backfill Groundwater same level as creekbed
- Operating Basis Earthquake (OBE)



Load Condition 4b: Normal Operating + MDE

- Structure Complete
- Backfill in place
- Channel at Mean Annual Operating Level
- Backfill Groundwater same level as creekbed
- Maximum Design Earthquake (MDE)

Proposed Plan

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	1	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — S. Onishuk — No. C48052 — Exp. 12/31/12 — CIVIL — STATE OF CALIFORNIA

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA

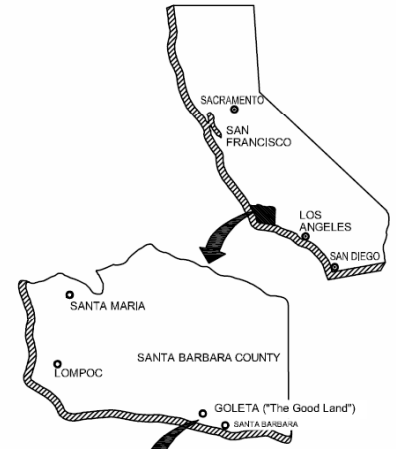
CITY OF GOLETA

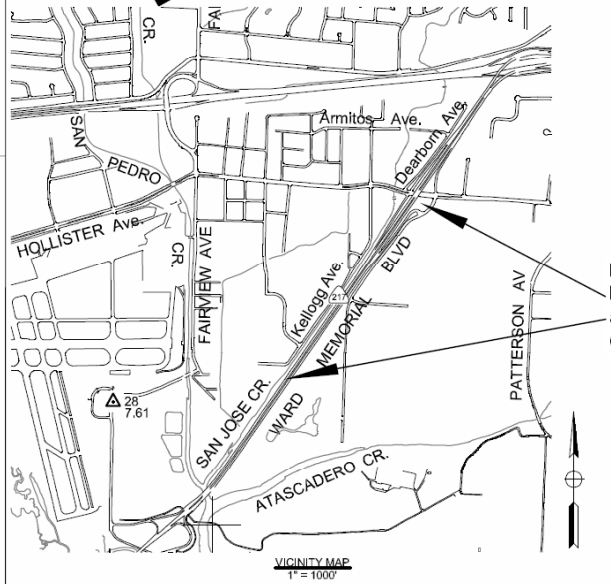
PROJECT PLANS FOR

SAN JOSE CR. IMPROVEMENTS

PROJECT NUMBER **

To Be Supplimented by Caltrans Standard Plans Dated May, 2006; Santa Barbara County Standard Details, dated 1987; and American Public Works Association Southern California, REV. 1996





VICINITY MAP
1" = 1000'

Project Limits:
From Hollister Ave.to Approx 4100 Feet South as measured along San Jose Cr.
(This is the existing terminus of Kellogg Ave.)

PROJECT DATUMS & REFERENCE SYSTEM

Projection and Basis of Bearings: California State Plane Coordinate System, Zone-5; The average Convergence Angle is -1-02-14. The average Combined Grid Factors is 0.99994055.

Horizontal Datum: North American Datum of 1983 (NAD83) Epoch: 1991.35 referred to as NAD83(1991.35) per NGS referenced to HPGN-D CA 05AS

Vertical Datum: NAVD88 per NGS referenced to EW3774 (Benchmark 43 LA=F 28); Geoid Model: Geoid 09

Survey ID	Latitude(Dms)	W. Longitude(Dms)	NAVD88(ft)	Source
BW3774	34 26 23.19786	119 49 11.45344	48.359	1991.35 Epoch per MSC 2004 San Jose Creek Control
HPN_CA05AS	34-26-32.96036	119-47-12.47406	94.59	1991.35 Epoch on HPGN Station NGS DS
UCSB	34-24-47.87194	119-50-37.65997		1991.35 Epoch per 171RS24

Index

Sht Name	Shts.
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Typical Cross Sections	2
Layouts	3-6

TITLE

CITY OF GOLETA; Rosemarie Gaglione, PE; CIP Program Manager — PROJECT ENGINEER: S. Onishuk, PE — CALCULATED/DESIGNED BY — CHECKED BY — DATE — REVISED BY: — DATE REVISED:

LAST REVISION 12/16/09

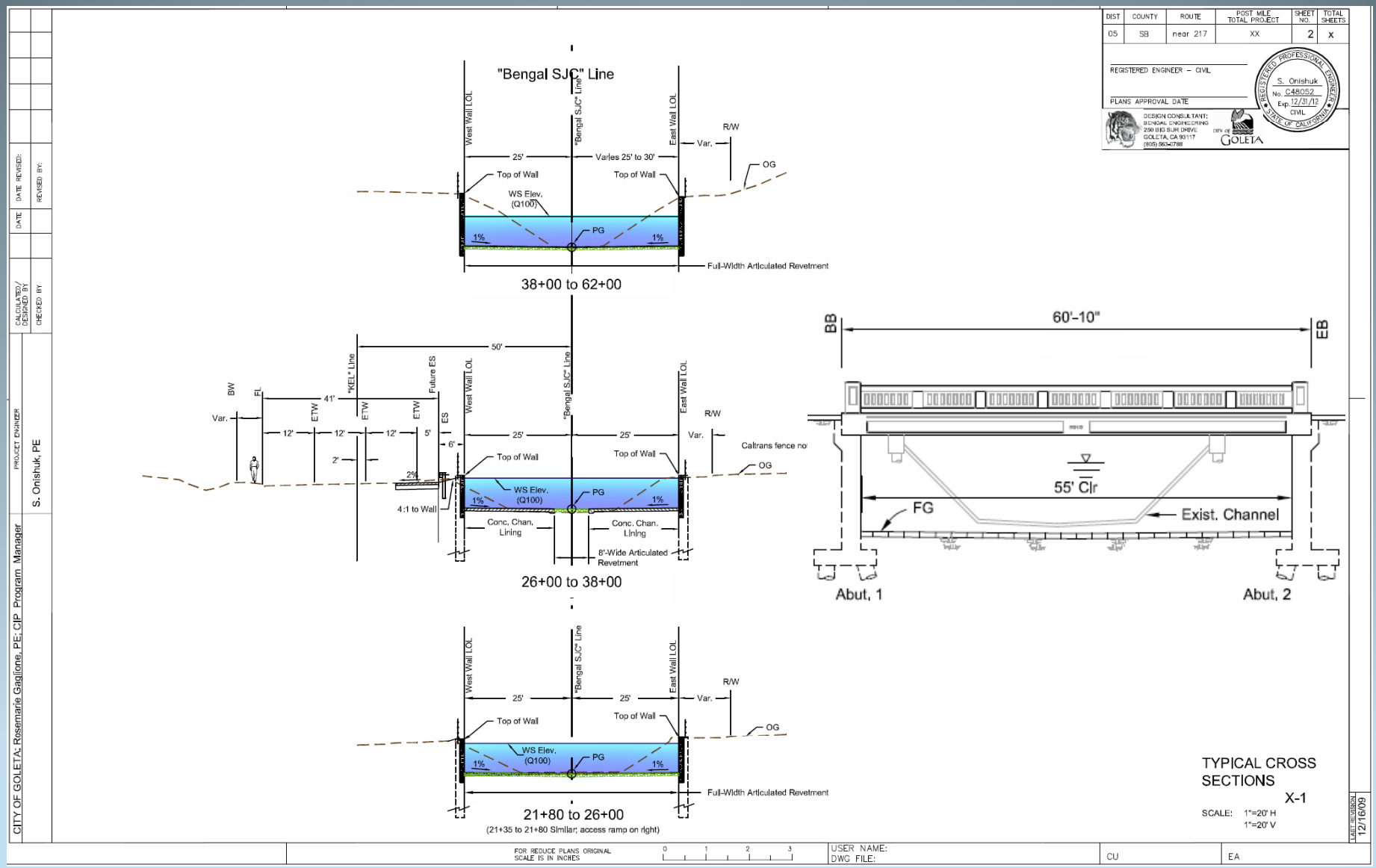
FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
DWG FILE:

CU

EA

Proposed Plan



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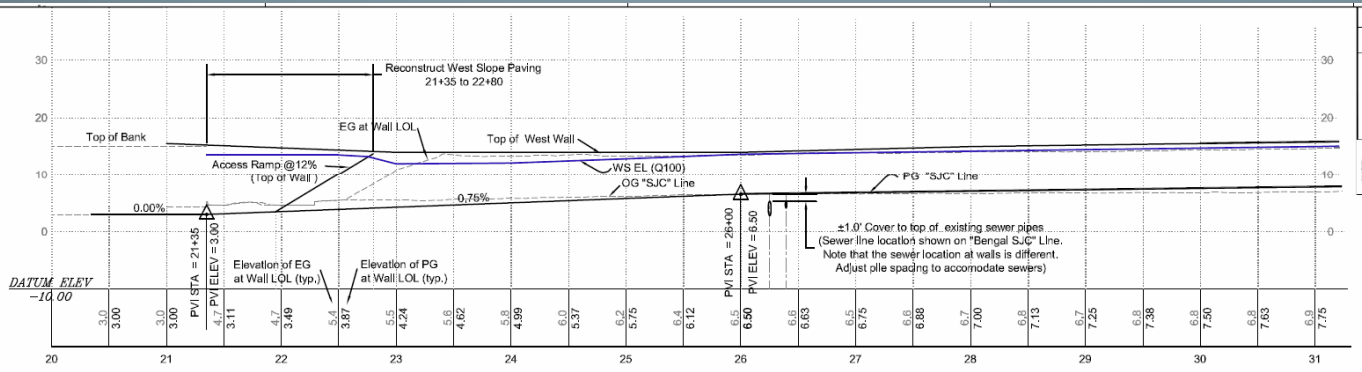
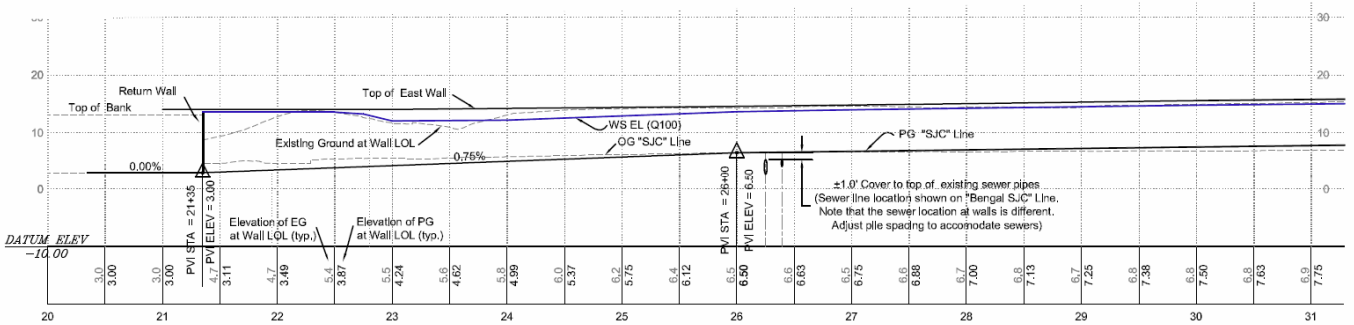


PROFILE "WEST WALL" Line



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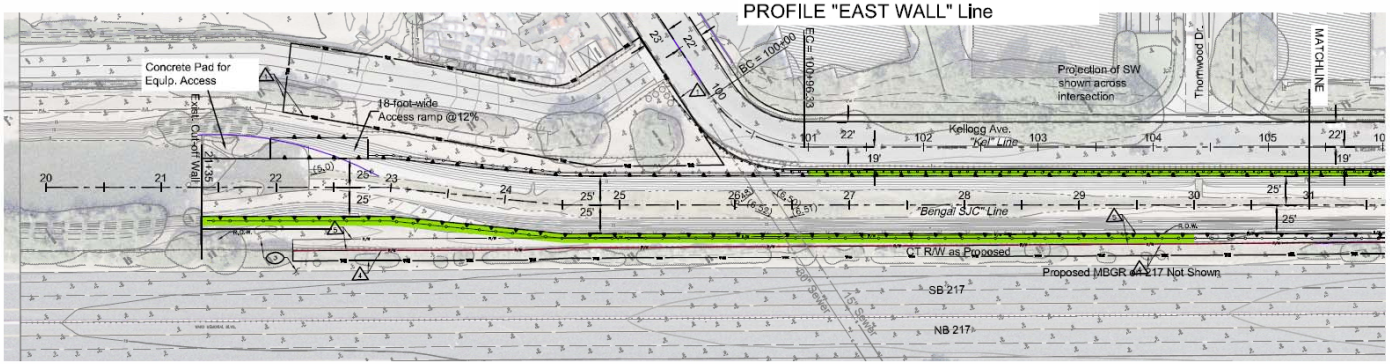

LAYOUT L-1

SCALE: 1"=50' H
1"=10' V

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	3	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA S. Onishuk No. C48052 Exp. 12/31/12 CIVIL

DESIGN CONSULTANT:
BENGAL ENGINEERING
290 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA

GOLETA

DATE REVISED: | REVISED BY: | DATE | CALCULATED/DESIGNED BY | CHECKED BY

PROJECT ENGINEER: S. Onishuk, PE

CITY OF GOLETA; Rosemarie Gaglione, PE; CIP Program Manager

LAST REVISION 12/16/09

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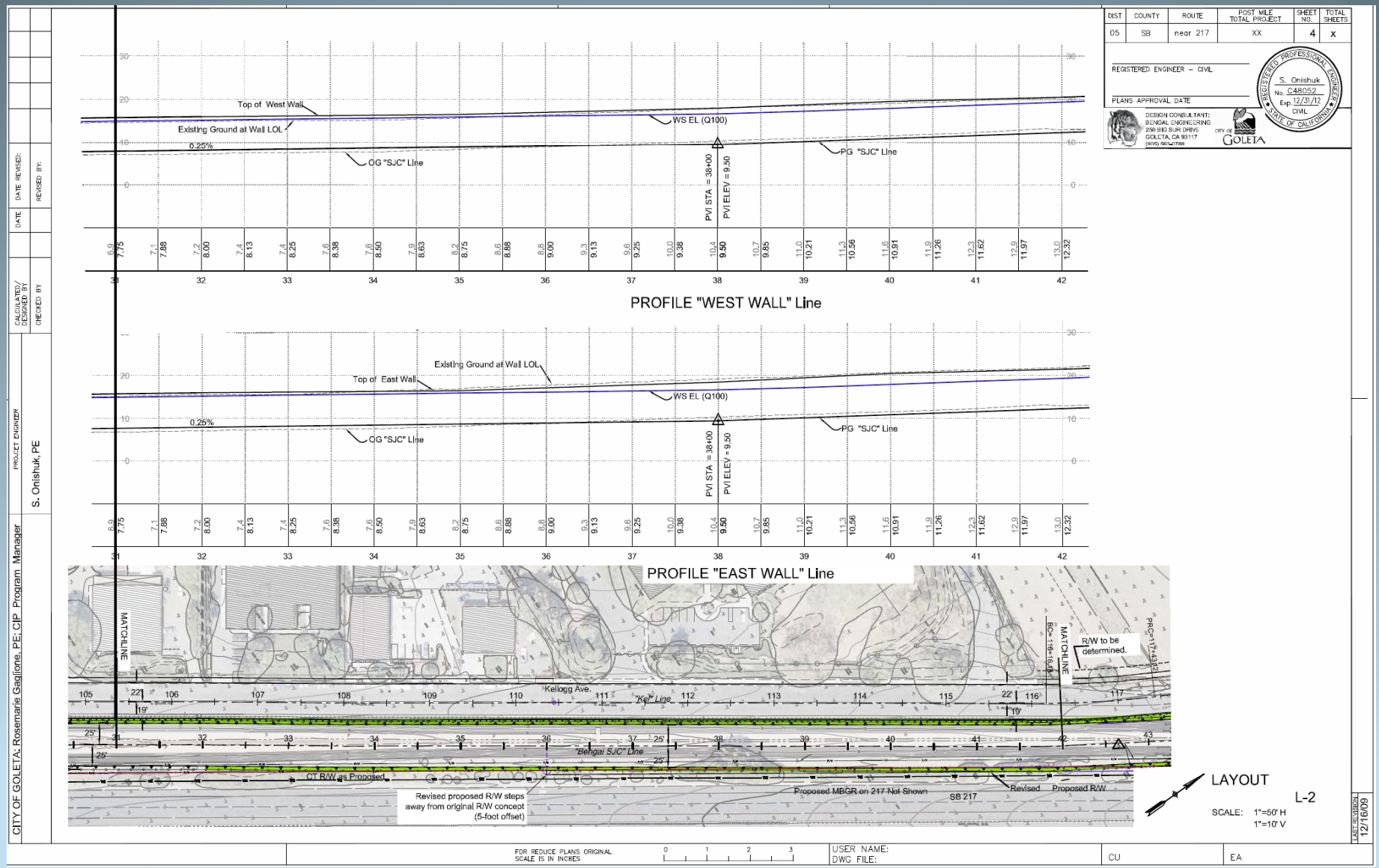

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	4	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER – STATE OF CALIFORNIA – S. Onishuk – No. C48052 – Exp. 12/31/12 – CIVIL

DESIGN CONSULTANT: BENGAL ENGINEERING 250 BIG SUR DRIVE GOLETA, CA 93117 (805) 967-2788

CITY OF GOLETA

CITY OF GOLETA: Rosemarie Gaglione, PE, CIP Program Manager

PROJECT ENGINEER: S. Onishuk, PE

CALCULATED/ DESIGNED BY

CHECKED BY

DATE

REVISED BY:

DATE REVISED:

LAST REVISION 12/16/09

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USER NAME:

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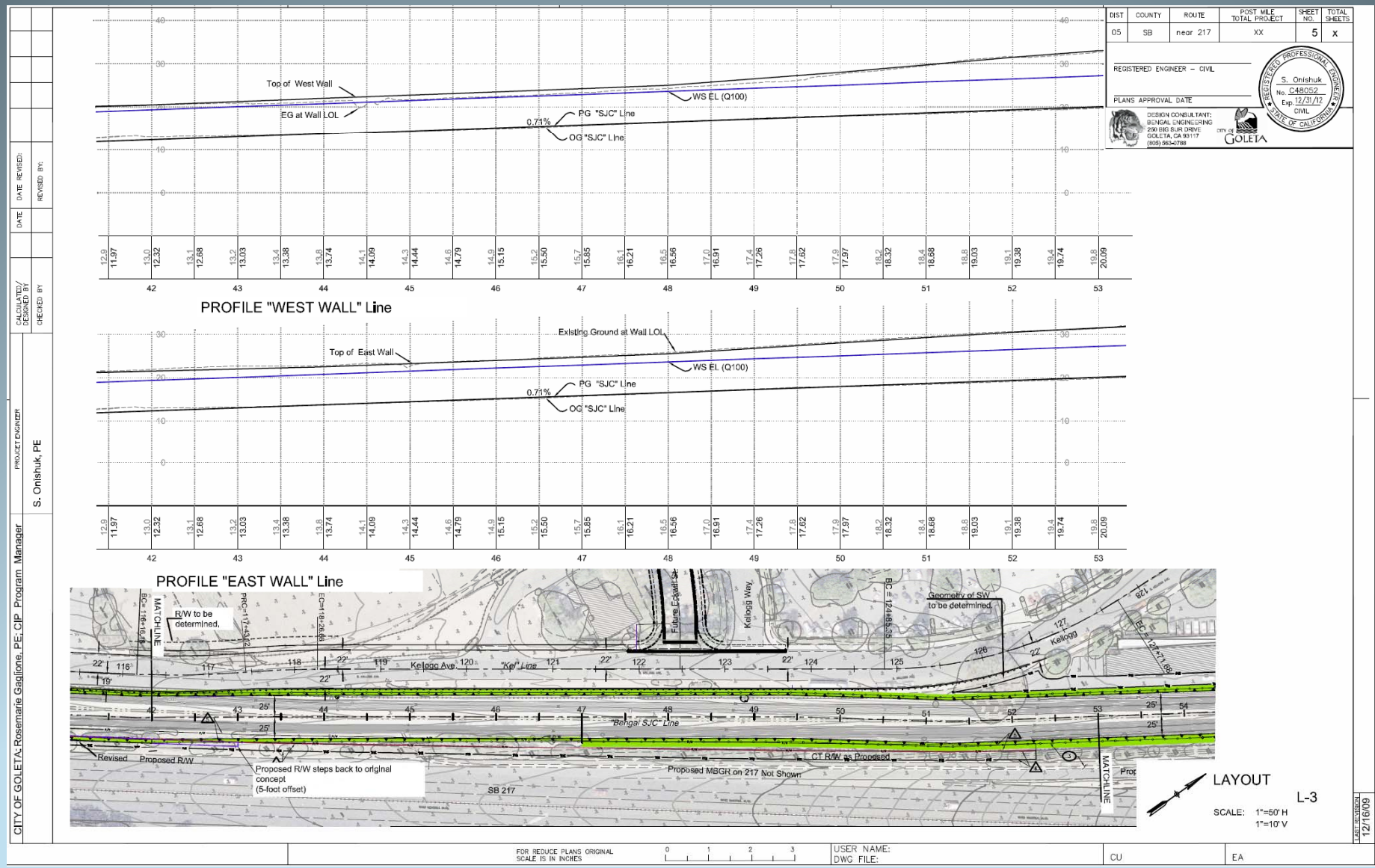

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	5	x

REGISTERED ENGINEER – CIVIL

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S. Onishuk No. C48052 Exp. 12/31/12 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

DESIGN CONSULTANT: BENGAL ENGINEERING 290 BIG SUR DRIVE GOLETA, CA 93117 (805) 563-0788

CITY OF GOLETA

DATE REVISED: | REVISED BY: | DATE | CALCULATED/DESIGNED BY | CHECKED BY

PROJECT ENGINEER: S. Onishuk, PE

CITY OF GOLETA-Rosemarie Gaglione, PE; CIP Program Manager

LAST REVISION 12/16/09

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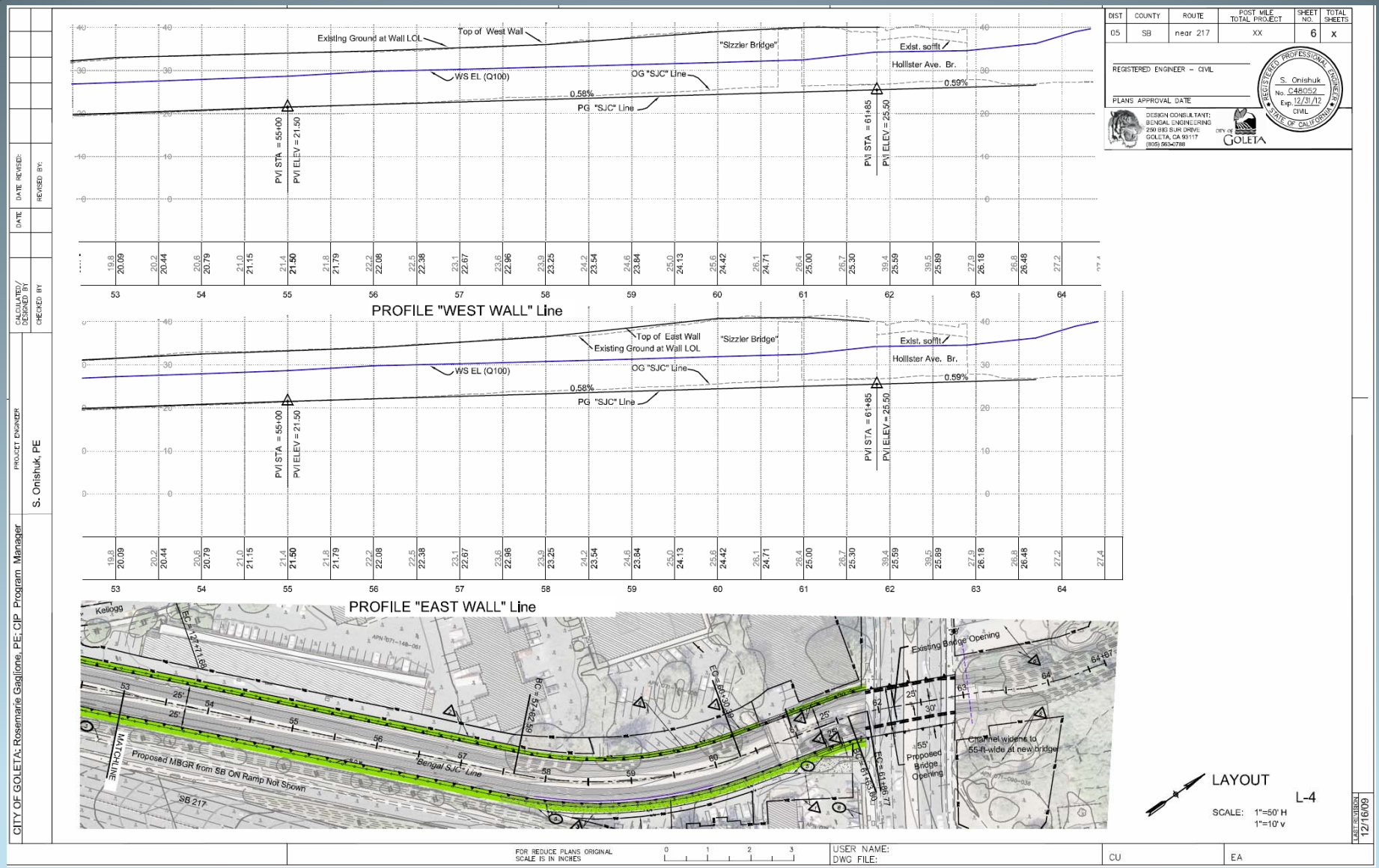
CU | EA

Proposed Plan



DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	6	x

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(805) 563-0788

CITY OF GOLETA

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

PROJECT ENGINEER: S. Onishuk, PE

CALCULATED/DESIGNED BY

CHECKED BY

DATE

DATE REVISED:

REVISED BY:

LAST REVISION 12/16/09

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
DWG FILE:

CU

EA

Design parameters

Segment Definition

Segments	Stations	
	From	To
SEG-1	21+35	50+00
SEG-2	50+00	58+00
SEG-3	58+00	62+95

Wall Height, Storm Water and Ground Water Depths

Segments	Wall Height (H)	Storm Water Height for Q_{100} (h_{DFL})	Ground Water	
			Depth below Backfill Surface (d_w)	Height above Creekbed (h_w)
SEG-1	10’	8’	8’	2’
SEG-2	13’	8’	10’	3’
SEG-3	16’	9’	13’	3’

Seismic Ground Motion and Liquefaction Hazard

Design Ground Motion Hazard					
OBE (Return Period = 144 years)			MDE (950 years)		
EPGA (g)		Modal Earthquake Magnitude, M	EPGA (g)		Modal Earthquake Magnitude, M
No Liquefaction	Liquefaction		No Liquefaction	Liquefaction	
0.27	0.27	7.01	0.7	0.35	7.01

Design Parameters

EQ Liquefaction Hazard

Preliminary Overall Liquefaction Hazard (Earthquake Magnitude, M=7.01)			
EPGA(g)	<0.20	0.20 - 0.35	>0.35
Liquefaction Potential	Low	Moderate to High	Very High
Design Earthquake Event	N/A	OBE	MDE

Design Parameters

Seismic Design Parameters

Case (a): No Liquefaction Seismic Lateral Soil Pressure Due to k_h=(2/3)EPGA and No Reduction in Soil Strength				
Segments	OBE		MDE	
	k_h=0.18g		k_h = 0.47g	
	Design Soil Parameters	Total Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Total Seismic Lateral Soil Force Component (ΔP_{ae}), kips/ft
SEG-1	c=0.0, ϕ = 30°, γ_t=125 pcf	0.75	c=0.0, ϕ = 30°, γ_t=125 pcf	3.05
SEG-2		1.27		5.15
SEG-3		1.92		7.8

Case (b): Liquefaction Initiation Seismic Soil Lateral Pressure Due to k_h =(2/3) EPGA and Reduced Soil Strength at Liquefaction Initiation						
Segments	OBE			MDE		
	k_h=0.18g			k_h=0.25g		
	Design Soil Parameters	Average Excess Pore Pressure Ratio, ($\Delta u/\sigma'_{vo}$)	Total Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Average Excess Pore Pressure Ratio, ($\Delta u/\sigma'_{vo}$)	Total Seismic Lateral Soil Force Component (ΔP_{ae})
SEG-1	c=0.0, ϕ = 30°, γ_t=125 pcf	+0.5	0.75	c=0.0, ϕ = 30°, γ_t=125 pcf	+0.5	1.25
SEG-2			1.27			2.11
SEG-3			1.92			3.20

Design Parameters

Seismic Design Parameters - continued

Case (c): Post-Liquefaction Seismic Soil Lateral Pressure Due to k_h =0.0 and Residual Strength for Liquefied Layers						
Segments	OBE			MDE		
	k_h=0.0g			k_h=0.0g		
	Design Soil Parameters	Excess Pore Pressure Ratio ($\Delta u/\sigma'_{vo}$)	Total Seismic Lateral Soil Force (ΔP_{ae}), kip/ft	Design Soil Parameters	Excess Pore Pressure Ratio ($\Delta u/\sigma'_{vo}$)	Total Seismic Lateral Soil Force Component (ΔP_{ae})
SEG-1	c=0.0, ϕ = 15°, γ_t=125 pcf	≈1.0	0.0	c=0.0, ϕ = 10°, γ_t=125 pcf	≈1.0	0.0
SEG-2	c=0.0, ϕ = 15°, γ_t=125 pcf		0.0	c=0.0, ϕ = 10°, γ_t=125 pcf		0.0
SEG-3	c=0.0, ϕ = 20°, γ_t=125 pcf		0.0	c=0.0, ϕ = 15°, γ_t=125 pcf		0.0

EPGA= Effective Peak Ground Acceleration defined in EM 1110-2-2100
k_h = Seismic coefficient for wall seismic stability evaluation (as per EM 1110-2-2100)
Δu = Estimated excess pore water pressure due to ground shaking
σ'_{vo} = Initial effective overburden pressure

Design Summary

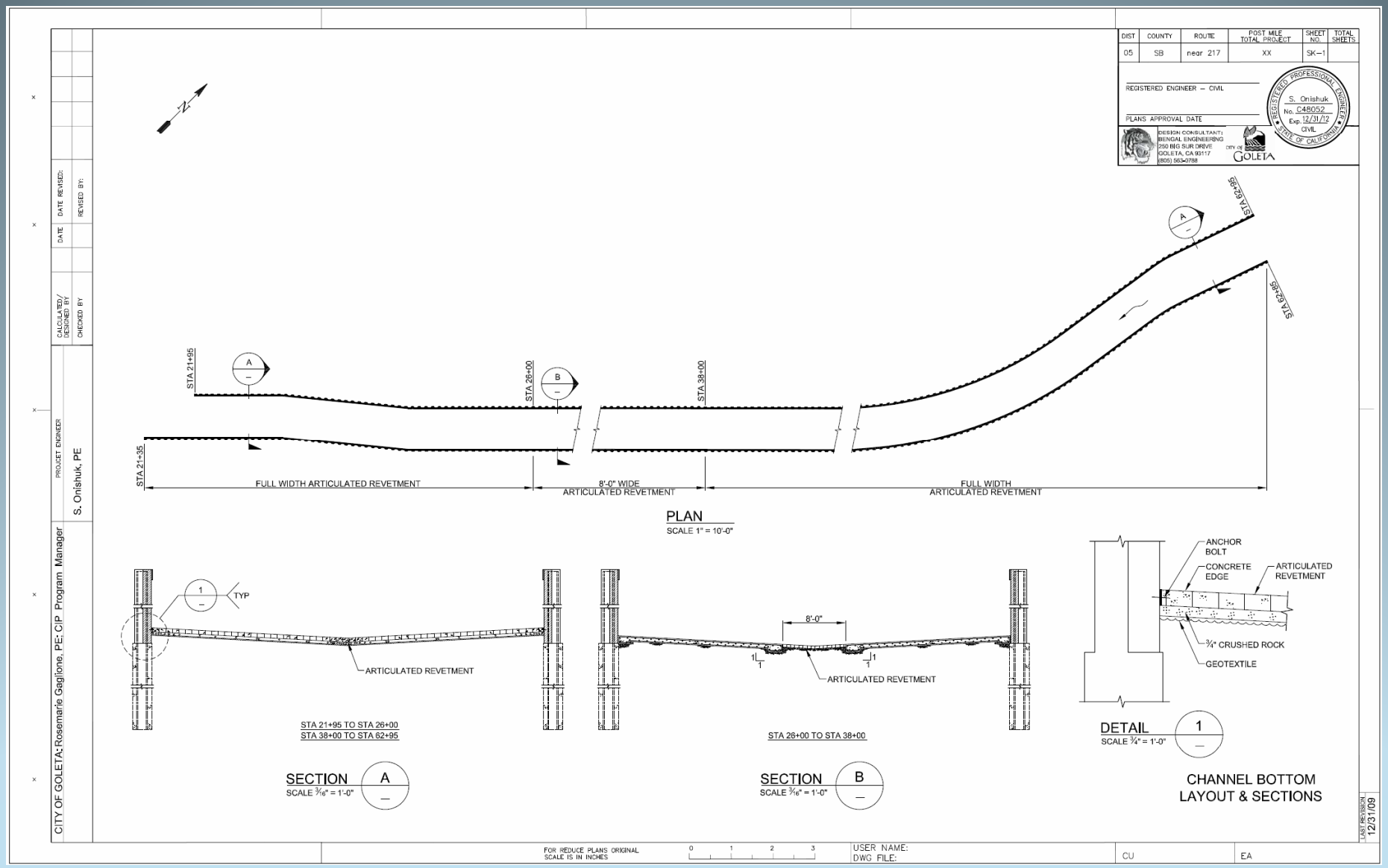
Analysis

	Wall Ht. (H)		Constr. Condition	Drawdown Condition		Operating + OBE			Operating + MDE		
						(a)	(b)	(c)	(a)	(b)	(c)
				½ Height	2/3rd Height	No Lique-faction	Lique-faction Initiation	Post-Lique-faction	No Lique-faction	Lique-faction Initiation	Post-Lique-faction
SEG-1	10’	Embed-ment	16’	15’	16’	16’	21’	20’	19’	21’	**24’**
		Pile Size	**W14x90**	W14x61	W14x61	W14x82	W14x90	W14x82	**W14x90**	W14x61	**W14x90**
SEG-2	13’	Embed-ment	20’	19’	20’	20’	27’	26’	25’	27’	**31’**
		Pile Size	W14x159	W14x109	W14x120	W14x159	W14x176	W14x159	**W14x211**	W14x132	**W14x211**
SEG-3	16’	Embed-ment	24’	23’	24’	25’	33’	28’	30’	**34’**	31’
		Pile Size	W14x257	W14x193	W14x211	W14x283	**W14x311**	W14x233	**W14x311**	W14x233	W14x257

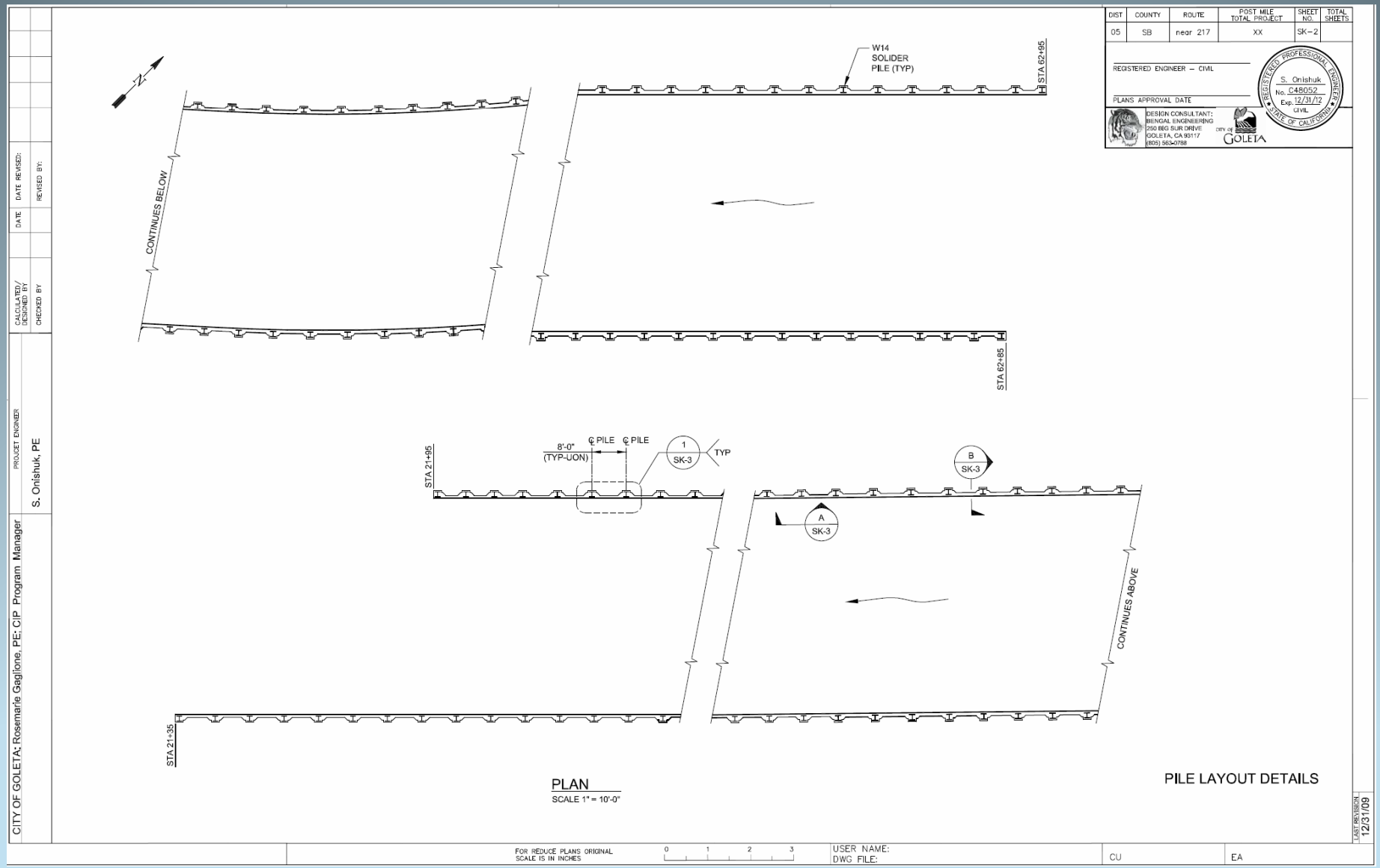
Summary of Results

	Wall Height (H)	Soldier Pile			Lagging Thickness
		Size	Embedment	Total Length	
SEG-1	10’	W14x90	24’	34’	8”
SEG-2	13’	W14x211	31’	44’	10”
SEG-3	16’	W14x311	34’	50’	12”

Proposed Plan



Proposed Plan



Proposed Plan

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	SK-3	

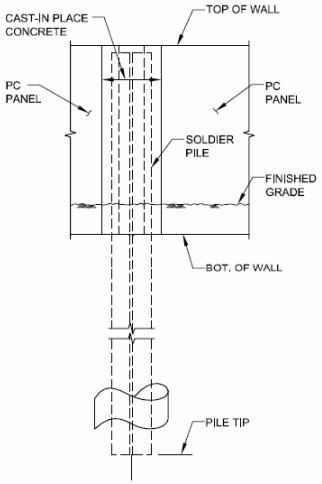
REGISTERED ENGINEER – CIVIL

S. Onishuk No. C48052 Exp. 12/31/12 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

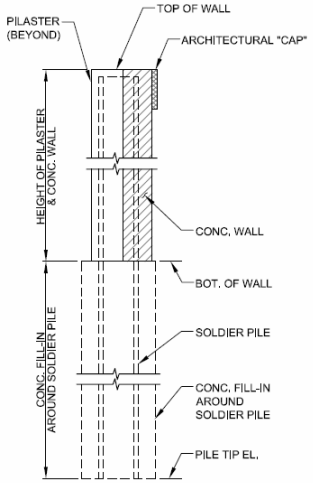
PLANS APPROVAL DATE

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA



ELEVATION VIEW A SK-3
SCALE 1/2" = 1'-0"



SECTION B SK-3
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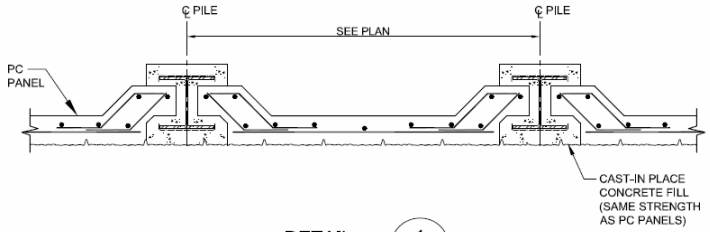


DETAIL 1 SK-3
SCALE 3/4" = 1'-0"

SECTION & DETAILS

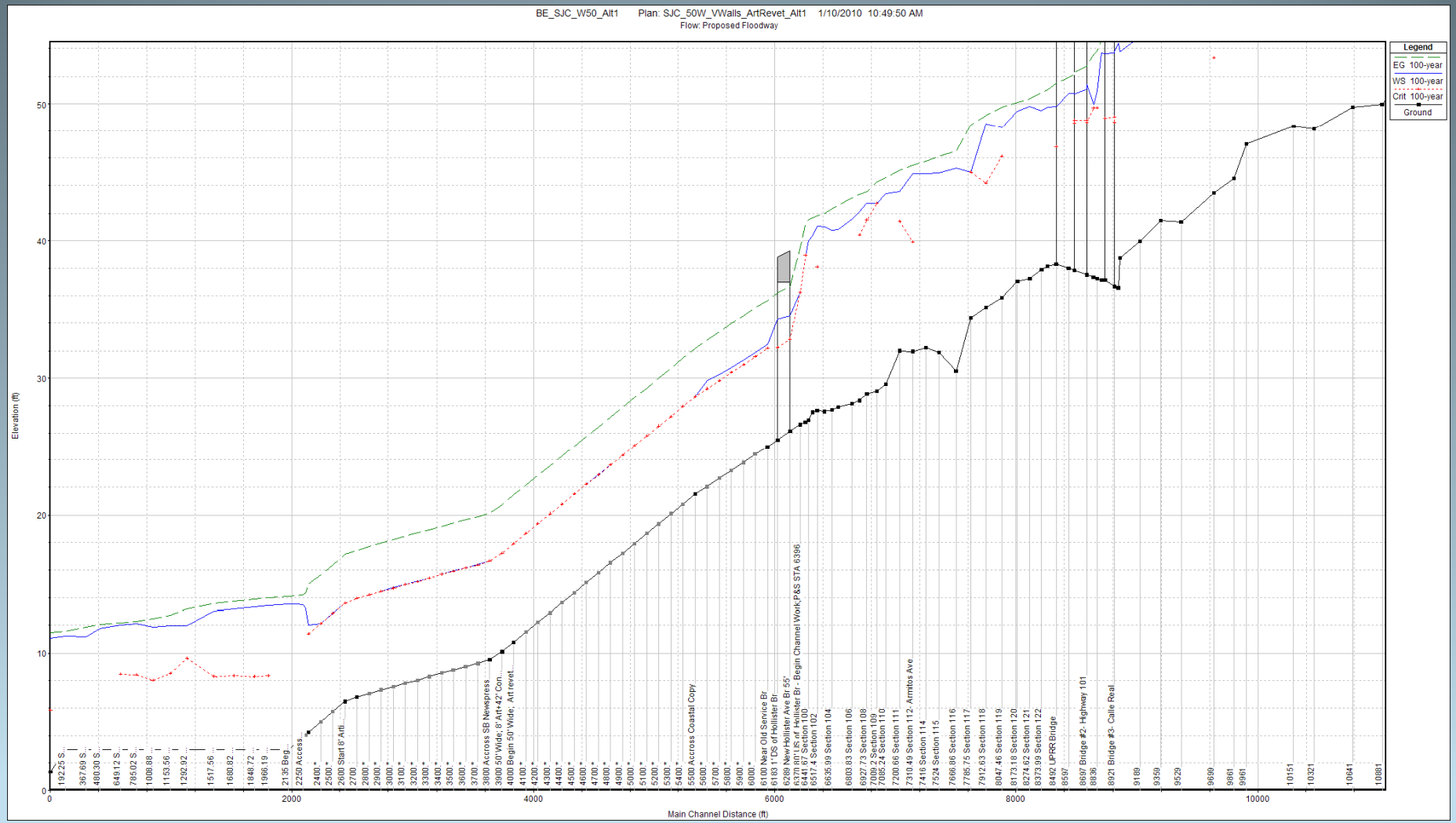
CITY OF GOLETA; Rosemarie Gaglione, PE; CIP Program Manager

PROJECT ENGINEER: S. Onishuk, PE

CALCULATED/DESIGNED BY | CHECKED BY | DATE | DATE REVISED: | REVISED BY:

LAST REVISION 12/31/09

HEC-RAS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Flow: Proposed Floodway
Legend
EG 100-year
WS 100-year
Crit 100-year
Ground
Elevation (ft)
Main Channel Distance (ft)
0
10
20
30
40
50
2000
4000
6000
8000
10000
192.25 S...
367.69 S...
480.30 S...
649.12 S...
785.02 S...
1008.88 ...
1153.56 ...
1292.92 ...
1517.56 ...
1680.82 ...
1848.72 ...
1966.19 ...
2135 Beg...
2250 Access...
2400 *
2500 *
2600 Start 8' Arti...
2700 *
2800 *
2900 *
3000 *
3100 *
3200 *
3300 *
3400 *
3500 *
3600 *
3700 *
3800 Across SB Newspress
3900 50' Wide, 8' Art+42' Con...
4000 Begin 50' Wide, Art revet...
4100 *
4200 *
4300 *
4400 *
4500 *
4600 *
4700 *
4800 *
4900 *
5000 *
5100 *
5200 *
5300 *
5400 *
5500 Across Coastal Copy
5600 *
5700 *
5800 *
5900 *
6000 *
6100 Near Old Service Br
6183.1 *DS of Hollister Br
6289 New Hollister Ave Br 55'
6370 RT US of Hollister Br - Begin Channel Work,P&S STA 6396
6447.5 Section 101
6517.4 Section 102
6635.99 Section 104
6803.83 Section 106
6927.73 Section 108
7009.2 Section 109
7080.24 Section 110
7200.66 Section 111
7310.49 Section 112- Arrellos Ave
7416 Section 114
7524 Section 115
7666.86 Section 116
7785.75 Section 117
7912.63 Section 118
8047.46 Section 119
8173.18 Section 120
8274.62 Section 121
8373.99 Section 122
8492 UPRR Bridge
8597
8697 Bridge #2: Highway 101
8836
8921 Bridge #3: Calle Real
9189
9359
9529
9699
9861
9961
10151
10321
10641
10881

HEC-RAS

HEC-RAS Plan: 50WDF Locations: User Defined Profile: 100-year

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
San Jose Creek	Upper Reach	6635.99	100-year	5300.00	27.68	40.78		42.31	0.003562	10.43	648.95	173.54	0.60
San Jose Creek	Upper Reach	6573.38	100-year	5300.00	27.58	41.04		41.97	0.002004	8.48	947.87	265.62	0.46
San Jose Creek	Upper Reach	6517.4	100-year	5300.00	27.63	41.06	38.12	41.82	0.001597	7.79	1081.94	293.18	0.42
San Jose Creek	Upper Reach	6478.68	100-year	5300.00	27.52	40.34		41.67	0.003161	9.73	702.29	170.50	0.57
San Jose Creek	Upper Reach	6441.67	100-year	5300.00	26.92	39.99		41.53	0.003682	10.22	622.42	147.28	0.61
San Jose Creek	Upper Reach	6415.78	100-year	5300.00	26.81	38.96	38.96	41.31	0.007257	12.49	476.68	124.96	0.82
San Jose Creek	Upper Reach	6370	100-year	5300.00	26.60	36.26	36.26	39.50	0.006876	14.43	367.36	57.21	1.00
San Jose Creek	Upper Reach	6290	100-year	5300.00	26.13	34.55	32.84	36.64	0.004019	11.60	456.99	55.00	0.71
San Jose Creek	Upper Reach	6289		Bridge									
San Jose Creek	Upper Reach	6183	100-year	5300.00	25.50	34.26		36.18	0.003548	11.13	476.30	55.00	0.67
San Jose Creek	Upper Reach	6100	100-year	5300.00	25.00	32.46	32.14	35.68	0.005778	14.40	367.99	49.99	0.94
San Jose Creek	Upper Reach	6000.*	100-year	5300.00	24.42	31.88	31.56	35.10	0.005772	14.40	368.13	49.99	0.93
San Jose Creek	Upper Reach	5900.*	100-year	5300.00	23.83	31.33	30.97	34.52	0.005697	14.34	369.72	49.99	0.93
San Jose Creek	Upper Reach	5800.*	100-year	5300.00	23.25	30.77	30.39	33.94	0.005629	14.28	371.03	49.99	0.92
San Jose Creek	Upper Reach	5700.*	100-year	5300.00	22.67	30.25	29.81	33.37	0.005490	14.17	373.95	49.99	0.91
San Jose Creek	Upper Reach	5600.*	100-year	5300.00	22.08	29.79	29.22	32.80	0.005195	13.93	380.38	49.99	0.89
San Jose Creek	Upper Reach	5500	100-year	5300.00	21.50	28.64	28.64	32.16	0.006681	15.06	351.82	49.99	1.00
San Jose Creek	Upper Reach	5400.*	100-year	5300.00	20.79	27.93	27.93	31.45	0.006680	15.07	351.81	49.99	1.00
San Jose Creek	Upper Reach	5300.*	100-year	5300.00	20.07	27.21	27.21	30.73	0.006687	15.07	351.78	49.99	1.00
San Jose Creek	Upper Reach	5200.*	100-year	5300.00	19.36	26.50	26.50	30.02	0.006686	15.07	351.73	49.99	1.00
San Jose Creek	Upper Reach	5100.*	100-year	5300.00	18.65	25.79	25.79	29.31	0.006680	15.06	351.90	49.99	1.00
San Jose Creek	Upper Reach	5000.*	100-year	5300.00	17.93	25.07	25.07	28.59	0.006691	15.07	351.68	49.99	1.00
San Jose Creek	Upper Reach	4900.*	100-year	5300.00	17.22	24.35	24.35	27.88	0.006682	15.06	351.83	49.99	1.00
San Jose Creek	Upper Reach	4800.*	100-year	5300.00	16.51	23.64	23.64	27.17	0.006685	15.06	351.81	49.99	1.00
San Jose Creek	Upper Reach	4700.*	100-year	5300.00	15.79	22.92	22.92	26.45	0.006683	15.07	351.78	49.99	1.00
San Jose Creek	Upper Reach	4600.*	100-year	5300.00	15.08	22.21	22.21	25.74	0.006686	15.07	351.74	49.99	1.00
San Jose Creek	Upper Reach	4500.*	100-year	5300.00	14.37	21.50	21.50	25.02	0.006674	15.06	351.91	49.99	1.00
San Jose Creek	Upper Reach	4400.*	100-year	5300.00	13.65	20.78	20.78	24.31	0.006691	15.07	351.69	50.00	1.00
San Jose Creek	Upper Reach	4300.*	100-year	5300.00	12.94	20.07	20.07	23.59	0.006679	15.06	351.84	50.00	1.00
San Jose Creek	Upper Reach	4200.*	100-year	5300.00	12.23	19.36	19.36	22.88	0.006683	15.06	351.82	50.00	1.00
San Jose Creek	Upper Reach	4100.*	100-year	5300.00	11.51	18.64	18.64	22.16	0.006685	15.07	351.79	50.00	1.00
San Jose Creek	Upper Reach	4000	100-year	5300.00	10.80	17.93	17.93	21.45	0.006671	15.06	352.02	50.00	1.00
San Jose Creek	Upper Reach	3900	100-year	5300.00	10.10	17.22	17.22	20.75	0.006696	15.08	351.56	50.00	1.00
San Jose Creek	Upper Reach	3800	100-year	5300.00	9.50	16.65	16.62	20.15	0.002425	15.00	353.29	50.00	0.99
San Jose Creek	Upper Reach	3700.*	100-year	5300.00	9.26	16.41	16.38	19.90	0.002421	15.00	353.45	50.00	0.99
San Jose Creek	Upper Reach	3600.*	100-year	5300.00	9.02	16.17	16.14	19.66	0.002425	15.01	353.19	49.99	0.99
San Jose Creek	Upper Reach	3500.*	100-year	5300.00	8.78	15.92	15.89	19.42	0.002425	15.00	353.33	49.99	0.99
San Jose Creek	Upper Reach	3400.*	100-year	5300.00	8.54	15.68	15.65	19.18	0.002429	15.01	353.03	49.99	1.00
San Jose Creek	Upper Reach	3300.*	100-year	5300.00	8.30	15.44	15.41	18.93	0.002428	15.01	353.14	49.99	1.00
San Jose Creek	Upper Reach	3200.*	100-year	5300.00	8.05	15.19	15.16	18.69	0.002432	15.01	353.05	49.99	1.00
San Jose Creek	Upper Reach	3100.*	100-year	5300.00	7.81	14.95	14.92	18.44	0.002427	15.01	353.15	49.99	1.00
San Jose Creek	Upper Reach	3000.*	100-year	5300.00	7.57	14.70	14.68	18.20	0.002435	15.02	352.79	49.99	1.00
San Jose Creek	Upper Reach	2900.*	100-year	5300.00	7.33	14.46	14.44	17.96	0.002436	15.02	352.82	49.99	1.00
San Jose Creek	Upper Reach	2800.*	100-year	5300.00	7.09	14.21	14.21	17.72	0.002448	15.04	352.31	49.99	1.00
San Jose Creek	Upper Reach	2700	100-year	5300.00	6.80	13.92	13.92	17.45	0.002456	15.07	351.73	49.99	1.00
San Jose Creek	Upper Reach	2600	100-year	5300.00	6.50	13.62	13.62	17.15	0.002458	15.07	351.65	49.99	1.00
San Jose Creek	Upper Reach	2500.*	100-year	5300.00	5.75	12.87	12.87	16.39	0.004243	15.07	351.73	49.99	1.00
San Jose Creek	Upper Reach	2400.*	100-year	5300.00	4.99	12.11	12.11	15.65	0.004537	15.10	350.89	49.99	1.00
San Jose Creek	Upper Reach	2300	100-year	5300.00	4.24	12.01	11.36	14.97	0.005060	13.82	383.64	50.00	0.86
San Jose Creek	Upper Reach	2275.*	100-year	5300.00	4.05	13.23		14.37	0.001113	8.58	617.49	77.49	0.54
San Jose Creek	Upper Reach	2250	100-year	5300.00	3.86	13.52		14.21	0.000716	6.66	795.49	102.33	0.42
San Jose Creek	Upper Reach	2192.5*	100-year	5300.00	3.43	13.53		14.15	0.000615	6.36	833.14	102.46	0.39
San Jose Creek	Upper Reach	2135	100-year	5300.00	3.00	13.53		14.11	0.000528	6.07	872.94	102.59	0.37
San Jose Creek	Upper Reach	1966.19	100-year	5300.00	3.00	13.45	8.32	13.98	0.000798	5.86	923.54	874.83	0.34
San Jose Creek	Upper Reach	1848.72	100-year	5300.00	3.00	13.33	8.30	13.89	0.000850	5.96	898.92	680.87	0.35
San Jose Creek	Upper Reach	1680.82	100-year	5300.00	3.00	13.18	8.37	13.74	0.000886	6.02	901.60	776.12	0.36
San Jose Creek	Upper Reach	1517.56	100-year	5300.00	3.00	13.01	8.29	13.59	0.000930	6.14	878.92	712.94	0.36
San Jose Creek	Upper Reach	1292.92	100-year	5300.00	3.00	11.95	9.61	13.17	0.003187	8.87	598.98	708.24	0.64
San Jose Creek	Upper Reach	1153.56	100-year	5300.00	3.00	11.96	8.48	12.74	0.001579	7.19	826.45	496.54	0.46

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	1	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ★ STATE OF CALIFORNIA ★ S. Onishuk No. C48052 Exp. 12/31/12 CIVIL

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA

CITY OF GOLETA

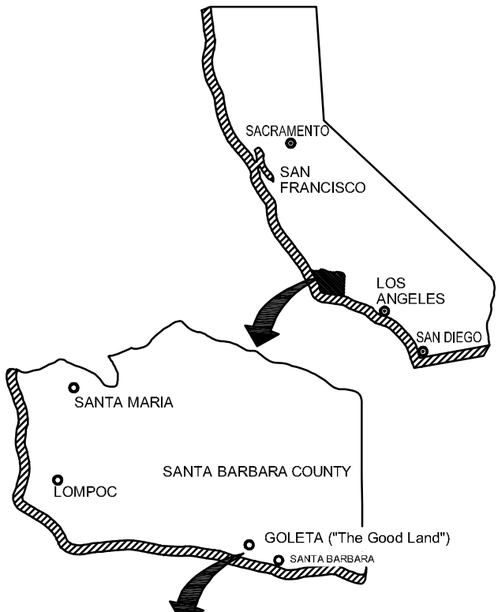
PROJECT PLANS FOR

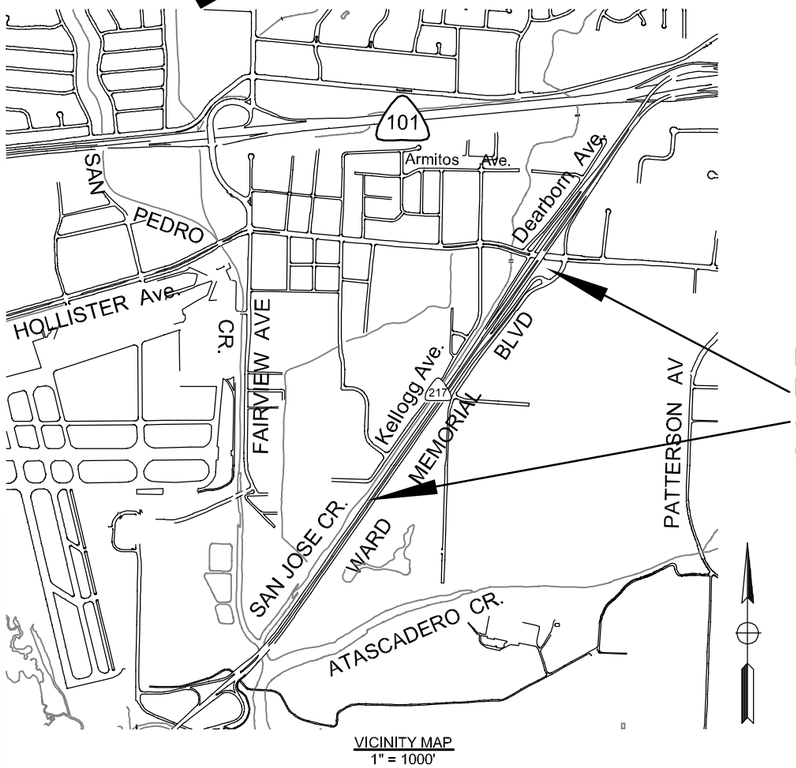
SAN JOSE CR. IMPROVEMENTS

PROJECT NUMBER **

To Be Supplimented by Caltrans Standard Plans Dated May, 2006; Santa Barbara County Standard Details, dated 1987;
and American Public Works Association Southern California, REV. 1996

Index to Sheets





VICINITY MAP
1" = 1000'

PROJECT DATUMS & REFERENCE SYSTEM

Projection and Basis of Bearings: California State Plane Coordinate System, Zone-5; The average Convergence Angle is -1-02-14.
The average Combined Grid Factors is 0.99994055.

Horizontal Datum: North American Datum of 1983 (NAD83) Epoch: 1991.35 referred to as NAD83(1991.35) per NGS referenced to HPGN-D CA 05AS

Vertical Datum: NAVD88 per NGS referenced to EW3774 (Benchmark 43 LA= F 28); Geoid Model: Geoid 09

Survey ID	Latitude(Dms)	W. Longitude(Dms)	NAVD88(ft)	Source
EW3774	34-26-23.19786	119-49-11.45344	48.359	1991.35 Epoch per MSC 2004 San Jose Creek Control
HPN_CA05AS	34-26-32.96036	119-47-12.47406	94.59	1991.35 Epoch on HPGN Station NGS DS
UCSB	34-24-47.87194	119-50-37.65997		1991.35 Epoch per 171RS24

Project Limits:
From Hollister Ave.to Approx 4100 Feet South
as measured along San Jose Cr.
(This is the existing terminus of South Kellogg Ave.)

TITLE

DATE REVISED: | REVISED BY:
DATE:
CALCULATED/DESIGNED BY:
CHECKED BY:
PROJECT ENGINEER: S. Onishuk, PE
CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

LAST REVISION 12/31/09

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
DWG FILE:

CU

EA

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	2	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
S. Onishuk
No. C48052
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
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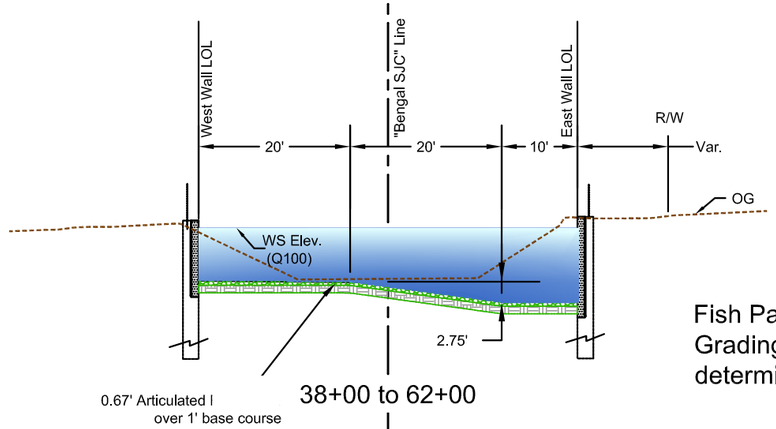
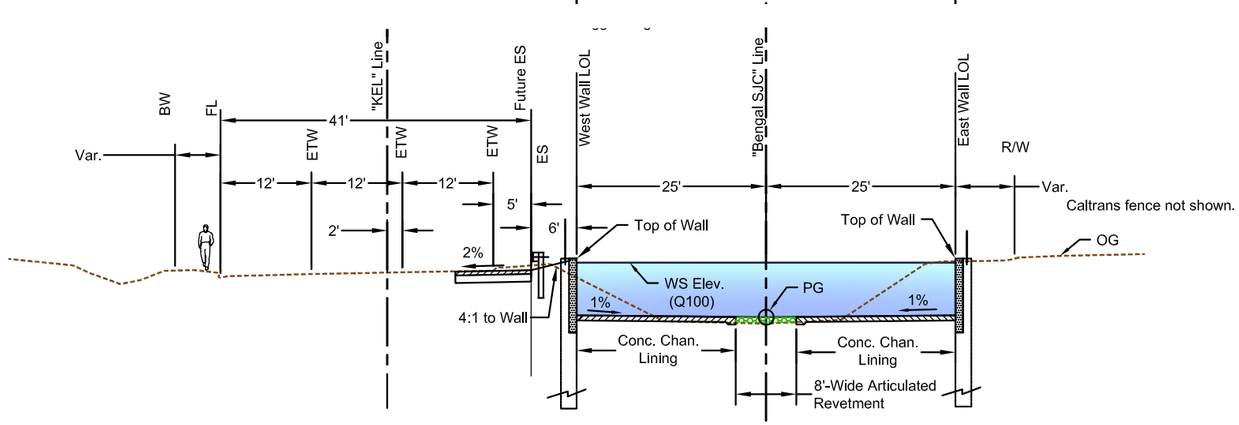
CITY OF GOLETA

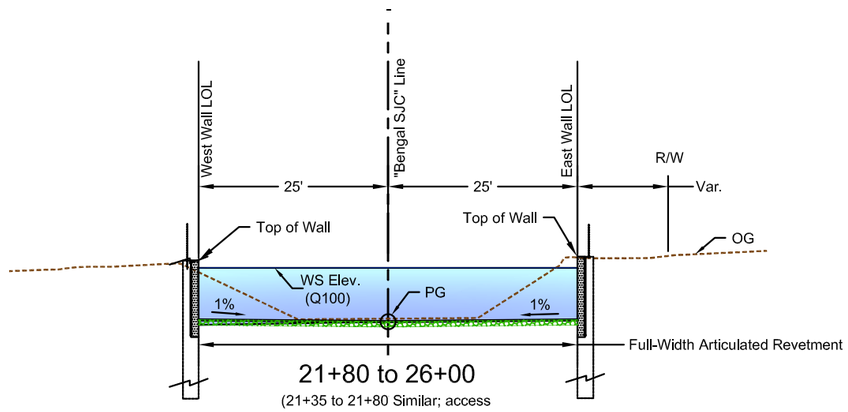


38+00 to 62+00

Fish Passage Concept Shown here.
Grading details (transitions) to be determined.



26+00 to 38+00



21+80 to 26+00

(21+35 to 21+80 Similar; access ramp on left not shown)

TYPICAL CROSS SECTIONS

X-1

SCALE: 1"=20' H
1"=20' V

CALCULATED/ DESIGNED BY	DATE	REVISED BY:	DATE REVISED:
CHECKED BY			

PROJECT ENGINEER
S. Onishuk, PE

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

LAST REVISION 12/31/09

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
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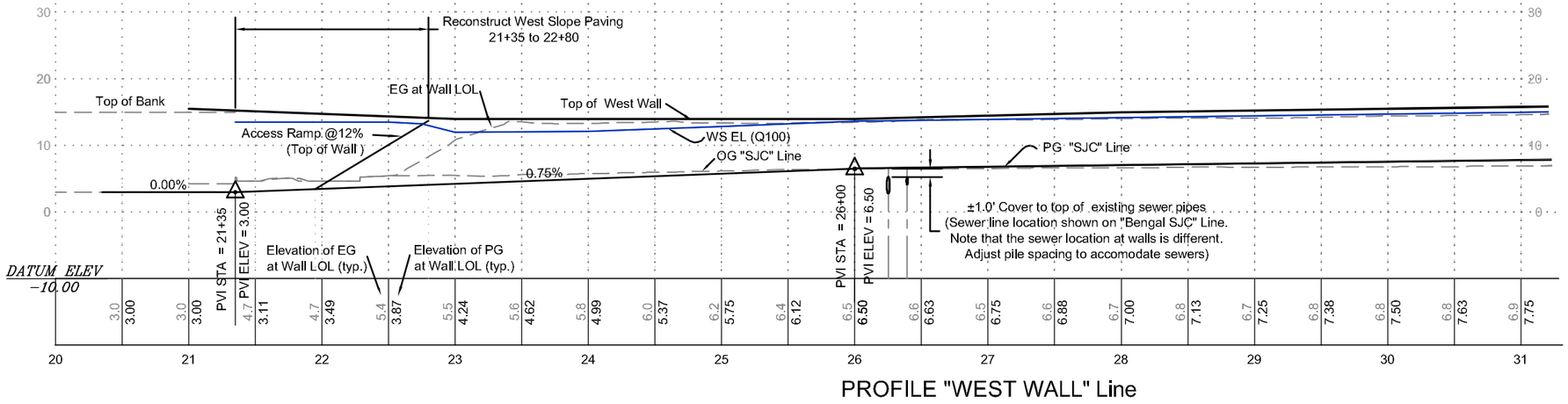

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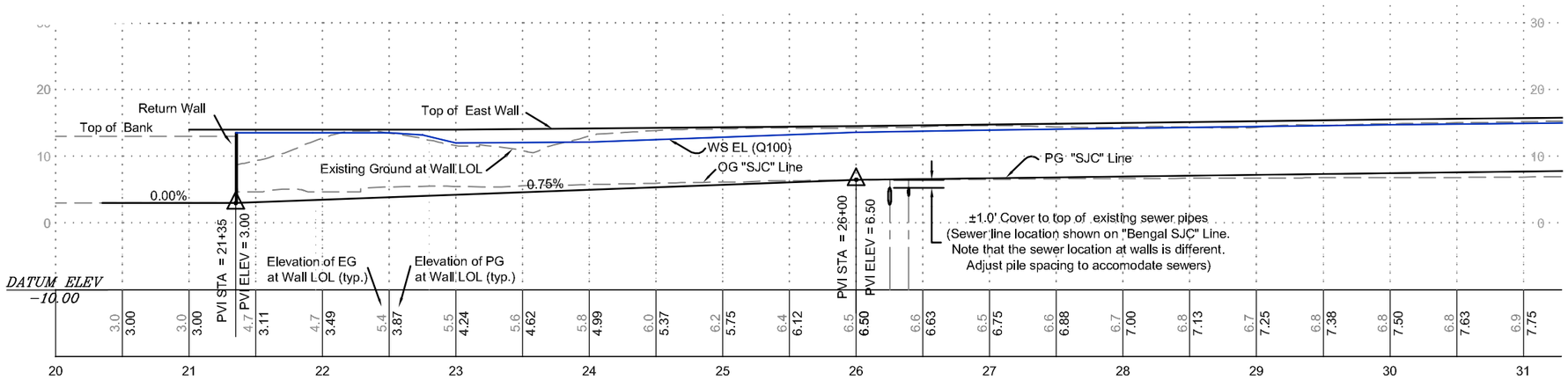

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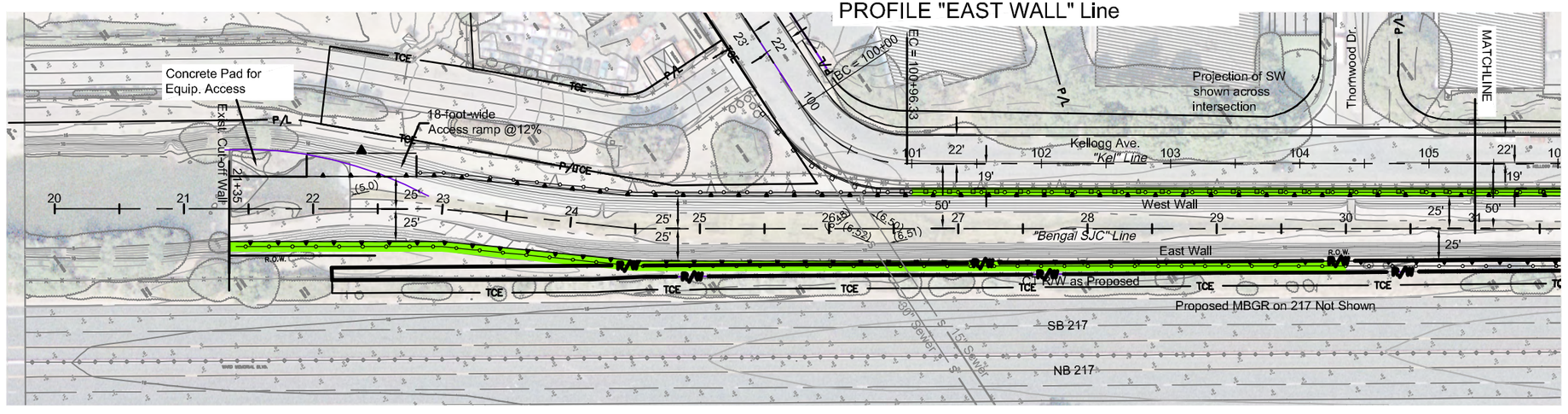

LAYOUT L-1

SCALE: 1"=50' H
1"=10' V

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	3	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
S. Onishuk
No. C48052
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

PROJECT ENGINEER: S. Onishuk, PE

CALCULATED/DESIGNED BY

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DATE REVISED:

REVISED BY:

DATE

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DWG FILE:

CU

EA

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	4	x

REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
S. Onishuk
No. C48052
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

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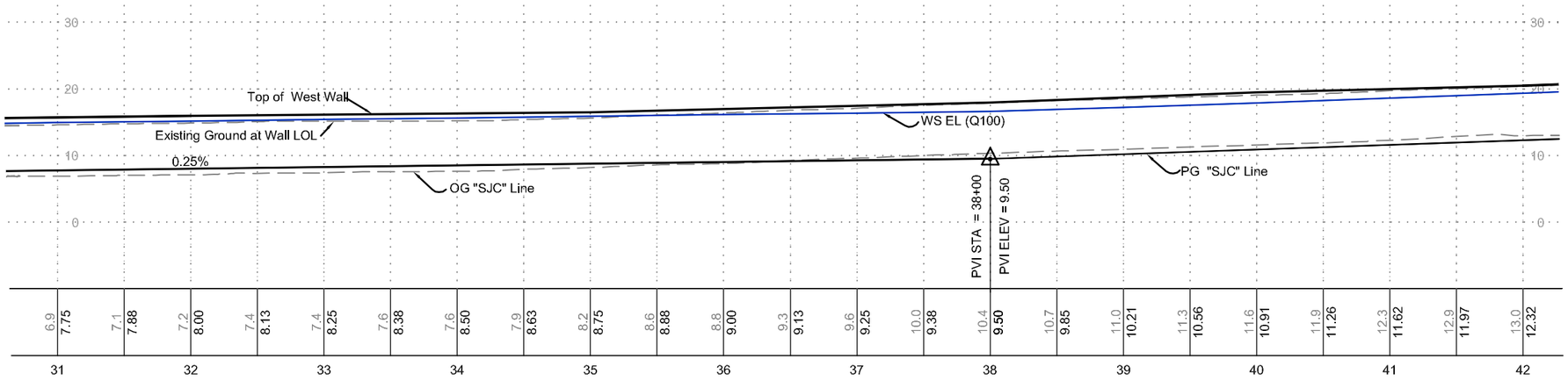
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA



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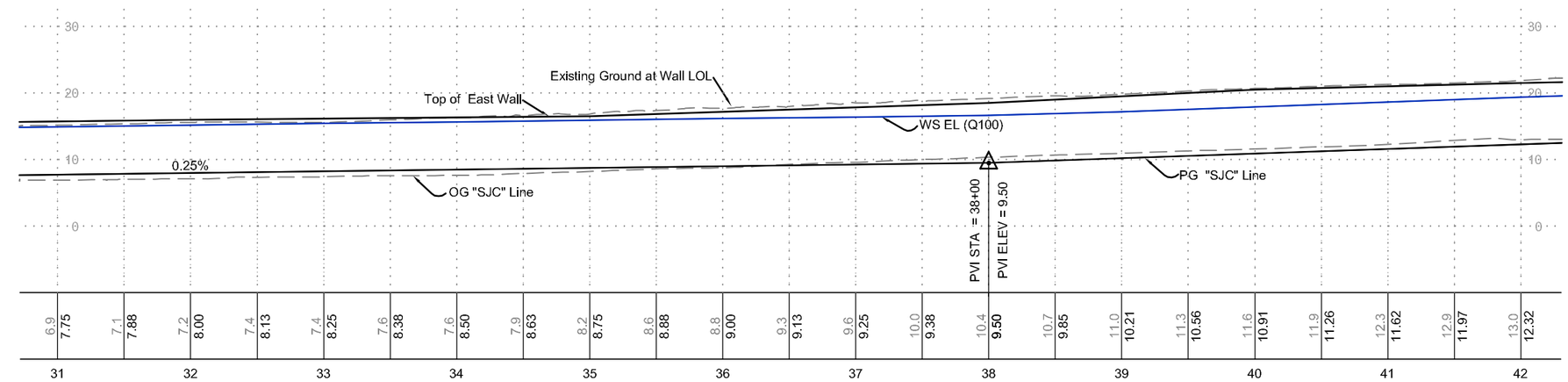

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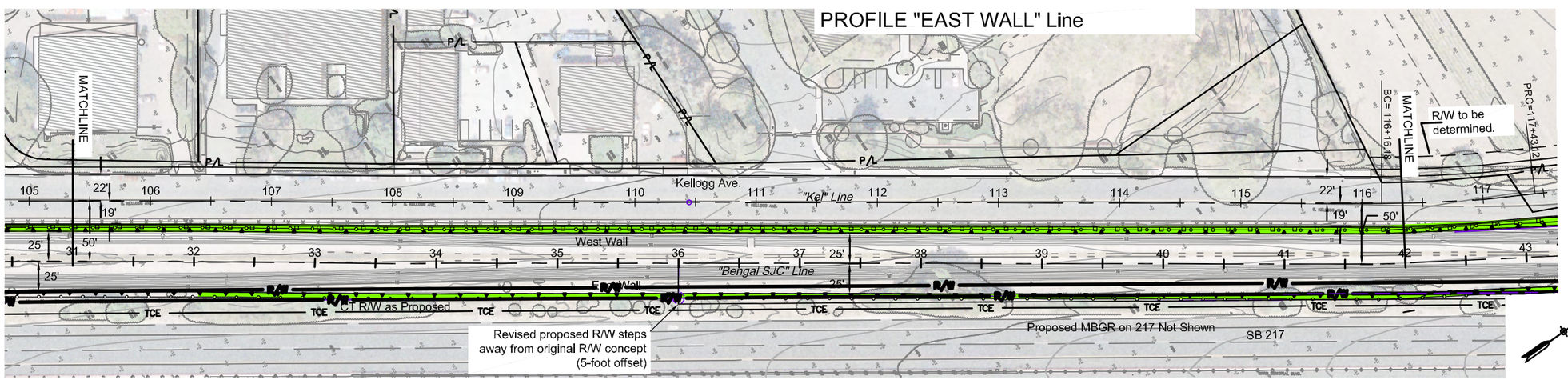


LAYOUT L-2

SCALE: 1"=50' H
1"=10' V

LAST REVISION 12/31/09

PROJECT ENGINEER: S. Onishuk, PE

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

DATE REVISED: | REVISED BY: | DATE | CALCULATED/DESIGNED BY | CHECKED BY

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
DWG FILE:

CU | EA

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	5	x

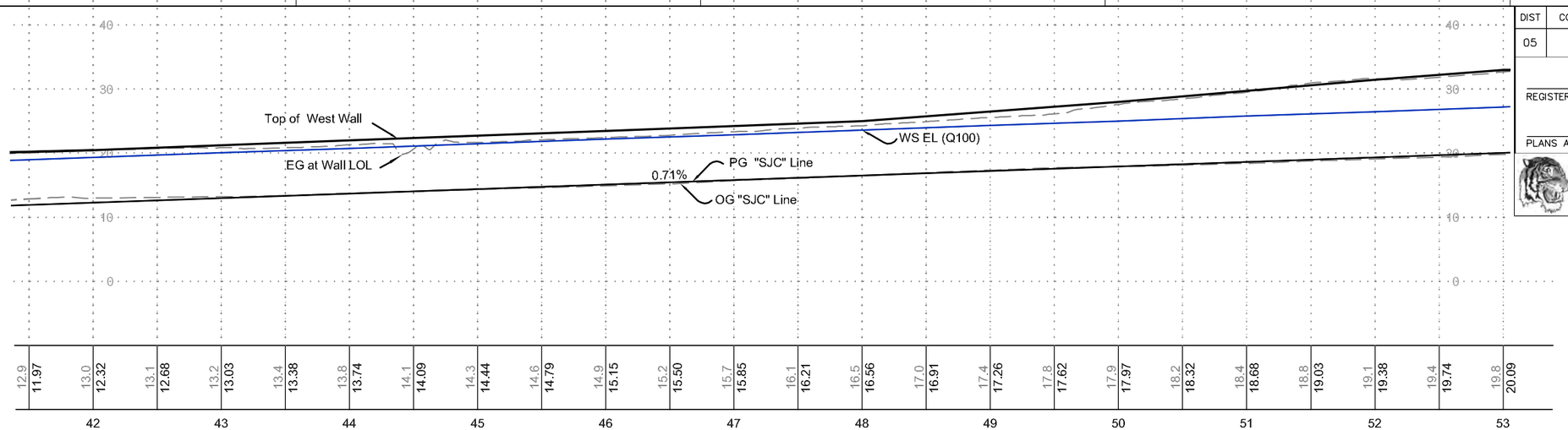
REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
S. Onishuk
No. C48052
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA



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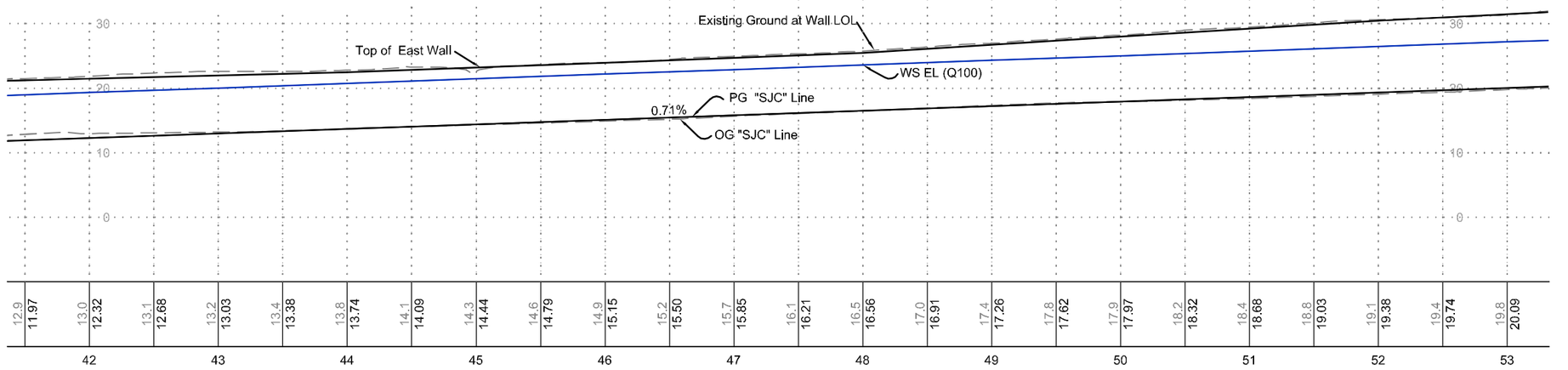

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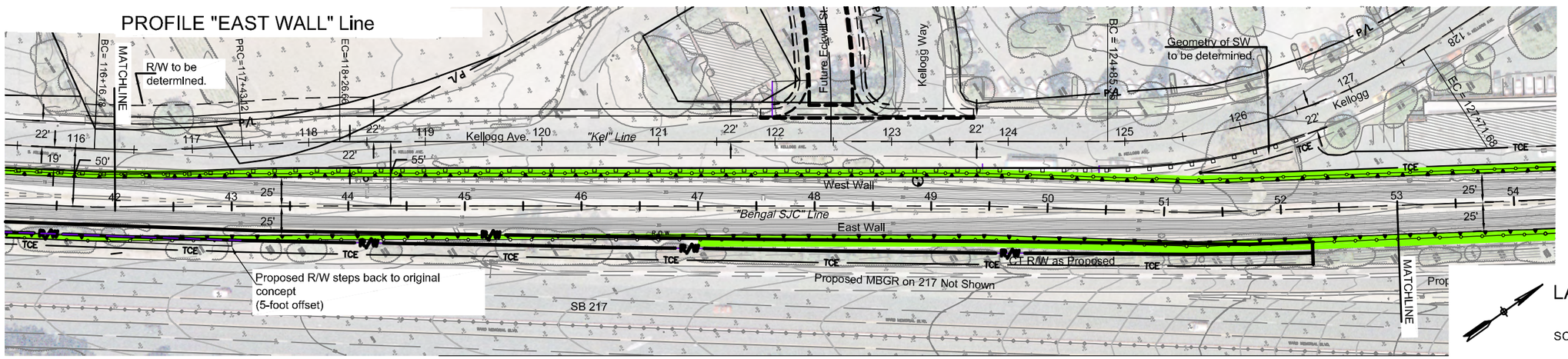

LAYOUT L-3

SCALE: 1"=50' H
1"=10' V

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

PROJECT ENGINEER: S. Onishuk, PE

DATE REVISED:	REVISED BY:
DATE	
CALCULATED/ DESIGNED BY	CHECKED BY

LAST REVISION 12/31/09

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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EA

DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	near 217	XX	6	x

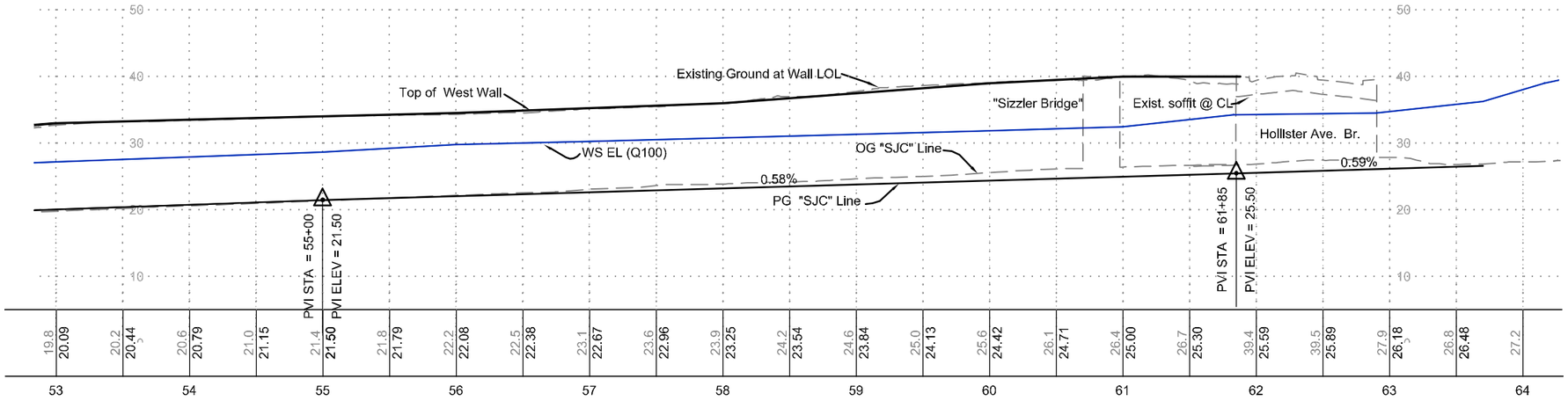
REGISTERED ENGINEER – CIVIL

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ★ S. Onishuk No. C48052 Exp. 12/31/12 CIVIL ★ STATE OF CALIFORNIA ★

DESIGN CONSULTANT:
BENGAL ENGINEERING
250 BIG SUR DRIVE
GOLETA, CA 93117
(805) 563-0788

CITY OF GOLETA



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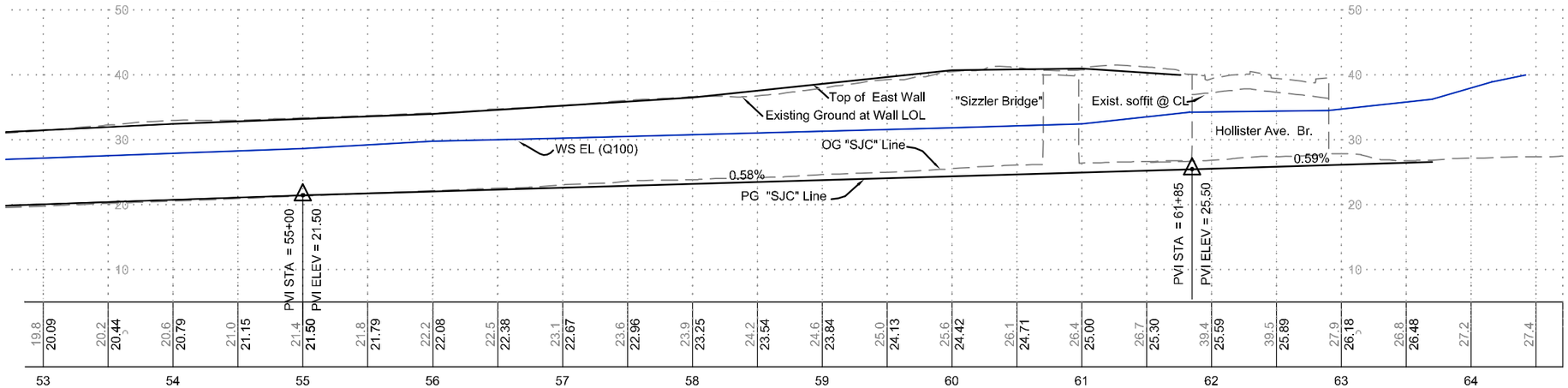

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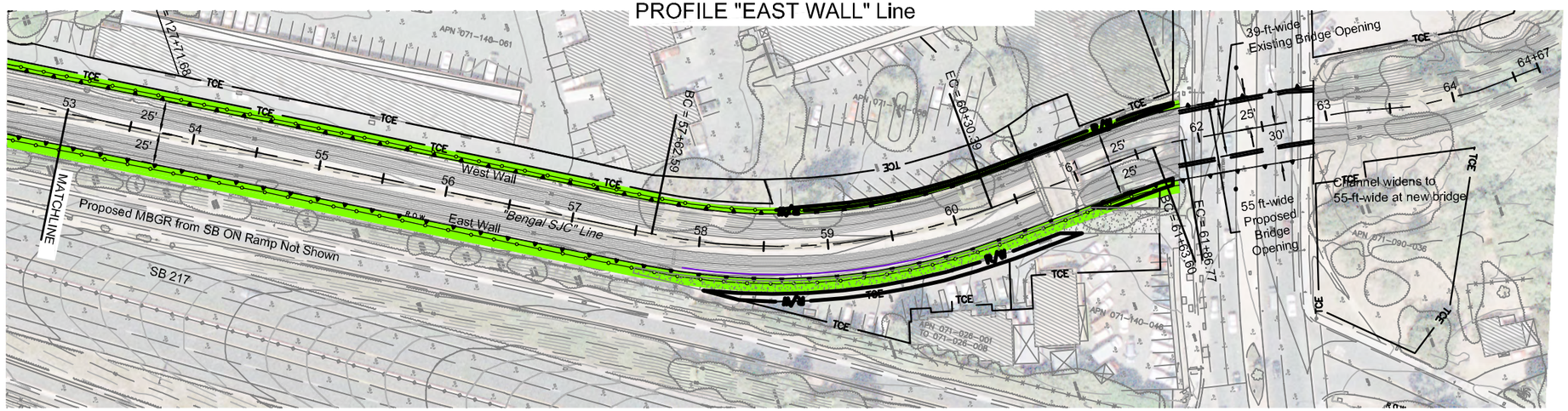


LAYOUT

L-4

SCALE: 1"=50' H
1"=10' v

CALCULATED/ DESIGNED BY	DATE	DATE REVISED:
CHECKED BY		REVISED BY:

PROJECT ENGINEER
S. Onishuk, PE

CITY OF GOLETA: Rosemarie Gaglione, PE; CIP Program Manager

LAST REVISION 12/31/09

FOR REDUCE PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USER NAME:
DWG FILE:

CU

EA

Final
Mitigated Negative Declaration/ Environmental Assessment Addendum
San Jose Creek Capacity Improvement Project

April 2008

Prepared for
City of Goleta

Prepared by
SAIC

CITY OF GOLETA
INITIAL STUDY/FINAL MITIGATED NEGATIVE DECLARATION/ENVIRONMENTAL ASSESSMENT ADDENDUM
07-MND-01

1. **PROJECT TITLE:** San Jose Creek Capacity Improvement Project; Case No. 06-127-DP (cz)

2. **LEAD AGENCY NAME & ADDRESS:** City of Goleta, 130 Cremona Drive, Suite B, Goleta, CA 93117

3. **CONTACT PERSON & PHONE NUMBER:** Rosemarie Gaglione, Senior Project Manager; (805) 961-7569

4. **APPLICANT:** City of Goleta
130 Cremona Drive, Suite B
Goleta, CA 931

AGENT: This document was written on behalf of the City of Goleta by Science Applications International Corporation. 5464 Carpinteria Avenue, Suite K. Carpinteria, CA 93013. Project Manager: Trevor Pattison (805)566-6447

5. **PROJECT LOCATION:** Hollister Avenue and San Jose Creek near Hollister Ave, (Figure 1), Goleta, CA (34º26'10.14" N, 119º49'08.20" W) 100 feet upstream and approximately 4,000 feet downstream of Hollister Avenue.

6. **DESCRIPTION OF PROJECT ALTERNATIVES:**

Introduction

The City of Goleta is proposing a flood control capital improvement project along a section of San Jose Creek from just upstream of the Hollister Avenue Bridge to just downstream of South Street. A Final Mitigated Negative Declaration/Environmental Assessment (MND/EA) was prepared in May 2007, but full funding could not be secured for the project without a fish passage component. Additional design work was completed to add fish passage, and this addendum to the Final MND/EA addresses those changes in the project. The revised proposed project is the design and installation of modifications to the existing concrete channeling and flood protection to provide improved flood protection and fish passage for this portion of San Jose Creek. Components of the proposed project include the removal and replacement of portions of the existing concrete channel with an improved channel design that provides for fish

passage, removal of an existing secondary steel bridge (located approximately 100 feet downstream of the Hollister Avenue Bridge), and relocation of an existing sewer line currently suspended from the steel bridge so that it is no longer susceptible to damage from flood flows and debris flowing down San Jose Creek. The sewer line would be relocated to go east underneath State Route 217 and thereby eliminate a sewer line crossing of San Jose Creek.

This joint MND/EA is intended to fulfill the requirements of the California Environmental Quality Act (CEQA) (PRC 21000 et seq.) and the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321-4370d). This EA has also been prepared to address requirements of the following statutes:

- National Historic Preservation Act (NHPA), 16 U.S.C. §§ 470-470x-6;
- Clean Water Act (CWA), 33 U.S.C. §§ 1251-1387;
- Clean Air Act (CAA), as amended, 42 U.S.C. §§ 7401-7671p, including 1990 General Conformity Rule;
- Executive Order (EO) 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, 11 February 1994;
- EO 13045 – Protection of Children from Environmental Health Risks and Safety Risks, 23 April 1997;
- Endangered Species Act (ESA), 16 U.S.C. §§ 1531-1544;
- Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et. seq., as amended;
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 et. seq., as amended;
- EO 13101 – Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition;
- EO 13123 – Greening the Government Through Efficient Energy Management; and
- EO 13148 – Greening the Government Through Leadership in Environmental Management.

The City of Goleta is the state lead agency for CEQA compliance. This MND/EA is being jointly prepared in accordance with NEPA because proposed project funding may be requested from various federal funding sources including the Federal Emergency Management Agency (FEMA). However, no federal lead agency has been identified at this time.

This document follows the City of Goleta Initial Study/Mitigated Negative Declaration checklist; however, some sections of the document have been modified to include standard components of NEPA documents.

Background

The Santa Barbara County Flood Control District (SBCFCD) is an independent special district that owns and maintains the San Jose Creek flood control channel. Their primary mission is to provide flood protection. The City owns and maintains the Hollister Avenue Bridge. The City is a participant in the National Flood Insurance Program (NFIP) and has regulatory authority over all

flood hazard areas within the City. Any modifications to the channel must be approved by the SBCFCD. In addition, FEMA must approve any changes to the flood hazard maps resulting from this project. Both the City and SBCFCD have permit authority and a vested interest in completion of the project. SBCFCD has agreed to participate in funding construction of the project with the inclusion of a fish passage design component, which is part of the proposed project. SBCFCD would continue to maintain this section of creek after the project is finished.

Purpose

The purpose of this project is to eliminate an existing flood hazard in the Old Town area of the City of Goleta (extending from Hollister Avenue south to the ocean and between Kellogg Avenue and Fairview Avenue) and to allow steelhead passage. The proposed project would implement capital improvements to existing infrastructure associated with San Jose Creek consistent with Implementation Action SE-IA-2 and Safety Element Policy SE 6.8 of the City of Goleta General Plan (2006). The purpose and related objectives of the proposed project are to:

- Engineer and implement an improved channel design for San Jose Creek (the creek is currently channeled at the project location; however, the existing design does not adequately provide flood protection to the area).

Need

The proposed project is needed to eliminate the current flooding that occurs in much of Old Town Goleta due to breakout along San Jose Creek (flooding of Old Town Goleta from San Pedro Creek would not be eliminated with this project). The project is also needed to provide a channel design that allows passage of steelhead through this section of creek. Under existing conditions, hazards associated with the breakout of San Jose Creek occur, resulting in historic flooding extending from Hollister Avenue south to the ocean and between Kellogg Avenue and Fairview Avenue. To eliminate the San Jose Creek flooding hazard in a large part of Old Town Goleta, the City of Goleta identified the need for a capital improvements project to re-design portions of the existing channeling of the creek, extending from Hollister Avenue to the termination of the channel (City of Goleta 2006). Additionally, the length of the existing smooth concrete channel creates a barrier to fish passage, and the channel re-design can accommodate fish passage.

The project also involves relocating a sewer line that is currently suspended from the metal secondary access bridge, thereby eliminating the potential for damage to this pipeline from high flows and debris that could result in spills to the creek.

6.1 Proposed Project

Channel Modifications

Transition to Vertical Walls under Hollister Avenue Bridge: Approximately 80 feet upstream of Hollister Avenue a transition will start to make the change from existing natural banks to the vertical walls required under Hollister Avenue (see Sheets 2 and 6 in Attachment A). Approximately 50 feet of vegetated banks would be graded, and composite revetment with joint plantings would be placed at slopes up to 1.5:1 (this is the steepest slope for ungrouted rock). The composite revetment would likely need to continue across the bottom of the channel. The composite revetment would consist of various sizes of rock and soil placed in layers with willow cuttings placed in-between the layers of rock (cuttings would be on slopes only – not on the channel bottom). The result would be a rock bottom and vegetated rock side slopes that are

strong enough to control scour. The bottom of the channel would be shaped to include a 10- to 12-foot wide notch for fish passage. The concrete channel in the 25 feet of creek adjacent to the bridge would be removed and replaced with concrete sides and bottom to form the transition to the vertical walls under the bridge. The concrete section of transition would also have a 10- to 12-foot wide fish passage notch that is 2 to 3 feet deep. The slope along the channel would be less than approximately 4 percent to accommodate fish passage.

The most likely method for construction of the new concrete transition section would include the use of soil nails and top down construction. This method would include excavating the first 5 feet of bank and placement of soil nails (steel placed in 4- to 6-inch diameter drilled and grouted holes perpendicular to the wall). Reinforcing steel would be followed by placement of concrete using the shotcrete method (concrete shot onto the surface with air). After the concrete for the first 5 feet of bank is cured, the process would be repeated for the next 5 feet. The banks would be approximately 12 to 15 feet high closest to the bridge. To have sufficient space for fish passage and to convey flood flows under the bridge, the channel will need to be deepened approximately 5 feet within the fish passage notch and approximately 1.5 feet over the remainder of the channel bottom.

The specific shape of the concrete surfaces would be refined during the final design process to efficiently meet fish passage needs and flood control requirements. This could include changes to the height of the vertical wall inside the channel at various locations, changes to the length of the 3.5 foot high flood wall along the length of the project, and changes to the amount of existing channel slope that needs to be reconstructed. These changes would be contained within the existing project limits.

Excavation below the creek bed would likely require dewatering to lower the groundwater and keep the excavated trench dry. Dewatering would be by use of dewatering wells placed along the area to be excavated at approximately 30-foot spacing. Water from these wells would be discharged into the stream channel below the work area using energy dissipation for aeration and to prevent scour, or as specified in project permits. The final dewatering system (such as containment within a sedimentation pond or other feature prior to discharge) would be developed in accordance with all required permits and in coordination with appropriate state and federal agencies.

If any flow is present when the creek work begins or could be present at any time during the work, a diversion system would be installed to bypass that water from upstream of the work to downstream of the work. This diversion would likely consist of a temporary dike made of clean material (e.g., sand bags or gravel wrapped in plastic) and one or more pipes to carry the water downstream. Energy dissipation would be provided at the downstream end of the pipes.

Hollister Avenue Bridge: Under the existing Hollister Avenue Bridge, the channel would need to be modified to create sufficient capacity for flood flows and a notch for fish passage. The existing trapezoidal concrete section would be removed and replaced with vertical walls (see Sheet 6 in Attachment A). The distance between the vertical walls would be approximately 33 feet.

The construction of this section would be similar to the top down construction described for the concrete transition section. Care would be taken to maintain constant soil pressure against the existing bridge pile foundation to preserve the ability of the piles to support the bridge.

Transition Downstream of Hollister Avenue Bridge: In the 70 feet immediately downstream of the bridge the existing concrete channel would be removed and replaced with a transition from vertical walls under the bridge to the existing trapezoidal section on the west side of the channel and a new concrete section on the east side of the channel (see Sheet 2 in Attachment A).

Channel Downstream of Hollister Avenue: The existing concrete channel on the west side of the creek would remain for approximately 3,000 feet downstream of Hollister Ave. The existing concrete channel on the east side of the channel would be removed and replaced with a new concrete channel that includes a 10- to 12-foot wide fish passage notch (see Sheets 2-8 in Attachment A). Where necessary to provide flood capacity, fish passage, and maintenance access along the bottom of the creek, the east bank would include a 4- to 6-foot high vertical wall at the top of the slope. A metal beam vehicle barrier would be placed behind the vertical wall. The channel would be widened 7 to 12 feet on the east side to accommodate the fish passage and flood control components of the project. This widening would reduce the width of the existing driveway and eliminate the existing Flood Control Access Road along the east side. The remaining driveway width will be sufficient for access, and Flood Control will use access along the west side of the channel and along the bottom of the channel instead of access along the east side of the channel.

The existing steel vehicle bridge (located approximately 100 feet downstream of the Hollister Avenue Bridge) within this section of channel must be removed to provide the required channel capacity and fish passage. The bridge currently provides an alternative access for businesses in the area and more importantly support for a sewer line serving the businesses on the east side of the creek. The sewer line currently hangs below the existing steel bridge and is at risk of damage from debris floating in the creek. The sewer line would be relocated to travel east under State Route 217 to an existing sewer line in Ward Drive.

The businesses between State Route 217 and San Jose Creek would retain their access to Hollister Avenue, or if access to Hollister Avenue cannot be maintained due to other improvement projects along Hollister Avenue, the metal bridge would be replaced to provide access. Jack and bore is the most likely method to be used to install the new sewer line under State Route 217 without disturbing the highway. This construction would include a jacking pit approximately 10 feet wide and 8 feet deep by 30 feet long on each side of State Route 217. From the jacking pit the pipe would be jacked (pushed with soil augured out) to the receiving pit. From each end of the jacked pipe, the new sewer pipe would be installed by trenching to connect to the existing sewer lines for the buildings on the west end and the existing sewer line in Ward Drive on the east end.

3,000 to 4,000 feet Downstream of Hollister Avenue: Both the east and west sides of the channel would be reconstructed to provide the required flood capacity and fish passage. The channel would be widened to approximately 75 feet and extend from the existing Caltrans fence to within approximately 2 to 3 feet of the existing Kellogg Avenue (see Sheets 5, 7, and 8 in Attachment A). Due to vertical constraints associated with an existing 30-inch diameter sewer line, the fish passage channel in this area would transition from being 2 to 3 feet deep to being contained with an 8- to 12-inch high concrete berm along the bottom of the channel.

A new 42-inch high flood wall would be installed along the outer edge of the west bank from approximately 2,000 feet downstream of Hollister to just downstream of South Street. Excavation for these walls would be 3 to 5 feet deep. A safety fence would be installed on top of the flood wall. Where there is not a wall the existing chain link fence would remain.

Access Ramps Downstream of South Street: The existing access ramps downstream of South Street on the west side would be reconstructed to accommodate the wider channel and access to the bottom of the channel for cleaning and other maintenance. This component of the project would occur within the Coastal Zone (see Sheet 5 in Attachment A).

Fish Passage

The design concept for the proposed project was developed to eliminate the flooding in Old Town Goleta as a result of breakouts from San Jose Creek and to improve fish passage along this section of the creek. The existing channel design acts as a barrier to fish passage. The City enlisted the expertise of a fish passage engineer to work with the project engineers and develop a strategy for improved fish passage while meeting the flood control goals. Two workshops were held with local stakeholders and concerned citizens to discuss fish passage conceptual alternatives that would meet flood control and environmental goals (see Section 6.4 below). As a result, the proposed project includes a slotted weir design component for low flows in the fish passage notch with embedded 8- to 12-inch boulders and small weirs (refer to Sheet 8 in Attachment A), that provide low energy resting areas for the fish. This fish passage component is included for the entire length of the proposed project area with some modifications where the creek crosses a buried sewer line, as described above, that is just below the existing channel bed. An alternative to the slotted weir design is also being considered. This alternative is for a roughened channel as shown in Sheet 8 in Attachment A. The slotted weir is the preferred design.

Material Removal and Recycling

Concrete removed during the proposed channel modifications would be recycled. Excess excavated earthen materials would be used for Old Town redevelopment projects or other projects needing fill material.

Area Fill

Low areas on the west bank north of Hollister Avenue that currently allow water to break out of the creek would be filled to contain creek flow (see Sheet 2 in Attachment A). Approximately 900 cubic yards of fill from the creek widening would be placed in this area with an average depth of approximately one foot. The fill may be bounded by a low wall up to 18 inches in height constructed using boulders that are partially buried in the fill. Vegetation within these fill areas would be cleared, although some trees may remain where the fill depth would not adversely affect the trees or the fill can be modified around the trees.

Access

Access for the creek bank work would be from the top of the bank and via one or more temporary ramps constructed down the bank to the bed of the creek. The ramps would be located within the project limits with specific locations of these ramps determined by the contractor based on its methods of construction with approval from the City of Goleta and Santa Barbara County Flood Control. These temporary ramps would be removed when no longer needed. With the construction work in the creek occurring outside the rainy season, no conflicts would occur between contractor operations and Santa Barbara County Flood Control access. Where access in the creek has the potential to damage the creek (natural or concrete), the contractor would use temporary means to reduce the risk of damage including, as appropriate, timber mats and earth fill. Equipment coming from the south would be trucked to the site via

U.S. Highway 101, State Route 217 (Ward Memorial Boulevard), and Hollister Avenue. For equipment coming from the north, the route would be U.S. 101 to Patterson Avenue and then on Hollister Avenue.

Landscaping

Vegetation removed during construction would be replaced by landscaping with native plants (see Table 1 for potential species to be used). These native plants would be installed along both sides of the creek upstream (north) of the bridge, on the east side of the creek for about 140 feet downstream of the bridge, and along the west bank for about 2,000 feet. In addition, as mitigation for disturbing existing riparian vegetation, selected eucalyptus trees along the creek near Armitos Avenue that prevent growth of native riparian plants and that may fall into the creek may be removed and replaced with native trees and shrubs. The eucalyptus trees in and adjacent to the creek are surrounded by other non-native species and have generally prevented native species growth and caused flood control problems in the past. Some eucalyptus trees in this area have fallen into the creek in the past and had to be cut and removed to prevent flooding (stumps remain). Approximately 10 eucalyptus trees would be removed, with the exact trees determined based on access and ecological benefits of replacement. The trees would be cut with a chain saw followed by stump killing. The cut trees would be removed using an excavator or skidsteer with grabber. Native and riparian vegetation removal and replacement is described in more detail under the impact discussion for Biological Resources below.

Table 1. Landscape Plants

Common Name	***Scientific Name***
Western sycamore	*Platanus racemosa*
Fremont cottonwood	*Populus balsamifera trichocarpa*
Coast live oak	*Quercus agrifolia*
Toyon	*Heteromeles arbutifolia*
Coyote brush	*Baccharis pilularis*
California rose	*Rosa californica*
Lemonadeberry	*Rhus integrifolia*
Arroyo willow	*Salix lasiolepis*
Blue elderberry	*Sambucus Mexicana*
Mulefat	*Baccharis salicifolia*
Wild blackberry	*Rubus ursinus*
Gooseberry	*Ribes speciosum*
Giant wild rye	*Leymus condensatus*
California melic grass	*Melica californicus*
Purple needle grass	*Nassella pulchra*
Note: All plants proposed for landscaping are native to the region. The final listing of plants used would be modified based on availability.	

as part of the project description are described in detail following each resource discussion. These measures are required and are considered part of the proposed project.

6.6 List of Cumulative Projects

A list of projects included as part of the cumulative analysis is included as Attachment C. Resource-specific cumulative analysis is provided under each resource description.

6.7 Statement on Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that federal agencies (or projects with a federal nexus) make achieving environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

The purpose of the proposed project is to eliminate an existing flood hazard in the Old Town area of the City of Goleta through implementation of capital improvements to existing infrastructure associated with San Jose Creek at and south of the Hollister Avenue Bridge. The proposed project would provide benefits to the local community by reducing the flood hazard associated with San Jose Creek. As a result, no component of the proposed project would not have a disproportionate effect on environmental justice populations (a disproportionate effect is defined as an effect that is predominantly borne, more severe, or of a greater magnitude in areas with environmental justice populations than in other areas).

7. APPROVAL REQUIRED BY OTHER PUBLIC AGENCIES:

California Coastal Commission (CCC) Coastal Development Permit, U.S. Army Corps of Engineers (USACE) 404 permit, Regional Water Quality Control Board (RWQCB) 401 certification and General Stormwater Construction Permit, California Department of Fish and Game (CDFG) Streambed Alteration Agreement, Goleta Sanitary District, Caltrans, and Santa Barbara County Flood Control District.

8. SITE INFORMATION:

Site Information	
Existing General Plan Land Use Designation	North: Multiple Family/Commercial East: Multiple Family/Commercial South: Commercial/Offices West: Commercial/Offices Creek/Channel: Public & Utility
Zoning Ordinance, Zone District	Article III (Inland Zoning Ordinance), Zoned DR-10 & DR-16 (Design Residential 10 units/acre & Design Residential 16 units/acre)

Site Information	
Site Size	Approximately 4,000 linear feet of San Jose Creek in the vicinity of Hollister Avenue.
Present Use and Development	Existing concrete lined San Jose Creek channel
Surrounding Uses/Zoning	North: Commercial/Multiple family housing South: Commercial/Offices/ Industrial - Coastal Zone occurs approximately 1,900 feet south of Hollister Avenue Bridge (see Attachment A, Sheets 2 through 5). East: State Route 217 West: Commercial/Offices./Industrial Creek/Channel: Public & Utility
Access	Existing: via Hollister and Kellogg Avenues Proposed: same plus ramp into creek
Utilities & Public Services	Water Supply: N/A Sewage: N/A Fire: SB County, Fire Station 12, 5330 Calle Real School Districts: N/A

9. ENVIRONMENTAL SETTING

Resource specific descriptions for all areas potentially affected by the project are provided below under Section 13, Issue Areas.

Slope/Topography

The project area is located in the Goleta Valley, and topography is generally flat with very minor sloping south/southwest towards the Pacific Ocean. At the proposed project site, San Jose Creek is at an elevation of approximately 35 feet above mean sea level. The creek parallels State Route 217 southwest towards Goleta Slough for approximately 1.5 miles.

Fauna

Although the riparian corridor within the project area on the north side of Hollister Avenue is located immediately adjacent to urban areas, the dense riparian vegetation and the continuous presence of fresh water provides cover, forage, and den and nesting habitat for several wildlife species. Terrestrial wildlife observed within the riparian zone during wildlife surveys included Pacific chorus frog (*Pseudacris regilla*); mammals such as raccoon (*Procyon lotor*), California ground squirrel (*Spermophylus beecheyii*), and pocket gopher (*Thomomys bottae*); and common bird species including great blue heron (*Ardea herodias*), American crow (*Corvus brachyrhynchos*), mourning dove (*Zenaida macroura*), acorn woodpecker (*Melanerpes formicivorus*), western scrub jay (*Aphelocoma californica*), black phoebe (*Sayornis nigricans*),

common yellowthroat (*Geothlypis trichas*), California towhee (*Pipilo crissalis*), and song sparrow (*Melospiza melodia*).

Common raptor species, including red-tailed hawk, would be expected to occur in the vicinity; however, no nesting raptors or other evidence of bird nesting were identified during project-specific bird surveys.

The partially armored threespine stickleback (*Gasterosteus aculeatus macrocephalus*) was very abundant in June 2005, and small schools of California roach (*Lavinia symmetricus*) were also present. The stickleback is native to this area while the roach is not. Mosquitofish (*Gambusia affinis*), a non-native, are likely to also be present in the creek.

Flora

Naturally occurring vegetation along the unchanneled sections of the creek north of Hollister Avenue is characterized by dense stands of riparian woodland including arroyo willow (*Salix lasiolepis*), occasional western sycamore (*Platanus racemosa*), and scattered coast live oak (*Quercus agrifolia*) in areas more distant from the creek. Understory vegetation is mostly non-native species including German ivy (*Senecio mikanioides*), giant cane (*Arundo donax*), and periwinkle (*Vinca minor*). Native species such as blackberry (*Rubus ursinus*) and virgin's bower (*Clematis* sp.) are also common, especially on the west side of the creek.

Downstream of the Hollister Avenue Bridge, the channel has a concrete bottom and sides and does not support vegetation, other than filamentous green algae during low flows. The tops of the banks in the channeled sections do support occasional native tree species such as western sycamore and coast live oak. There are also several non-native trees such as eucalyptus (*Eucalyptus* sp.).

Other vegetation in the vicinity of the proposed project includes mostly non-native species and is generally weedy in nature. Landscape plantings associated with roads include bottle brush (*Callistemon* sp.), oleander (*Nerium oleander*), Leptospermum (*Leptospermum* sp.), and ngaio tree (*Myoporum lantum*), which line the area between State Route 217 and San Jose creek. Native shrubs such as coyote brush (*Baccharis pilularis*) are scattered among the landscape plantings. Understory vegetation consists of non-native annual grasses such as bromes (*Bromus* spp.) and oats (*Avena* spp.) and other non-native species such as iceplant (*Carpobrotus edulis*).

Archaeological Sites

The Hollister Avenue Bridge over San Jose Creek is located within the Barbareño Chumash cultural area, which includes evidence of human occupation dating to over 9,500 years ago. The bridge is located in an area considered to be a highly sensitive zone for archaeological resources. A cultural resources record search of relevant archaeological and historic documents, and a surface search were undertaken within the vicinity of the Hollister Avenue bridge over San Jose Creek. One recorded archaeological site was identified within approximately ½ mile of the bridge. CA-SBA-2204/H, the 1880 Joseph Sexton house and barn, is located approximately 1,640 feet from the project area. No other cultural resources were identified or observed.

Surface Water Bodies

San Jose Creek is the subject of the proposed project. The creek is intermittent to perennial with high variability in flows, ranging from dry to large flood events. The creek flows approximately 9 miles from its headwaters to the Pacific Ocean and drains approximately 6,080 acres (City of Goleta 2006). Creek flows correlate strongly with rainfall because of the short flow distance and the steep gradient of many reaches. High creek flows occur during and immediately after heavy rainfall events, which occur almost exclusively between November and April in the project area. Generally, low surface flows or dry conditions exist between rainy periods. Perennial sections are usually in the mountains and foothills (Padre 2003). The project area has intermittent flow as a result of rain events. Within the proposed project area, the creek has a shallow gradient and is surrounded by urban and agricultural development. The creek is channeled downstream of the Hollister Avenue Bridge with concrete banks and bottom. Upstream of the bridge, the creek has natural banks and bottom.

Surrounding Land Uses

The project vicinity contains a range of commercial, vacant, residential, and accompanying land use/zoning designations. The City of Goleta Final General Plan designates the following land uses adjacent to the site: multiple family, offices, industrial, and commercial. Zoning to the north and east of Hollister Avenue Bridge is multiple family/commercial; zoning to the south and west of the bridge is commercial/offices.

The Coastal Zone boundary occurs approximately 1,900 feet south of the Hollister Avenue Bridge and includes the downstream section of San Jose Creek as well areas to the east and south.

Existing Structures

Structures in the vicinity of the proposed project are limited to buildings associated with commercial development. Hollister Avenue crosses San Jose Creek at the proposed project area (Hollister Avenue Bridge), and a small metal bridge is also present just downstream of Hollister Avenue.

10. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist and analysis on the following pages:

- □ Aesthetics
- □ Agricultural Resources
- ■ Air Quality
- ■ Biological Resources
- ■ Cultural Resources
- ■ Geology/Soils
- ■ Hazards and Hazardous Materials
- ■ Hydrology/Water Quality

- ■ Land Use/Planning
- □ Mineral Resources
- ■ Noise
- □ Population/Housing
- □ Public Services
- □ Recreation
- ■ Transportation/Traffic
- □ Utilities/Service Systems
- ■ Mandatory Findings of Significance

11. DETERMINATION

On the basis of this environmental checklist/initial study:

- □ I find that the proposed project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.
- ■ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- □ I find that the proposed project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required.
- □ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- □ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier environmental impact report or mitigated negative declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier environmental document, including revisions or mitigation measures that are imposed upon the proposed project and that a subsequent document containing updated and/or site specific information should be prepared pursuant to CEQA Sections 15162/15163/15164.
- □ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier environmental impact report or mitigated negative declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier environmental document, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Patricia S. Miller, Manager
Current Planning Division

April 2008
Date

BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓			
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓			
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			✓		

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			✓		
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			✓		
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				✓	

Existing Setting

Vegetation. Naturally occurring vegetation upstream (north) of the existing Hollister Avenue crossing of San Jose Creek consists of dense riparian woodland. The dominant tree species is arroyo willow (*Salix lasiolepis*) with scattered coast live oaks (*Quercus agrifolia*) in areas more distant from the creek. Occasional western sycamores (*Platanus racemosa*) line the creek. Upland areas to the east support a grove of non-native walnut trees that are not maintained.

The willows have been established for many years, and most of them consist of numerous branches that grow horizontally for 10 to 20 feet, then grow upward. This growth pattern is somewhat unusual, but could be caused by high stream flows or winds bending stems. Due to this growth form, individual trees provide large areas of cover, and there are relatively few trees, despite a well-developed canopy. Understory vegetation is very dense and consists of mostly non-native species including German ivy (*Senecio mikanioides*), giant cane (*Arundo donax*), and periwinkle (*Vinca minor*). Native species such as blackberry (*Rubus ursinus*) and virgin's bower (*Clematis* sp.) are also common, especially on the west side of the creek.

Downstream of the bridge (south) the channel has a concrete bottom and sides and does not support vegetation, other than filamentous green algae during low flows. Occasional trees populate the tops of the banks including native species such as western sycamore and coast live oak. There are also several non-native trees such as eucalyptus (*Eucalyptus* sp.).

The area proposed for the bridge is within a designated Environmentally Sensitive Habitat Area (ESHA). It is considered an ESHA due the presence of San Jose Creek, wetlands, and native woodlands. Drainage improvements and public road crossings are generally permitted in ESHAs where there is no feasible, less-environmentally damaging alternative and where mitigation measures would avoid or lessen impact to the maximum extent feasible (City of Goleta 2006).

Other vegetation within the area of potential effect is mostly non-native and generally weedy in nature. Several landscape plantings including bottle brush (*Callistemon* sp.), oleander (*Nerium oleander*), Leptospermum (*Leptospermum* sp.), and ngaio tree (*Myoporum lantum*) line the area between State Route 217 and San Jose creek. Native shrubs such as coyote brush (*Baccharis pilularis*) are scattered among the landscape plantings. Understory vegetation consists of non-native annual grasses such as bromes (*Bromus* spp.) and oats (*Avena* spp.) and other non-native species such as iceplant (*Carpobrotus edulis*).

A large sycamore tree known as the "Witness Tree" is located at the Sizzler Restaurant on the west side of the creek. Another large sycamore tree located on the upper bank of the creek approximately 150 feet north of the Hollister Avenue Bridge is known as the "Sister Witness Tree". Both of these trees are located outside the area of potential effect.

Wetlands. There are two wetland definitions widely-used for assessing and delineating areas as wetlands: federal and state, as defined below.

1. **Federal** wetlands are consistent with definitions maintained by the U.S. Army Corps of Engineers, pursuant to Section 404 of the Clean Water Act. This delineation method follows the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and is used for most federal permits. A "wetland" under this definition may be within or adjacent to Waters of the U.S. In general, this method requires a jurisdictional wetland area to meet three separate criteria: hydrophytic vegetation, wetland hydrology, and hydric soils.

   Hydrophytic vegetation is defined as macrophytic vegetation that is adapted to, and occurs in, areas where soils are frequently or permanently saturated for sufficient duration to exert a controlling influence on the plant species present. Plant species adjacent to the delineation pit were identified and included following the "50/20 rule," meaning that plant species in each layer of the vegetation (herb, shrub, tree, and vine) were included in order of abundance until at least 50 percent of total vegetation cover was accounted for, and all species with at least 20 percent relative cover were included. Indicator status of individual plant species follows the 1988 National List of Plant Species that Occur in Wetlands (available at http://www.nwi.fws.gov/bha/).

   Wetland hydrology refers to inundation and/or saturation of the soil by flooding or a shallow water table for a prolonged period during the growing season, such that the character of the soil and vegetation are substantially different from areas that do not experience inundation/saturation in this manner. Geomorphic features associated with flooding (e.g., channels, shorelines) and sediment deposits are among the indicators of wetland hydrology.

Hydric soils are defined as soils that are sufficiently ponded, flooded, or saturated throughout the growing season to produce anaerobic conditions which favor the growth of hydrophytic vegetation (Environmental Laboratory 1987). Hydric soils are identifiable based on observable properties that result from prolonged saturated-anaerobic conditions. To assess whether hydric soil was present at each sample point, a soil pit was excavated to a depth of 16 inches (when possible), and soil attributes (including color, mottling, texture, grain size, structure, streaking, degree of saturation) were recorded on the delineation forms. Soil colors were assessed using Munsell Soil Color Charts (Munsell Color 1992). Other than direct observation of saturated conditions, low chroma (dark) soil colors are among the most conspicuous indicators of hydric soils.

2. **State** wetlands require that only one of the three previously mentioned U.S. Army Corps of Engineers criteria must be met. This wetland definition is used by the California Department of Fish and Game, California Coastal Commission, the City of Goleta, and the U.S. Fish and Wildlife Service.

Both state and federal wetlands are present north (upstream) of the Hollister Avenue Bridge. A one-foot wide strip of Corps wetlands occurs at the water's edge on both sides of the creek extending upstream from the end of the concrete channel about 25 feet upstream of the bridge (north of Hollister Avenue). It is dominated by umbrella sedge (*Cyperus* sp.) and kikuyu grass (*Pennisetum clandestinum*). The federal wetlands are not well developed in terms of vegetation (i.e., do not have dense cover of wetland plants), and these plants are periodically removed by scour during high flows. The state wetland along the natural channel is substantially bigger, measuring approximately 80 feet wide, which includes vegetated banks and the flowing water channel. Some state wetland is also present adjacent to the short (about 25 feet) section of concrete channel extending upstream from the Hollister Avenue bridge. The state wetland consists of arroyo willows on the banks with an understory of blackberry (*Rubus ursinus*). The flowing channel is unvegetated, but is still considered a state wetland due to the presence of water.

The concrete channel from just upstream of the Hollister Avenue Bridge southward to below the project area is not considered to be a state or federal wetland because the channel does not meet any of the three wetland criteria, but it is considered waters of the United States. Even though water is present much to all of the year, no soil is inundated or saturated, and the hydrology criterion is not met.

Wildlife (Terrestrial and Aquatic). San Jose Creek has perennial water in at least segments upstream from the Hollister Avenue crossing because fish are present. The bottom substrate is primarily silt and sand just upstream of Hollister Avenue with some gravel and cobbles further upstream. The partially armored threespine stickleback (*Gasterosteus aculeatus macrocephalus*) was very abundant in June 2005. Small schools of California roach (*Lavinia symmetricus*) were also present. The stickleback is native to this area while the roach is not. Other fish species that could be present include mosquitofish (*Gambusia affinis*), a non-native. Steelhead (*Oncorhynchus mykiss*), a native, is discussed below under special status species. Common aquatic invertebrates are present, and filamentous green algae occur during the summer.

Although the riparian corridor within the project area is located immediately adjacent to urban areas, the dense riparian vegetation and the continuous presence of fresh water provides cover, forage, and den and nesting habitat for several wildlife species. Terrestrial wildlife observed within the riparian zone during the SAIC 2005 wildlife surveys included Pacific chorus frog (*Pseudacris regilla*); mammals such as raccoon (*Procyon lotor*), California ground squirrel

(*Spermophylus beecheyii*), and pocket gopher (*Thomomys bottae*); and common bird species including great blue heron, American crow, mourning dove, acorn woodpecker, western scrub jay, black phoebe, common yellowthroat, California towhee, and song sparrow. No bats were observed at the Hollister Avenue Bridge, although they could potentially roost there. However, the amount of potential roosting habitat is small and of marginal quality. Swallows also could nest on the bridge structure.

Special Status Species. Special status species are those that are state- or federally-listed as threatened or endangered, candidates for such listing, state Species of Special Concern, or California Native Plant Society (CNPS) List 1B. A search of the California Natural Diversity Data Base (CNDDB) and other literature sources as well as field surveys of the project area indicate that few special status species could be present. Table 2 summarizes those species. No sensitive plants or wildlife were observed at the bridge or approximately 1,500 feet up or downstream of the bridge during the SAIC 2005 surveys. A number of non-sensitive bird species are expected to nest within the riparian habitat, and these birds and their nests are protected under the Migratory Bird Treaty Act (MBTA).

Table 2. Special Status Species Potentially Present in Project Area

Common Name	***Scientific Name***	***Status***		***Notes***
		Federal	***State/CNPS***	
Southern tarplant	*Centromadia parryi* ssp. *australis*	--	--/1B	Near the intersection of Hollister and Kellogg; last seen in 1959
Southern steelhead	*Oncorhynchus mykiss*	E	SSC	One captured in San Jose Creek in 1975
California red-legged frog	*Rana aurora draytonii*	T	SSC	Potential habitat upstream of Hollister Avenue
Sources: CNDDB 2006, NMFS no date.				

The following describes each of these species.

Southern tarplant. The southern tarplant is not expected to occur within the work areas. The CNDDB record near the intersection of Kellogg Avenue and Hollister Avenue is prior to much of the development that is currently present in that area, and none were observed by a qualified biologist during field surveys for the project in 2005.

California red-legged frog. Adults prefer dense, shrubby or emergent riparian vegetation closely associated with deep (more than 2.3 feet in depth), still or slowly moving water. However, they have been observed to occur in a variety of habitat types, including aquatic, riparian, and upland habitats with permanent water nearby. California red-legged frogs breed from November through April. Eggs hatch in 6 to 14 days while larvae take 3.5 months or longer to metamorphose. California red-legged frogs may live 8 to 10 years. The frogs disperse upstream and downstream of breeding habitat to forage and seek resting habitat. They take cover in small mammal burrows and moist leaf litter (up to 100 feet from water) in dense riparian vegetation with drying of creeks in summer, but will use other cover sites when traveling overland. Adults can be found within streams over 1.8 miles from breeding habitat and within dense riparian vegetation more than 328 feet from water. After winter rains begin, California red-legged frogs may move away from aquatic habitats, primarily at night, and can travel one mile from those habitats (USFWS 1997). Juveniles may also disperse locally shortly after metamorphosis in July-September and away from their natal habitats during warm rain events. No California red-legged frogs have been reported in the San Jose Creek

drainage (CNDDB 2006), and none were observed within the channel during the USFWS protocol surveys conducted by a qualified biologist for this species in May and June 2005 (See Attachment D). Habitat potentially suitable for movement of this species was observed in the channel upstream of the Hollister Avenue bridge. The project is not within any designated critical habitat units for the red-legged frog (USFWS 2006).

Steelhead. Adult steelhead enter coastal creeks during winter runoff events from October through March, lay their eggs in gravel beds (late February through March), and then return to the ocean in the spring (March through July) before sand bars close the mouth of the creek. Fry emerge from the gravel in 2 to 6 weeks after hatching in late May to early June and disperse throughout the creek, typically occupying shallow areas along stream margins. The young remain in freshwater for one or more years before migrating to the ocean, also in March through July (NOAA 1997, Titus et al. 2003). Juvenile steelhead may spend several weeks in the coastal lagoon or estuary of a stream before entering the ocean. They reside in the ocean for 2 to 3 years before returning to their natal stream to spawn (NOAA 1997), although in wet years steelhead may return to spawn after only 1 year in the ocean (Moyle et at. 1995). The adults can spawn more than once, although most do not spawn more than twice (NOAA 1997). Optimal habitat for steelhead throughout its range on the Pacific Coast can generally be characterized by clear, cool water with abundant instream cover, well-vegetated stream banks, relatively stable water flow, and a 50:50 pool-to-riffle ratio (Raleigh et al. 1984). Although optimal water temperatures for steelhead are considered to range from 12 to 20ºC, various sources document southern steelhead as persisting in streams with water temperatures ranging from 14.4 to 25.5ºC during the summer and early fall months of drought years (Titus et al. 2003). The critical thermal maximum is reported to be up to 29.4ºC (Lee and Rinne 1980). No spawning or rearing habitat is present in the project area, although adults and juveniles could pass through the area. An adult steelhead was caught at an unspecified location in the creek in 1975 (Titus et al. 2003). The concrete lined section downstream of Hollister Avenue has been identified as a complete barrier to upstream movement of steelhead (Stoecker 2002). Other partial and complete barriers are present higher in the watershed. The project area is within the Southern California Evolutionarily Significant Unit (ESU) for steelhead that includes coastal drainages south from (and including) the Santa Maria River. San Jose Creek is within designated critical habitat for this species (NOAA 2005).

Thresholds of Significance

A significant impact on Biological Resources would be expected to occur if the proposed project resulted in any of the impacts noted in the above checklist. Additional thresholds are contained in the City's *Environmental Thresholds & Guidelines Manual*.

The City's adopted thresholds of significant environmental impact(s) for biological resources indicate the potential for a significant impact if a proposed project would result in any of the following:

a) Conflict with adopted environmental plans and goals of the community where it is located;

b) Substantially affect a rare or endangered plant or animal species;

c) Substantially interfere with the movement of any migratory or resident fish or wildlife species;

d) Substantially diminish habitat for fish, wildlife, or plants.

Of these, only *d* is not covered specifically in the checklist and will be addressed as *g*.

Project Specific Impacts

Impacts presented below would predominately occur outside of the Coastal Zone and be associated with the replacement of the Hollister Avenue Bridge and restoration of the native areas of San Jose Creek. Parts of the project that would occur along Kellogg Avenue, including a portion of the low retaining wall and safety fence, would occur within the Coastal Zone boundary (Coastal Zone boundary is approximately 1,900 feet south of the Hollister Avenue Bridge (see Sheets 2-5 in Attachment A).

Proposed Project

a) Construction activities in the creek would include removal and replacement of the existing concrete channel walls and bottom, excavation to widen the creek bed and form a fish passage notch, and installation of rock for the transition from the concrete walls to natural bank over approximately 50 feet of the stream north of the bridge. These activities would be scheduled during the dry season when the creek is dry or flows are at their lowest. If flow were present, that water would be diverted through the work area using pipes. This schedule would avoid interference with movement of steelhead that enter Goleta Slough and attempt to migrate up San Jose Creek because upstream movement would not occur at that time and the concrete section poses a barrier to such movement so that no steelhead juveniles would be migrating to the ocean. As a result, no impacts to steelhead would occur. As noted in the Steelhead Assessment and Recovery Opportunities in Southern Santa Barbara County (Stoecker 2002), the concrete lined section of creek where the in-channel work would occur is an upstream barrier to adult steelhead upstream migration. Installing the proposed fish passage notch the length of this section of creek bottom would substantially enhance steelhead passage to areas above Hollister Avenue while still accommodating the required 100-year flood event as well as allowing maintenance by the County Flood Control District.

   No habitat for California red-legged frogs is currently present in the concrete lined channel to be removed and replaced. Because none were observed upstream of the project site during surveys in 2005, none have been reported in the drainage or in any drainages nearby within the urban area (CNDDB 2006, USFWS 2005), and dense urbanization is present between San Jose Creek and other streams in the area, the species is very unlikely to be present in the project area during construction. Installation of a water diversion, if needed, to pass creek flow beyond the work area would require work in potential habitat. Extending the rock transition about 50 feet upstream from the end of the existing concrete wing walls would alter potential habitat in that location. Once construction is complete, the rocky bank would provide potential habitat in the form of crevices and vegetation for cover. During construction, no impacts to red-legged frogs are predicted to occur. If, however, individuals of the species were to be present and entered the work area, impacts would have the potential to be significant.

b) Removal of riparian trees would occur during excavation and bank realignment, staging, and access. Up to three western sycamores would be removed. One western sycamore on the west bank just upstream of the boulder slope north of the bridge would be avoided if a suitable project design can be developed. The two western sycamores on the east bank adjacent to the Mission City Leasing property south of the bridge are too close to the work area to be avoided. In addition to sycamores, several coast live oak trees are in the area that would be affected by the proposed project. Only one would be removed, and it is located very close to the top of the existing concrete wall south of Hollister Avenue. All

other oak trees and their critical root zones would be avoided and protected during construction. Impacts to native trees would be significant but mitigable.

Approximately 0.13 acre of riparian vegetation, that is primarily arroyo willow and associated understory, could be removed by the proposed project on the north side of Hollister Avenue. This area includes the vegetated portion of the state wetlands discussed below. Removal would be limited to that necessary for construction. Impacts would be significant but mitigable.

Removal of non-native trees, shrubs, and herbaceous vegetation would occur on the bank between Kellogg Avenue and State Route 217. A few additional non-native trees, particularly eucalyptus, would be removed between Kellogg and Hollister Avenues. This would be a less than significant impact. Selected eucalyptus trees also may be removed along the creek banks near Armitos Avenue to increase native vegetation in the creek precluded by the non-native eucalyptus trees and to decrease flood risks associated with the trees falling into the creek. Removal of these eucalyptus trees has the potential to damage adjacent native riparian vegetation, a significant but mitigable impact.

In addition, construction activities such as washing of concrete trucks and other equipment could result in the introduction of substantial levels of pollutants into San Jose Creek. The potential for such activities to affect surface water quality in the area is high because construction of the new creek channel walls would occur within the creek. Best management practices (BMPs) would be implemented to prevent pollutants from entering the creek during the work. These include measures described under Hydrology and Water Quality below. This would reduce the short-term impacts of these construction activities on biological resources.

c) Construction would result in temporary removal of up to 100 square feet (less than 1/100th of an acre) of Corps wetland. For state wetlands, up to 4,500 square feet of vegetated wetland on the stream banks would be temporarily lost and 1,000 square feet of the stream channel (open water) would be temporarily disturbed (Table 3). Overall impacts to state wetlands would be less than significant because disturbances to the wetted channel would be temporary and the riparian vegetation removed would be replaced, resulting in no loss of state wetlands. (Sheet 2 in Attachment A was used for calculating the state wetland losses and gains.) Overall impacts to Corps wetlands would be less than significant because the area lost would be small and has minimal wetland functions due to its size, shape (two linear strips 1 foot wide by 50 feet long), and sparse vegetation cover.

Table 3. State Wetland Impacts

Location	***Area (ft^2)***
Water in natural channel – temporary disturbance during construction (20'X50')	1,000
Vegetation along natural channel – temporary loss during construction (60'X50')	3,000
Vegetation on bank, Hollister Avenue bridge to natural channel – temporary loss during construction (60'X25')	1,500
Total temporary loss	4,500
Bank vegetation to be replanted(6075')	4,500
Natural channel remaining ()20'X50')	1,000
Created wetlands	4,500
Note: Actual impacts will be determined at the end of construction	

d) Construction activities would not substantially interfere with movement of aquatic species because construction in the stream bed would be conducted in the dry season when native migratory fish, such as steelhead, would not be using this corridor. Other native aquatic species are not migratory, but local movements would not be substantially impeded. Once construction is completed, the new fish passage notch would improve the movement corridor for aquatic species. Construction would not substantially alter terrestrial wildlife movement corridors because only a small area of trees (0.13 acre) would be removed at the north side of Hollister Avenue, leaving the remaining riparian corridor intact for wildlife movement. Replanting of trees after construction is complete would restore the small area temporarily lost. Impacts would be less than significant.

e) The project would not conflict with local policies for protection of biological resources. Work within ESHA would be consistent with General Plan Policies CE 1.6 and 1.7. The creek and riparian area upstream of the Hollister Avenue Bridge would be protected to the extent feasible during construction and would be restored after construction as required in Policies CE 2.1 and 2.2. All native trees removed would be replaced at ratios compatible with these local policies. Installation of the new flood control measures would be consistent with Policies CE 2.5 and 2.6 and would enhance the creek where the natural bed is to be restored. Construction would temporarily affect wetlands and would be consistent with Policies CE 3.5 and 3.6. The project is designed to avoid impacts to special status species in accordance with Policy CE 8. Native trees would be protected, and those that have to be removed would be replaced in accordance with Policy CE 9. The project would not affect ESHA (Coastal Act Policies 30107.5 and 30240) or biological productivity of creeks (Coastal Act Policy 30231) within the Coastal Zone. Flood control measures installed in the Coastal Zone would be consistent with Policy 30236. Impacts would be less than significant. Neither the Witness Tree nor the Sister Witness Tree, and their critical root zones, would be affected by project activities because they are located outside the work area.

f) There are no Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plans that either affect the project site or would be in conflict with the project. Therefore, the proposed project poses no potential to generate such impacts.

g) Reconstruction of the concrete channel to include a fish passage notch would improve habitat for migratory fish such as steelhead. The existing sloped wing walls north of the bridge would be replaced by vertical walls with boulders forming most of the slope to tie into the existing creek channel upstream of Hollister Avenue. Native species would be planted in the boulders (see Sheet 6 in Attachment A), and the native trees removed during the channel modification would be replanted to meet local requirements. Thus, the project would not substantially diminish habitat for fish, wildlife, or plants, and impacts would be less than significant.

Removal of non-native trees, shrubs, and herbaceous vegetation would occur on the bank between Kellogg Avenue and State Route 217. A few additional non-native trees, particularly eucalyptus, would be removed between Kellogg and Hollister Avenues. This would be a less than significant impact.

Removal of any riparian vegetation, including the willow understory, for the proposed bank realignment, staging, and access could result in impacts to nesting birds if construction

activities occurred from February 1 through August 15 and if birds were nesting in that area. Impacts to active nests and nesting birds are prohibited by the MBTA and the Goleta General Plan (Policy CE 8). Impacts to nesting birds would be significant but mitigable.

"Steel" Bridge Replacement Option

a-g) Impacts under this option would be less than significant with implementation of mitigation that is part of the project as described under the proposed project. The replacement of the "steel" bridge under this option would occur at the same time as the channel improvements and would not increase the length of time that construction would occur, and therefore would not increase the temporal impact associated with short-term construction activities. No additional biological resources would be affected. All other project components would be the same as for the proposed project. Impacts would remain essentially the same as those described above under the proposed project, and the mitigation measures presented below would be adequate to minimize impacts.

No Action Alternative

The No Action Alternative would not reduce or eliminate flooding in Old Town Goleta. Modification of existing concrete channeling along San Jose Creek, including installation of a fish passage notch, and relocation of the sewer line currently suspended under the small metal bridge would not occur. The No Action Alternative would leave the proposed project area and vicinity in its current condition and subject to potential sewer spills. Improved flow capacity and the habitat benefits of a natural channel bottom would not occur under the No Action Alternative. Temporary impacts including potential disturbance of nesting species, tree and vegetation removal and replacement, and interruption of wildlife movement would not occur.

Cumulative Impacts

Projects that result in significant, project-specific biological impacts are generally considered to also make a significant contribution to corresponding cumulative biological impacts. As such, the proposed project would result in a significant but mitigable contribution to cumulative impacts on riparian trees associated with San Jose Creek.

Required Mitigation Measures

The riparian vegetation mitigation measure (**BIO3**) would also restore the vegetated bank part of the state wetland temporarily disturbed during construction. Because impacts to state wetlands are less than significant, no mitigation measure is required.

BIO1 **Red-legged Frog:** A qualified monitor shall be present during installation of any water diversions, initial vegetation clearing, and excavation/rock placement work upstream of Hollister Avenue. The monitor will check the area for red-legged frogs prior to the work. If any are found, work would be halted until the frogs leave the work area or until consultation with the USFWS has been completed and authorization for take has been authorized so that they can be relocated upstream to suitable habitat by the monitor.

Plan Requirements & Timing: The requirement for a red-legged frog monitor shall be included on all project plans prior to final approval, and a qualified monitor shall be on site prior to new ground disturbing activities and when any activities that could affect the species take place.

Monitoring: A qualified biological monitor shall be present during the work and will prepare daily monitoring logs of all observations. These logs shall be summarized into a weekly memo-style report.

BIO2 **Trees:** A Native Tree Protection and Replacement Plan shall be prepared by a certified arborist or qualified expert and approved prior to vegetation clearing. All native trees to be removed, except willows which are included in the Riparian Vegetation Protection and Replacement Plan below, will be covered. This plan can be developed as a component of the Landscape Plan.

Plan Requirements & Timing: The Plan shall be completed and approved prior to vegetation clearing and shall minimally include the following elements:

- Details on native trees that would be removed including species, diameter at breast height (DBH), overall health, general location, and reason for removal.

- Details on native trees that the contractor would preserve including species, diameter at breast height (DBH), overall health, general location, and what actions would be taken to preserve each tree (e.g., fencing around the drip line). The project would be designed to minimize damage to existing trees located within the fill area north of Hollister Avenue, by avoiding placement of soil around the trunks and providing adequate drainage.

- A Mitigation Plan to address native trees, excluding those included in the riparian vegetation (see **BIO3**), that would be removed (Table 4). The mitigation plan shall address species, size, source propagules, location, and timing of replacement tree planting. In addition, monitoring, performance criteria, and reporting shall be addressed. All trees removed will be replaced at a 10:1 ratio with the same species removed. Replacement trees will be from local stock, except as allowed in project permits. The Mitigation Plan will include a map of approximate planting locations.

Table 4. Native Tree Replacement

Species	*No. Removed*	*No. Replaced*
Coast live oak	1	10
Sycamore[1]	2 or 3	20 or 30
Note: 1. Actual number would be determined during construction.		

Monitoring: Biological monitors shall be present during vegetation clearing to ensure that tree removal is consistent with the Native Tree Protection and Replacement Plan. Weekly memo-style reports shall be completed with the results of monitoring as recorded on daily monitoring logs.

A restoration specialist shall oversee the planting, maintenance, and monitoring of replacement trees until they have met performance criteria. Monitoring shall occur for a minimum of five years and annual monitoring reports shall be prepared.

BIO3 **Riparian Vegetation:** A Riparian Vegetation Protection and Replacement Plan shall be prepared and approved prior to vegetation clearing. This plan can be developed as a component of the Landscape Plan.

Plan Requirements & Timing: The Plan shall be completed and approved prior to vegetation clearing and shall minimally include the following elements:

- Measures to minimize damage to riparian vegetation including avoidance and cutting riparian vegetation that must be removed, but not excavated, at ground level and covering cut stems with approximately 3-6 inches of native topsoil. Wooden mats will be placed over the fill prior to access by heavy equipment to avoid damage to the cut stems. This technique will increase the likelihood that willows and other riparian vegetation will resprout following construction.

- Eucalyptus trees to be removed within the riparian woodland upstream of the work area shall be clearly marked and checked by a biologist to verify that the trees are not used by monarch butterflies or roosting/nesting raptors. Removal will be performed in a manner that minimizes disturbance to adjacent native riparian vegetation, and native trees will be planted to replace them.

- A Mitigation Plan will be prepared to address native vegetation to be removed. The mitigation plan shall address species, size, source, and timing of replacement planting. In addition, monitoring, performance criteria, and reporting shall be addressed. It is anticipated that replacement planting will be conducted onsite were vegetation was removed. The boulder slope at the upstream end of the new channel walls would provide an excellent location for establishing willows, blackberry, and other riparian vegetation. All native riparian vegetation removed (approximately 0.13 acre) shall be replaced at a 2:1 ratio, as required by the Goleta General Plan, with the same species removed, if feasible. Eucalyptus trees removed will be replaced with native trees appropriate for the sites where the trees are removed. Replacement plants will be from local stock, except as allowed in project permits. The Mitigation Plan will include a map of planting locations.

Monitoring: Biological monitors shall be present during vegetation clearing to ensure that riparian vegetation removal is consistent with the Plan. Weekly memo-style reports shall be completed with the results of monitoring as recorded on daily monitoring logs.

A restoration specialist shall oversee the planting, maintenance, and monitoring of replacement vegetation until they have met the performance criteria. Monitoring shall occur for a minimum of five years, and annual monitoring reports shall be prepared.

BIO4 **Breeding Birds:** The pre-approved Riparian Vegetation Protection and Replacement Plan shall include seasonal constraints on vegetation removal and nesting bird survey specifications to reduce impacts to nesting birds within the work area.

Plan Requirements & Timing: The vegetation clearing timing restrictions and bird survey requirements shall be included on all project plans prior to final approval. The Plan shall be completed and approved prior to vegetation clearing and shall minimally include the following elements:

GEOLOGY & SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				✓	
b. Strong seismic ground shaking?				✓	
c. Seismic-related ground failure, including liquefaction?				✓	
d. Landslides?				✓	
e. Result in substantial soil erosion or the loss of topsoil?		✓			
f. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?				✓	
g. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				✓	

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
h. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				✓	

Existing Setting

The project area is located within the broad, flat alluvial plain of the Goleta Valley. This alluvial plain generally slopes from all directions into Goleta Slough, which is located to the southwest of the project area. San Jose Creek flows southwest to the Pacific Ocean, with the elevation of the proposed project area at approximately 35 feet above mean sea level. Problems related to liquefaction hazards and compressible/expansive soils are present; however, the project area is generally flat-lying and not subject to slope-related geologic hazards. Liquefaction involves the complete loss of shear strength of a saturated sandy soil during an earthquake. Compressible soils occur in fine-grained, organic-rich sediments deposited in marshy areas such as the historic Goleta Slough. These deposits can consolidate and cause settlement when surcharged with fill or structural loads such as buildings. Expansive soils are subject to repeated shrinking and swelling and could cause cracking of foundations and other structural problems.

The project area, like the entire Central Coast of California, is located in an area known for increased seismic activity, due to the presence of numerous local and regional faults. Several faults are present in the vicinity of the project area including the More Ranch, Glenn Annie, and Carneros faults. None are considered active by the California Division of Mines and Geology (CDMG) or subject to an Alquist-Priolo Special Studies Zone; however, the Santa Barbara County Seismic Safety and Safety Element considers the More Ranch fault (5.8 maximum credible earthquake [Richter Scale]) active based on surface evidence of a geologically recent fault scarp (County of Santa Barbara 1979). The More Ranch fault is the closest recognized fault to the project area, at approximately ¾ mile to the south.

Thresholds of Significance

A significant impact on Geology & Soils would be expected to occur if the proposed project resulted in any of the impacts noted in the above checklist. Additional thresholds are contained in the City's *Environmental Thresholds & Guidelines Manual*.

The City's adopted thresholds indicate that a proposed project would result in a potentially significant impact on geological processes if the project, and/or implementation of required mitigation measures, could result in increased erosion, landslides, soil creep, mudslides, and/or unstable slopes. In addition, impacts are considered significant if the project would expose people and/or structures to major geological hazards such as earthquakes, seismic related ground failure, or expansive soils capable of creating a significant risk to life and property.

Plan Requirements & Timing: The City of Goleta, Santa Barbara County LUFT Program official, and Santa Barbara County Fire Protection Service District shall coordinate and develop specific timing and remediation actions prior to project construction.

Residual Impact

Residual project-specific and cumulative Hazards & Hazardous Materials impacts would be less than significant with implementation of Mitigation Measure **HAZ1** and **WQ1**.

HYDROLOGY & WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
a. Violate any water quality standards or waste discharge requirements?		✓			
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				✓	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite?		✓			

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?			✓		
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			✓		
f. Otherwise substantially degrade water quality?			✓		
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				✓	
h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				✓	
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?				✓	
j. Inundation by seiche, tsunami, or mudflow?			✓		

Existing Setting

San Jose Creek is the subject of the proposed project. The creek flows approximately 9 miles from its headwaters to the Pacific Ocean and drains approximately 6,080 acres (City of Goleta 2006). Creek flows correlate strongly with rainfall because of the short flow distance and the steep gradient of many reaches. The creek is channeled downstream of the Hollister Avenue Bridge with concrete banks and bottom.

Runoff to San Jose Creek comes from undeveloped areas, agriculture, and urban and industrial development in the watershed. Storm water quality is generally affected by the length of time since last rainfall, rainfall intensity, urban uses of the area, and the quantity of transported sediment. Typical urban water quality pollutants usually result from motor vehicle operations, oil and grease residues, fertilizer/pesticide uses, human/animal littering, careless material storage and handling, and poor property management. The majority of pollutant loads are usually washed away during the first flush of the storm occurring after the dry-season period.

As previously mentioned under Hazards and Hazardous Materials, leaking underground fuel tanks were present approximately 100 feet east of San Jose Creek (formerly Goleta Exxon), just south of Hollister Avenue. The tanks have been removed, but contaminated soils (elevated TPH and BTEX) are present in the area and were mapped and evaluated in 2005. The County of Santa Barbara Fire Protection Services District is currently regulating the cleanup process at this location.

The project area is located just north of the Potential Tsunami Runup Area, and is located within the 100-year floodplain, as defined by the City of Goleta General Plan Safety Element (City of Goleta 2006). Only one tsunami has been well documented (1927), and only one other event (1812) is noted in records for the area (although poorly documented).

Thresholds of Significance

A significant impact on Hydrology & Water Quality would be expected to occur if the proposed project resulted in any of the impacts noted in the above checklist. Additional thresholds are contained in the City's *Environmental Thresholds & Guidelines Manual*.

The City's adopted thresholds, indicate that a significant impact on hydrology and water resources would occur if a project would result in a substantial alteration of existing drainage patterns; alter the course of a stream or river; increase the rate of surface runoff to the extent that flooding, including increased erosion or sedimentation, occurs; create or contribute to runoff volumes exceed existing or planned stormwater runoff facilities; or substantially degrade water quality.

Project Specific Impacts

Proposed Project

a) The proposed project could potentially result in wastewater discharge that violates state or federal water quality standards and requires Wastewater Discharge Requirements (WDRs) from the RWCQB. As discussed for Hazardous and Hazardous Materials, soils in the project area have been adversely impacted by petroleum hydrocarbons as a result of USTs at a former service station, located east of the site. Shallow groundwater may similarly be affected. In the event that dewatering is required during project construction,

petroleum hydrocarbon-impacted groundwater may be pumped from the subsurface. In the absence of mitigation, impacts would be potentially significant.

In addition, typical construction activities involve the use of fuels, lubricants, and other materials associated with construction equipment. Construction activities could adversely affect surface water quality if improperly used or stored at the project site. Although unlikely, use of these construction materials and pouring concrete would have the potential to result in short-term exceedances of water quality standards, a significant but mitigable impact.

b) Groundwater supplies would not be reduced by the proposed project. Although the existing channel would be modified to increase flow capacity and improve fish passage, the footprint of impervious surfaces would increase very little. As a result, no impacts on groundwater supplies would occur. No groundwater wells are included as part of the proposed project and existing percolation rates would not be affected because the existing channel is concrete lined. Possible construction-related dewatering wells would temporarily pump shallow groundwater from site, resulting in negligible impacts to groundwater supplies in the area.

c) The proposed project would increase the capacity of the Creek through the widening and modification of the channel geometry, lowering the banks downstream of the widened area, and installation of a low flood wall where the banks are lowered; however, the project would not substantially alter the drainage pattern of the existing creek. If rain occurs during construction activities, the project site could generate a substantial amount of sediment in stormwater runoff as a result of site erosion. Runoff from disturbed soils on the north side of Hollister Avenue could also occur until the soils are stabilized with vegetation (post-construction runoff). Extending the concrete channel lining on the east side of the creek where bare dirt is currently present would decrease the runoff of sediment from that area. Any increase in the discharge of sediment laden runoff from the project site would be temporary and associated with construction activities only. As a result, impacts have the potential to be significant.

d,g-i) The project would increase the capacity of the existing San Jose Creek drainage to prevent flooding of structures by the 100-year flood flow (see Figure 2 in Attachment A). Although the project would alter San Jose Creek at the Hollister Avenue Bridge (modify the channel design to increase capacity), results of the project would decrease the flooding potential and would have a beneficial impact on flooding in Old Town Goleta. The proposed project does not include any housing development within the 100-year floodplain. Since the proposed project would increase flood flow capacity within the existing channel, it would provide flood protection for existing structures located adjacent to the creek banks.

The proposed channel alterations are designed to accommodate flows without impeding water movement within the channel. A flood control maintenance plan would be developed with the Santa Barbara County Flood Control District to ensure the channel remains free of debris that could back up stormwater flowing down the channel. As a result, impacts would be less than significant.

e,f) Runoff from the Hollister Avenue bridge and via storm drains in the project area would not be altered with implementation of the project. Runoff from the existing bridge and

surrounding areas would continue to contain roadway pollutants (e.g., oil, trash, sediment, etc).

Similar to impacts discussed under Hazards and Hazardous Materials, the known existence of contaminated soils would result in the potential to encounter elevated TPH/BTEX-contaminated soils during project construction. Potential surface runoff in contact with petroleum contaminated soils could result in adverse surface water quality impacts. The property owner is responsible for the cleanup of contaminated soils and is currently working with the City of Goleta and the County of Santa Barbara through the LUFT Program. Cleanup of contaminated soils is not part of the proposed project; however, if construction associated with the proposed project occurs prior to remediation of the contaminated soils, the County of Santa Barbara would require the property owner to excavate the soils before or in conjunction with the proposed project. As a result, encountering known contaminated soil during project construction would have the potential for significant impacts to surface water quality.

j) The project proposes to improve existing concrete channelization of a small section of San Jose Creek. No new additional habitable structures are proposed. The project area is located just north of the Potential Tsunami Runup Area, as identified in the City of Goleta General Plan Safety Element (City of Goleta 2006). Additionally, no aspect of the proposed project would increase the potential for tsunamis or mud flows. Based on the very low frequency of previously recorded tsunamis as well as the limited potential for tsunamis of large height in this area, potential risks posed by future tsunamis on property and people in the vicinity of the project site are considered less than significant.

"Steel" Bridge Replacement Option

a-j) Impacts associated with the "steel" bridge replacement option would be identical to those described under the proposed project.

No Action Alternative

The purpose of the proposed project is to eliminate the flood hazard that currently exists in Old Town Goleta in the vicinity of Hollister and Kellogg avenues. Under the No Action Alternative, the proposed improvements to drainage associated with San Jose Creek would not occur, and the project vicinity would continue to be susceptible to flooding associated with flood events below the 100-year flood event level.

Cumulative Impacts

Projects that result in significant, project-specific hydrology and water quality impacts are generally considered to also make a significant contribution to corresponding cumulative impacts. As such, the proposed project would have the potential to result in a significant contribution to impacts on water quality associated with San Jose Creek.

Required Mitigation Measures

The proposed construction activities could cause a temporary increase in on-site erosion, potential runoff of petroleum hydrocarbon-contaminated surface water, and potential discharge of contaminated shallow groundwater. Significant construction water quality impacts would be avoided by the water quality protection measures in the General Construction

Stormwater Permit required by the State Water Resources Control Board. Additional water quality protection measures for construction- and operation-related impacts are provided in Mitigation Measures **WQ1** and **WQ2**.

WQ1 The Storm Water Pollution Prevention Plan (SWPPP) to be prepared under the provisions of a Construction General Storm Water Permit shall specifically include measures to: (1) prevent erosion and sediment runoff from the construction site and from the post-construction site that could cause sedimentation in the creek or Goleta Slough; and (2) prevent discharge of construction materials, contaminants, washings, concrete, fuels, and oils to the creek. These measures shall include, at a minimum, physical devices to prevent sedimentation and discharges (e.g., silt fencing, straw bales), and routine monitoring of these devices and revegetation of disturbed soils that would remain exposed after construction. BMPs shall be developed and implemented based on the following guidance manuals: California Storm Water Best Management Practice Handbook (Stormwater Quality Task Force 1993) and Caltrans Storm Water Quality Handbook – Construction Contractor's Guide and Specifications (Caltrans 1997). Types of BMPs that would be implemented as appropriate to site conditions include:

Stockpile Management BMPs

- Include silt fencing, straw logs, or straw bales around the base of all stockpiles to intercept sediment and inhibit the flow of sediment-laden runoff from the stockpiles.
- Use soil binders or other cover on stockpiles to reduce runoff of sediments.

Grading and Filling BMPs

- Place silt fences, straw logs, or straw bales around areas to be graded, especially cut and fill slopes, to intercept any loose material that could erode and enter the creek during construction.
- Use soil binders, temporary mulches, or erosion control blankets or hydroseeding for temporarily bare slopes that would be exposed to wind and water erosion prior to beginning work and immediately after work.
- Revegetate disturbed soils that would remain after construction (can be part of the Landscape Plan).
- Stabilize construction entrances to the project site with gravel. This would help prevent sediment tracking from the construction area to paved roads.

Dewatering BMPs

- If dewatering is required, install sediment controls (either a sediment trap or sediment basin) to collect water from any dewatering operations. Filter out sediment from the sediment trap or sediment basin using a sump pit and perforated or silt standpipe with holes and wrapped in filter material.

Waste Management BMPs

- Properly maintained (offsite) all construction vehicles and equipment that enter the construction and grading areas to prevent leaks of fuel, oil, and other vehicle fluids. Vehicles working in the creek bed shall be inspected daily for leaks and immediately repaired if any are found.

- Conduct equipment and vehicle fueling off-site. If refueling is required at the project site, it shall be done within a bermed area with an impervious surface to collect spilled fluids.

- Prepare a spill prevention/spill response plan for the project site that includes training, equipment, and procedures to address spills from equipment, stored fluids, and other materials.

- Place all stored fuel, lubricants, paints, and other construction liquids in secured and covered containers within a bermed area.

- Conduct any mixing and storage of concrete and mortar in contained areas.

- Ensure that all equipment washing and major maintenance is prohibited at the project site, except for washdown of vehicles to remove dirt, which must only occur in a bermed area.

- Remove all refuse and excess material from the site as soon as possible.

WQ2 Any project-related dewatering activities shall either discharge into the sanitary sewer, under permit with Goleta Sanitary District, or comply with the National Pollutant Discharge Elimination System (NPDES) permit regulations and an associated SWPPP regarding discharge into storm drains and/or directly into San Jose Creek. Such permit requirements typically include on-site treatment to remove pollutants prior to discharge. Effluent analyses should include, but not be limited to, TPH and BTEX. Alternatively, the water shall be temporarily stored onsite in holding tanks, pending off-site disposal at a disposal facility approved by the RWQCB. An NPDES-mandated SWPPP shall include measures ensuring that potential pollutant-contaminated waters encountered during excavation would be isolated and collected for transportation to a hazardous waste treatment facility prior to their discharge into the storm drain system or directly into San Jose Creek. Mitigation measure **HAZ1** would also apply

Plan Requirements & Timing: Requirements for BMPs to prevent pollution of the creek shall be included in construction contract documents and on all plans. The project-specific SWPPP and NPDES permit shall be reviewed and approved by the City of Goleta or their designated representative prior to submittal to the Regional Water Quality Control Board.

Monitoring: Vehicle inspections for leaks shall be performed daily by the on-site construction management personnel or environmental monitor. Daily monitoring logs shall be kept to record these inspections and any remedial actions taken, and weekly summaries shall be submitted to the City.

Residual Impact

Residual project-specific and cumulative Hydrology & Water Quality impacts would be considered less than significant.

LAND USE & PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	See Prior Document
a. Physically divide an established community?				✓	
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for purpose of avoiding or mitigating an environmental effect?		✓			
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?				✓	

Existing Setting

The project area includes two improved roadways (Hollister Avenue and Kellogg Avenue) as well as developed and undeveloped land within the City of Goleta. The project vicinity contains a range of commercial, vacant, residential, and accompanying land use/zoning designations. The City of Goleta General Plan designates the following land uses adjacent to the site: multiple family, offices, industrial, and commercial. Zoning to the north and east of the Hollister Avenue Bridge is multiple family/commercial; zoning to the south and west of the bridge is commercial/offices.

Thresholds of Significance

A significant Land Use & Planning impact would be expected to occur if the proposed project resulted in any of the impacts noted in the checklist above.

Project Specific Impacts

Impacts presented below would predominately occur outside of the Coastal Zone and be associated with the replacement of the Hollister Avenue Bridge and restoration of the native areas of San Jose Creek. Parts of the project that would occur along Kellogg Avenue, including a portion of the low retaining wall and safety fence, would occur within the Coastal Zone boundary (Coastal Zone boundary is approximately 1,900 feet south of the Hollister Avenue Bridge (see Sheets 2-5 in Attachment A).

Proposed Project

a) The proposed project would not physically divide any established community. Therefore, no impact would occur.

b) The land surrounding the project site is zoned multiple family/commercial to the north and east; and commercial/offices to the south and west. Channel alterations would improve flood control and follow all applicable regulations including regulations by CDFG for alteration of streambeds.

As stated under Biological Resources, the site has been designated an Environmentally Sensitive Habitat in the City of Goleta General Plan. However, flood improvements are generally permitted in ESHA where there is no feasible, less-environmentally damaging alternative and where mitigation measures would avoid or lessen impact to the maximum extent feasible. As a result, impacts would have the potential to be significant but mitigable.

c) There are no habitat or natural community conservation plans covering the property in the vicinity of the project site nor would the proposed project conflict with any other such plans in the City of Goleta. Therefore, no impact would occur.

"Steel" Bridge Replacement Option

a-c) Impacts associated with the "steel" bridge replacement option would be identical to those described under the proposed project.

No Action Alternative

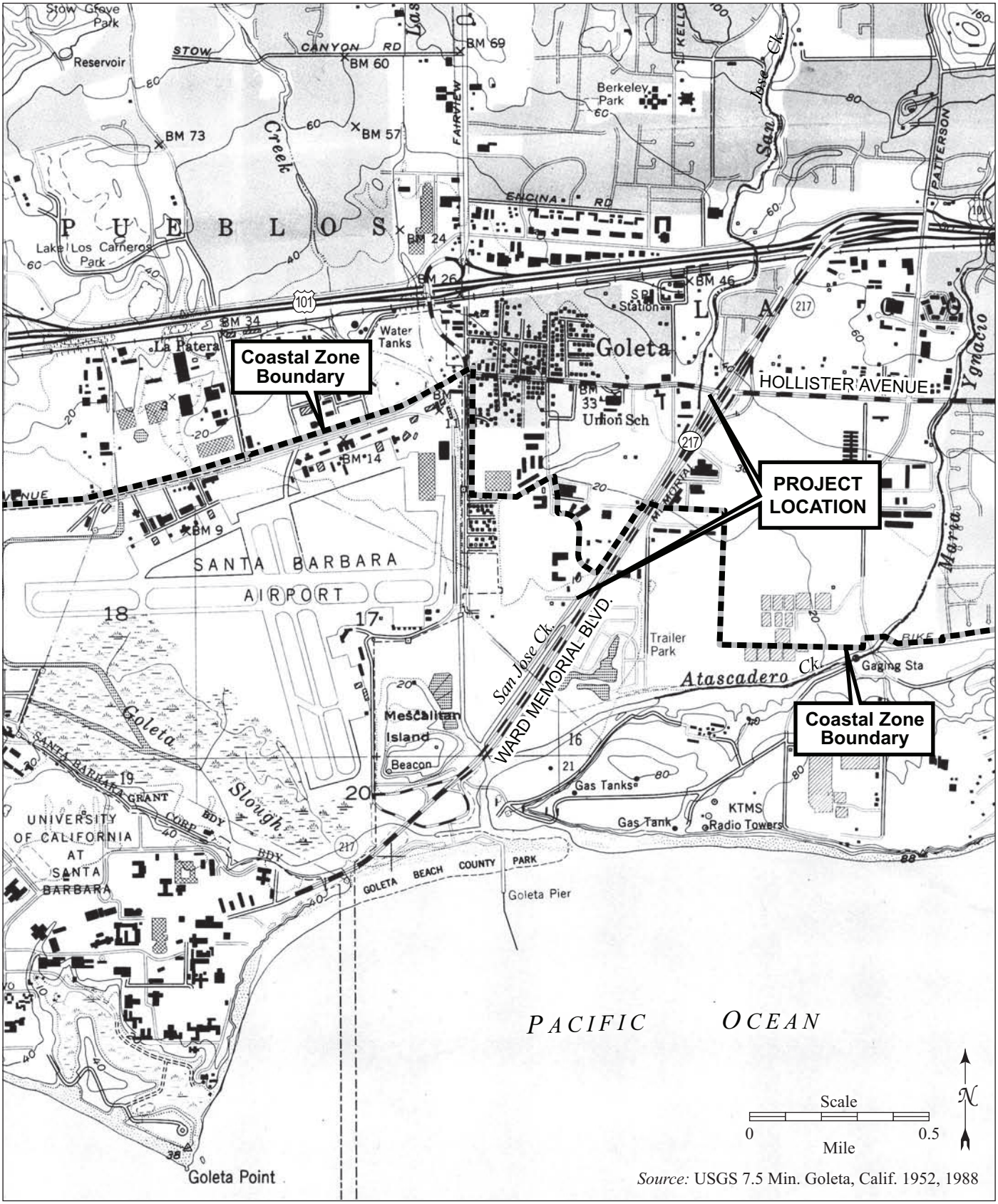
The proposed project is identified as a capital improvements project in the City of Goleta General Plan (2006) to reduce flooding in Old Town. Under the No Action Alternative, the proposed project would not occur, and the existing flood conditions would be inconsistent with Safety Element Policy SE 6.8 and Implementation Action IA-2 (City of Goleta 2006).

Cumulative Impacts

Projects that result in significant, project-specific land use and planning impacts are generally considered to also make a significant contribution to corresponding cumulative impacts. As such, the proposed project would result in a significant but mitigable contribution to cumulative impacts related to compliance with ESHA policies as discussed under Biological Resources. The project's contribution to other cumulative land use and planning impacts would be less than significant because the project would not change any existing land uses, conflict with any land use plan, or permanently conflict with any policy (except ESHA as noted above) or regulation of an agency with jurisdiction over the project. Additionally, the project would address

ATTACHMENT A

Figures and Plans



Source: USGS 7.5 Min. Goleta, Calif. 1952, 1988

Figure 1. Study Location Area: San Jose Creek Capacity Improvement Project

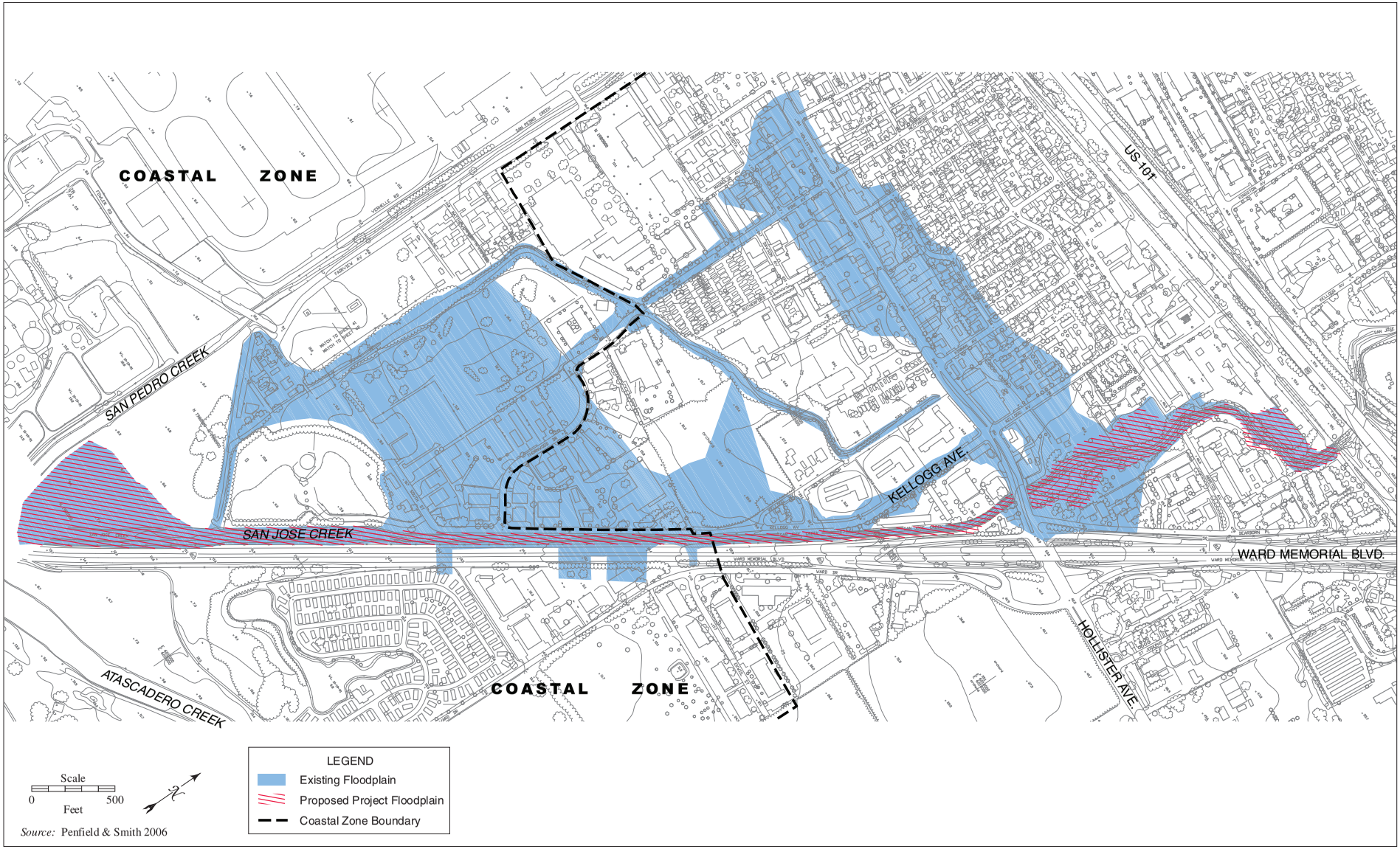


Figure 2. Existing and Proposed Project Floodplains

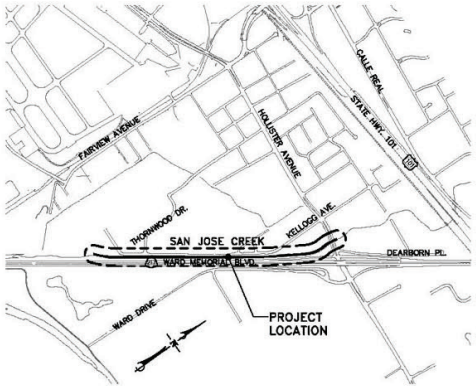
PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT WITH FISH PASSAGE

CITY OF GOLETA

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MARCH 2008

LOCATION MAP
N.T.S.



VICINITY MAP
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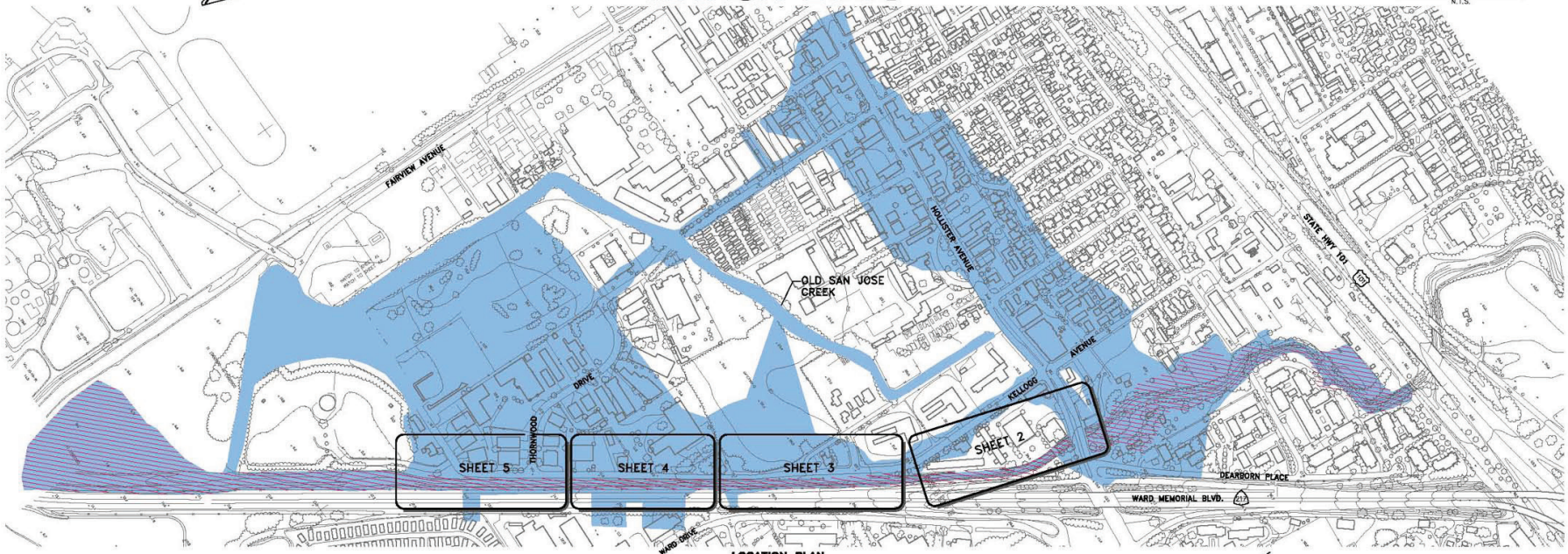

LOCATION PLAN

LEGEND

- EXISTING FLOOD PLAIN
- PROPOSED FLOOD PLAIN

INDEX TO SHEETS

SCALE: 1"=300'
0 300 600 900

SURVEYOR'S NOTES:

TOPOGRAPHY PERFORMED BY RBF.

DATUM: HORIZONTAL DATUM: CCS ZONE V, NAD 1983, VERTICAL DATUM: NAVD 1988

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· Construction Management ·
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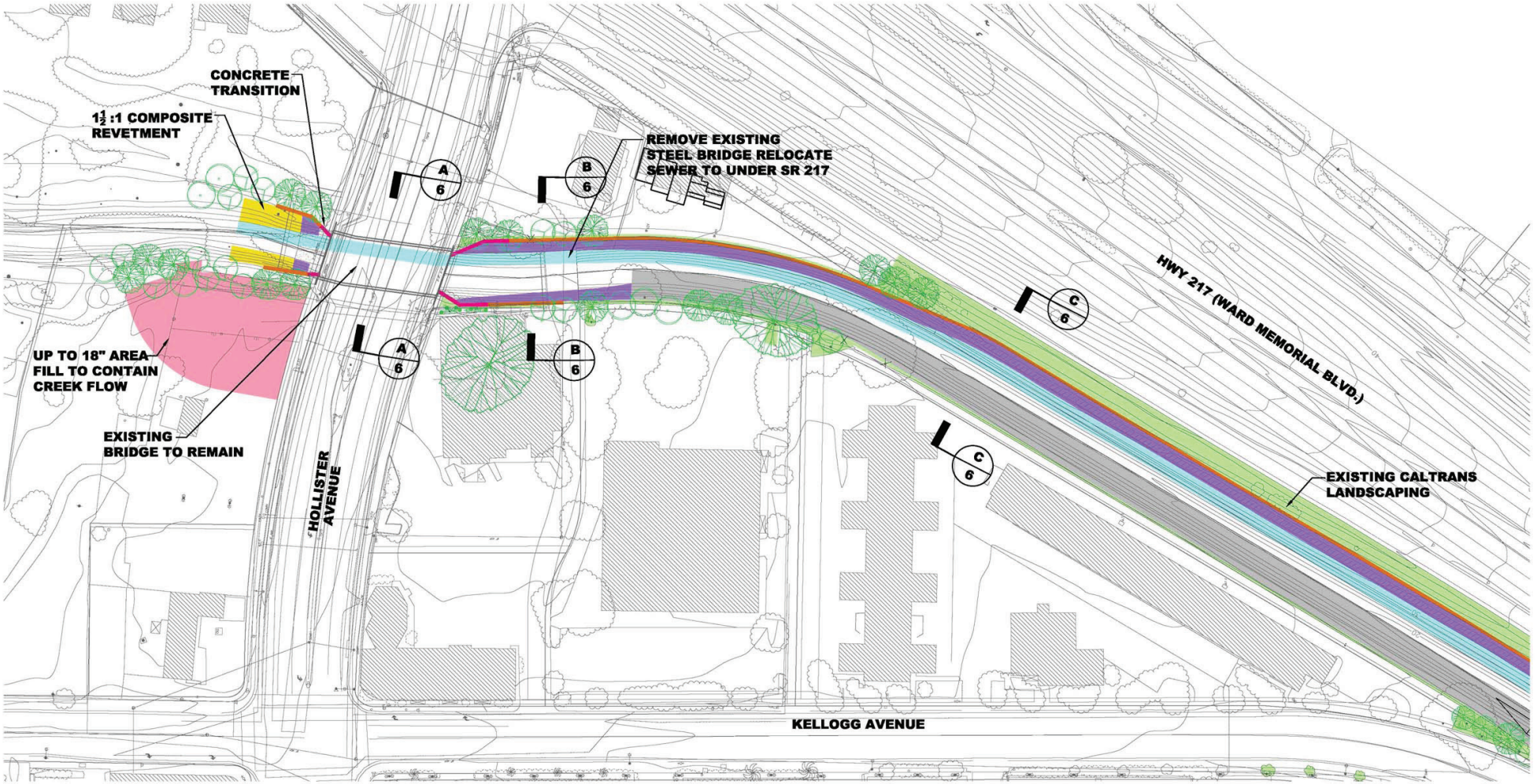
BRUCE BURNWORTH DATE:
PROJECT ENGINEER
R.C.E. 34,394 (EXP. 9-30-09)

REGISTERED PROFESSIONAL ENGINEER
CRAIG A. STEWARD
NO 37253
EXPIRES
CIVIL
STATE OF CALIFORNIA

CITY OF GOLETA, CALIFORNIA
REVIEWED BY:
SIGNATURE DATE

TITLE SHEET
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT WITH FISH PASSAGE
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 1 OF 8
PLAN DATE MARCH 2008



LEGEND

- 48" TO 84" VERTICAL WALL
- 1½: 1 ROCK SLOPE FULL VERTICAL WALL
- 1:1 SLOPE FISH PASSAGE
- EXISTING CHANNEL TO REMAIN

SCALE: 1"=40

0 40 80 120

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NO 37253
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PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT WITH FISH PASSAGE
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 2 OF 8
PLAN DATE MARCH 2008

38-ENG SAVE DATE:3/24/2008 12:52:34 PM PLOT BY:Bruce Burnworth PLOT DATE:3/24/2008 12:54:03 PM PLOT SCALE:1:1

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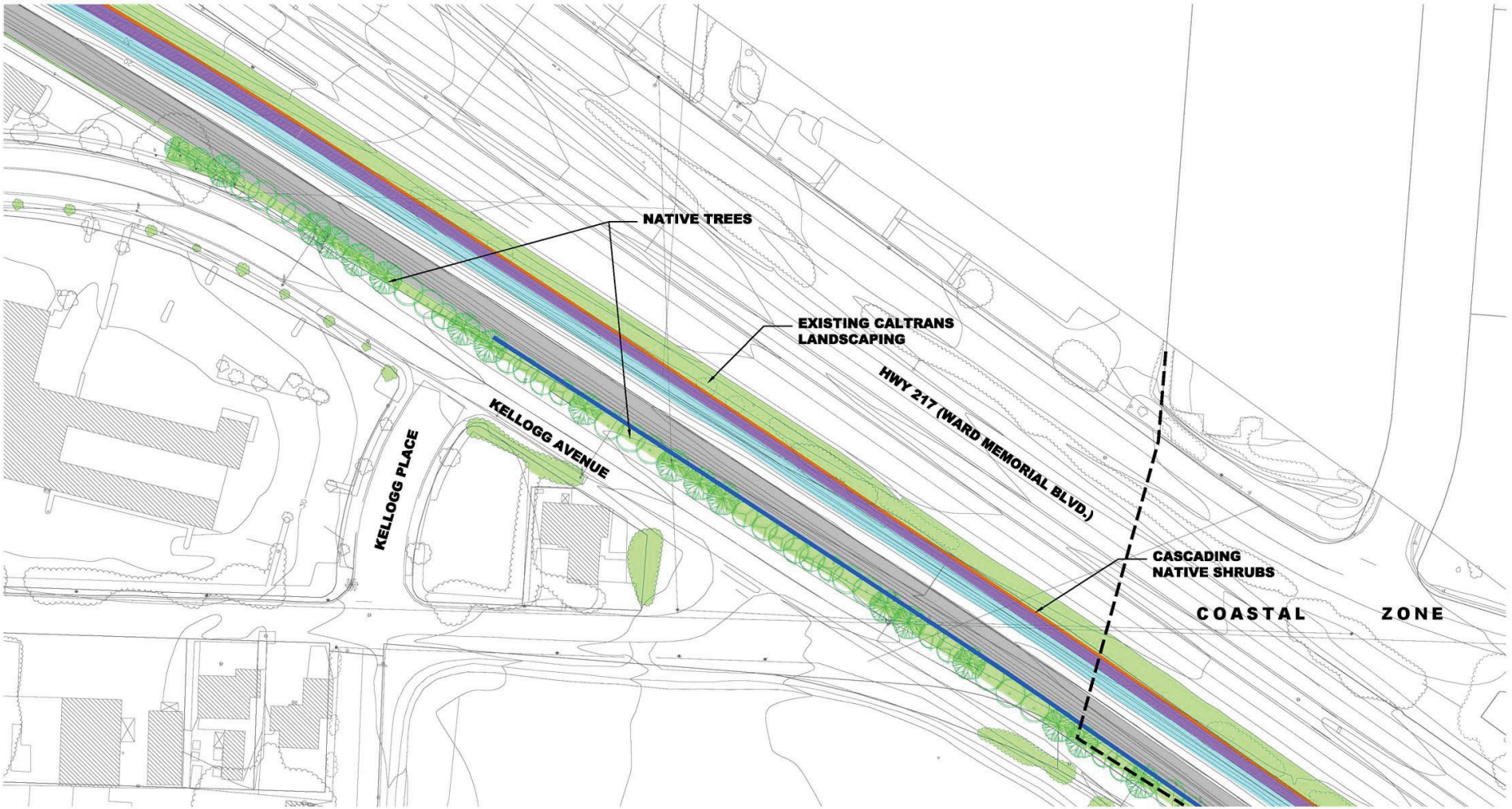

LEGEND

- 48" VERTICAL WALL
- 1:1 SLOPE
- FISH PASSAGE
- EXISTING CHANNEL TO REMAIN
- 42" FLOOD WALL
- COASTAL ZONE BOUNDARY

SCALE: 1"=40
0 40 80 120

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REVIEWED BY:
SIGNATURE DATE

PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT WITH FISH PASSAGE
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 3 OF 8
PLAN DATE MARCH 2008

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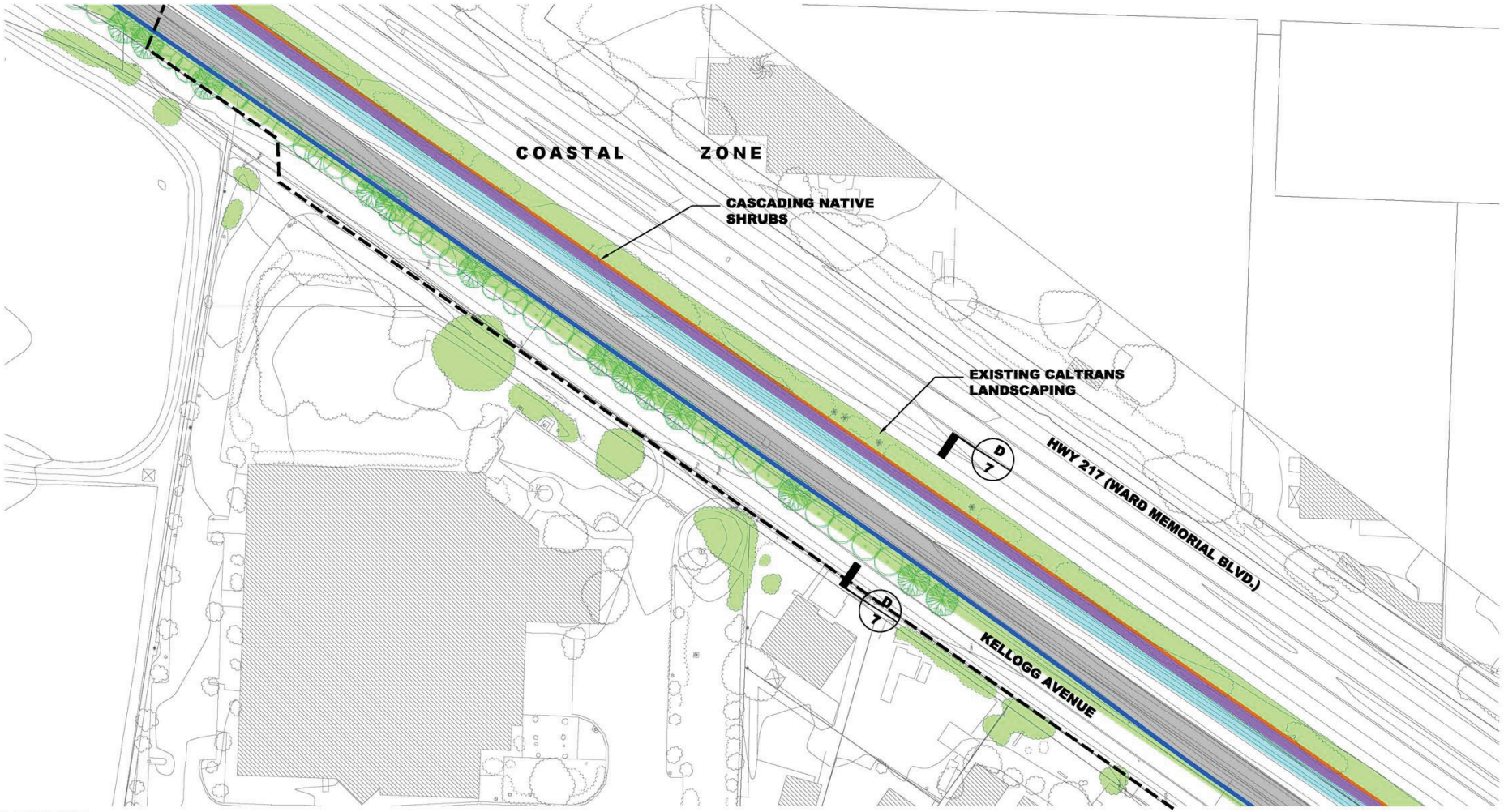

LEGEND

- 48" VERTICAL WALL
- 1:1 SLOPE
- FISH PASSAGE
- EXISTING CHANNEL TO REMAIN
- 42" FLOOD WALL
- COASTAL ZONE BOUNDARY

N

SCALE: 1"=40
0 40 80 120

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PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT WITH FISH PASSAGE
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 4 OF 8
PLAN DATE MARCH 2008

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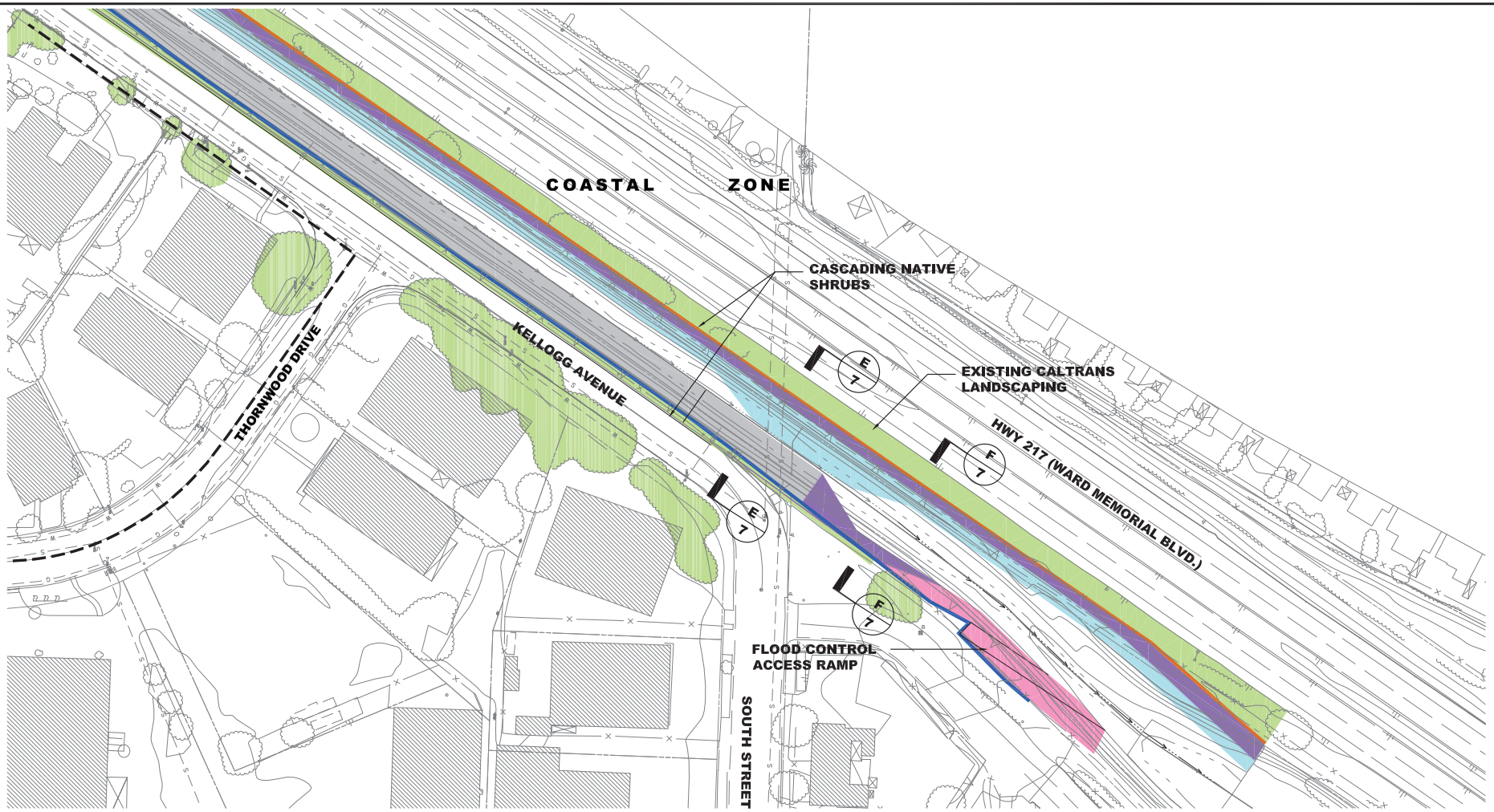

LEGEND

- 48" VERTICAL WALL
- 1:1 SLOPE
- FISH PASSAGE
- 42" FLOODWALL
- ACCESS RAMP
- COASTAL ZONE BOUNDARY

SCALE: 1"=40
0 40 80 120

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REVIEWED BY:
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PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 5 OF 8
PLAN DATE MARCH 2008

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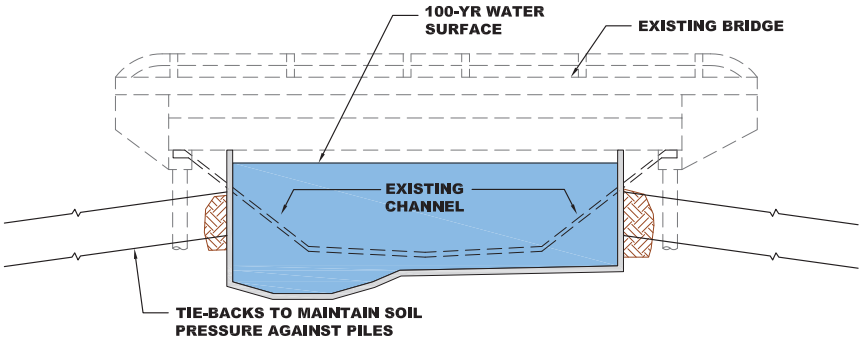

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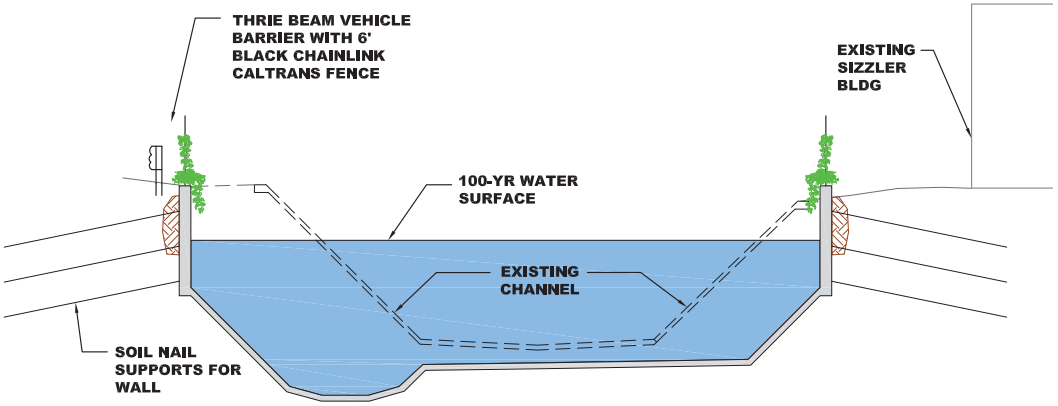
62+40



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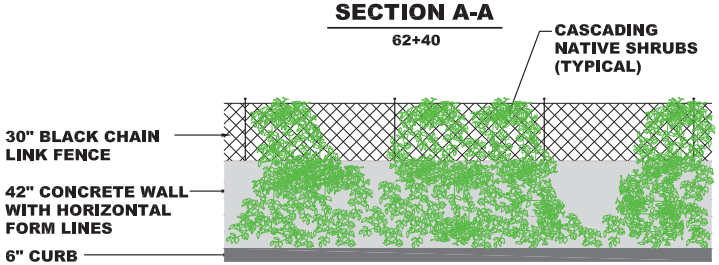

TYPICAL 42" WALL ELEVATION
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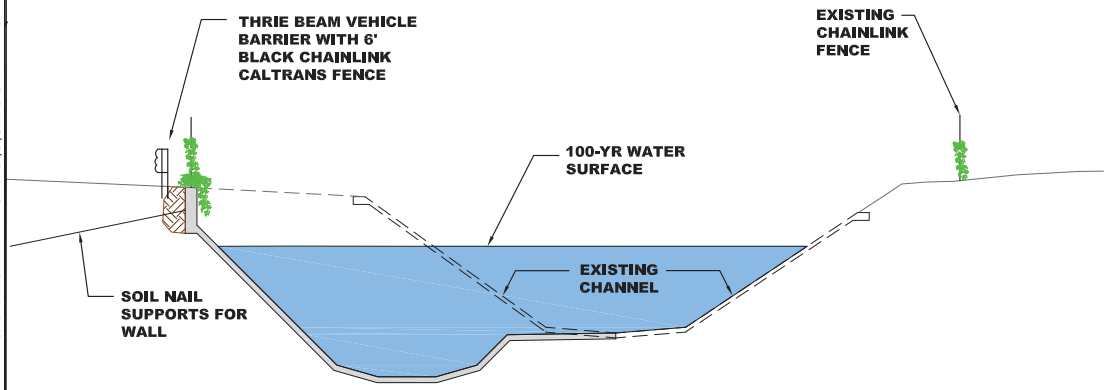
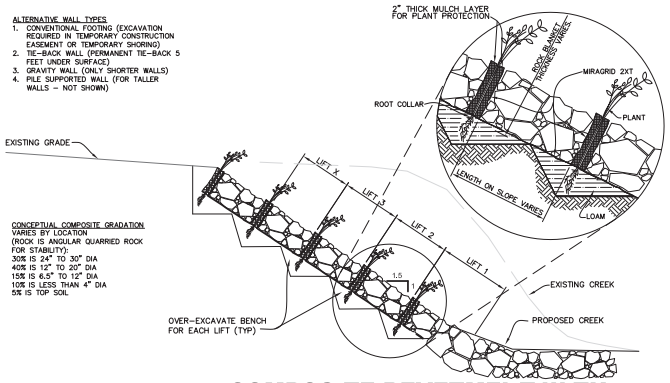


SECTION C-C
57+07



COMPOSITE REVETMENT WITH JOINT PLANTINGS
NTS

SCALE: 1"=5'
0 5 10 15

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SECTIONS AND DETAIL
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 6 OF 8
PLAN DATE MARCH 2008

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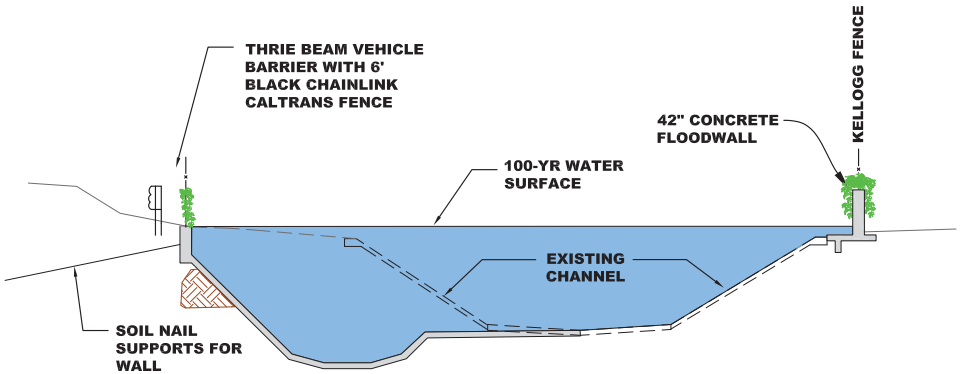
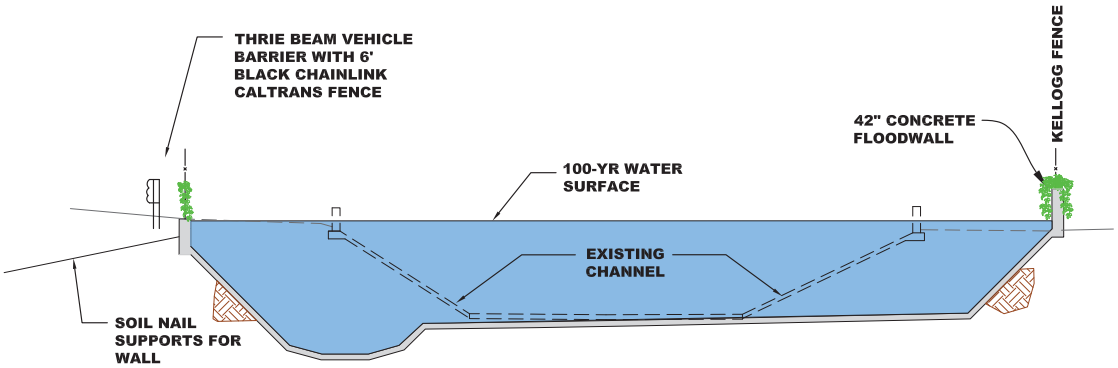


SECTION D-D
35+55



SECTION F-F
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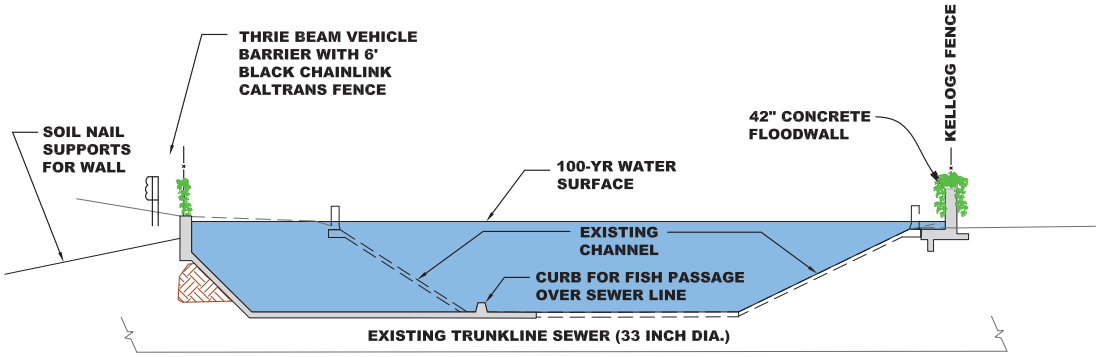

SECTION E-E
26+55

SCALE: 1"=5'
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SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 7 OF 8
PLAN DATE MARCH 08

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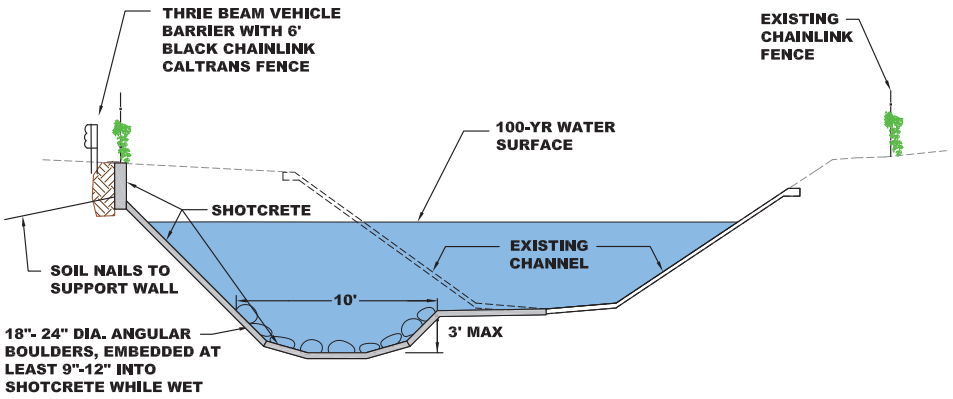
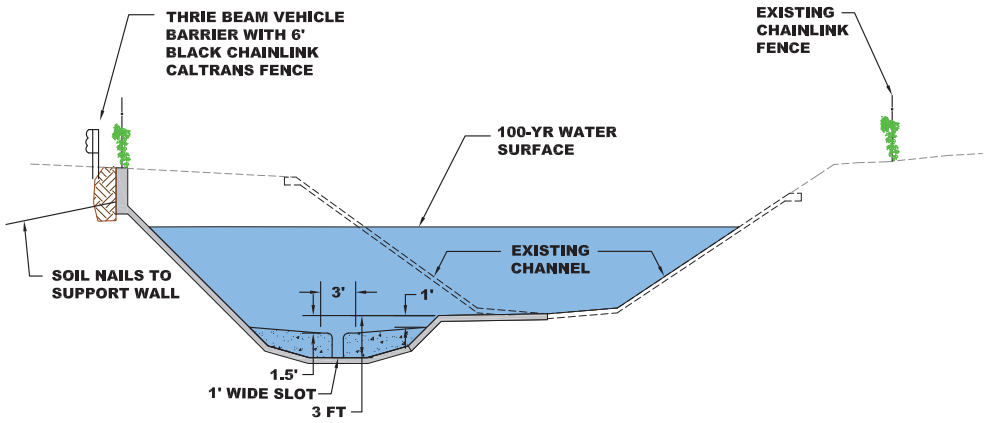


ROUGHENED PASSAGE CHANNEL- SECTION C-C

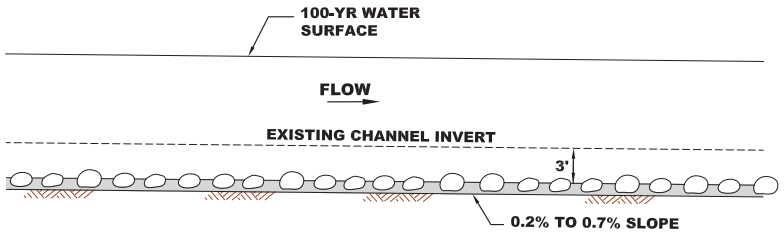
57+06



SLOTTED WEIR- SECTION C-C

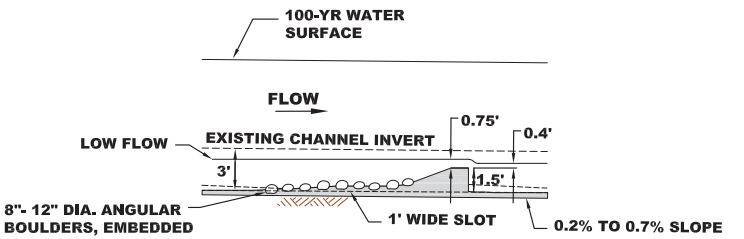
57+06

FISH PASSAGE CHANNEL ALTERNATIVES



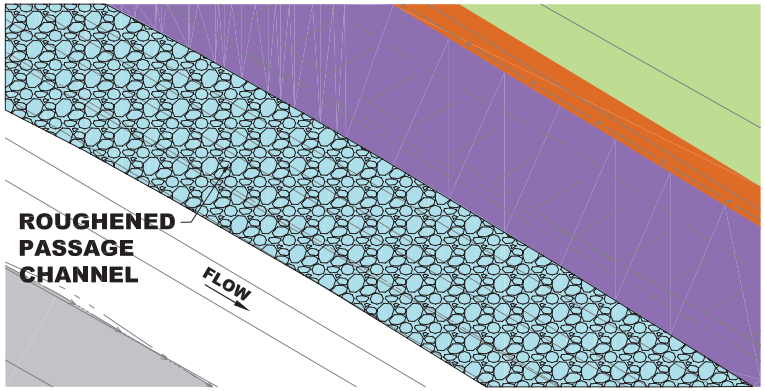
ROUGHENED PASSAGE CHANNEL PROFILE

57+06



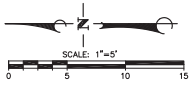
SLOTTED WEIR CHANNEL PROFILE

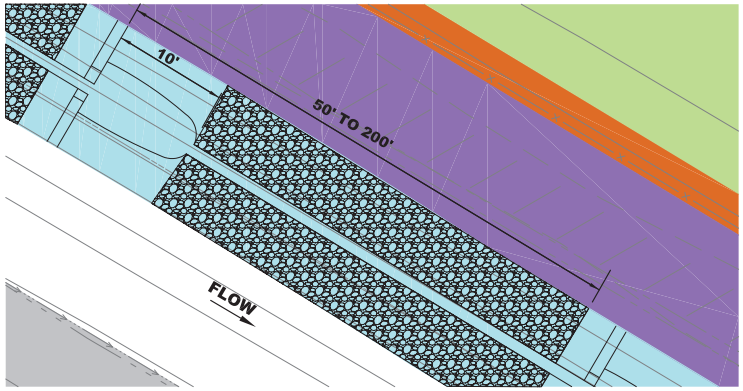
57+06



ROUGHENED PASSAGE CHANNEL PLAN

57+06.64





SLOTTED WEIR CHANNEL PLAN

57+06.64

NO.	DATE	REVISIONS	APP'D.

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PROJECT ENGINEER
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CITY OF GOLETA, CALIFORNIA
REVIEWED BY:
SIGNATURE DATE

PRELIMINARY PLAN
SAN JOSE CREEK CAPACITY IMPROVEMENT PROJECT
CITY OF GOLETA, CALIFORNIA

P&S PROJECT NO. 15581.03
SHEET 8 OF 8
PLAN DATE MARCH 2008

ATTACHMENT D

California Red-Legged Frog and Other Wildlife Survey Report

CALIFORNIA RED-LEGGED FROG AND OTHER WILDLIFE SURVEY REPORT

San Jose Creek Capacity Improvement Project

City of Goleta, Santa Barbara County, California

Prepared by

Science Applications International Corporation
525 Anacapa Street
Santa Barbara, California 93101

January 2007

Introduction

The following report summarizes the California red-legged frog (*Rana aurora draytonii*) and other wildlife surveys conducted within and around the San Jose Creek Capacity Improvement Project located on the San Jose Creek in Goleta, California. This report describes the survey methods and results and provides a habitat characterization in terms of California red-legged frog habitat in the survey area.

Purpose

The City of Goleta is proposing a capital improvements project along a section of San Jose Creek at the Hollister Avenue bridge consistent with Policies and Implementation Actions identified in the City of Goleta General Plan, 2006. The proposed project is the design and installation of modifications to the existing concrete channeling and flood protection to provide improved flood protection. Components of the proposed project include the removal and replacement of existing concrete channeling with an improved channel design, removal and widening of the existing Hollister Avenue bridge, and relocation of an existing sewer line currently suspended from a metal bridge over the creek. The line would be relocated underneath State Route 217.

Methods

The USFWS has developed a specific protocol for biologists to accurately survey for California red-legged frogs. By using the methods described in USFWS protocols, the surveys could later be accepted as verifying the species' presence.

USFWS protocol surveys were conducted for California red-legged frogs by SAIC biologist, Ted Mullen on May 25, 26, and June 1 and 26, 2005. As required in the 1995 USFWS Survey Protocols, surveys consisted of two daytime and two nighttime surveys of all appropriate habitat within the project boundary. The San Jose Creek drainage was surveyed for approximately 2,000 feet upstream and 2,500 feet downstream of the Hollister Avenue bridge. The USFWS protocol requires red-legged frog surveys to be conducted between May 1 and November 1. Daytime surveys for this species were conducted on May 25 and June 1. Nighttime surveys were conducted on May 26 and June 26, 2005.

Nighttime surveys consisted of the biologist walking around the periphery of suitable aquatic habitat using a flashlight to detect eye-shine from red-legged frogs. The field surveys focused on identifying the presence of California red-legged frogs or habitat that could be used by the species for breeding, summer refuge or as migratory corridors.

Observations of other wildlife were recorded during the day and night surveys.

Survey Results

The San Jose Creek drainage within the survey area was flowing at the time of the 2005 surveys. No California red-legged frogs were observed in this area during any of the protocol surveys. Several habitat requirements for California red-legged frog were present in the creek upstream of the Hollister Avenue bridge including flowing water, deeper pools, and a vegetation community in the bottom and along the slopes of the drainage (which included a mixture of

willow riparian vegetation and non-native weedy species in upland areas). However, this part of the drainage also showed a high level of disturbance including trash, non-native weedy species in the upland areas, and close proximity to heavy human use. In addition, the area is very close to housing which means pets are likely visitors in the drainage. On both night surveys several raccoons were observed following the biologist during the duration of the survey, and other non-native species were observed (crayfish and mosquito) fish in the channel; both of these species are known predators of amphibian eggs.

Due to the lack of any observations of the species and the high level of disturbance in the creek, the channel up and down stream of the Hollister Avenue bridge is not considered to be suitable habitat for California red-legged frogs except as a possible travel corridor during the rainy season.

Other wildlife species observed in the project area:

> Pacific treefrog (*Hyla regilla)*, western fence lizard (*Sceloporus occidentalis)*, raccoon (*Procyon lotor)*, spotted sandpiper (*Actitis macularia)*, turkey vulture (*Cathartes aura)*, red-tailed hawk (*Buteo jamaicensis)*, red-shouldered hawk (*Buteo lineatus)*, great blue heron (*Ardea herodias)*, green heron (*Butorides virescens)*, mallard (*Anas platyrhynchos)*, mourning dove (*Zenaida macroura)*, rock dove (*Columba livia)*, Anna'a hummingbird (*Calypte anna)*, Nuttall's woodpecker (*Picoides nuttallii)*, acorn woodpecker (*Melanerpes formicivorus)*, American crow (*Corvus brachyrhynchos)*, western scrub jay (*Aphelocoma californica)*, cliff swallow (*Petrochelidon pyrrhonota)*, ash-throated flycatcher (*Myiarchus cinerascens)*, black phoebe (*Sayornis nigricans)*, oak titmouse (*Baeolophus inornatus)*, bushtit (*Psaltriparus minimus)*, Bewick's wren (*Thryomanes bewickii)*, house wren (*Troglodytes aedon)*, northern mockingbird (*Mimus polyglottos)*, common yellowthroat (*Geothlypis trichas)*, Hutton's vireo (*Vireo huttoni)*, spotted towhee (*Pipilo maculatus)*, California towhee (*Pipilo crissalis)*, song sparrow (*Melospiza melodia)*, white-crowned sparrow (*Zonotrichia leucophrys)*, house sparrow (*Passer domesticus)*, house finch (*Carpodacus mexicanus)*, lesser goldfinch (*Carduelis psaltria)*, and European starling (*Sturnus vulgaris).*

Although no bats were observed or heard at the Hollister Avenue bridge during the night California red-legged frog surveys, the bridge potentially could be used by bats for roosting. The bridge also could be used by nesting swallows although no nests were recorded during the day surveys.

Conclusions/Recommendations

1. Activities that restore riparian vegetation and maintain clean water flow within the Creek channel near the project boundary will increase the habitat value for California red-legged frogs and other riparian species. Although this species has not been recorded in the drainage, habitat improvements that would result in increased water depth and plant cover would increase the likelihood of red-legged frogs using the drainage as summer habitat or a travel corridor. This will in turn increase the value of the deeper pools upstream of the project site as breeding habitat or as summer refuge for the species.

2. The Hollister Avenue bridge should be checked by a qualified biologist for the presence of bats prior to bridge removal and replacement.

3. The bridge should be checked for swallow nests prior to the nesting season, and measures to prevent nesting on the bridge should be implemented if nesting could occur during construction activities at and near the bridge.

ATTACHMENT E

Mitigation, Monitoring, and Reporting Plan

San Jose Creek Capacity Improvement Project Mitigation Monitoring and Reporting Plan					
Mitigation Measure	**Implementation Procedure or Action**	**Organization Responsible for Implementation**	**Reporting/ Notification Requirement**	**Compliance Schedule**	**Verification of Compliance**
AIR QUALITY					
AQ1	Dust Control: Dust generated by construction activities shall be kept to a minimum with a goal of retaining dust on the site. The following dust control measures listed below shall be implemented by the applicant. a) During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems are to be used to prevent dust from leaving the site and to create a crust after each day's activities cease. b) During construction, water trucks or sprinkler systems shall be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the later morning and after work is completed for the day and whenever wind exceeds 15 miles per hour. c) After clearing, grading, earth-moving, or excavation is completed, the disturbed area must be treated by watering or revegetating; or by spreading soil binders until the area is paved or otherwise developed so that dust generation will not occur. d) Soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. e) Trucks transporting fill material to and from the site shall be tarped from the point of origin.	Construction Contractor	Dust control measures shall be identified on all final construction plans.	Prior and During Construction	Responsible Party: City Staff Date: Ongoing
AQ2	Dust Monitoring: The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering as necessary to prevent transport of dust off-site. Their duties shall include holiday and weekend periods when work may not be in progress.	Construction Contractor	N/A	Prior and During Construction	Responsible Party: City Staff Date: Ongoing
BIOLOGICAL RESOURCES					
BIO1	Red-legged Frog: A qualified monitor shall be present during installation of any water diversions, initial vegetation clearing, and excavation/rock placement work upstream of Hollister Avenue. The monitor will check the area for red-legged frogs prior to the work. If any are found, work would be halted until the frogs leave the work area or until consultation with the USFWS has been completed and authorization for take has been authorized so that they can be relocated upstream to suitable habitat by the monitor.	City of Goleta	City shall have qualified RLF biologist on retainer; Construction Contractor shall provide advanced notice and schedule for activities requiring monitor.	Prior and During Construction	Responsible Party: Contractor/Bio Monitor Date: Ongoing

San Jose Creek Capacity Improvement Project Mitigation Monitoring and Reporting Plan					
Mitigation Measure	**Implementation Procedure or Action**	**Organization Responsible for Implementation**	**Reporting/ Notification Requirement**	**Compliance Schedule**	**Verification of Compliance**
BIO2	Native Trees: A Native Tree Protection and Replacement Plan (NTRP) shall be prepared by a certified arborist or qualified expert and approved prior to vegetation clearing. All native trees to be removed, except willows which are included in the Riparian Vegetation Protection and Replacement Plan below, will be covered. This plan can be developed as a component of the Landscape Plan.	City of Goleta	Prepare NTPRP	Prior to Construction	Responsible Party: Contractor/Bio Monitor Date: Ongoing
BIO3	Riparian Vegetation: A Riparian Vegetation Protection and Replacement Plan (RVPRP) shall be prepared and approved prior to vegetation clearing. This plan can be developed as a component of the Landscape Plan.	City of Goleta	Prepare RVPRP	Prior to Construction	Responsible Party: Contractor/Bio Monitor Date: Ongoing
BIO4	Breeding Birds: The pre-approved Riparian Vegetation Protection and Replacement Plan shall include seasonal constraints on vegetation removal and nesting bird survey specifications to reduce impacts to nesting birds within the work area.	City of Goleta	N/A	Prior to Construction	Responsible Party: Contractor/Bio Monitor Date: Ongoing
CULTURAL RESOURCES					
ARCH1	Cultural Resources Monitoring: Onsite monitoring by a qualified archeologist and appropriate Native American observer shall occur during all grading, excavation, and site preparation that involves earth moving operations. In the unlikely event archaeological remains or cultural resources are encountered during construction in the proposed project area, work shall be stopped immediately or redirected and the City shall be notified. A qualified archaeologist shall prepare a report assessing the significance of the find and provide recommendations regarding appropriate disposition. Disposition would be determined by the City in conjunction with the affected Native American nation.	City of Goleta	A report of findings is required if archaeological remains or cultural resources are encountered during the project.	Prior and During Construction	Responsible Party: City Staff Date: Ongoing

San Jose Creek Capacity Improvement Project Mitigation Monitoring and Reporting Plan					
Mitigation Measure	**Implementation Procedure or Action**	**Organization Responsible for Implementation**	**Reporting/ Notification Requirement**	**Compliance Schedule**	**Verification of Compliance**
HAZARDS & HAZARDOUS MATERIALS					
HAZ1	Contaminated Soils: Unless otherwise authorized by the City of Goleta and Santa Barbara County Fire Protection Services District, contaminated soils or contamination within the project construction footprint shall be remediated prior to or during subsurface construction activities. Remediation shall occur in compliance with local, state, and federal regulations and as directed by the Santa Barbara County Fire Protection District, Santa Barbara County Leaking Underground Fuel TankLUFT Program, and/or Regional Water Quality Control Board, including but not limited to the presence of a regulatory monitor, specific handling or disposal of contaminated materials, and/or soil testing. Soil remediation shall be completed such that contamination levels are below health screening levels established by OEHHA and/or applicable action levels established by the lead regulatory agency with jurisdiction over the remediation. Additionally, only clean soil shall be used as backfill.	City of Goleta, Construction Contractor, Santa Barbara County Fire Protection Services District	Immediate notification of City staff if contaminated soils are encountered.	Prior and During Construction	Responsible Party: City Staff Date: Ongoing
HYDROLOGY & WATER QUALITY					
WQ1	Storm Water Pollution Prevention Plan (SWPPP): A SWPPP shall be prepared under the provisions of a Construction General Storm Water Permit and specifically include measures to: (1) prevent erosion and sediment runoff from the construction site and from the post-construction site that could cause sedimentation in the creek or Goleta Slough; and (2) prevent discharge of construction materials, contaminants, washings, concrete, fuels, and oils to the creek. These measures shall include, at a minimum, physical devices to prevent sedimentation and discharges (e.g., silt fencing, straw bales), and routine monitoring of these devices and revegetation of disturbed soils that would remain exposed after construction. BMPs shall be developed and implemented based on the following guidance manuals: California Storm Water Best Management Practice Handbook (Stormwater Quality Task Force 1993) and Caltrans Storm Water Quality Handbook – Construction Contractor's Guide and Specifications (Caltrans 1997). Types of BMPs that would be implemented as appropriate to site conditions include: Stockpile Management BMPs, Grading and Filling BMPs, Dewatering BMPs, and Waste Management BMPs.	Construction Contractor	Prepare SWPPP	Daily Prior and During Construction	Responsible Party: on-site construction management personnel or environmental monitor Date: Ongoing

San Jose Creek Capacity Improvement Project Mitigation Monitoring and Reporting Plan					
Mitigation Measure	**Implementation Procedure or Action**	**Organization Responsible for Implementation**	**Reporting/ Notification Requirement**	**Compliance Schedule**	**Verification of Compliance**
WQ2	Contaminated Water: Any project-related dewatering activities shall either discharge into the sanitary sewer, under permit with Goleta Sanitary District, or comply with the National Pollutant Discharge Elimination System (NPDES) permit regulations and an associated SWPPP regarding discharge into storm drains and/or directly into San Jose Creek. Such permit requirements typically include on-site treatment to remove pollutants prior to discharge. Effluent analyses should include, but not be limited to, TPH and BTEX. Alternatively, the water shall be temporarily stored onsite in holding tanks, pending off-site disposal at a disposal facility approved by the RWQCB. An NPDES-mandated SWPPP shall include measures ensuring that potential pollutant-contaminated waters encountered during excavation would be isolated and collected for transportation to a hazardous waste treatment facility prior to their discharge into the storm drain system or directly into San Jose Creek.	Construction Contractor, City of Goleta Staff	Immediate notification of City staff if contaminated soils are encountered.	Daily Prior and During Construction	Responsible Party: on-site construction management personnel or environmental monitor Date: Ongoing
NOISE					
N1	Noise Prevention: Construction activities for the proposed project shall be limited to weekdays between the hours of 8:00 a.m. and 5:00 p.m., in accordance with the City of Goleta General Plan Noise Element Policy 6.4.	Construction Contractor	N/A	During Construction	Responsible Party: City Staff Date: Ongoing
N2	Noise Control: All construction equipment shall have properly maintained sound-control devices, and no equipment shall have an unmuffled exhaust system.	Construction Contractor	N/A	During Construction	Responsible Party: City Staff Date: Ongoing

San Jose Creek Capacity Improvement Project Mitigation Monitoring and Reporting Plan					
Mitigation Measure	**Implementation Procedure or Action**	**Organization Responsible for Implementation**	**Reporting/ Notification Requirement**	**Compliance Schedule**	**Verification of Compliance**
TRANSPORTATION & TRAFFIC					
TRANS1	Traffic Management Plan: A qualified traffic engineer shall prepare a traffic management plan that defines how traffic operations will be managed and maintained on roadways during each phase of construction including any detours, signage, lane closures, or utility relocation work.	City of Goleta	Prepare a Traffic Management Plan	Prior and During Construction	Responsible Party: Contractor Date: Ongoing
TRANS2	Repairs and Refurbishments: Kellogg Avenue will be repaired and refurbished to City of Goleta standards for "Minor Arterials" following project construction.	City of Goleta	N/A	After Construction	Responsible Party: City Staff Date: Ongoing
TRANS3	Design Plan Review: A qualified traffic engineer will review and approve final design plans for alterations to Kellogg Avenue resulting from the proposed project.	City of Goleta	N/A	Prior to Construction	Responsible Party: City Staff Date: Ongoing
UTILITIES & SERVICE SYSTEMS					
UTIL1	Construction Waste Recycling: Demolition and/or excess construction materials shall be separated onsite or offsite for reuse/recycling or proper disposal (e.g., concrete, asphalt). During grading and construction, separate bins for recycling of construction materials and brush shall be provided onsite or separated offsite.	Construction Contractor	N/A	During Construction	Responsible Party: City of Goleta Date: Ongoing

Steelhead Assessment and Recovery Opportunities in Southern Santa Barbara County, California

by

Matt W. Stoecker

and

Conception Coast Project

June 2002

Barrier ID: BR_AO_SJ_1
Stream: San Jose
Barrier Type: Concrete Channelization
Location: From the Goleta Slough upstream approximately 0.78 mile to the upstream side of the Hollister Avenue Bridge
Ownership/Interest: Santa Barbara County Flood Control District

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Description: This entire reach of San Jose Creek was created by realigning the stream from its former channel to the west into this trapezoidal concrete channel, which was built by the Army Corps or Engineers (pers. comm. Treiberg). Portions of the original natural stream channel continue to exist to the west, but the upstream end of this channel has been covered around Hollister Avenue and confined by development. The total length of the concrete lined channel measured 0.78 mile, using GPS. Stream flows are unconfined and spread out over the bottom of the lower channel and then become more confined in the middle and upper reaches as the slope increases. The lowest reach of the channel is relatively flat, but the slope gradually increasing to 1-2% at the upstream end. Under the Hollister Avenue Bridge the concrete channel measured 20 feet wide on the bottom and 9 feet tall to the bridge bottom. The channelized reach is currently maintained by the SBCFCD (pers. comm. Treiberg).

Condition: The channel is in poor to fair condition with significant concrete wear and several holes completely eroded through the bottom. A total of five significant holes through the concrete were observed. The channel walls are cracked in many places with vegetation growing through the concrete in several locations.

Diagnosis: The downstream end of the channel transitions into natural silt substrate and no jump exist for steelhead attempting to migrate into the channel. Prior to 1984, Beguhl noted that he observed adult steelhead ascend the concrete channel to within a couple hundred feet of the upstream end, but they could never successfully negotiate the upper reach (pers. comm. Beguhl). Sjovold also observed adult steelhead trying unsuccessfully to swim upstream in the concrete channel (See the Salmonid Documentation Table in Section 6.0 for more information about these sightings). The steepest slope in the channel occurs along the upper reach, where excessive water velocities and/or shallow water depth prevent upstream steelhead migration. The excessive length of the channel, with no significant resting areas, accelerated stream velocities, and/or shallow water conditions, prevents upstream steelhead migration.

Stream flows are extremely exposed in this reach due to the lack of riparian cover and water temperatures are elevated with the direct sunlight. The channel is a prime poaching and predation spot where upstream and downstream migrating salmonids are readily captured by human and

other predatory animals. The channel also eliminates the biofiltration functions provided in a natural stream channel, which allows pollutants to more readily enter the Goleta Slough and Ocean.

Recommended Action:

Background-

Observations of the U.S. Coast Survey maps, depicting the Goleta Slough in 1870, show the slough system and lower San Jose Creek prior to significant alterations by humans. When comparing this map to existing conditions it is easy to recognize the naturally shifting nature of these streams as they historically entered the Goleta Slough. The map shows the confined channel of "Arroyo de San Jose" eventually tapering out as the stream flows apparently spread out into the expanses of the "La Goleta" slough. Adjacent to the creeks entering the slough, this historic map shows isolated reaches of former stream channels that were no longer connected to the active stream channel. These isolated stream channel reaches attest to the seasonal shifting nature of these creeks as they emerged from the foothills and carved through the lowland alluvial deposits around the Goleta Slough. Like other creeks entering the Goleta Slough, San Jose Creek historically jumped it's banks and changed courses often during years of high stream flow.

Santa Barbara County is currently working on developing a watershed planning process for San Jose Creek that will address watershed restoration, steelhead passage, flood control, and other watershed issues. The Army Corps of Engineers is studying potential improvements to the existing concrete channel from Hollister Avenue to the Goleta Slough. Significant funding from the Corps will likely be available for an actual project. The plan is looking into increasing the flow capacity of the currently undersized channel by possibly replacing it with a larger capacity box channel configuration. Fish passage measures within the new channel have been proposed. The modification of the existing channel or construction of a new concrete channel will provided minimal, or no, benefit to the ecological health of San Jose Creek, Goleta Slough, and near shore ocean environment and may not effectively provide upstream steelhead passage due to the dependence on fish passage measures subject to damage, debris blockage, and flows limitations that are also dependant on continual human maintenance.

Lower San Jose Creek Restoration Feasibility Study-

The ecological health of the entire San Jose Creek watershed and the Goleta Slough system, as well as benefits to water quality and recreational opportunities, are tied into future projects on the lower creek. Due to the historically shifting nature of the creeks passing through the Goleta Slough and the fact that the existing stream location was realigned into the constructed flood control channel, the focus of future planning on lower San Jose Creek should not be bound to the existing location of the concrete channel. In fact, the most ideal alternative for meeting all stakeholder objectives may involve looking beyond the existing channel location, which most view as undesirable and functionally undersized. Naturalizing the existing channel reach is likely not feasible due to the confined nature of the channel between development along Kellogg Street and Highway 217, but should be assessed. One alternative that offers an amazing opportunity for many stakeholder objectives involves creating a new lower San Jose Creek.

Creating a New Lower San Jose Creek-

An alternatives analysis that looks into options for modifying the existing channel, reestablishing the former channel, and creating a new stream channel should be conducted. The third option of

creating a new stream channel is described below and may offer a solution that meets most stakeholder objectives and is not currently being considered. A coordinated effort with watershed stakeholders should assess the feasibility of abandoning the existing concrete channel and realigning the creek from near the upstream end of the channel at Hollister Avenue under Highway 217 to the open agricultural land to the east. Should the landowner(s) be interested in selling a portion of this agricultural land, a buffered riparian and stream corridor approximately 200-300 feet wide could be established through this area and into lower Atascadero Creek, near the grade control structure (BR_AO_1) at the Goleta Slough. Lower Atascadero Creek is not confined by adjacent development and appears to have a channel large enough to convey the increased flows. Historically, the streams draining into Goleta Slough jumped their banks and shifted in such a manner reconnecting to other adjacent streams near the slough. This action would have many potential benefits, including those described below.

1) Revival of a naturalized lower San Jose Creek and native riparian corridor (0.78 miles of which are currently lost with the existing concrete channel).
2) Development of public trails and bike paths along this creek parkway that are consistent with Santa Barbara County objectives of developing a park in this area and providing public linkages from Goleta to the ocean and the existing bike path along Atascadero Creek.
3) Increased flood control with an adequately sized, unconfined, natural stream channel, using biotechnical bank stabilization techniques, and a native riparian buffer zone.
4) Unimpeded migration of aquatic species, including steelhead.
5) Improved water quality into the slough and ocean would be accomplished by providing riparian shade and restoring the biofiltration functions of a natural stream channel.

The above maps shows a rough conceptual drawing of the newly created lower San Jose Creek in blue with surrounding riparian buffer in green. This area is currently being used for agriculture. The existing, confined concrete channel is shown in red. The natural stream channel of San Jose Creek can be seen extending form the upper end of the concrete channel to Highway 101. Connecting the natural creek upstream of Hollister Avenue across Highway 217 may require the construction of a bridge(s), but may work well with Highway 217 modifications being discussed.

It is likely that many of the items identified in the "Issue Areas" list produced by the San Jose Creek Watershed group as well as developing stakeholder goals for San Jose Creek would be addressed and accomplished with the implementation of the above-mentioned project. This project has many unanswered questions and needs to be studied in detail to determine the feasibility of such an action. Because of the considerable costs associated with such a project and need to buy agricultural lands to accomplish this plan, the material removed to create the new stream channel could be used to fill the existing channel. This 'new' land on top of the existing concrete channel site and surrounded by commercial development could potentially be sold or traded to commercial or agricultural interests to offset project costs.

Structural Capacity Evaluation

For

Hollister Avenue Bridge (51C-027)

Submitted to

Rosemarie Gaglione, P.E.
Project Manager

Capital Improvement Program
City of Goleta

Prepared By

Bengal Engineering, Inc.

Civil, Bridge, Hydraulics, Structural & Highway Engineers

November 1, 2010

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EXECUTIVE SUMMARY

The Hollister Avenue Bridge is a single-span bridge over San Jose Creek located in the City of Goleta ("the City"). This precast/prestressed (PC/PS) concrete voided slab structure was constructed in 1960 and subsequently widened in 1982. The approximate dimensions of the bridge are: 44 feet-long and 104 feet-wide. The existing abutment configuration is unconventional; according to current practice. The bridge deck rests on shallow (18" deep by 24" wide) pile caps. There are no backwalls to protect the bearing pads from debris. The PC/PS slab ends are directly exposed to the retained soil at the approaches. The trapezoidal channel below is lined with concrete. The sloping channel lining sides reaches the bottom of the abutment (pile cap).

While performing a geotechnical investigation for the San Jose Creek Channel Improvement Project, Bengal noticed large cracks characteristic of Alkali-Silica Reactivity (ASR) at the bridge pile caps and notified the City. In July 2009, Bengal performed tests on the concrete near the cracks and found alkali-silica reactivity (ASR). ASR is known to initiate cracks in concrete, thereby allowing moisture/water infiltration which causes further expansion of cracks. Eventually, this process may lead to concrete disintegration.

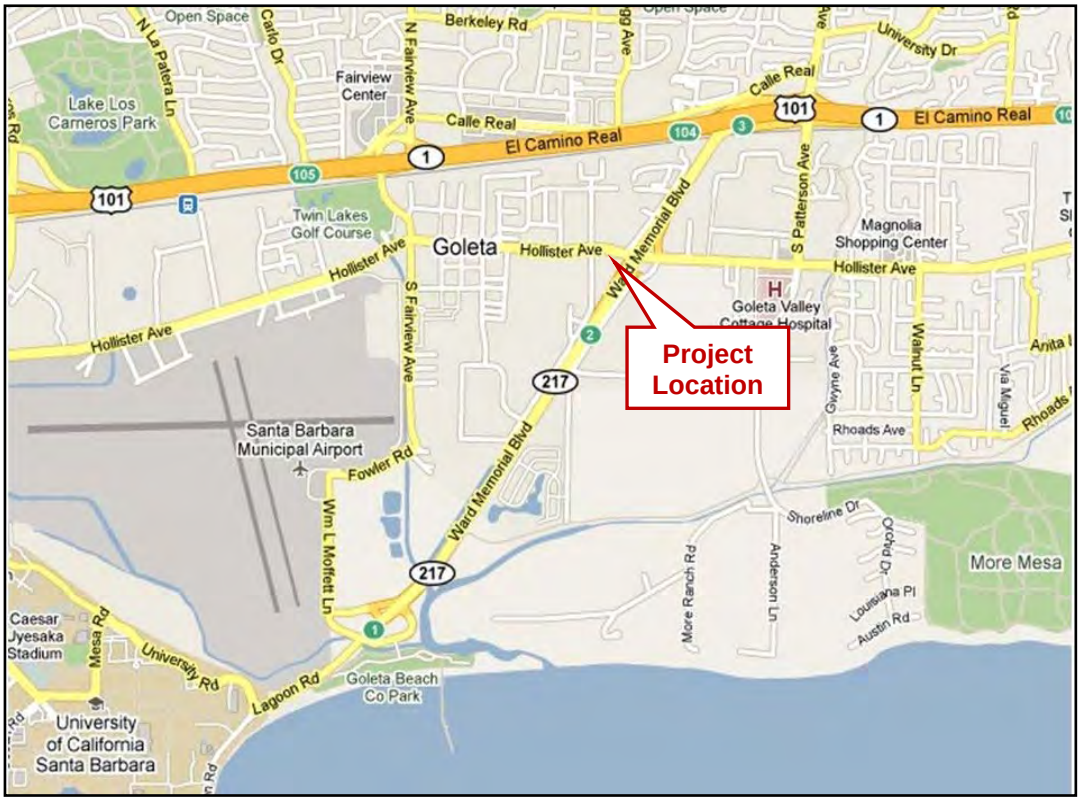
The cracks on the west pile cap propagated inside and traveled to the bottom of the pile cap. These cracks are effectively disengaging the flexural rebars from the rest of the concrete and thereby reducing the flexural capacity.

The pile cap capacity was evaluated for Inventory and Operating conditions. The Inventory and Operating Ratings of the pile caps were found to be 0.55 and 0.72 respectively. Ratings of less than 1.0 are considered deficient in either condition. The bridge is structurally deficient.

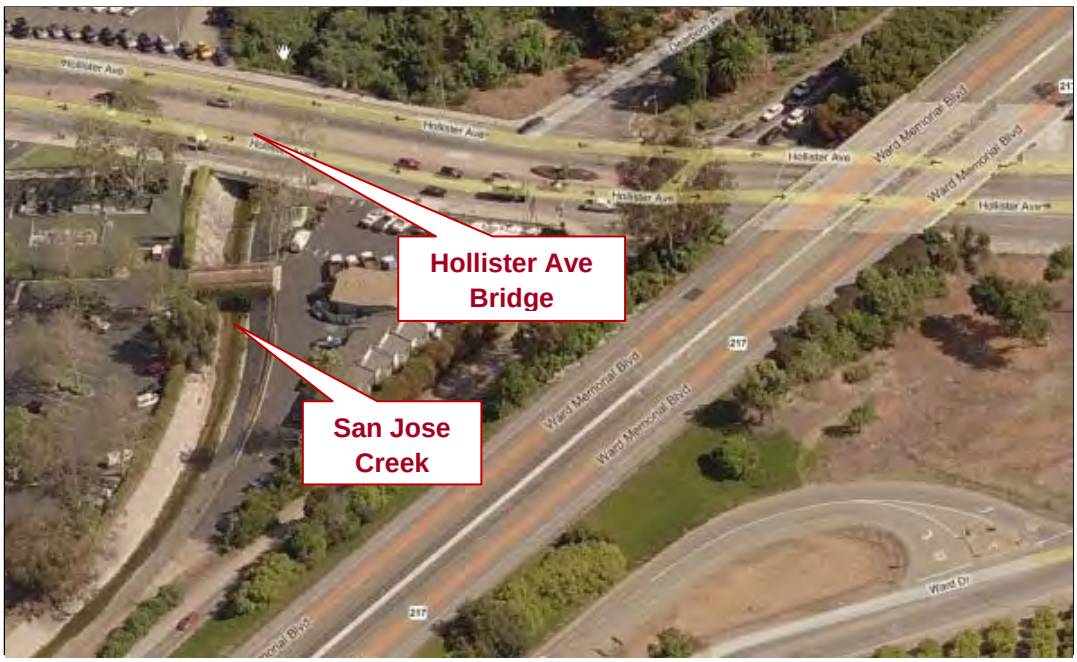
Due to inadequate hydraulic capacity of the bridge, it is also a source of major flooding of Down Town Goleta.

Recommendations includes:

a) Reevaluation of structural Load Capacity and Ratings of the bridge by Caltrans.
b) Initiate environmental permitting process for major rehabilitation/replacement of the bridge.
c) Monitor the bridge condition frequently.



Vicinity Map



Aerial View

I. GENERAL DESCRIPTION: HOLLISTER AVENUE BRIDGE

The Hollister Avenue Bridge over San Jose Creek is located in the City of Goleta. Built in 1960, it is a single span bridge constructed of PC/PS concrete voided slabs placed side-by-side, and tied together with a lateral tie rod at mid span. The bridge length is 44-ft. The original width of the bridge, 84-ft, was increased to 104-ft in 1982. The bridge deck rests on pile caps supported by concrete piles spaced at 8'-2" on center along the pile cap. Key sheets of the as-built drawings are presented in Appendix A. The channel below is a trapezoidal shape and is lined with concrete. The sloping sides of the concrete lining reach the bottom of the pile cap. Approximate plan, elevation and section of the bridge are shown in Figures 1 through 3. Angle points in the pile caps are not shown for simplicity.

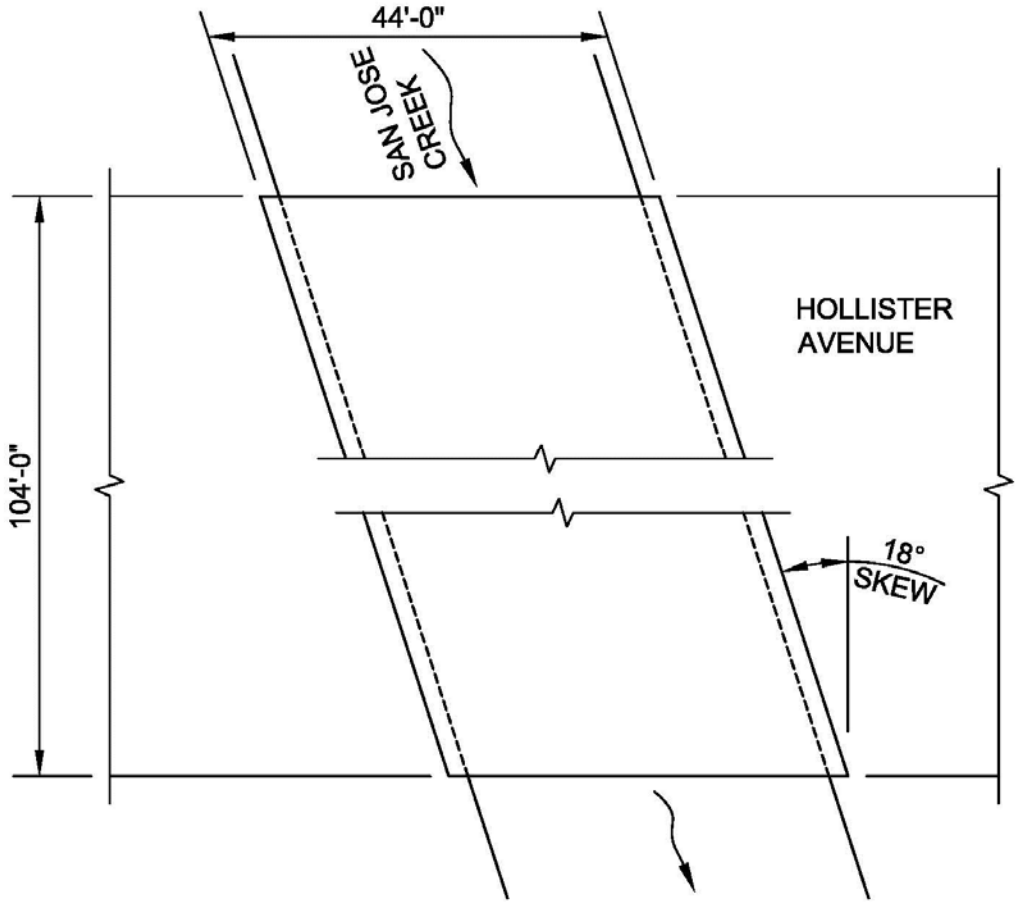


Figure 1: Bridge Plan View

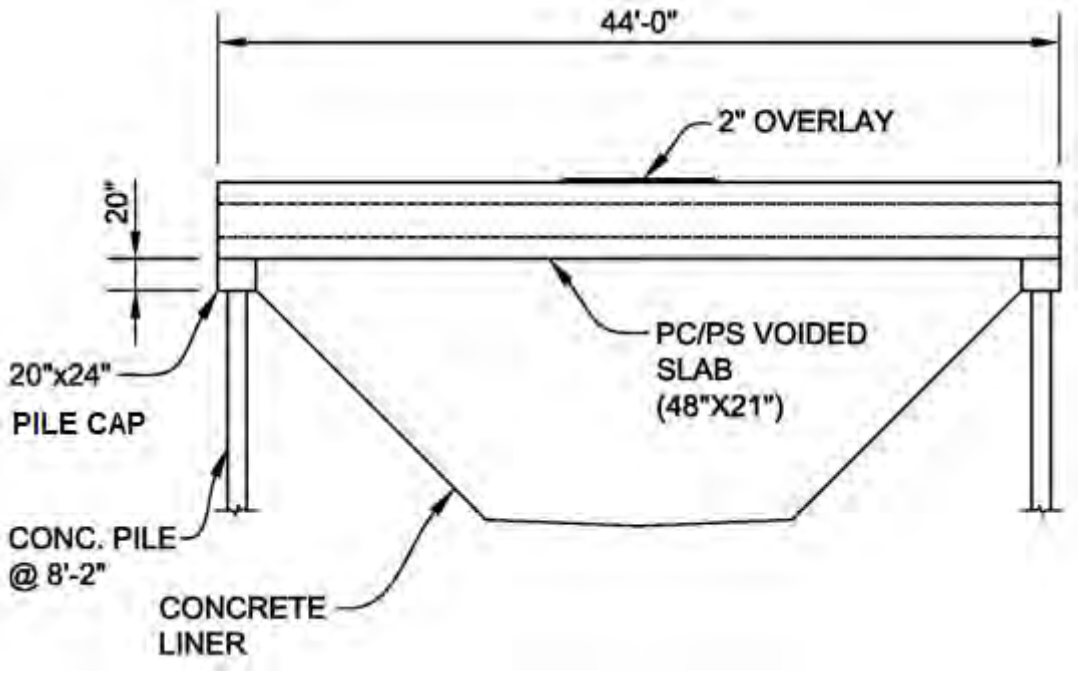


Figure 2: Bridge Elevation View

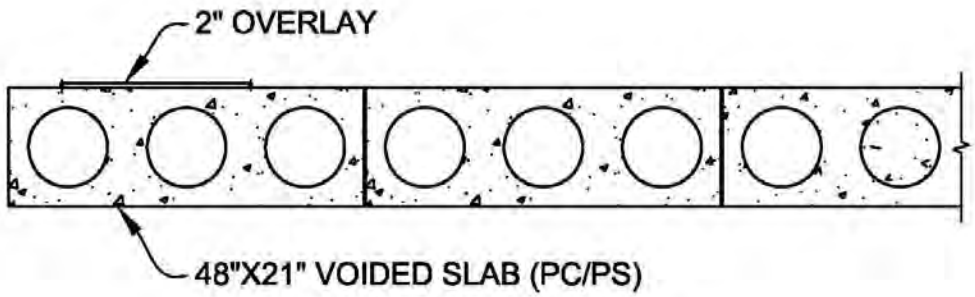


Figure 3: Deck Section

II. FIELD INVESTIGATION & ASR TESTING

In July 2009, while performing a geotechnical investigation for the San Jose Creek Channel Improvement Project, Bengal noticed large cracks characteristic of Alkali-Silica Reactivity (ASR) at the bridge pile caps and notified the City. The City requested that Caltrans Structure Maintenance and Investigations (CT-SM&I) evaluate the new findings.

Per the City request, CT-SM&I performed a supplemental bridge inspection on October 14, 2009 and observed the cracks at the pile caps. They recommended that the City perform ASR testing at the pile caps to ascertain possible cause(s) of the cracks. Caltrans Inspection Reports are attached in Appendix B.

The City asked Bengal to facilitate ASR tests at the bridge pile caps. Bengal consulted with Bureau Veritas North America to perform petrographic examination in conformance with ASTM C 856 standard. Following visual examination of the concrete cores, the petrographic analysis included microscopic examination of the prepared concrete samples.

Bengal's investigation found ASR-type distress present in the pile cap concrete and recommended to reevaluate the bridge capacity in light of ASR presence at the pile caps. Bengal prepared the following memorandum summarizing the findings:

"Results and Findings of Concrete Coring and Alkali-Silica Reactivity (ASR) Testing, Hollister Avenue Bridge (51C-027) over San Jose Creek, Goleta, California", February 22, 2010. Submitted to the City of Goleta.

This document is attached in Appendix C.

III. REPAIR DESIGN

Subsequent to the ASR findings at the bridge pile caps, the City asked Bengal to prepare a repair strategy of the bridge pile caps.

Prior to designing repairs to the bridge, Bengal undertook a field investigation to determine if the cracks that are visible in the outside face of the pile cap are also visible in the bottom of the pile caps and to generally determine the extent of the cracking in the pile caps. This field investigation would also help determine if the cracks in the concrete pass completely through the pile caps, as suspected from the earlier coring samples. See Photos 3 through 6, and Figure 4: ”Abutment Section” for more information.

The results of the inspection showed that the cracks visible in the outside face of the pile cap, do in fact propagate through the cross-section. This finding confirms the earlier findings of the coring.

An additional interesting finding was discovered below the pile caps: the bottom of the pile caps, when viewed in cross section, have uneven deflection and an unusual rotation with respect to the crack in the bottom of the pile cap (see photo 5 and 6). We noted that the portion of the pile cap on the side of the crack that is “away from the channel” has a more pronounced deflection and greater torsional rotation than the adjacent portion of the pile cap on the side of the crack “closer to the channel”.

It appears that the concrete channel lining, although relatively thin and lightly reinforced, may have provided some unintended vertical support to the pile caps, prior to the ASR problems within the concrete of the pile cap. Now that pile cap has cracked, it appears that the channel lining no longer provides the unintended support for the entire x-section of the pile cap, and the portion of the pile cap “away from the channel”, is now free to sag and rotate as compared to the portion of the pile cap that is adjacent to the channel lining. It was interesting to note that these two neighboring regions are separated by the longitudinal crack in the pile cap, further illustrating the undesired effect the ASR cracks are having on the pile caps.

The unusual grade changes of the trapezoidal channel lining in front of the pile caps mentioned in the Caltrans Bridge Inspection Report, stating “The concrete-lined trapezoidal channel has an unusual change in front of both abutments. …This condition is noted due to its close proximity to the most severe cracks in the abutments, …” , may have caused by load transfer from the weakened bridge pile caps to the channel lining.

Bengal performed structural calculations of the pile cap for the condition observed at the southwest corner of the west pile cap. The structural conditions could be worse at other locations since bottom reinforcements could be totally separated from the rest of the pile cap concrete mass.

IV. BRIDGE CAPACITY EVALUATION

The sketch below depicts the propagation of the crack through the west pile cap cross-section:

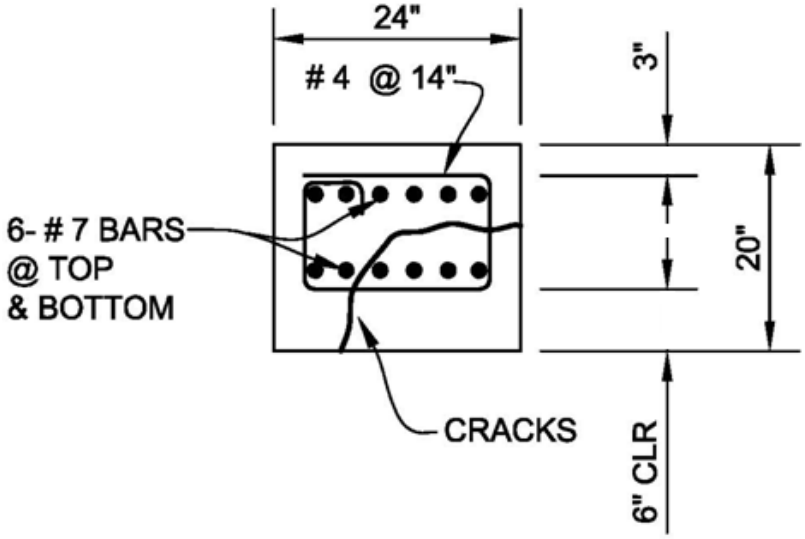


Figure 4: Pile cap section (with cracks). Channel lining on the right not shown. Concrete on the approach side as well at the top were not investigated for the cracks.

It is estimated that only two (2) bottom reinforcing bars are effective in resisting flexural moment. Accordingly, flexural capacity of the pile cap is reduced, thereby lowering the capacity ratings of the bridge. Detailed calculations are presented in Appendix D. The inventory and operating ratings of the bridge are follows:

Inventory Rating (I.R.) = 0.55 < 1.0 (N.G.)
Operating Rating (O.R.) = 0.72 < 1.0 (N.G.)

Torsion effects on the pile cap due to asymmetric effective rebars, frictional forces from the deck slabs, and soil pressure from the roadway approach were not considered in the calculation for simplicity. In addition, the pile cap was analyzed as a structural beam element, instead of a typical pile cap, because of the structural details and how it resists the applied forces.

Ratings of less than unity (1.0) are indicative of inadequate capacity of the bridge for the prescribed condition.

V. RECOMMENDATIONS

- Reevaluate the structural Load Capacity and Ratings of the bridge by Caltrans.
- Due to unconventional support configurations and presence of ASR related large cracks, structural capacity of the bridge is controlled by the condition of the pile caps, instead of bridge superstructure (PC/PS voided slabs).
- Consider major bridge rehabilitation or bridge replacement as options to overcome the structural deficiency.
- Any emergency temporary support of the deck will reduce hydraulic conveyance of the creek and will put the Old Town Goleta in additional flood hazard risk.
- Load restriction will be difficult to enforce since the bridge is located on a major arterial and in a busy commercial and industrial zone.
- Initiate environmental permitting process for major rehabilitation/replacement of the bridge.
- Monitor the bridge condition frequently.

Appendix B: Caltrans Bridge Inspection Reports

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 51C0027
Facility Carried: HOLLISTER AVE
Location : 0.1 MI EAST KELLOG AVE
City : GOLETA
Inspection Date : 03/03/2010
Inspection Type
Routine ☐ FC ☐ Underwater ☐ Special ☐ Other ☒ : Office

Bridge Inspection Report

STRUCTURE NAME: SAN JOSE CREEK

CONSTRUCTION INFORMATION

Year Built : 1964
Year Widened: 1981
Length (m) : 13.4
Skew (degrees): 11
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span PC/PS RC concrete voided slab unit (18) on RC sill abutments.

Span Configuration : 1 @ 13.4 m

LOAD CAPACITY AND RATINGS

Design Live Load: M-18 OR H-20
Inventory Rating: 32.4 metric tonnes Calculation Method: LOAD FACTOR
Operating Rating: 72.3 metric tonnes Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: .3br, 2.7sw, 19.5, 2.7sw, .3br
Total Width: 31.7 m Net Width: 20.7 m No. of Lanes: 4
Rail Description: Type 11 Rail Code : 1000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: PCC lined trapezoidal channel.

CONDITION TEXT

HISTORY

Ownership and maintenance responsibility for this structure changed from the County of Santa Barbara to the City of Goleta in 2002.

The presence of alkali-silica reactivity (ASR) was confirmed in the abutments of the structure by a petrographic analysis performed by Analytical Consulting Group, Inc., on February 16, 2010.

REVISIONS

Element #215, Reinforced Concrete Abutment, has been changed from 49 m in State 2 and 3 m in State 3, to 52 m in State 4.

Due to the lowered level of Element #215, the following appraisals have changed:

Item #60, Substructure Appraisal, has changed from 6 to 5.

Item #67, Structural Evaluation Appraisal, has changed from 6 to 5.

Subsequently, the Sufficiency Rating has changed from 83.2 to 70.9.

CONDITION TEXT

Item #91, Designated Inspection Frequency, has been changed from 48 months to 24 months.

CONDITION OF STRUCTURE

This is an office generated report created to address the findings of ASR in both abutments of the structure. Attached is the Report and Findings created by Bengal Engineering, Inc., a consultant to the City of Goleta.

In addition to the above finding of ASR, the following abutment condition was noted in the special investigation performed on 10/14/2009:

"There are hairline to 1/8", predominantly horizontal cracks throughout the faces of both abutments. The horizontal abutment cracks are more severe near the centerline of the roadway and near the right side of Abutment 1. The largest crack is found approximately 12' away from the right side of Abutment 1, and measures approximately 20' in length. Sounding with a geology pick along the face and around the horizontal crack at the right side of Abutment 1 revealed some minor delaminations along the edges of the cracks. The sounding produced a 6" x 1" x 1" deep spall along a portion of the horizontal crack."

Although the abutment sills are not exhibiting shear or moment cracks due to dead and live load, due to the uncertain deterioration rate of ASR, the Element Level Inspection (ELI) item for the abutments has been downgraded to State 4 (the lowest level possible). The ELI rating may not accurately describe the current state of the abutments, but it was also downgraded in this way to get a more accurate description of the substructure and structure appraisals (Items 60 and 67). Despite the presence of ASR, and the cracks due to expansion, there is no appreciable loss to the capacity of the member and no action is required at this time.

RECOMMENDATIONS

The structure should be monitored in the future for deterioration due to ASR, specifically any indications that the abutments are settling, losing shear capacity, or losing moment capacity. Additionally, even though the superstructure box-beams were pre-stressed and pre-cast offsite, the superstructure should be monitored for ASR indications as well.

SAFE LOAD CAPACITY

A stress analysis done for this structure on 05/01/1981 indicates that it is capable of sustaining legal truckloads and also the State's largest Permit Load. The capacity is controlled by moment at mid-span of the pre-stressed box-beams. The presence of ASR at the abutments does not control the structure capacity at this time.

The ratings are applicable only as long as this structure remains in the same general condition as it was during this investigation.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	61	PS Conc Slab - Unprotected w/ AC Overlay	2	280	sq.m.	280	0	0	0	0
101	215	Reinforced Conc Abutment	2	52	m.	0	0	0	52	
101	227	Reinforced Conc Submerged Pile	2	1	ea.	1	0	0	0	0

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	256	Slope Protection	2	2	ea.	2	0	0	0	0
101	335	Other Bridge Railing	2	50	m.	50	0	0	0	0

WORK RECOMMENDATIONS

RecDate: 05/23/2002
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Attach the loose bridge rail post on the left side of Abutment 1.

Inspected By : AW.Corker

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **51C0027**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500H0010
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 083 (4) PLACE CODE 30378
(6) FEATURE INTERSECTED- SAN JOSE CREEK
(7) FACILITY CARRIED- HOLLISTER AVE
(9) LOCATION- 0.1 MI EAST KELLOG AVE
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- PART OF NET 1
(13) LRS INVENTORY ROUTE & SUBROUTE 000000H00100
(16) LATITUDE 34 DEG 26 MIN 06 SEC
(17) LONGITUDE 119 DEG 49 MIN 08 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- PRESTRESS CONC
TYPE- SLAB CODE 501
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1964
(106) YEAR RECONSTRUCTED 1981
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 04 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 25445
(30) YEAR OF ADT 2004 (109) TRUCK ADT 5 %
(19) BYPASS, DETOUR LENGTH 6 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 12.5 M
(49) STRUCTURE LENGTH 13.4 M
(50) CURB OR SIDEWALK: LEFT 2.7 M RIGHT 2.7 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 20.7 M
(52) DECK WIDTH OUT TO OUT 31.7 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 25.6 M
(33) BRIDGE MEDIAN- CLOSED (NO BARRIER) 2
(34) SKEW 11 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 20.7 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 70.9
STATUS
HEALTH INDEX = .0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-18 OR H-20 4
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 72.3
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.4
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 9
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 4
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 1000
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 31000
(115) YEAR OF FUTURE ADT 2030

********** INSPECTIONS **********

(90) INSPECTION DATE 02/09 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 51C0027
Facility Carried: HOLLISTER AVE
Location : 0.1 MI EAST KELLOG AVE
City : GOLETA
Inspection Date : 10/14/2009
Inspection Type

Routine	FC	Underwater	Special	Other
☐	☐	☐	☐	☒

Bridge Inspection Report

STRUCTURE NAME: SAN JOSE CREEK

CONSTRUCTION INFORMATION

Year Built : 1964
Year Widened: 1981
Length (m) : 13.4
Skew (degrees): 11
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span PC/PS RC concrete voided slab unit (18) on RC sill abutments.

Span Configuration : 1 @ 13.4 m

LOAD CAPACITY AND RATINGS

Design Live Load: M-18 OR H-20
Inventory Rating: 32.4 metric tonnes Calculation Method: LOAD FACTOR
Operating Rating: 72.3 metric tonnes Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: .3br, 2.7sw, 19.5, 2.7sw, .3br
Total Width: 31.7 m Net Width: 20.7 m No. of Lanes: 4
Rail Description: Type 11 Rail Code : 1000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: PCC lined trapezoidal channel.

CONDITION TEXT

HISTORY

Ownership and maintenance responsibility for this structure changed from the County of Santa Barbara to the City of Goleta in 2002.

REVISIONS

Element #215, Reinforced Concrete Abutment, has been changed from 52 m in State 1, to 49 m in State 2 and 3 m in State 3.

Traffic data was modified based on observations in the field, and a report provided by the City of Goleta dated August of 2008:

Item #29, Average Daily Traffic, has been changed from 17759 to 25,445.

Item #30, Year of ADT, has been changed from 2000 to 2004.

Item #109, Truck ADT, has been changed from 2% to 5%.

Item #114, Future ADT, has been changed from 25504 to 31,000.

CONDITION TEXT

Item #115, Year of Future ADT, has been changed from 2026 to 2030.

The City of Goleta has reported that San Jose Creek has overtopped the structure's approaches twice in 1995, once in 1998, and once in 2002. Based on this information, Item #71, Waterway Adequacy, has been changed from 6 to 4.

Item #60, Substructure Appraisal, has been changed from 7 to 6.

Item #67, Structural Evaluation Appraisal, has been changed from 7 to 6.

The Sufficiency Rating has changed from 87.7 to 83.2.

CONDITION OF STRUCTURE

A special investigation was conducted on 10/14/2009 in response to concerns from the Capital Improvement Program Manager for the City of Goleta, Rosemarie Gaglione, that there could be the presence of akali-silica reactivity (ASR) within the concrete at both abutments. This inspection is limited to the abutments, channel, and elements that could be visually inspected from below the structure.

There was approximately 12" of swift flowing water in the channel at the time of this investigation.

There are hairline to 1/8", predominantly horizontal cracks throughout the faces of both abutments. The horizontal abutment cracks are more severe near the centerline of the roadway and near the right side of Abutment 1. The largest crack is found approximately 12' away from the right side of Abutment 1, and measures approximately 20' in length. Sounding with a geology pick along the face and around the horizontal crack at the right side of Abutment 1 revealed some minor delaminations along the edges of the cracks. The sounding produced a 6" x 1" x 1" deep spall along a portion of the horizontal crack. See attached photos. It is not certain at this time if the cracks are from a chemical reaction within the concrete abutments due to ASR, or due to an undetermined cause. The cracks due not appear to affect the load capacity or the stability of the structure.

Water is leaking between the pre-stressed concrete slab units. Subsequently, there are water stains along the slab unit joints as well as on the faces of both abutments. Differential deflection was not observed during this inspection, but the shear keys between the slab units and the transverse tie rod at mid-span should be monitored for deterioration because these elements make the individual slabs act as a unit.

The concrete-lined trapezoidal channel has an unusual grade change in front of both abutments. See attached photos. The channel could have been constructed in its current condition, but it appears that either the center of the channel has settled, or the sides of the channel have heaved. This condition is noted due to its close proximity to the most severe cracks in the abutments, and so it can be monitored in the future.

RECOMMENDATIONS

The City of Goleta should test the concrete at both abutments for the presence of akali-silica reactivity (ASR). The results of the test should be shared with the Office of Structure Maintenance and Investigations so appropriate action can be taken.

SAFE LOAD CAPACITY

A stress analysis done for this structure on 05/01/1981 indicates that it is capable of

CONDITION TEXT

sustaining legal truckloads and also the State's largest Permit Load.

The ratings are applicable only as long as this structure remains in the same general condition as it was during this investigation.

Inspected By : AW.Corker/W.Baker

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **51C0027**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500H0010
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 083 (4) PLACE CODE 30378
(6) FEATURE INTERSECTED- SAN JOSE CREEK
(7) FACILITY CARRIED- HOLLISTER AVE
(9) LOCATION- 0.1 MI EAST KELLOG AVE
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- PART OF NET 1
(13) LRS INVENTORY ROUTE & SUBROUTE 000000H00100
(16) LATITUDE 34 DEG 26 MIN 06 SEC
(17) LONGITUDE 119 DEG 49 MIN 08 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- PRESTRESS CONC
TYPE- SLAB CODE 501
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1964
(106) YEAR RECONSTRUCTED 1981
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 04 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 25445
(30) YEAR OF ADT 2004 (109) TRUCK ADT 5 %
(19) BYPASS, DETOUR LENGTH 6 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 12.5 M
(49) STRUCTURE LENGTH 13.4 M
(50) CURB OR SIDEWALK: LEFT 2.7 M RIGHT 2.7 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 20.7 M
(52) DECK WIDTH OUT TO OUT 31.7 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 25.6 M
(33) BRIDGE MEDIAN- CLOSED (NO BARRIER) 2
(34) SKEW 11 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 20.7 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 83.2
STATUS
HEALTH INDEX = 64.7
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-18 OR H-20 4
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 72.3
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.4
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 6
(68) DECK GEOMETRY 9
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 4
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 1000
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 31000
(115) YEAR OF FUTURE ADT 2030

********** INSPECTIONS **********

(90) INSPECTION DATE 02/09 (91) FREQUENCY 48 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Printed on:Monday 11/23/2009 11:23 AM 51C0027/AAAF/17367

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 51C0027
Facility Carried: HOLLISTER AVE
Location : 0.1 MI EAST KELLOG AVE
City : GOLETA
Inspection Date : 02/04/2009

Bridge Inspection Report

Inspection Type	Routine	FC	Underwater	Special	Other
	X				

STRUCTURE NAME: SAN JOSE CREEK

CONSTRUCTION INFORMATION

Year Built : 1964
Year Widened: 1981
Length (m) : 13.4

Skew (degrees): 11
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span PC/PS RC concrete cored slab unit (18) on RC sill abutments.

Span Configuration : 1 @ 13.4 m

LOAD CAPACITY AND RATINGS

Design Live Load: M-18 OR H-20

Inventory Rating: 32.4 metric tons — Calculation Method: LOAD FACTOR
Operating Rating: 72.3 metric tons — Calculation Method: LOAD FACTOR
Permit Rating : PPPPP

Posting Load :	Type 3	N/A	Type 3S2	N/A	Type 3-3	N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: .3br, 2.7sw, 19.5, 2.7sw, .3br

Total Width: 31.7 m — Net Width: 20.7 m — No. of Lanes: 4
Rail Description: Type 11 — Rail Code : 1000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: PCC lined

CONDITION TEXT

CONDITION OF STRUCTURE

The streambed was almost dry at the time of this investigation allowing a thorough inspection of all the substructure elements. The stream-bed is concrete lined. No stream section is needed.

No new structural defects were found in this investigation.

The following conditions existed prior to this investigation and have not changed significantly:

The hex nuts and washers connecting the first post of the metal barrier to the concrete barrier are missing on the left side of Abutment 1 at the northwest corner of the bridge.

There are small intermittent transverse cracks for the full length of each sidewalk.

SAFE LOAD CAPACITY

A stress analysis done for this structure on 05/01/1981 indicates that it is capable of sustaining legal truckloads and also the State's largest Permit Load.

The ratings are applicable only as long as this structure remains in the same general

CONDITION TEXT

condition as it was during this investigation.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	61	PS Conc Slab - Unprotected w/ AC Overlay	2	280	sq.m.	280	0	0	0	0
101	215	Reinforced Conc Abutment	2	52	m.	52	0	0	0	0
101	227	Reinforced Conc Submerged Pile	2	1	ea.	1	0	0	0	0
101	256	Slope Protection	2	2	ea.	2	0	0	0	0
101	335	Other Bridge Railing	2	50	m.	50	0	0	0	0

WORK RECOMMENDATIONS

RecDate: 05/23/2002
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Attach the loose bridge rail post on the left side of Abutment 1.

Inspected By : A.Reyes

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ARIEL A. REYES C 46139 12-31-10 CIVIL STATE OF CALIFORNIA

Appendix C: Bengal Technical Memorandum on ASR Testing

Bengal Engineering, Inc.

TECHNICAL MEMORANDUM

Date: February 22, 2010

To: Rosemarie Gaglione, P.E.
Capitol Improvement Program Manager
City of Goleta, California

Subject: Results and Findings of Concrete Coring and Alkali-Silica Reactivity (ASR) Testing, Hollister Avenue Bridge (51C-027) over San Jose Creek, Goleta, California

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INTRODUCTION

This technical memorandum summarizes the results of alkali-silica reactivity (ASR) testing performed on two (2) of four (4) concrete cores recovered during coring of the bridge, performed on Thursday, December 17, 2009.

Alkali-silica reactivity is the process in which certain minerals (mostly glass-type silica), in the presence of moisture, are broken down by the highly alkaline environment of concrete producing a gel that expands, creating tensile forces in the concrete matrix which cause cracking of the concrete. The cracking then allows more water to infiltrate into the concrete creating more gel, more expansion etc. Ultimately the concrete fails or disintegrates.

The California Department of Transportation, Structure Maintenance and Investigations (CT-SM&I) is responsible for the bridge inspections for the City of Goleta (City).

Recently, Bengal Engineering noticed large cracks at the bridge abutments. The cracks appeared to be ASR-type cracks and notified the City. The City requested that CT-SM&I evaluate the new findings. Per the City's request, Caltrans SM&I performed a supplemental bridge inspection on October 14, 2009 to observe the cracks at the abutments. CT-SM&I recommended that the City perform ASR tests at both abutments to ascertain the possible cause(s) of the cracks.

The City hired Bengal Engineering (BE) to facilitate the ASR testing at the bridge abutments. BE sub-consulted with Bureau Veritas North America, Inc., a material and geotechnical testing company located in Ventura, California. It was decided to perform a petrographic examination, in accordance with ASTM C 856, of the abutment concrete. The petrographic examination included visual (i.e. unmagnified) and microscopic examination of the prepared concrete cores.

ASR TESTING

Two of the four core samples (Core #1 from the west abutment and #4 from the east abutment) were the subject of petrographic analysis, in accordance with ASTM Standard C-856. The purpose of the petrographic analysis was to determine the condition of the concrete and the cause(s) of the cracks. The petrographic analysis was performed by Analytical Consulting Group, Inc. (ACG), and their report is enclosed in Attachment 1.

The following observations were noted by ACG. For a complete discussion, please see the attached report.

- Siliceous shale aggregate, most likely from the Monterey Formation, is present in both cores. The siliceous shale aggregate is reactive and many of them have undergone ASR reactions in the two cores.

- Particles which have undergone ASR show dilation cracks within the particle, cracks around the periphery of the article, and cracks extending into the cement paste. ASR gel commonly fills the cracks extending into the adjacent cement paste, and may also replace part of the particle or permeate the cement paste immediately adjacent to the particle.

CONCLUSIONS

The following conclusions of the petrographic analysis were provided by ACG:

- The distress in these concrete samples is clearly the result of expansive alkali-silica reactions (ASR) between siliceous shale particles in the aggregate and alkalis derived either from within the concrete, from the environment, or both.

- The alkali-silica reaction in these samples is abundant and pervasive and has caused severe distress.

- There appears to be sufficient reactive aggregate remaining in the concrete for reaction to continue indefinitely.

It is our opinion that the reactive aggregate, cracking and dilation seen at the microscopic level are directly related to the cracks readily seen at the abutment face below the bridge (see Photos 2 and 5 above).

RECOMMENDATIONS

1. Re-evaluate bridge load capacity and ratings.
2. Re-evaluate bridge sufficiency ratings in light of ASR presence at the abutments.
3. Future inspections: the bridge should be inspected -
    - Annually, until a replacement structure is constructed.
    - After a major seismic event.
    - After a major flood event.
    - If the bridge shows sign of settlement or unusual structural cracks.
4. Replace the bridge.

We appreciate this opportunity to be of service to the City of Goleta. If you have any questions or we can be of any further assistance, please do not hesitate to contact us.

Sincerely,

Md. Wahiduzzaman, P.E.
BENGAL ENGINEERING, INC.
Goleta, California

Attachment:

1. Attachment 1: Petrographic Analysis Report by ACG, Inc.

Attachment 1

Petrographic Analysis Report by ACG, Inc.

February 16, 2010 Project No.: 45009-000791.00

Bengal Engineering
250 Big Sur Drive
Goleta, California 93117

Attention: Ed Pongracz-Bartha, CEG

Subject: **Report of Hollister Avenue Bridge ASR Concrete Testing, San Jose Creek Capacity Improvement Project, Goleta, California**

Dear Mr. Pongracz-Bartha;

In accordance with you request, Bureau Veritas prepared this report of concrete testing of two concrete core samples sampled by others and delivered to our lab. The purpose of the testing was to provide test data to facilitate evaluation of the existing concrete at the Hollister Avenue Bridge over San Jose Creek.

Scope of Services

The scope of services provided included the following tasks:

- Petrographic analysis of concrete thin sections from 2 samples. Petrographic analysis was conducted in substantial conformance with ASTM C856. Petrographic analysis was performed by Analytical Consulting Group, Inc. of Ventura, California. ACG's report is included as Attachment 1.

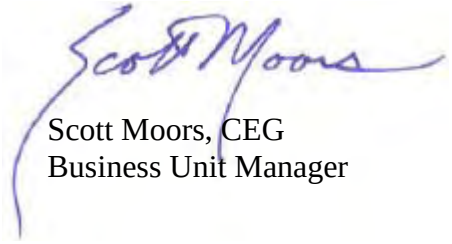
Summary of Testing

Results of the Petrographic analyses indicate that the observed distress to the concrete core thin section samples is "clearly" the result of alkali-silica reactions (ASR). ASR in the samples is "abundant and pervasive and has caused severe distress". ASR is likely to continue as long as there is adequate moisture. A complete discussion is provided in the attached report.

Bureau Veritas North America, Inc.
1868 Palma Drive, Suite A
Ventura, CA 93003
Main: (805) 656-6074
Fax: (805) 656-1263
www.us.bureauveritas.com

If you have questions concerning this report, please contact the undersigned at your convenience.

Respectfully Submitted,
Bureau Veritas North America, Inc.



Scott Moors, CEG
Business Unit Manager

Attachment 1 - Report of Petrographic Examination (ACG, 2/12/10)

Appendix D: Bridge Capacity Evaluation (Rating)

$t_{AC} := 2in$ AC overlay

$b_w := 24in$ Abutment beam width

$b_{PC.Slab} := 48in$ PC/PS Voided Slab width

$h := 20in$ Beam depth

$N_b := 16$ No. of 48"x21" PC/PS Voided Slab

$L_{Span} := 44ft$ PC/PS Slab length

$\theta_{skew} := 18deg$ Abutment skew

$L_{Abt} := 98in$ Pile support spacing

$\gamma_p := 1.25$ Load Facor of DC & DW (LRFD)

$g_{m.St\_Sr.V} := .352$ Load Distribution Factor the indivial slab for Strength/Service Shear Forces

$g_{m.St\_Sr.M} := .282$ Load Distribution Factor the indivial slab for Strength/Service Moment Forces

$R_{Serv.DC.1} := 16.6kip$ Service Load Reaction from the self weight of the PC Slab unit

$R_{Serv.DW.1} := 1.93kip$ Service Load Reaction from the AC overlay on the PC Slab unit

$R_{Serv1.LL.IM.1} := 31.2kip$ Service Load LL + IM Reaction from the PC Slab unit

$R_{Serv1.1} := R_{Serv.DC.1} + R_{Serv.DW.1} + R_{Serv1.LL.IM.1}$ $R_{Serv1.1} = 49.73 \cdot kip$

Abutment Beam Moment Demand/Capacity Analysis

$M_{DC} := \left[\frac{\left(R_{Serv.DC.1}\right)}{b_{PC.Slab}} + b_w \cdot h \cdot \gamma_c\right] \cdot \frac{L_{Abt}^2}{24} = 12.92 \cdot kip \cdot ft$ Abut. Beam Moment due to Deck DC+Beam Self Weight

$M_{DW} := \frac{\left(R_{Serv.DW.1}\right)}{b_{PC.Slab}} \cdot \frac{L_{Abt}^2}{24}$ Abut. Beam Moment due to DW from deck

$M_{LL.IM} := \frac{R_{Serv1.LL.IM.1}}{b_{PC.Slab}} \cdot \frac{L_{Abt}^2}{24}$ Abut. Beam Moment due to LL+IM from deck

$M_{str1.P} := \gamma_p \cdot (M_{DC} + M_{DW}) + 1.75 \cdot (M_{LL.IM})$ $M_{str1.P} = 55.76 \cdot kip \cdot ft$ Strength 1 Applied Moment

Section Geometry

$b_t := b_w$ $\phi_m := 0.9$ $f'_c := 3ksi$

$b_b := b_w$ $\phi_v := 0.9$ $f_y := 40ksi$

$d_{c.b} := 6in + \left(\frac{1}{2} + \frac{7}{16}\right) \cdot in$ $d_{c.b} = 6.94 \cdot in$ $d_{eff.b} := h - d_{c.b}$

Flexure Capacity

$M_{u.P} := M_{str1.P}$ $M_{u.P} = 55.76 \cdot kip \cdot ft$

$R_{u.P} := \frac{M_{u.P}}{\phi_m \cdot b_t \cdot d_{eff.b}^2}$ $R_{u.P} = 181.55 \cdot psi$

$\rho_P := 0.85 \cdot \frac{f'_c}{f_y} \cdot \left(1 - \sqrt{1 - \frac{2 \cdot R_{u.P}}{0.85 \cdot f'_c}}\right)$

$\rho_P = 0.0047$

$A_{s.P} := \rho_P \cdot b_t \cdot d_{eff.b}$

$A_{s.P} = 1.48 \cdot in^2$ Flexural reinforcement required to satisfy applied moment

$Bar_{num.P} := 2$ Site investigation revealed less than 1/2 of total 6-#7 are effective for the flexural capacity at a location near SW corner of the bridge.

$A_{s.prov.P} := 0.6 \cdot Bar_{num.P} \, in^2$ $A_{s.prov.P} = 1.2 \cdot in^2$ Effective reinforcement available for strucural capacity of the Abutment Beam

$c_P := \frac{A_{s.prov.P} \cdot f_y}{0.85 \cdot 0.85 \cdot f'_c \cdot b_t}$

$a_P := 0.85 \cdot c_P$

$a_P = 0.78 \cdot in$

$$Bar_{spacing} := \frac{b_w - 1.5in \cdot 2 - 2 \cdot \frac{1}{2} in - Bar_{num.P} \cdot \frac{7}{8} \cdot in}{(6 - 1)}$$

$Bar_{spacing} = 3.65 \cdot in$

$$M_{r.P} := \phi_m \cdot \left[A_{s.prov.P} \cdot f_y \cdot \left(d_{eff.b} - \frac{a_P}{2} \right) \right]$$

$M_{r.P} = 45.61 \cdot kip \cdot ft$

$if\left(M_{r.P} \geq M_{u.P}, "OK", "NG"\right) = "NG"$

$$R_n := \frac{M_{r.P}}{\phi_m}$$

Load Ratings per AASHTO Manual for Bridge Evaluation (2010 Interim revisions)

$\phi_{flex.A5.5.4.2} := 0.9$ $\gamma_{DC.INV} := 1.25$ $\gamma_{DC.OP} := 1.25$

$\phi_{c.6A.4.2.3} := 0.85$ $\gamma_{L.INV} := 1.75$ $\gamma_{L.OP} := 1.35$

$\phi_{s.6A.4.2.4} := 1.0$ $\gamma_{DW.INV} := 1.25$ $\gamma_{DW.OP} := 1.25$

$DC := M_{DC}$ $DW := M_{DW}$

$$RF_{INV} := \frac{\phi_{flex.A5.5.4.2} \cdot \phi_{c.6A.4.2.3} \cdot \phi_{s.6A.4.2.4} \cdot R_n - (\gamma_{DC.INV}) \cdot DC - \gamma_{DW.INV} \cdot DW}{\gamma_{L.INV} \cdot M_{LL.IM}}$$

$RF_{INV} = 0.55$ Abutment Inventory Rating N.G < 1.0

$$RF_{OP} := \frac{\phi_{flex.A5.5.4.2} \cdot \phi_{c.6A.4.2.3} \cdot \phi_{s.6A.4.2.4} \cdot R_n - \gamma_{DC.OP} \cdot DC - \gamma_{DW.OP} \cdot DW}{\gamma_{L.OP} \cdot M_{LL.IM}}$$

$RF_{OP} = 0.72$ Abutment Operating Rating N.G < 1.0

CITY OF GOLETA

December 8, 2010

Mr. Matt Naftaly
Santa Barbara County Water Agency Manager
123 E. Anapamu Street
Santa Barbara CA 93101

RE: Hollister Avenue Bridge Replacement Project

Dear Mr Naftaly,

This letter is in response to questions raised regarding the reconstruction of the Hollister Avenue Bridge as it relates to the San Jose Creek Capacity Improvement and Fish Passage Project.

The Hollister Avenue Bridge is owned by and maintained by City of Goleta. As such, any repairs and/or modifications to the bridge are the City's responsibility. In order to complete the San Jose Creek project the bridge must be enlarged to pass 100 year flood flows. Recent structural investigations conducted by the City as part of the design of the San Jose Creek project have shown that the bridge has deteriorated due to reactive aggregate and is structurally deficient. This means the bridge must be completely replaced.

The City is working with Caltrans on this project as they are the conduit for federal bridge replacement funding. Caltrans Division of Local Assistance has already programmed $400,000 into the Federal Transportation Improvement Program (FTIP) for rehabilitation. Caltrans is currently reviewing the structural studies conducted by the City and is recalculating the bridge rating. Based on the revised rating, the bridge will be eligible for additional Federal funding.

The total estimated cost to replace the bridge is approximately $4.5 million. Once the new rating is approved, the Highway Bridge Program (HBP) will cover 90% or approximately $4.0 million of this cost.

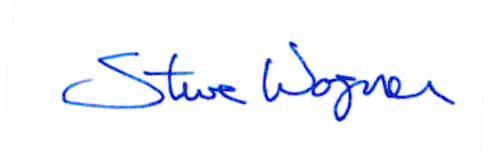
The Hollister bridge replacement project is currently listed in the FTIP as a "lump sum" project so that additional Federal funds can be easily programmed. Although the City is confident that the additional HBP funding will be approved, this approval has not yet been obtained. In the

event that HBP funding is not approved, the City would fund the project using RDA or other City funds.

The replacement of the bridge will be coordinated with the San Jose Creek project so as to achieve the overall project goals of 100 year flood protection and fish passage. The duration of the Hollister Avenue bridge replacement project is anticipated to take two years.

It is our hope that this letter resolves the outstanding issues related to the bridge project so that the Proposition 84 application can be completed. As always, please contact me if you have any further questions.

Sincerely,



Steve Wagner
Community Services Director

cc: Rosemarie Gaglione, Capital Program Manager

GOLETA VALLEY CHAMBER OF COMMERCE

A Head for Business, A Heart for the Community

December 16, 2008

California Coastal Commission
South Central Coast Area
89 South California Street, Suite 200
Ventura, CA, 93001

RE: Support the San Jose Creek Improvement Project

Dear California Coastal Commissioners,

The Goleta Valley Chamber of Commerce strongly supports the San Jose Creek Capacity and Fish Passage Improvement Project. We support the flood control and environmental benefits of the project as both are needed for the on-going restoration and revitalization of Goleta's historic downtown core.

Representing nearly 500 members and more than 38,000 jobs in the region, one of the Goleta Valley Chamber's highest priorities is promoting the economic vitality and restoration of Old Town Goleta. Unfortunately, the area and its businesses have suffered for years due to frequent flooding of San Jose Creek. In addition, the current creek bed is inhospitable to some native species, including the steelhead trout.

We support the sophisticated proposal designed to both control 100 year flooding levels that have ravaged surrounding property and restore the riparian ecosystem along the banks of the creek and the creek bed to facilitate steelhead passage.

Work will be scheduled to minimize disruption to environmental cycles as well as traffic and commerce along the busy Hollister Avenue corridor. I am pleased to see such an example of city and county agencies working with business, environmental, and neighborhood advocacy groups to come up with a solution that works for everyone.

271 North Fairview, Suite 104 • P.O. Box 781 • Goleta, CA 93117
p: 805.967.2500 • f: 805.967.4615 • info@GoletaValley.com • www.GoletaValleyChamber.com

Once the improvements are complete, business owners and residents of Old Town will begin to improve and invest in their own properties without fear of future flooding. Overall, the quality of life stands to improve immensely for Old Town business owners, residents, and creek wildlife.

In consideration of the many local and state benefits associated with the project, we respectfully urge you to approve the San Jose Creek Improvement Project.

Sincerely,

Kristen Amyx,
President & CEO

cc: Rosemarie Gaglione, CIP Manager, City of Goleta

CITY OF GOLETA

October 27, 2009

Mr. William Vasquez, Director
Office of Community Planning and Development
Department of Housing and Urban Development
Attn: Jane Wilson
611 W. 6th Street, Suite 1000
Los Angeles, CA 90017

Subject: LMA National Objective for Goleta's San Jose Creek Flood Control Project

Dear Mr. Vasquez:

I am writing to you as the City Engineer to support use of the Low-Moderate Income Benefit Area (LMA) CDBG National Objective for the San Jose Creek Flood Control Project. While it is true that the project has important benefits for the commercially and industrially zoned areas of Goleta's Old Town area (namely the removal of Hollister Avenue and portions of Goleta Old Town from the regulatory floodplain and floodway), the benefits to the residential areas and people residing within the non-residential areas cannot be overstated.

The benefits of the project are more than just the obvious removal of certain properties from the floodplain. There are other not so obvious benefits to the vast residential areas in and around Goleta's Old Town. One is the restoration of emergency access to all the areas within Old Town, predominantly residential, which become cut off during major storm events. In addition to the issue of access, there is another benefit of the project to the surrounding residential areas. Although they may not necessarily be in the floodplain, residents living in proximity to flooding face serious health threats that go well beyond the issue of emergency access. Flooding is a danger to public health since flood waters are often contaminated with harmful chemicals and waste products. These contaminants and associated vectors can result in adverse health consequences for people residing in the vicinity of areas that flood.

Because the project will remove most of Old Town from the 100-year floodplain, the potential for flooding in the area will be significantly

reduced, if not eliminated altogether, as will the threat to homes and residents which exist due to the noted secondary effects of flooding in the area. As you can see, by removing or eliminating flooding in the area, the secondary benefits of the project are priceless in terms of preventing adverse health effects to residents in Old Town as well as potentially saving lives in the event of an emergency through the restoration of access to the area.

When the above-noted secondary benefits of the San Jose Creek Flood Control Project are taken into consideration, the benefit area of the Project does meet the LMA threshold of being primarily residential. In fact, the Project's service area contains approximately 440 residential parcels and only about 232 commercial or industrial parcels. I submit these numbers to you as further documentation that the area which will benefit by the Project is predominantly residential. Furthermore, the entire area is classified as low- to moderate-income (predominantly low-income) based on 2000 U.S. Census data.

Your consideration in allowing the San Jose Creek Flood Control Project to remain under the LMA national objective is greatly appreciated. The use of this national objective is important in giving the City maximum funding leverage to finance this critical project. Should the LMA national objective be disallowed, the City would be forced to apply the Slum/Blight national objective which would carry with it the restriction that no more than 30% of the City's CDBG funding be allocated to projects under this objective. This restriction would greatly limit the use CDBG funds for this project in the future.

Again, thank you for your consideration. If you have any questions, please contact me by email at swagner@cityofgoleta.org or by phone at 805-961-7561.

Sincerely,

Steve Wagner

Steven Wagner
City Engineer
Community Services Director

cc: Vyto Adomaitis, RDA, NS & Public Safety Director

Fire Department

"Serving the community since 1926"

HEADQUARTERS

4410 Cathedral Oaks Road
Santa Barbara, CA 93110-1042
(805) 681-5500 FAX: (805) 681-5563

Michael W. Dryer
Fire Chief
County Fire Warden

Christian J. Hahn
Deputy Fire Chief

October 29, 2009

Mr. William Vasquez, Director
Office of Community Planning and Development
Department of Housing and Urban Development
Attn: Jane Wilson
611 W. 6th Street, Suite 1000
Los Angeles, CA 90017

Subject: LMA National Objective for Goleta's San Jose Creek Flood Control Project

Dear Mr. Vasquez:

I am writing to you as the acting Santa Barbara County Fire Department liaison for the City of Goleta to urge you to allow use of the Low-Moderate Income Benefit Area (LMA) CDBG National Objective for the San Jose Creek Flood Control Project which will benefit the Old Town district of Goleta. In addition to removing properties from the floodplain, this Project will also address an on-going public health and safety hazard which threatens the residential areas and residents in the Project's identified service area.

Based on the location of existing flood zones and historic flood events, access to all of the residential areas in Old Town can be completely cut off in times of significant flooding. Without adequate access to residents living in the area, emergency personnel may be unable to respond to calls for medical assistance, fires, or other incidents threatening life and property. The lack of access to residential areas during flood events is therefore of significant concern.

It is my understanding that the Project is designed to remove most of Old Town from the 100-year floodplain, thereby reducing the potential for flooding in the area significantly, if not eliminating it altogether. In doing so, the Project will also remove the threat to homes and residents which exist from lack of access during flood events. By removing or eliminating flooding in the area, the secondary benefits of the Project are invaluable in terms of potentially saving lives and property in the event of an emergency through the restoration of access to the area. When this secondary benefit of the San Jose Creek Flood Control Project is taken into consideration, the benefit area of the Project does meet the LMA threshold of being primarily residential.

The Santa Barbara County Fire Department is committed to protecting the people and property of Goleta. Access to citizens and property in distress is critical to carrying out this mission. Your consideration in allowing the San Jose Creek Flood Control Project to remain under the LMA national objective is greatly appreciated. It is my understanding that the use of this national objective would give the City access to a greater percentage of CDBG funding, which has thus far been a critical component in financing the preliminary design of the Project. Should the LMA national objective be disallowed, the City would be forced to apply the Slum/Blight national objective which would considerably restrict the amount of CDBG funding that could be allocated to the Project. Based on the aforementioned factors, and in the interest of public health and safety, I urge HUD to allow application of the LMA national objective to the San Jose Creek Flood Control Project.

Again, thank you for your consideration. If you have any questions, please contact me by email at glenn.fidler@sbcfire.com or by phone at 805-681-5528.

Sincerely,

Glenn Fidler
Fire Captain
Fire Prevention Division

c Vyto Adomaitis, RDA, NS & Public Safety Director, City of Goleta

Office of the Sheriff

SANTA BARBARA COUNTY

HEADQUARTERS
P.O. Box 6427 • 4434 Calle Real • Santa Barbara, California 93160
Phone (805) 681-4100 • Fax: (805) 681-4322

BILL BROWN
Sheriff-Coroner

KENNETH R. SHEMWELL
Undersheriff

STATIONS

Buellton
140 W. Highway 246
Buellton, CA 93427
Phone (805) 686-8150

Carpinteria
5775 Carpinteria Avenue
Carpinteria, CA 93013
Phone (805) 684-4561

Isla Vista
6546 Pardall Road
Isla Vista, CA 93117
Phone (805) 681-4179

Lompoc
751 Burton Mesa Road
Lompoc, CA 93436
Phone (805) 737-7737

New Cuyama
70 Newsome Street
New Cuyama, CA 93254
Phone (661) 766-2310

Santa Maria
812-A W. Foster Road
Santa Maria, CA 93455
Phone (805) 934-6150

Solvang
1745 Mission Drive
Solvang, CA 93463
Phone (805) 686-5000

Sheriff - Coroner Office
66 South San Antonio Road
Santa Barbara, CA 93110
Phone (805) 681-4145

Main Jail
4436 Calle Real
Santa Barbara, CA 93110
Phone (805) 681-4260

COURT SERVICES
CIVIL OFFICES

Santa Barbara
1105 Santa Barbara Street
P.O. Box 690
Santa Barbara, CA 93102
Phone (805) 568-2900

Santa Maria
312 E. Cook Street "O"
Santa Maria, CA 93455
Phone (805) 346-7430

Lompoc
401 E. Cypress #105
Lompoc, CA 93436
Phone (805) 737-7710

October 29, 2009

Mr. William Vasquez, Director
Office of Community Planning and Development
Department of Housing and Urban Development
Attn: Jane Wilson
611 W. 6th Street, Suite 1000
Los Angeles, CA 90017

Subject: LMA National Objective for Goleta's San Jose Creek Flood Control Project

Dear Mr. Vasquez:

I am writing to you as the acting Police Chief for the City of Goleta to urge you to allow use of the Low-Moderate Income Benefit Area (LMA) CDBG National Objective for the San Jose Creek Flood Control Project which will benefit the Old Town district of Goleta. The benefits of this Project go far beyond the removal of properties from the floodplain, admittedly, many of which are commercial and industrial in nature. The Project will also address an on-going public health and safety hazard which threatens the residential areas and residents in the Project's identified service area.

As you can see from the enclosed aerial map depicting the Project's service area boundaries and existing flood zones, access to all of the residential areas can be completely cut off in times of significant flooding. Without adequate access to residents living in the service area, emergency personnel may be unable to respond to calls for medical assistance, crimes in progress, destruction of property or vandalism, fires, and other critical incidents threatening life and property. The lack of access to residential areas during flood events is therefore of significant concern to law enforcement.

Fortunately, the Project is designed to remove most of Old Town from the 100-year floodplain, thereby reducing the potential for flooding in the area significantly, if not eliminating it altogether. In doing so, the Project will also remove the threat to homes and residents which exist from lack of access during flood events. By removing or eliminating flooding in the area, the secondary benefits of the Project are priceless in terms of potentially saving lives in the event of an emergency through the restoration of access to the area. When this secondary benefit of the San Jose Creek Flood Control Project is taken into consideration, the benefit area of the Project does meet the LMA threshold of being primarily residential.

The Santa Barbara County Sheriff's Department is committed to protecting the people and property of Goleta. Access to citizens and property in distress is critical to carrying out this mission. Your consideration in allowing the San Jose Creek Flood Control Project to remain under the LMA national objective is greatly appreciated. It is my understanding that the use of this national objective would give the City access to a greater percentage of CDBG funding, which has thus far been a critical component in funding the preliminary design of the Project. Should the LMA national objective be disallowed, the City would be forced to apply the Slum/Blight national objective which would considerably restrict the amount of CDBG funding that could be allocated to the Project. Based on the aforementioned factors, and in the interest of public health and safety, I urge HUD to allow application of the LMA national objective to the San Jose Creek Flood Control Project.

Again, thank you for your consideration. If you have any questions, please contact me by email at pmw0386@sbsheriff.org or by phone at 805-961-7512.

Sincerely,

Phil Willis, Lieutenant
City of Goleta Police Chief

cc: Vyto Adomaitis, RDA, NS & Public Safety Director

JANET WOLF
County Supervisor, Second District
MARY O'GORMAN
Executive Assistant
JAMES KYRIACO, Jr
Administrative Assistant
JANE S. FERRY
Administrative Assistant

BOARD OF SUPERVISORS
105 East Anapamu Street
Santa Barbara, California 93101
TELEPHONE: (805) 568-2191
FAX: (805) 568-2283
E-mail: jwolf@sbcbos2.org

SANTA BARBARA COUNTY

10/24/2007

National Marine Fisheries Service,
National Oceanic and Atmospheric Administration,
Department of Commerce

Re: City of Goleta Fish Passage Project

To Whom It May Concern:

This letter is to express support for the application from the City of Goleta for the Open Rivers Initiative Project Grants program for the San Jose Creek Fish Passage Project. This project is critical to efforts to restore a vital habitat for steelhead trout and has received broad community support.

The addition of a fish passage to the San Jose Creek channel will remove a barrier that has been an impediment to fish passage for decades. The creek has several pools located upstream from the project area and the addition of a fish passage component is important to local effort to restore native species to their historical habitat. It also ensures the viability of future habitat restoration projects upstream from the fish passage.

This project has been carefully planned with the input and collaboration of numerous agencies and the public. Various options have been evaluated and the final design has won the support of numerous stakeholders. We would very much appreciate your favorable consideration of this request.

Sincerely,

Janet Wolf
Second District Supervisor
County of Santa Barbara

Goleta Valley Voice

Letter to the Editor: Cooperation worked for San Jose Creek

Cooperation worked for San Jose Creek

Santa Barbara Channelkeeper commends the city of Goleta and the county Board of Supervisors, led by Supervisor Janet Wolf, for their recent decision to work with local stakeholders and agencies to incorporate fish passage into the San Jose Creek Flood Control Improvement Project.

The existing flooding hazard in Old Town Goleta is a legitimate concern for businesses and residents in the area and needs to be addressed. Because of the city's actions, we are now working together as a community toward a solution that will not only prevent flooding in Old Town but will also help to mitigate a past wrong — the concrete armoring of San Jose Creek.
Someone recently characterized to me the steelhead trout situation in the Goleta Slough watershed as an "interesting historical fact." Although community members today don't have the same opportunity to appreciate our creeks as older generations once did, we should not yet chalk up the existence of healthy creek ecosystems in our community as a relic of the past.

We are all extremely fortunate to live on the South Coast; it is the preservation of this region's stunning natural beauty that still separates us from the rest of Southern California. It is the responsibility of each and every South Coast citizen to ensure that our precious natural resources are preserved and to strive to improve those areas that, due to poor planning and lack of foresight, have been degraded to the point that steelhead and other fish cannot navigate or utilize them as habitat.

The decision to incorporate measures that improve fish passage into the San Jose Creek Flood Control Project represents the forward thinking and collaboration that is necessary to achieve mutually beneficial solutions to the pressing environmental and economic issues facing our community and its natural resources, and I for one applaud the City's initiative.

Ben Pitterle
Director of Watershed Programs
Santa Barbara Channelkeeper

Back

Goleta Valley Voice

LOIS CAPPS
23RD DISTRICT, CALIFORNIA

1110 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–0522
(202) 225–3601

COMMITTEE ON
ENERGY AND COMMERCE

COMMITTEE ON
NATURAL RESOURCES

Congress of the United States
House of Representatives

DISTRICT OFFICES:

☐ 1411 MARSH STREET, SUITE 205
SAN LUIS OBISPO, CA 93401
(805) 546–8348

☐ 101 WEST ANAPAMU STREET, SUITE C
SANTA BARBARA, CA 93101
(805) 730–1710

☐ 2675 NORTH VENTURA ROAD, SUITE 105
PORT HUENEME, CA 93041
(805) 985–6807

January 16, 2009

To Whom it May Concern:

I am writing on behalf of the City of Goleta for the commission's support for the San Jose Creek Passage Project. This important project has received strong community support and is critical in restoring access for native fish species to their habitat.

The creation of this passage for fish in the San Jose Creek channel will remove a barrier that has impeded the passage of the native species for decades. In addition to restoring native species to their habitat, the creation of this channel will make future habitat restoration projects upstream from the channel more viable. This viable and carefully considered proposal would improve the quality of the San Jose Creek watershed as well as provide a much-needed revitalized habitat for the endangered steelhead trout.

In closing, please grant the City of Goleta full and fair consideration, consistent with all rules and regulations. If you should require any further information from my office, please contact Jonathan Saur in my Santa Barbara District Office at (805) 730-1710. Thank you in advance for your consideration of this worthwhile project.

Sincerely,

Lois Capps

Congresswoman Lois Capps

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0035
(916) 319-2035
FAX (916) 319-2135

DISTRICT OFFICES
101 W. ANAPAMU ST., SUITE A
SANTA BARBARA, CA 93101
(805) 564-1649
FAX (805) 564-1651

201 E. FOURTH ST., SUITE 209-A
OXNARD, CA 93030
(805) 483-9808
FAX (805) 483-8182

Assembly
California Legislature

PEDRO NAVA
ASSEMBLYMEMBER, THIRTY-FIFTH DISTRICT

COMMITTEES:
CHAIR, BANKING AND FINANCE
CHAIR, JOINT COMMITTEE ON EMERGENCY SERVICES AND HOMELAND SECURITY
APPROPRIATIONS
ENVIRONMENTAL SAFETY AND TOXIC MATERIALS

CALIFORNIA OCEAN PROTECTION COUNCIL
CALIFORNIA TRANSPORTATION COMMISSION
LITTLE HOOVER COMMISSION

January 16, 2009

Shana Gray, Coastal Program Analyst
California Coastal Commission
South Central Coast Area
89 South California Street, Suite 200
Ventura, CA 93001

To Whom It May Concern:

I am writing to express my support for the application from the City of Goleta for the Open Rivers Initiative Project Grants program for the San Jose Creek Fish Passage Project. This is a worthwhile project that has received strong community support and is critical in the restoration of access to native species habitat.

The addition of a fish passage to the San Jose Creek channel will remove a barrier that has been an impediment to fish passage for decades. The creek has several pools located upstream from the project area and the addition of a fish passage is vital to restoring native species to their historical habitat. It also allows for the viability of future habitat restoration projects upstream from the fish passage.

This project has been carefully planned with the input and collaboration of numerous agencies and the public. Various options have been evaluated and the final design has the support of all involved parties. I would appreciate your consideration of this important project in our area.

Sincerely,

PEDRO NAVA
Assemblymember, 35th District

Santa Barbara Audubon Society, Inc.
A Chapter of the National Audubon Society

5679 Hollister Avenue, Suite 5B, Goleta, CA 93117 (805) 964-1468

December 18, 2008

Shana Gray, Coastal Program Analyst
California Coastal Commission
South Central Coast Area
89 South California Street, Suite 200
Ventura, CA, 93001

copy: City of Goleta
Attention: Rosemarie Gaglione, CIP Manager
130 Cremona Drive
Goleta, CA 93117

Re: City of Goleta Fish Passage Project

Shana Gray:

Santa Barbara Audubon Society (Audubon) is a California non-profit 501(c)(3) corporation whose mission is to engage in projects relative to conserving and restoring natural ecosystems, to interact with other organizations with similar concerns, to provide educational opportunities to the local community to increase their awareness, appreciation, and involvement in their environment, and to advocate public policies which help preserve our natural resources.

Steelhead recovery by barrier removal projects has been a long-term goal of Audubon. There- fore, Audubon enthusiastically supports the City of Goleta's permit application to the California Coastal Commission (CCC) for the San Jose Creek Fish Passage Project.

San Jose Creek historically supported the now federally-endangered southern steelhead. The addition of a fish passage component to the San Jose Creek channel project the City of Goleta is planning will remove a barrier that has been an impediment to fish passage for many decades. It is also hoped that the project will facilitate future habitat restoration projects upstream from the fish passage project.

Audubon has managed and provided volunteers for several habitat restoration projects upstream of the project site, and is encouraged to see this complimentary project move forward.

Santa Barbara Audubon has worked collaboratively with other non-profit environmental groups and the City of Goleta in evaluating options for the project. Our organization opposed the flood control project until the City agreed to incorporate fish passage; the City has worked diligently with consultants to design a project that meets both objectives--flood management and fish passage. CCC permits for this project will help to achieve a long-desired goal by Santa Barbara Audubon to provide for the long-term habitat restoration for the southern steelhead.

Sincerely,

Darlene Chirman

Darlene Chirman

Santa Barbara Audubon Society, Inc.
A Chapter of the National Audubon Society

5679 Hollister Avenue, Suite 5B, Goleta, CA 93117 (805) 964-1468

September 24, 2007

National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Department of Commerce

City of Goleta
Attention: Rosemarie Gaglione
130 Cremona Drive
Goleta, CA 93117

Re: City of Goleta Fish Passage Project

To Whom It May Concern:

Santa Barbara Audubon Society (Audubon) is a California non-profit 501(c)(3) corporation whose mission is to engage in projects relative to conserving and restoring natural ecosystems, to interact with other organizations with similar concerns, to provide educational opportunities to the local community to increase their awareness, appreciation, and involvement in their environment, and to advocate public policies which help preserve our natural resources.

Steelhead recovery by barrier removal projects have been a long-term goal of Audubon. Therefore, Audubon enthusiastically supports the City of Goleta's application for the Community-based Habitat Restoration Project Grant for the San Jose Creek Fish Passage Project.

San Jose Creek historically supported the now federally-endangered southern steelhead. The addition of a fish passage component to the San Jose Creek channel project the City of Goleta is planning will remove a barrier that has been an impediment to fish passage for many decades. It is also hoped that the project will facilitate future habitat restoration projects upstream from the fish passage project.

Audubon has managed and provided volunteers for several habitat restoration projects upstream of the project site, and is encouraged to see this complimentary project move forward.

Santa Barbara Audubon has appreciated the opportunity to work collaboratively with other non-profit environmental groups and the City of Goleta in evaluating options for the project. Favorable consideration of this project will help to achieve a long-desired goal by Santa Barbara Audubon to provide for the long-term habitat restoration for the southern steelhead.

Sincerely,

Darlene Chirman, President

Darlene Chirman

SANTA BARBARA
CHANNELKEEPER®

Protecting and Restoring the Santa Barbara Channel and Its Watersheds

714 Bond Avenue ♦ Santa Barbara, CA 93103 ♦ Tel (805) 563 3377 ♦ Fax (805) 687 5635 ♦ www.sbck.org

9/18/2007

National Marine Fisheries Service,
National Oceanic and Atmospheric Administration,
Department of Commerce

Re: City of Goleta Fish Passage Project

To Whom It May Concern:

Santa Barbara Channelkeeper would like to express support for the application from the City of Goleta for the Open Rivers Initiative Project Grants program for the San Jose Creek Fish Passage Project. Santa Barbara Channelkeeper is a local non-profit organization dedicated to protecting and restoring the Santa Barbara Channel and its watersheds through citizen action, education, field work and enforcement. We have been leading a volunteer-based water quality monitoring program in the Goleta Slough watershed (including on San Jose Creek) for the past five years, and thus have a strong interest in this project.

Studies, including the Conception Coast Project's Steelhead Assessment and Recovery Opportunities report, indicate that San Jose Creek once supported a thriving steelhead trout population and that present populations of trout still exist in upstream habitat. Countless dollars have already been spent on restoring and managing the San Jose Creek watershed including multiple restoration projects and a multi-year, collaborative effort by the County and stakeholders to create the San Jose Creek Watershed Plan. This plan specifically recommends that the San Jose Creek Channel Improvements project be assessed to provide for fish passage.

The addition of a fish passage to the San Jose Creek channel will remove a barrier that has been an impediment to fish passage for decades. The addition of a fish passage through the lower portion of the creek is vital to restoring native species to their historical habitat. It also allows for the viability of future habitat restoration projects upstream from the fish passage.

This project has been carefully planned with the input and collaboration of numerous agencies and the public. We would very much appreciate your favorable consideration of this request.

Sincerely,

Ben Pitterle
Director of Watershed Programs

SANTA BARBARA URBAN CREEKS COUNCIL

P.O. Box 1467, Santa Barbara, CA 93102 (805) 968-3000

October 24, 2007

National Marine Fisheries Service,
National Oceanic and Atmospheric Administration,
Department of Commerce

Re: City of Goleta Fish Passage Project

Santa Barbara Urban Creeks Council supports the City of Goleta's application for an Open Rivers Initiative Project Grant for fish passage in San Jose Creek. SBUCC is a 15 year old, 2000 member non-profit organization formed to protect and restore the ecological, functional, aesthetic and recreational benefits of our local creeks.

Forty years ago the lower section of San Jose Creek was realigned into a concrete channel which has prevented fish from migrating upstream. The upper sections of this creek have good spawning pools as well as residual populations of Steelhead Trout. A fish passage project is needed to reconnect the upper creek with the ocean and restore this habitat.

A number of local environmental groups have worked with city, county and state representatives to come up with a satisfactory project. We ask that you support this project by approving the City of Goleta's grant request.

Sincerely,

Rick Frickmann
Board Member, SBUCC

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Santa Barbara County

Application
for
Proposition 84
Planning Grant
Round 1

Santa Barbara County IRWM Plan 2012

Santa Barbara County Water Agency

Twitchell Reservoir
Guadalupe
Santa Maria
Casmalia
Vandenberg AFB
Lompoc
Figueroa
Santa Ynez
Solvang
Cachuma Lake
Gibraltar Reservoir
Juncal Reservoir
Goleta
Montecito
Santa Barbara
Carpinteria

Prepared by

CH2MHILL®

September 28, 2010

Task 4: Establish Data Management System

Introduction

The objective of this task is to establish a DMS, which will set up a process of data collection, storage, and dissemination to IRWM participants, stakeholders, the public, and the State. The type of data that will be included for dissemination may include technical information such as designs, feasibility studies, reports, and information gathered for a specific project in any phase of development including the planning, design, construction, operation, and monitoring of a project. This task will also include cross referencing of existing data in various databases such as:

The WDL that DWR maintains for the state, which stores data from various monitoring stations, including groundwater level wells, water quality stations, surface water stage and flow sites, rainfall/climate observers, and water well logs (http://wdl.water.ca.gov/).

The SWAMP created by SWRCB has standards required for any group collecting or monitoring surface water quality data, using funds from Propositions 13, 40, 50, and 84 (http://www.swrcb.ca.gov/water_issues/programs/swamp).

The GAMA program is maintained by the SWRCB and provides a comprehensive assessment of water quality in water wells throughout the State. GAMA has two main components, the California Aquifer Susceptibility (CAS) assessment and the Voluntary Domestic Well Assessment Project. The CAS combines age dating of water and sampling for low-level volatile organic compounds to assess the relative susceptibility of public supply wells throughout the State. Because water quality in individual domestic wells is unregulated, the program is voluntary and will focus, as resources permit, on specific areas of the State. Constituents to be analyzed include nitrate, total and fecal coliform bacteria, methyl tert-butyl ether, and minerals (http://www.swrcb.ca.gov/gama).

DWR maintains the Integrated Water Resources Information System (IWRIS), which is a data management tool for water resources data and not a database. IWRIS is a web based GIS application that allows entities to access, integrate, query, and visualize multiple sets of data simultaneously (http://www.water.ca.gov/iwris/).

California Environmental Resources Evaluation System (CERES) is an information system developed and maintained by the California Natural Resources Agency to facilitate access to a variety of electronic data describing California's rich and diverse environments.

The DMS as proposed in the 2007 Santa Barbara IRWM Plan needs improvements to include or better provide access to more local water-related information. Currently, Santa Barbara County maintains existing water resources-related and IRWM-related data on the Santa Barbara County Water Agency website located at: http://www.countyofsb.org/pwd/water/index.htm. This site also provides the forum for sharing of reports, public meeting dates, agendas, meeting minutes, and annual reports. In-depth data are not currently stored on the website and the GIS capabilities are not explored extensively.

The objective of the DMS for IRWM Plan 2012 is to store project related data and make it publicly available, is to ensure efficient use of available data, stakeholder access to data, and to ensure the data generated by IRWM implementation activities can be

integrated into existing State databases. A part of the effort of this task will be to explore financial and staff resources to implement the scope under this task.

Task 4.1 Review the Existing Data within the IRWM Region and Identify Data Needs

This task includes identifying and analyzing documents and data that are pertinent to updating the IRWM Plan. The principal task will be to conduct review of previous studies, e.g., City of Santa Barbara's Water Supply Planning Study; SMVWCD annual report, Reports of Santa Barbara County, monitoring reports required by adjudicator. The data gaps/data needs within the IRWM region will be identified from the existing documents.

Where appropriate, data management will be coordinated with State and Federal databases in a format consistent with SWAMP and GAMA.

Task 4.2: Develop a Web-based DMS

One of the objectives of the DMS is to make the data publicly available. This task includes development of a web-based DMS with easy access to the participating agencies including stakeholders. The DMS will serve as a data repository for various types of data (for example, project related data, water quality data). Depending on the type of data, the components and protocols for data assimilation from various sources into the DMS will be developed. For example, a library of information for spatial data can be complied into a Geographic Information System (GIS) on a project by project basis and shared with the stakeholders.

The RWMG will decide on the use of an appropriate website for developing the DMS. The existing system on the website management will be explored at the time of implementation of DMS. For example, the existing Santa Barbara County Water Agency website located at: http://www.countyofsb.org/pwd/water/index.htm also may serve as a resource for the development of the DMS. This site may also be continued to provide the forum for sharing of reports, public meeting dates, agendas, meeting minutes, and annual reports. All data used to support development of the IRWM will be outlined in a database and available for review on the website, which will provide links to information available on partner agency websites. Any required documentation of Proposition 50 will be made available on the DMS website by appropriate project administrators.

Task 4.3 Establish Typical Data Collection Technique

For data gathering a common data collection protocol will be developed to keep the web-based DMS up-to-date. The protocol will describe the use of common and compatible methods for data gathering, analysis, monitoring, and reporting formats. The data collection technique will be developed in such a way that any update on the website will be notified automatically to all the participating stakeholders to bring their attention on the changes made on the data bank.

Task 4.4 Develop Procedure for Adding Data to the DMS

Separate account login information and the website links will be set up to provide access to the DMS for all the stakeholders. Guidelines for uploading the information to the DMS will be developed. Stakeholders will access the website to retrieve information and/or contribute data to the DMS using their account login information.

Task 4.5 Maintain the DMS

The responsibilities for maintenance of the DMS will be explored by the RWMG. The RWMG will select the best approach for maintaining the DMS. This task will include the following:

Develop guidelines for maintaining the DMS system

Update information as it becomes available

Update calendar of meetings and workshops to inform the stakeholders for the upcoming events

Encourage participation from various stakeholders

Resolve any data management related issues

Task 4.6 Data Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) of data is a major task that involves reviewing the quality of data. This task includes description of the validation or quality assurance/quality control measures that will be implemented by the RWMG for data generated and submitted for inclusion into the DMS.

Under the QA/QC task an effort will be taken to update the datasets and to prepare a consistent format for all types of data.

Task 4.7 Data Sharing

This task includes a protocol preparation on how data collected for IRWM project implementation will be transferred or shared between members of the RWMG and other interested parties throughout the IRWM region, including local, State, and federal agencies. The data saved in the DMS will be distributed to the stakeholders. Efforts will be made to keep compatibility with the State databases including SWAMP, WDL, GAMA program, CEIC, and the CERES.

RWMG and public workshops will serve as the primary venue for information sharing. Other settings where information can be shared include quarterly project progress meetings, monthly agency coordination meetings, e-mail subscription lists, and monthly e-mail newsletters. These forums will serve to continue to facilitate the ongoing data sharing between stakeholders as well as the expansion of the existing Water Agency data warehousing activities.