



Technical Approach - Scope of Work

Quincy Engineering, Inc. personnel have provided plans, specifications, and estimates for a large number of projects throughout California. The Quincy Engineering design process is carried out under procedures that closely parallel those of local agencies and Caltrans. As a result, Quincy Engineering recognizes the importance of maintaining close coordination and cooperation with the County throughout the project development (PS&E) process. With this in mind, we have developed and utilize an efficient project approach that expedites this process. Tasks are defined and numbered in this *Scope of Work* in accordance with the tasks outlined in the RFP.

The project covered by this *Scope of Work* consists of the reconstruction of approximately 1,200' of Tepusquet Road, including a new (replacement) bridge over the Sisquoc River that is approximately 480' long and 37' wide. Also included is the design for modification to the existing reinforced box culvert and intersection north of the project site as well improvements to a horizontal curve south of the low-water crossing.

Quincy Engineering's approach to this project will be as follows:

PHASE I

TASK 1 - Project Management, Team Leadership & Quality Control/Phase I

Task 1.1 - Kickoff Meeting

A kickoff meeting will be held at County offices that should include key personnel from Santa Barbara County (County), the Quincy Engineering Team (Team) and all other interested parties. The meeting will serve to introduce project staff and establish lines of and procedures for communication. The project background, scope, concepts, and schedule will also be discussed, and all existing information about the project will be gathered (supplied by the County). Following the meeting, all attendees will participate in a review of the project site to further identify and discuss project issues. Meeting minutes will be prepared by the Team for County review and approval.

Task 1.2 - Project Management & PDT Meetings

The Project Manager will coordinate all activities of the Quincy Engineering Team with those of the County's staff.

The Project Manager will prepare and submit monthly progress reports for County review. These reports will include progress-to-date, schedule updates, County action items, consultant action items, work product deliveries, problems encountered with suggested solutions, and anticipated work for the next month.

The Team will work with the County to schedule, prepare agenda items, attend, and prepare minutes for monthly Project Development Team (PDT) meetings. Draft minutes will be distributed to attendees and comments will be incorporated as appropriate, and final meeting minutes will be distributed. It has been assumed that two PDT meetings will be required during this phase of the project. Team members will include representatives from QEI as well as URS.

Task 1.3 - Quality Assurance/Quality Control Review

All deliverables will be reviewed in accordance with the Quincy Engineering *Management Plan*, which identifies roles and responsibilities of individuals in the Quality Assurance/Quality Control process, as well as procedures for reviews, independent design checks, and administrative guidelines concerning signatures, approvals, and records.

Product: **Kickoff Meeting**
Monthly PDT Meetings (2)
Project Progress Reports
QA/QC Reviews



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TASK 2 - Preliminary Coordination/Data Gathering

Task 2.1 - Survey Data

Topographic mapping in electronic form will be provided by the surveying subconsultant, Huitt-Zollars, Inc., to be used during the preliminary and final design phase of the project. The Team will review the provided survey for completeness and accuracy. The survey will be tied into the State Plane Coordinate System Zone VI (CCS83) by utilizing the existing County of Santa Barbara Horizontal Control Network information or by utilizing existing CORS (Continuously Operating Reference Stations) sites. The surveys will also be tied into the County of Santa Barbara Vertical Control Network NAVD88 datum utilizing their existing benchmark monuments in the area.

The scope of the survey work will consist of: utilizing projects horizontal and vertical control points based on control monuments as referenced above; providing topographic information; listing of benchmarks utilized in the survey; site data control; and construction centerline for existing roadway. From the survey data generated, the base map will be prepared in an electronic data format to be used during design. The base map will include a digital terrain model (DTM) providing all required contours, topographic features, utilities and trees six inches in diameter and greater in the format specified by Quincy Engineering, Inc.. The survey limits are expected to be approximately 2,000' long and 200' wide. Prior to conducting field surveys, USA will be contacted to mark existing utilities, which will then be located and shown on the base map.

River cross-sections for performing the hydraulic analysis will also be provided by Huitt-Zollars. To adequately address hydraulic design issues, cross-sections will be taken at 5 different locations where the lengths of the cross-sections will vary from 600 to 1800 feet. These cross-sections will be plotted utilizing ground shots and tied into controls established above. The lengths of cross-sections vary because of the changing bank widths and have been discussed with Avila & Associates, hydraulic subconsultant.

Based on Preliminary Title Reports of the adjacent properties to be provided by County, Huitt-Zollars will research for available recorded subdivision mapping data in the Tepusquet Road area and calculate a Record location of the Flood Control Right-of-Ways, public roads and private property lines in that area. This work includes research, title report review and field survey to locate sufficient monumentation. This field work may include items such as existing roadway centerline or section corner monuments, to orient the topographic survey control to the record boundary. Huitt-Zollars will also calculate record title lines and location of roadway easements that impact this area as defined in the title reports and incorporate them into the topographic basemap drawing. All right of way and roadway easements within the project limits will be identified and located on the project topographic basemap. Based upon APN mapping, this proposal assumes 5 adjacent properties may be impacted.

The County will prepare the necessary right-of-way documentation for appraisal and acquisition.

Task 2.2 - Preliminary Utility Coordination

At the beginning of the project, "A" letters notifying affected utilities of the proposed project will be sent to all known utility companies at the site to determine the location and size of their facilities within the project limits. This information will be incorporated in the topographic map and used during preliminary design to determine conflicts and relocation requirements. Utility conflict plans will be prepared as needed. The County will provide the names and contacts of all utilities in the area.

Product: **Topographic Map and Creek Cross-sections**
Utility Relocation "A" Letters and Utility Conflict Plans



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TASK 3 - Combine CEQA & NEPA Environmental Document

The County seeks an environmental consultant to complete the environmental review for the project. The project will require both a CEQA and NEPA environmental review because of the involvement of the County (design and partial funding) and the FHWA (funding). Based on the relatively low environmental sensitivity at the project site and the nature of the project, the likely CEQA document would be an Initial Study/Negative Declaration. The County has completed Caltrans' *Preliminary Environmental Studies* (PES) document, which recommends that the project be considered under a NEPA Categorical Exclusion; as such, no NEPA environmental review document is required. However, the biological and cultural resource technical studies for the project must meet Caltrans' requirements for form and content.

The County also seeks an environmental consultant to prepare applications for State and Federal permits, and to facilitate the issuance of the permits during the final stages of the design process.

Preparation of the IS/ND will involve the tasks listed below. The document will be based on the conceptual plans for the bridge, which will include a plan view on a topographic map, a preliminary cross-section with the selected bridge type, and preliminary estimates of construction quantities for fill, rock, base, and pavement. It is recognized that additional design detail will be developed during Phase II, but that it is necessary to complete the IS/ND document as early as possible to begin the permitting efforts.

Task 3.1 - Develop Project Description

URS will prepare a narrative description of the proposed project based on drawings, sketches, tables, and other information provided by Quincy Engineering. The description will include design, construction (methods, materials, and schedule), and maintenance of the new bridge and roadway.

Task 3.2 - Conduct Technical Studies for the Impact Assessment

Various technical studies will be conducted under this task, as described **below**. For each resource or issue area, potential effects of the project on the environment will be identified. The significance of these impacts will be evaluated, and, for identified significant impacts, mitigation measures will be recommended that could reduce the potential magnitude of such impacts. URS will use the County's adopted impact thresholds.

Technical Analyses

URS will conduct technical analyses for the following issue areas: air quality, biology, hydrology and water quality, traffic, visual resources, and cultural resources. The scopes of these investigations for the IS/ND are described in the following subsections. Impact analyses related to agricultural, land use, noise, recreation, mineral resources, population, housing, energy, geology, and public services will be brief, and will not require in-depth technical studies.

Air Quality

URS will prepare an inventory of the construction related emissions based on the latest version of URBEMIS. The emission estimates include construction equipment, truck trips, and fugitive dust at the site. URS will provide estimates of emissions of nitrogen oxide, carbon dioxide, hydrocarbons, and fugitive dust on an hourly, daily, and annual basis. URS will assess the significance of these emissions using the CEQA guidelines from the Santa Barbara Air Pollution Control District. URS will identify standard APCD and project-specific mitigation measures to reduce gaseous and fugitive dust emissions from construction.

Biological Resources

URS will prepare a Natural Environment Study (NES) and wetland delineation report in accordance with Caltrans requirements. The study will include a description of the following key biological resources and issues at the project site and related to impacts of the proposed project:

- Native vegetation;
- Fish and wildlife in general;
- Wetlands and waters of the U.S.;



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- Special status species – plants, fish, and wildlife listed by the State or Federal governments as threatened or endangered, or species otherwise considered rare or endangered using local and regional criteria;
- Impacts of construction on riparian vegetation, if any, in the river channel;
- Impacts of the bridge on passage by trout; and
- Beneficial impacts of the bridge on river channel biota due to reduced maintenance requirements.

URS biologists John Gray and Johanna La Claire will conduct a field survey of the project site, mapping vegetation, searching for evidence of special status species, compiling a plant species list, and making general observations about habitat quality. During the site visit, URS will identify the limits of CDFG jurisdiction along the Cuyama River under Fish and Game Code 1603, and the limits of “waters of the United States,” as defined by the Corps of Engineers under Section 404 of the Clean Water Act.

Traffic

URS will describe the short-term impacts on local circulation and traffic conditions due to closure of the crossing during the construction period. They will identify detour routes and assess any potential traffic conflicts on the temporary detour.

Water Resources

URS will conduct various investigations to address issues related to hydraulics and surface water quality, as described below:

Based on the hydraulic analysis of the existing and proposed crossings completed by Quincy Engineering, URS will prepare an analysis for the IS/ND that indicates the improved flow conditions at the crossing. They will identify any potential incidental adverse hydraulic impacts such as increased channel or bank erosion at the bridge (if any).

URS will address the potential for erosion and sedimentation impacts during and immediately after construction due to earth work in the river channel. Construction would occur in the summer when flows are absent; hence, the focus will be on post-construction bank stabilization and restoration. They will identify key elements to be addressed in the construction Stormwater Pollution Prevention Plan (SWPPP). URS will identify additional best management practices, if any, to ensure that no significant stormwater quality impact would occur.

URS will characterize the groundwater conditions at the project site associated with the Sisquoc River alluvium based on available well data and published studies. URS will evaluate whether the proposed construction methods would encounter groundwater, and provide best management practices to reduce impacts, if any, from groundwater dewatering operations.

Aesthetics

URS will provide a qualitative assessment of the aesthetic impacts of the new bridge structure compared to the current earthen crossing. It is anticipated that a beneficial impact will result from the new project.

Cultural Resources

URS will coordinate delineation of the Area of Potential Effect (APE) with the Caltrans archeologist. A URS archeologist will then conduct an archival search for the nearest recorded archeological sites in the vicinity, and conduct a pedestrian survey of the approach roads to detect any evidence of cultural material. The results will be presented in the IS/ND. In addition, URS will prepare a Historic Properties Survey Report (HPSR) and an Archeological Survey Report (ASR) in compliance with Caltrans' requirements.

Task 3.3 - Prepare Administrative IS/ND

The IS/ND will follow the County's format, but will include all sections and issues relevant to Caltrans projects. URS will submit five copies of the administrative Draft IS/ND to the County for review and comment. URS will meet with the County to discuss comments and revisions. URS anticipates that Caltrans



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and FHWA will also review the document for content and format, and that the County will coordinate their involvement.

Task 3.4 - Prepare Public Draft IS/ND

Based on the comments received on the administrative Draft IS/ND, URS will prepare a copy of a "screencheck" Draft IS/ND for the County's final review. This document will represent a 100% complete document submitted to the County staff for one final review and sign-off. URS will meet with the County to discuss any final revisions, and then prepare 50 copies of a public Draft IS/ND, and one digital version in pdf format. If requested, URS will prepare the *Notice of Availability* for the Draft IS/ND and coordinate publication in the local newspaper. They can also develop a mailing list and distribute the document on behalf of the County. The Draft IS/ND will be issued for a 30-day review period.

Task 3.5 - Review Responses to Comments & Meet with County

Upon receipt of comments on the Draft IS/ND, URS will assign each comment letter an alphabetic symbol and each comment will be individually numbered. URS will identify substantive comments and prepare a summary of these comments for discussion with the County. At that meeting, URS will discuss the recommended approach and level of effort required to respond to the comment. For budgeting purposes, URS assumes no more than 150 individual comments will be received, and that the responses will not require additional analyses, only clarification and elaboration of previously conducted analyses.

Task 3.6 - Prepare Administrative Final IS/ND

After meeting with the County staff to review the comments, URS will prepare five copies of an administrative Final IS/ND that will include the entire Draft IS/ND, modified as necessary to respond to comments, and comment letters and accompanying responses (keyed to the comment letter and specific comment). As noted above, it is assumed that Caltrans will review the document, and that the County will coordinate their involvement.

Based on the comments received on the administrative Final IS/ND, URS will prepare a screencheck copy of the Final IS/ND for the County to review. URS will meet with the County to discuss any final revisions.

Task 3.7 - Prepare Public Final IS/ND & Mitigation Monitoring & Reporting Plan

Based on the comments received on the administrative Final IS/ND, URS will prepare 30 copies of the public Final IS/ND for the County along with a digital copy on CD. They will also prepare the *Mitigation Monitoring and Reporting Plan*.

Task 3.8 - Participate in Public Hearings

URS and all Team members will attend the Planning Commission hearing on the adoption of the Final IS/ND and approval of the project. URS will also make any necessary presentations to support the hearing.

Product: **Area of Potential Effects Map (APE)**
Historical Properties Survey Report (HPSR)
Archeological Survey Report (ASR)
Natural Environment Study (NES)
Five (5) copies of the administrative Draft IS/ND
Fifty (50) copies of public Draft IS/ND
Five (5) copies administrative IS/ND
Thirty (30) copies public Final IS/ND

TASK 4 - Location Hydraulic Study & Design Hydraulic Study Report

Avila and Associates will perform flood plain risk assessment, bridge hydraulic study, scour analysis, and creek bank assessment for this project. All available hydrologic and hydraulic data from the County of Santa Barbara, FEMA and other agencies will be collected and reviewed. These may include available degradation studies (Chang, 1997, Balance Hydrologics), Floodplain Studies (FEMA, 2004), gravel operations



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information (from County of Santa Barbara Resource Management Department) and Hydrology Studies (FEMA, Adjacent Bridge, sediment transport reports). Hydraulic analysis and scour analysis will be performed following FHWA/Caltrans procedures to provide design hydraulic information, including flow characteristics and scour potential, for the structural and foundation design.

Data Review

In addition to all of the above information that will be collected, Caltrans Bridge Maintenance Reports for the existing bridges crossing the Sisquoc River (for example, the Garey Bridge #51C0095) and any information available for the existing crossing will be researched. From this information, it can be determined if any maintenance issues of concern have occurred. This helps to determine the necessary freeboard, span length and the type of bridge pier that will minimize debris capture. Maintenance records can also be used to determine if significant channel bed degradation has occurred at the bridges and can be used as part of the degradation analysis. In addition, research will be undertaken to determine the potential impacts of the adjacent in-stream gravel mining activities by Coast Rock Products and Kaiser Sand in the Sisquoc River which will likely impact the estimated degradation at the site. The field reconnaissance will be performed on the same day as the kickoff meeting.

Hydrology

Avila and Associates will estimate the discharge for Flood of Record, the 50-year, and 100-year flow for the Sisquoc River using at least two (2) different statistical gage analysis methods (assuming records are adequate to complete analysis). A significant independent analysis is not needed because of past relevant studies for this river.

Existing Condition Hydraulic Analysis

Existing condition hydraulic models at the bridge site will be set up and calibrated to known high water marks if available. Existing condition stage discharge curves and flood profiles at the bridge sites will also be prepared. The Corps of Engineer's HEC-RAS backwater program or other appropriate software will be used for these analyses. Existing condition water surface profiles for the most probable 50- and 100-year floods, the overtopping floods, and the floods of record, as appropriate, will be identified.

Bridge Hydraulic Analysis

A hydraulic analysis will be performed to provide design hydraulic information, including flow characteristics and freeboard criteria for the bridge design.

Preliminary Bridge Hydraulic Analysis: Hydraulic models at the bridge site representing preliminary bridge configurations will be set up. Soffit elevations will be estimated, and the conveyance capacities determined, as applicable. The effects (if any) of the preliminary bridge configurations on the water surface elevations of the most probable 100-year flood will also be determined (FEMA Base Flood). In addition, if degradation or aggregation is occurring in the creek it will be assessed as well, and its effects of water surface elevations will be considered.

Final Bridge Hydraulic Analysis: After selection of a specific bridge configuration, final hydraulic models representing the selected bridge, including additional bridge details, will be prepared. Using this model, the water surface profiles of the Design Flood, Base Flood (most probable 100-year flood) and other floods of significance to the replacement bridge will be identified. The minimum appropriate soffit elevations to meet currently recommended design standards, the minimum required conveyance capacities, and the effects of the selected bridge on risk of flood damage to structures will also be identified. Hydraulic characteristics necessary for estimating potential scour will be determined, and figures showing flood profiles and stage-discharge curves, as appropriate, will be prepared.

Draft Design Hydraulic Study (DHS) Report

A comprehensive draft DHS report for the bridge site and selected bridge configuration will be prepared. The report will include the following: "Executive Summary", "Introduction", "Description of the Basin",



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"Description of Stream and Site", "Hydrologic Analysis", "Hydraulic Analysis", "Scour and Erosion", "Other Considerations", and "Conclusions and Recommendations". The "Introduction" will identify the purpose of the study, describe the existing and proposed bridges and will identify the significance of the bridge. The "Description of the Basin" will include basin location, area, precipitation, elevation, land use and vegetation, aspect, etc. The "Description of Stream and Site" will include a description of the stream, streambed materials, observed erosion or deposition, etc. "Hydrologic Analysis", "Hydraulic Analysis", and "Scour and Erosion" will describe data, assumptions and methodologies of the respective analyses. "Other Considerations" will identify other constraints to bridge configurations that may affect hydraulic conditions, properties at risk of flooding, significance of properties at risk of flooding, environmental considerations, etc. "Conclusions and Recommendations" will present the results of the analyses, identify bridge hydraulic design requirements and recommend measures appropriate to minimize the risk of damage to the bridge and other structures (if impacted by the bridge project) during the most probable 100-year flood. Figures, photographs and tables will be included, as appropriate, including a sketch of the flood plain. After review by the County, the Quincy Team will be available to go over the County's comments and suggestions (at the next scheduled PDT meeting). After addressing all County review comments, a final DHS report will be prepared and submitted for approval.

Bridge Scour Analysis

A bridge scour analysis will be performed following FHWA/Caltrans procedures to provide the scour potential for the design of the foundations. As applicable, potential abutment, contraction and pier scour for the selected bridge configuration will be estimated using methods presented in FHWA HEC-18. Degradation estimates will be straight line extrapolation using best available data if no numeric sediment transport models are available. The potential for channel degradation, enlargement, and migration considering historic changes in land use and channel geometry using the Type 1 qualitative analysis described in FHWA HEC-20 will also be determined. Scour protection measure recommendations will be made if necessary.

Location Hydraulic Study

Using the information completed in preparation of the *Design Hydraulic Report* and the *Flood Plain Evaluation*, the *Location Hydraulic Study* will be completed for inclusion as an appendix to the *Design Hydraulic Report*.

River Bank Protection

The condition of river banks will be assessed, and recommendations for protection measures based on the field inspection and hydraulic analysis will be made.

Flood Plain Risk Assessment

A flood plain risk assessment will be performed to assist the County in securing all environmental permits. There will be two submittals, draft and final.

Product: **Draft Design Hydraulic Study Report (3 copies)**
Final Design Hydraulic Study Report (6 copies submitted after verification of bridge and alignment alternatives)

TASK 5 - Geometric Approval Plan Drawings

Plans prepared as part of this task will be combined with the *Bridge Type Selection Report* to form the *Project Report*, which will serve as the basis of final design. This report will document all options and alternatives evaluated (both roadway and bridge) and will define the alignment (and bridge) that will be developed during final design (Phase II).

Task 5.1 - Preliminary Roadway Plans

The Team will develop up to two (2) roadway conceptual alignment alternatives (horizontal and vertical) for this project. At the direction of the County and after review of conceptual alignment alternatives, one or both



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will be developed to the 35% design level. Evaluation of other issues affecting the final design, such as permanent and temporary right-of-way requirements, construction staging, detours, temporary access areas, known utility relocation and accommodation and roadway drainage elements will be included.

Task 5.2 - Preliminary Roadway Estimate

An "Engineers Opinion of Probable Construction Cost" will be prepared for each alignment alternative, as directed by the County, and will be included in the *Project Report*.

Product: **Preliminary Roadway Plan and Profile Sheets (GAD)**
Preliminary Roadway Cost Estimate
Discussion on Roadway Design Issues

TASK 6 - Bridge Type Selection

Task 6.1 - Preliminary Geotechnical Recommendations

Initiation & Data Gathering

Fugro West Inc. will be performing geotechnical services for the project. They will consult with the design team and attend a kickoff meeting for the project. The purpose of the initial meeting will be to review their approach to providing geotechnical services and to define the goals for the project. They will review selected information obtained from their in-house files, published geologic maps and any other information provided by the design team. Fugro will review this information to preliminarily characterize the geologic conditions at the site. This information will be used to assist in further planning the field exploration program, and serve as baseline information for preparation of their report.

Fugro will visit the site to coordinate access for field exploration, and will mark the locations of their planned explorations and contact Underground Services Alert (USA) to review the locations relative to underground utilities. Fugro will not be responsible for damages resulting from damage to buried structures or underground utilities that are not brought to their attention and properly marked at the site. They will obtain and coordinate site access with County. Fugro anticipates that the drilling can be performed along the existing roadway and that only a County encroachment permit will be needed to perform the drilling.

Field Exploration

Drilling: Fugro will drill an initial boring along the proposed bridge alignment. The borings will be advanced using the sonic core method. The sonic coring will be performed using a truck-mounted drill rig. Sonic coring will allow for continuous coring. The core will be logged and photographed for inclusion in the report. Samples will be obtained from the core for subsequent laboratory testing. The depth of the borings will be selected based on the subsurface conditions and the anticipated scour depths. For the purposes of preparing this proposal, it is assumed that the boring will be advanced to the depths of 100 to 125 feet below the existing ground surface or to about 20 to 30 feet into bedrock, if bedrock is encountered at a shallower depth. The boring will be backfilled with sand cement slurry.

Traffic Control

Traffic control consisting of cones and signs will be provided during the field exploration along the existing alignment. Fugro will attempt to work along the side of the alignment to allow traffic access.

Hazardous Materials

This Scope of Work specifically excludes the search for, and evaluation of hazardous materials in soil, water or air. In the event that hazardous materials are encountered during field exploration, Fugro will be required to report the contamination and to follow protocols required by various agencies. The cost for work performed in association with the discovery of hazardous material will be provided on a time and materials basis, and is not included in this proposal.



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Laboratory Tests

Laboratory tests will be performed on selected samples obtained from the field exploration program to assist in our characterization of the geotechnical engineering properties of the materials encountered. Fugro will perform tests for soil classification, corrosion, R-value, compaction, shear strength, and consolidation. The precise types and numbers of laboratory tests that Fugro performs will be selected based on the results of the field exploration program.

Draft Preliminary Foundation Report

As input to the bridge type selection process, Fugro will prepare a *Preliminary Foundation Report* that summarizes the following preliminary findings and recommendations. Recommendations may be revised based on additional subsurface exploration, laboratory testing, and geotechnical analyses performed as part of the final design phase.

- Potential for geologic hazards to impact the project (such as seismic shaking, liquefaction, slope instability, and scour);
- Preliminary seismic data for use with Caltrans design methods (causative fault, peak bedrock acceleration, soil profile type, increases for fault type, increases for near-source faults, and response spectra from ATC-32);
- Possible suitable foundations types for the observed conditions (such as drilled or driven piles);
- Creek bank and approach embankment considerations such as site preparation and grading, settlement considerations, allowable slope inclinations, and erosion protection, if needed;
- Corrosion; and
- Need for additional studies or field exploration based on the conditions encountered.

Final Preliminary Foundation Report

A final report will be prepared to incorporate review comments from the design team and the County.

Product: **Draft Preliminary Geotechnical Report (6 copies)**
 Final Preliminary Geotechnical Report (4 copies)

Task 6.2 - General Plan Drawings

During this task Quincy Engineering will examine a number of possible bridge type alternatives. Possible candidates for this site include prestressed concrete box girder, and precast, prestressed concrete I-girder bridge types. After a preliminary evaluation and discussion with the County, general plans will be prepared for up to three bridge types.

Task 6.3 - General Plan Estimates

Quincy Engineering will prepare an "Engineer's Opinion of Probable Construction Cost" for each alternative. The costs will include appropriate contingency factors for this level of design.

Task 6.4 - Draft Type Selection Report

The Type Selection Report will include:

- Up to three feasible alternative bridge types, span arrangements, and construction methods.
- General Plan drawings defining each alternative, including plan, elevation, and section views as required, to illustrate each of the proposed alternatives. Preliminary roadway plans or geometric approval drawings will also be included.
- A description of the advantages and disadvantages of each alternative to allow the County to judge each alternative on its own merits.
- An "Engineer's Opinion of Probable Construction Cost" for each alternative.



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- Our Team's recommendation of the alternative that is most appropriate for the site.

The Quincy Team will attend a Type Selection Meeting at the County where the results of the Type Selection Report will be presented and discussed with the County.

Task 6.5 - Final Type Selection Report

After review and comments by the County, the *Draft Bridge Type Selection Report* will be revised and resubmitted as the *Final Bridge Type Selection Report*.

Product: **Final Preliminary Foundation Report (4 copies)**
Bridge Type Selection Report
Preliminary Bridge and Roadway Cost Estimates
Define the alignment (and bridge) that will be developed during final design (Phase II)
Final Design (Phase II) Schedule



PHASE II

Upon approval of Phase I, final design will be completed for the selected roadway alignment and bridge alternative. The hours estimate accompanying this scope of work is based on the assumptions of the design of the new roadway on the same (existing) alignment, and a multi span, cast-in-place box girder bridge approximately 480' long. Should Phase I lead to a different alignment and/or structure type than assumed, this scope and hours proposal shall be modified accordingly.

TASK 7 - Project Management, Team Leadership & Quality Control - Phase II

Task 7.1 - Negotiate Phase II Services

Should any changes to the *Scope of Work* be necessary as a result of Phase I of the project, adjustments to previously submitted Phase II hours can be made at this time.

Task 7.2 - Project Management & PDT Meetings

Activities under this task are a continuation of those described in *Task 1.2* above. PDT meetings will be conducted monthly at the County to coordinate design efforts of the project team. It has been assumed that three (3) meetings will be required during this phase of the project. Team members will include representatives from QEI as well as URS.

Task 7.3 - Quality Assurance/Quality Control Review

Quality Control reviews will be conducted prior to delivery of 35%, 65%, 90%, and 100% PS&E.

As an integral part of the Quincy QA/QC Program, a senior level engineer will review the entire draft PS&E (90% PS&E) package for uniformity, compatibility and constructibility. This review will include comparing bridge and roadway plans for conflicts or inconsistencies, and to ensure that the final design is in accordance with all environmental documents, permit requirements, the hydraulics report, and foundation recommendations. The specifications and estimate will be reviewed for consistency with the plans and to assure that each construction item has been covered.

Product: **Monthly PDT Meetings (3)**
Project Progress Reports
QA/QC Reviews

TASK 8 - Preliminary - 35% PS&E/Roadway

Task 8.1 - Project Report

Most items for the 35% Roadway have already been completed. Upon approval of the Geometric Approval Plan (Drawings) and the *Bridge Type Selection Report*, the plans and other information developed as part of



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this task will be combined to form the Project Report, which will serve as the basis of final design. This report will include the following items:

- Project Description
- Design and Construction Data
- Final Geotechnical Report (Task 8.2)
- Construction Cost Estimates
- Draft Design Hydraulic Study Report
- Project Final Design Schedule

This report will document all options and alternatives evaluated (both roadway and bridge) and will define the alignment (and bridge) that will be developed during final design. This report will be used by the team for final design. No formal report will be submitted.

Task 8.2 - Final Geotechnical Recommendations

Coordination & Utility Clearances

As part of the initiation of Phase II of the project, Fugro will request that a preliminary plan and profile for the project, showing the site topography and layout of the planned improvements, be provided to us to assist in planning the locations of the field explorations. They will visit the site to coordinate access for field exploration. We will mark the locations of our planned explorations and contact Underground Services Alert (USA) to review the locations relative to underground utilities. Fugro will not be responsible for damages resulting from damage to buried structures or underground utilities that are not brought to our attention and properly marked at the site.

Field Exploration

Drilling: Fugro will drill up to five (5) borings along the proposed bridge alignment. The borings will be advanced using the sonic core method. The sonic coring will be performed using a truck-mounted drill rig. Sonic coring will allow for continuous coring. The core will be logged and photographed for inclusion in the report. In addition, three holes will be cased with 3-inch PVC casing and grouted in place. Downhole shear wave and compression wave velocity profiles will then be conducted within the casing to develop shear wave velocity profiles that will then be used to characterize the seismic response, liquefaction potential, and relative density of the subsurface materials. Samples will also be obtained from the core for subsequent laboratory testing. The depth of the borings will be selected based on the subsurface conditions and the anticipated scour depths. For the purposes of preparing this proposal, Fugro is assuming that the borings will be advanced to the depths of up to 100 to 125 feet below the existing ground surface or to about 20 to 30 feet into bedrock, if encountered at a shallower depth. The borings will be backfilled with sand cement slurry or with the grouted casings.

Backhoe: Fugro will excavate several shallow backhoe pits within the roadway approaches. The pits will be excavated to depth of approximately 4' below the existing ground surface using a 12-inch wide bucket. The purpose of the pits will be to observe the subgrade conditions within the bridge approach areas, and to obtain samples for R-value testing. The backhoe pits will be backfilled with the excavated materials, and will be compacted with a hand operated whacker type compactor if performed near or in close proximity to the existing roadway.

Traffic Control: Traffic control consisting of cones and signs will be provided during the field exploration along the existing alignment. Fugro will attempt to work along the side of the alignment to allow traffic access.

Hazardous Materials: This *Scope of Work* specifically excludes the search for, and evaluation of hazardous materials in soil, water, or air. In the event that hazardous materials are encountered during field exploration, Fugro will be required to report the contamination and to follow protocols required by various agencies. The



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cost for work performed in association with the discovery of hazardous material will be provided on a time and materials basis, and is not included in this proposal.

Laboratory Testing

Laboratory tests will be performed on selected samples obtained from the field exploration program to assist in our characterization of the geotechnical engineering properties of the materials encountered. We will perform tests for soil classification, corrosion, R-value, compaction, shear strength, and consolidation. The precise types and numbers of laboratory tests that we perform will be selected based on the results of the field exploration program.

Draft Geotechnical Report

Fugro will prepare a draft of the *Geotechnical Report* for the project for review by the design team and reviewing agencies. The report will provide a summary of the data obtained, and our opinions and recommendations regarding:

- Soil and groundwater conditions encountered;
- Site geology, faulting, and seismicity;
- Potential for geologic hazards to impact the project (such as, seismic shaking, liquefaction, and slope instability);
- Seismic data for use with Caltrans design methods (causative fault, peak bedrock acceleration, depth to bedrock, soil profile type, increases for fault type, increases for near-source faults, and response spectra from ATC-32);
- Suitable foundation types for the conditions encountered (such as spread footings, driven concrete or steel piles, CISS, or CIDH piles);
- Specified tip/bearing elevations, settlement, and size for suitable deep foundation types and class of pile loading considered;
- Lateral capacity of pile foundations for free-head and fixed-head conditions based on p-y analyses;
- Lateral earth pressures, spring constants, and passive pressure resistance for abutment design;
- Scour considerations including estimated scour velocity for creek bed materials encountered, if needed;
- Creek bank and approach embankment considerations including stability evaluations, settlement considerations, and retaining structure or scour protection concepts, if needed;
- Site preparation and grading for the approach roadway and associated embankments;
- Potential for settlement or liquefaction to result in settlement or instability of the approach embankments.
- Earthwork factors for onsite materials that are excavated and replaced as compacted fill;
- Suggested specifications for on-site and imported materials used as fill;
- Construction considerations: need for dewatering, pile driving, CIDH pile construction, adjacent structures, temporary excavations, and shoring;
- Corrosion considerations for the design of subsurface structures (minimum cement factors estimated in accordance with Caltrans guidelines); and
- Pavement structural sections for the roadway pavement (according to Caltrans design methods).

Specifically excluded from this work is the evaluation and design-level recommendations for deep compaction, geosynthetic reinforced embankments, and other specialty geotechnical construction that may be recommended to address the subsurface conditions, project schedule and environmental constraints. We can address the need for the types of services once the field exploration is complete, and the potential for liquefaction and settlement to impact the project has been assessed.



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Fugro may recommend that additional exploration or evaluation be performed based on the results of the work performed. Field and laboratory data obtained from our evaluation will be included in the report. A draft report will be submitted for review by the design team prior to preparing the final report. Upon receipt of written comments, we will then address the comments and incorporate them into a final report.

Draft Log of Test Borings Sheets

Fugro will prepare a draft log of test borings sheet for the new bridge. The Log of Test Borings will be prepared on Caltrans standard plan sheets for log of test borings, and can be modified to incorporate the County's plan sheet border, if requested.

Final Geotechnical Report

A final report will be prepared to incorporate review comments from the design team and the County. Fugro will submit four (4) copies of the final report.

Final Log of Test Borings Sheet

A final log of test borings sheet will be prepared to incorporate review comments from the design team and the County. Fugro will submit the LOTB with the final geotechnical report, and provide an electronic submittal for inclusion in the plan set.

Review of Plans & Specifications

Fugro will review the project plans and specifications for conformance with the geotechnical recommendations of the report. Fugro can prepare portions of the specifications for deep compaction, geosynthetics, and lightweight fill, if requested. The hours and fee for preparing portions of the specifications is not included in this proposal, and could be provided as an additional service, if needed.

Product: **Draft Geotechnical Report**
Draft Log of Test Borings Sheet
Final Geotechnical Report (4 copies)
Final Log of Test Borings Sheet

TASK 9 - Preliminary - 35% PS&E/Structures

The *Bridge Type Selection Report* will be combined with the Geometric Approval Plan to form the *Project Report* used by the team. At this time, a schedule to complete the project will also be developed.

Product: **Project Schedule**

TASK 10 - Final Design Unchecked - 65% PS&E/Roadway

Upon approval of Phase I and the roadway Geometric Approval Plan, Quincy Engineering will proceed with final roadway design. At this time, final geotechnical investigations have been completed:

Task 10.1 - Permitting Services

URS will assist the County in acquiring the following permits for the project: Corps of Engineers (Corps) 404 nationwide permit, a California Department of Fish and Game (CDFG) Streambed Alteration Agreement, and a 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB). We would prepare permit applications upon completion of the 35% design drawings, and the completion of the Final IS/ND. Our scope of work includes the following efforts:

- We will prepare the application for a Corps 404 nationwide permit. It will consist of a summary of the proposed project, 35% design plans, a wetland delineation, an analysis of consistency with the Corps' regulations, and any riparian habitat mitigation from the IS/ND. We will meet with the Corps, if necessary, to discuss the project and the application. We assume that the project will qualify for a nationwide permit



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- We will also prepare the notification package to submit to CDFG for a Streambed Alteration Agreement. We will include a project description, 35% drawings of the project, site photographs, and the Final IS/ND. We will review the Draft Agreement sent to the County, and meet in the field with the CDFG representative.
- We will also prepare the application package for a certification or waiver to be submitted to the RWQCB.

During the permitting task, we will also coordinate with the Corps of Engineers, California Department of Fish and Game, and the Central Coast Regional Water Quality Control Board staffs to coordinate and expedite issuance of the permits.

Task 10.2 - Roadway Design

The final approach roadway design will be performed in accordance with County Standards, AASHTO's "A Policy on Geometric Design of Highways and Streets", Caltrans "Highway Design Manual", and Caltrans Standard Specifications. Final grading and drainage details will be developed as well as new/existing roadway conformance details, as required. Cross-sections will be developed on approximately 15 meter (50') intervals.

Task 10.3 - Roadway Detailing - CAD

Roadway plan sheets will be prepared in AutoCAD according to the County drafting standards (County drafting standards and borders should be provided in an electronic format). Plans will be prepared in metric units with English units in parentheses and will be consistent with County and Caltrans' Standard Plans. All plans will be signed by the civil engineer registered in the state of California in responsible charge of the design, in accordance with the Caltrans *Local Programs Manual*. We expect the plans, specifications, and estimate (PS&E) will contain the following roadway plan sheets:

- Title Sheet (one sheet)
- Typical Section (one sheet)
- Layout/Profile Sheets (three sheets)
- Construction Signs (two sheets)
- Quantities Sheet (one sheet)
- Construction Details (three sheets)
- Pavement Delineation and Sign Plans (three sheets)
- Utility Sheet (three sheets)

Task 10.4 - Submit 65% Roadway Plans

Open communication between the County's staff and the Quincy design staff will allow both parties the opportunity for input during the plan preparation stage, ensuring that roadway design parameters are adequately addressed. This opportunity will occur at the first PDT meeting subsequent to the 65% plan submittal, during which the bridge plans can be discussed. This should save considerable time in the County's review of the Draft (90%) PS&E since most of the major issues will have been previously discussed and addressed.

Product: **65% Plans (11x17 bond)**

TASK 11 - Final Design Unchecked - 65% PS&E/Structures

Upon approval of Phase I, Preliminary Design, and the *Bridge Type Selection Report*, the Quincy Team will proceed with final bridge design.



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Task 11.1 - Bridge Design

Final bridge design will be performed in accordance with Caltrans "Bridge Design Specifications" and other Caltrans bridge design manuals. Design will be based on the "Load Factor Design" method, with HS20-44 (including alternative) and permit truck design live loads. Seismic design will be performed in accordance with the Caltrans "Seismic Design Criteria (Version 1.3)".

Task 11.2 - Bridge Detailing - CAD

Bridge plan sheets will be prepared in AutoCAD according to County drafting standards (again, County drafting standards and borders should be provided in an electronic format). Plans will be prepared in metric units with English units in parentheses and will be consistent with Caltrans' Standard Plans. All plans will be signed by the civil engineer registered in the state of California in responsible charge of the design, in accordance with the Caltrans "Local Programs Manual". For a multi-span slab or box girder bridge, plans are expected to consist of the following:

- Bridge General Plan
- Deck Contours
- Foundation Plan
- Abutment Layout (2 sheets)
- Abutment Details (2 sheets)
- Pier Details (2 sheets)
- Typical Section
- Girder Layout
- Girder Reinforcement
- Miscellaneous Details
- Structure Approach Details
- Structure Drainage Details
- Log of Test Borings Sheet

Task 11.3 - Submit 65% Bridge Plans

Again, open communication between the County's staff and the Quincy design staff will allow both parties the opportunity for input during the plan preparation stage, ensuring that bridge design parameters are adequately addressed. This opportunity will occur at the first PDT meeting subsequent to the 65% plan submittal, where the bridge plans can be discussed.

Product: **65% Plans (11x17 bond)**

TASK 12 - Utility Coordination

Once conflicts have been determined (see *Task 2.4*), "B" letters identifying utility conflicts identified by the Team will be sent to the affected utility companies to determine protection and/or relocation requirements. Temporary or permanent right-of-way needs will also be determined for any relocations. Upon completion of 90% PS&E, "C" letters requesting utility company approval of the final project, and 90% plans, which will incorporate identified utility needs, will be sent to affected utilities. A schedule will be developed in cooperation with the utility companies for relocation of the affected utilities that meets the needs of the project. If utility relocation is to be performed as part of the project, the affected utility will provide the PS&E for their facility, which will be included by the team in the final PS&E.

Product: **Utility PS&E (by Utility Companies)**



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TASK 13 - Final Design Checked - 100% PS&E/Roadway

Once the 65% PS&E has been completed and submitted to the County, the Team will immediately begin preparation of construction quantities and engineer's estimate, technical specifications, and a construction (working days) schedule.

Task 13.1 - Roadway Independent Review

An independent review of the road plans will be performed by an engineer not involved in the design of the project. This will involve reviewing the plans for content, presentation, and completeness. Based upon the independent review and agreement to revisions by the designer and reviewer, the plans will be revised.

Task 13.2 - Roadway Quantities & Cost Estimate

Construction quantities and a construction cost estimate will be developed. Quantities will be calculated in accordance with Caltrans' practice and segregated into pay items. The estimate will include quantities, unit costs, and a project cost summary. This roadway summary will be combined with the bridge summary described below to develop the engineer's estimate.

Product: **Roadway Quantities**
Project Roadway Construction Cost Estimate

Task 13.3 - Roadway Technical Specifications

Project Technical Specifications, including Special Provisions based on Caltrans "Standard Special Provisions" (SSP) (Chapters 8, 9, and 10), will be developed. A hard copy and disc copy of the technical specifications will be provided for the County's review. The County will combine these technical special provisions with its boilerplate specifications to develop the project specifications.

Product: **Roadway Technical Specifications (Chapters 8, 9, and 10)**

Task 13.4 - Submit 90% Roadway PS&E

After the 90% PS&E has been developed, a QA/QC review will be performed by the Team. Upon completion of the QA/QC review, and changes to the PS&E as appropriate, the plans, specifications, and estimate, along with design and quantity calculations, will be submitted to the County for its review. (Note that the roadway PS&E will be combined with the bridge PS&E and submitted as one package.)

Product: **Roadway 90% PS&E**

Task 13.5 - Submit 100% Roadway PS&E

Upon receiving review comments from the County and other agencies, each comment will be reviewed, discussed, and addressed in writing. All conflicts will be resolved, and appropriate modifications will be made to the plans, specifications, and estimate. The revised (100%) PS&E will then be resubmitted for the County's final review and approval.

Product: **See Task 14.5**

TASK 14 - Final Design Checked - 100% PS&E/Structures

Task 14.1 - Bridge Independent Design Check

An independent check of the bridge design will be performed by the team. This involves a completely independent analysis of the unchecked bridge plans by an engineer that has not been intimately involved in the design of the bridge. This is an integral part of Quincy Engineering's QA/QC Plan and is identical to the Caltrans/Local Agency process. Based upon the independent check and agreement to revisions by the designer and checker, the plans will be revised.



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Task 14.2 - Bridge Quantities & Cost Estimate

Construction quantities and a construction cost estimate will be developed. Quantities will be calculated in accordance with Caltrans' practice and segregated into pay items. The estimate will show quantities, unit costs, and a project cost summary. The bridge summary will be combined with the roadway summary to develop a total project cost.

Product: **Structure Quantities**
Project Bridge Construction Cost Estimate

Task 14.3 - Bridge Technical Specifications

Project Technical Specifications, including Special Provisions based on Caltrans "Standard Special Provisions" (SSP) (Chapters 8, 9, and 10), will be developed. Again, a hard copy and disc copy of the technical specifications will be provided for the County's review. The County will combine these technical special provisions with its boilerplate specifications to develop the project specifications. A construction (working days) schedule will also be developed to determine the number of working days for the construction contract.

Product: **Bridge Technical Specifications (Chapters 8, 9, and 10)**
Construction (Working Days) Schedule

Task 14.4 - Submit 90% Bridge PS&E

Again, prior to submitting 90% PS&E, a QA/QC review will be performed by the Team. The plans, specifications, and estimate, along with design, check, and quantity calculations, will then be submitted to the County at the 90% completion stage. These will be combined with the 90% roadway PS&E and submitted as one package.

Product: **Bridge 90% PS&E**

Task 14.5 - Submit 100% Bridge PS&E

Upon receiving review comments from the County and other agencies, each comment will be reviewed, discussed, and addressed in writing. All apparent conflicts will be resolved in person or via telephone/fax as necessary. Appropriate modifications will be made to the bridge plans, specifications, and estimate. The revised (100%) PS&E will then be resubmitted for the County's final review and approval.

Product: **Final Roadway and Bridge final PS&E Package**

TASK 15 - Approval of Contract Documents

Final PS&E will be prepared after receipt of 100% PS&E comments and/or approval of the 100% Roadway and Bridge PS&E submittal. Full-sized (vellum) and half-sized plans (on bond paper) as well as a hard copy and computer files (MS Word format) of the special provisions for bidding purposes, and the Engineer's Estimate will be provided.

Upon approval of the 100% PS&E, legal descriptions and right-of-way plats will be prepared for use by the County in obtaining right-of-way certification. It is assumed that the County will prepare final right-of-way maps and records of survey, and will be responsible for right-of-way appraisals and acquisition.

Product: **Contract Plans (1 set full-size vellum, 1 set half-size bond)**
Special Provisions (hard copy and disc)
Engineer's Estimate
Appraisals and Acquisitions (by County)
Right-of-Way Maps and Records of Survey (by County)



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TASK 16 - Bidding Phase

The individuals that were directly involved in the design will be available during the bid period to interpret the plans and specifications, prepare addenda if needed, and provide general consultation to the County to obtain bids. When the construction bids are opened, the Team will be available to provide analysis and recommendations concerning award of the contract.

Product: **Addenda (if needed)**
Bid Review

Optional TASK 17 - Construction Support

After award of the construction contract, the Quincy Team will be available to continue providing services such as reviewing contractor submittals, reviewing shop plans, reviewing change orders, and making other field observations, at the County's request. All activities will include appropriate recommendations and documentation of the Team's activities.

If, during the construction phase of the project, a problem occurs that is directly caused by an error on the part of the Quincy Team, the Team will modify the design, details, specifications, and/or estimates at no cost to the County as needed to remedy the situation.

When construction is completed, Quincy Engineering will prepare Record Drawings (as-builts) for the County's files. These as-builts will be based on information clearly marked on a set of contract plans prepared by the County's Resident Engineer/Bridge Representative.

The level of effort for this task is directly related to the contractor's expertise and experience. We have included 80 hours in our hours estimate for this task.

Product: **Record (As-Built) Drawings**