

Lower Stevens Creek Levee Improvements Study

Scope of Work

Task 1: Site Investigation and Characterization

Subtask 1.1 – Existing Data Review and Site Visit

Under this subtask, Consultant will collect, compile, and review relevant existing information pertaining to the Lower Stevens Creek Levee Improvement Study (Project) including previous reports, geotechnical data, topographic and bathymetry data, and other available data.

Consultant will also perform a site inspection of existing conditions and documenting any ongoing issues related to stability, seepage, erosion, or settlement. The visual inspection will be documented by photographs, and the locations of areas of interest will be recorded by a hand-held Global Positioning System (GPS) unit. This subtask consists of a visual inspection only; neither a detailed inspection nor any type of testing is proposed. The results from both data review and site visit shall be used to develop a draft investigation work plan.

Subtask 1.2 – Soil Investigation and Laboratory Testing

Consultant will perform a supplemental investigation to fill gaps in the existing geotechnical data and to satisfy FEMA requirements (44 CFR 65.10) for feasibility level design. The supplemental exploration plan should maximize the use of the existing geotechnical data. The supplemental exploration plan will consist of up to five (5) borings. The number of borings and maximum depth of borings will be finalized based on results of Subtask 1.1.

Consultant will apply for and obtain a soil boring permit from Santa Clara County. Consultant will also be responsible for field-marking of the planned boring locations and contacting Underground Service Alert (USA) for underground utility clearance before the start of drilling. All material removed from borings shall be collected in 55-gallon drums and disposed offsite after confirming the absence of hazardous or toxic materials by contractor. The scope of work assumes that no potentially hazardous substances will be encountered during drilling. In the unlikely event that such substances are suspected or identified in screening tests of the drill cuttings, the field team will segregate the potentially contaminated cuttings and drilling fluid from the “clean” cuttings and drilling fluid and store them in a separate container for further evaluation. City will be immediately notified so that an appropriate course of action can be determined.

Consultant will contract with a drilling vendor to conduct the soil boring operations. Consultant’s engineer or a geologist will log the soil cuttings, collect soil samples, and provide field supervision during the drilling operation. Soil samples will be obtained at selected depths in the borings by advancing the appropriate soil sampler (standard penetration test [SPT], modified California sampler, or Shelby tube) into the soil at the bottom of the borehole. The borings will be grouted on completion with neat cement per local regulations.

Following the borings, soil samples obtained from the borings will be sealed and delivered to Cooper Testing Laboratory, in Palo Alto, CA, for laboratory testing. This testing will include further classification and testing to determine material properties for use in engineering analyses. The laboratory testing program will be refined and finalized after the soil samples have been inspected in the laboratory. Laboratory tests will likely include grain size, specific gravity, water

content, Atterberg limits, shear strength, and consolidation. The laboratory test results will be presented in the logs of borings at the corresponding depths of samples tested and in summary tables.

Assumptions:

- This scope does not account for unforeseen delays caused by inclement weather or other environmental conditions.
- Environmental clearance under the California Environmental Quality Act (CEQA) for the proposed borings, if needed, will be obtained by the City.

Task 1 Deliverable

Consultant shall prepare a Geotechnical Investigation Report to present the results from the data review, supplemental soil investigation and laboratory testing. The draft report shall be submitted to the City for review and comment. A final report shall then be prepared that incorporates the comments from the City.

Task 2: Engineering Analysis

Subtask 2.1 – Develop Study Criteria

Consultant will develop a set of study criteria based on the requirements presented in the following guidance documents:

- 44 CFR Section 65.10 for freeboard criteria
- Design and Construction of Levees (USACE EM 1110-2-1913) for slope stability and seepage criteria
- Soil Mechanics Design Settlement Analysis (USACE EM 1100-2-1904) for settlement criteria
- USACE Coastal Engineering Manual for riprap sizing criteria
- Shoreline Regional Park Community Sea Level Rise Study (2012)

Subtask 2.2 – Engineering Analyses

Consultant will verify the required crest elevation recommended in the Shoreline Sea Level Rise Study. Consultant will also characterize the levee and foundation materials based on results from Task 1 including results obtained from previous investigation performed as part of various studies at the site. Consultant also will check the previous seepage and stability analyses performed by others as part of the Shoreline Sea Level Rise Study and assess whether new set of analyses are required based on information gathered as part of the Task 1. Consultant will then perform engineering analyses consist of seepage and stability if deemed necessary, erosion, and settlement to comply as required with the regulations at 44 CFR subparagraphs 65.10.b.3 through 65.10.b.5. Consultant will develop study criteria to define acceptable performance for the different failure modes based on the requirements of the regulatory agencies. The results from the engineering analyses will be compared with the study criteria to determine the need for flood levee improvements.

Task 2 Deliverable: At the completion of subtasks 2.1 and 2.2, Consultant will prepare the Existing Conditions Report to present the results from the engineering analyses, the assessment of existing conditions, and identification of levee segments that do not meet the study criteria. The draft report will be submitted to the City for review and comments. A final report, incorporating and addressing received comments, will then be delivered to the City.

Task 3: Perform Improvements Alternatives Assessments

Consultant shall first review and assess the alternatives selected by the City. These alternatives included:

- (1) Keeping the channel as it is and providing erosion protection improvements along the landfill levee slope, if needed;
- (2) Merging the channel with Stevens Creek Tidal Marsh by adding a levee breach and providing erosion protection improvements along the landfill levee slope, if needed;
- (3) Filling the channel to provide upland habitat and erosion protection to the landfill levee;
- (4) Raising the levee between Stevens Creek Tidal Marsh and Drainage Channel and (if needed) relocating the proposed new levee from the southern end to the northern end of the Drainage Channel.

Consultant may develop additional alternatives in consultation with the City. Consultant will develop improvement alternatives for the Lower Stevens Creek levee for meeting required crest elevations and meeting 44 CFR 65.10 requirements for seepage, stability, erosion, and settlement related issues, if any. Consultant will develop preliminary cost estimates of each alternative based on experience, RS Mean estimates, and vendor quotes. The cost estimates will include the capital costs for construction/implementation and operation & maintenance of each alternative, as well as for the subsequent design and permitting phases of project planning.

Consultant will develop estimates of the various permits and other regulatory agreements that would be required for each alternative. Consultant will similarly develop estimates of mitigation requirements. The incorporation of habitat restoration and/or recreation/public access features into the alternatives may increase or decrease the cost or the permitting requirements. Consultant will estimate these changes and identify potential savings and suitable collaborations with external partners. Consultant will also perform a qualitative alternative assessment that considers factors such as effectiveness in satisfying 44 CFR Section 65.10, construction cost, constructability, habitat enhancement and recreational opportunities, permitting and mitigation requirements, and potential for collaboration with external partners. Consultant may convene a workshop with the City project manager and other City-requested staff to discuss the approach and the weightings to use for each factor. The results from the alternative assessment will be used to select a preferred alternative.

Assumptions

- Cost estimates will be based on experience and vendor quotes for various services.
- A simple hydraulic model analysis using the 1-Dimensional HEC-RAS may be performed for an alternative that encroaches into the creek. This scope does not include any major hydraulic modeling effort beyond the simple hydraulic model using the 1-Dimensional HEC-RAS.
- The environmental permitting and mitigation requirements will vary depending on the alternative selected and the footprint size and location, the volume of earth to be moved, the nature of the construction, and the types of habitat connectivity and other enhancements that might be able to be incorporated. The most likely permits and agreements are a BCDC permit, a Clean Water Act Section 404 permit, and a Section 401 water quality certification. Consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service may also be required under the Endangered Species Act (ESA). Stevens Creek is a habitat for ESA-listed steelhead, making the need for some coordination with NMFS likely.

- The City Council or other stakeholders will be able to approve a preferred alternative within the schedule proposed in this scope.

Task 3 Deliverable

The Task 3 deliverable will be an Alternative Assessment Report. This report will present the results of the alternative assessment, as described above. The draft report will be submitted to the City for review and comments. A final report, incorporating and addressing received comments, will then be delivered to the City.

Task 4: Conceptual Design and Cost Estimate**4.1 – Develop Conceptual Design Criteria**

Consultant will prepare a conceptual Design Criteria Memorandum (DCM) that will be used as the basis for the conceptual design. The DCM will consist of civil design criteria (e.g., alignment, minimum crest elevation and width, steepest slope, survey control), geotechnical criteria (e.g., minimum foundation strength, loading conditions and acceptable minimum factors of safety), hydrological criteria (e.g., 100-year water levels, sea level rise, freeboard), flood protection system operational criteria (e.g., riprap sizing, instrumentation for flood protection safety, pumping of seepage, crest access requirements), construction and environmental criteria (endangered species, wetlands, availability of earth materials, material disposal).

4.2 – Conceptual Design

Consultant will develop the conceptual design of the preferred alternative (selected in Task 3), including plans, profiles, and sections. The design will be sufficiently detailed such that quantity take-offs and costs of construction can be estimated. At this level of design, cost estimates are typically within about 25 percent accuracy. Construction schedules will also be developed, including possible phasing of the work to minimize impacts to bay trail users and meet City requirements.

Task 4 Deliverable

The Task 4 deliverable will be a Conceptual Design Report. This report will be prepared to present our conceptual design and cost estimate. The draft report will be submitted to the City for review and comments. A final report will then be prepared that incorporates comments from the City.

Task 5: Project Management

Consultant will perform general project management functions including, quality assurance, budget and schedule control, invoicing, and coordination of activities necessary for successful project completion. Consultant also will prepare and implement a Project Execution Plan and a Quality Management Plan for internal use by consultant. This task includes a project kickoff meeting with the City and external stakeholders requested by the City, as well as up to five 2-hour meetings with the City during the course of the project.

Assumptions

- Other Direct Costs (ODCs) for the project are itemized on the budget spreadsheet; they include expected costs for rental cars, fuel, parking, tolls, printing, and so on.
- One QA/QC audit will be required for this project.
- Assumes an 8-month performance period
- Invoicing will occur monthly. Budget tracking will occur weekly.

		Project Manager	QA/QC Officer	Principal	Senior Project Manager	Senior Project Professional	Project Professional	Professional	GIS/CADD Technician	Cost Estimator	Project Admin	URS Labor Hours	URS Labor Cost	URS ODCs	Vendors	Total Task Cost	
Task Number	Task Description	Billing Rate (\$)	\$169.00	\$208.00	\$221.00	\$182.00	\$130.00	\$117.00	\$104.00	\$104.00	\$169.00	\$78.00	(#)	(\$)	(\$)	(\$)	(\$)
Task 1	Site Investigation and Characterization	24	4	2	0	48	12	64	0	0	4	158	\$ 19,942	\$ 1,100	\$ 21,000	\$ 42,042	
1.1	Existing Data Review and Site Visit	16				24		16				56	\$ 7,488	\$ 100	\$ -	\$ 7,588	
1.2	Soil Investigation and Laboratory Testing	8	4	2		24	12	48			4	102	\$ 12,454	\$ 1,000	\$ 21,000	\$ 34,454	
Task 2	Engineering Analysis	28	10	4	8	28	36	64	20	0	4	202	\$ 26,052	\$ 500	\$ -	\$ 26,552	
2.1	Develop Study Criteria	4	2	2	4	8						20	\$ 3,302			\$ 3,302	
2.2	Engineering Analyses	24	8	2	4	20	36	64	20		4	182	\$ 22,750	\$ 500		\$ 23,250	
Task 3	Perform Improvements Alternatives Assessments	24	12	6	16	52	56	116	0	8	0	290	\$ 37,518	\$ 500	\$ -	\$ 38,018	
Task 4	Conceptual Design and Cost Estimate	36	20	6	40	20	100	48	40	16	4	330	\$ 45,318	\$ 1,000	\$ -	\$ 46,318	
4.1	Develop Conceptual Design Criteria	8	4	2	8		20	20				62	\$ 8,502	\$ 500	\$ -	\$ 9,002	
4.2	Conceptual Design	28	16	4	32	20	80	28	40	16	4	268	\$ 36,816	\$ 500	\$ -	\$ 37,316	
Task 5	Project Management	64	0	8	0	12	0	0	0	0	16	100	\$ 15,392	\$ 500	\$ -	\$ 15,892	
	Subtotal	176	46	26	64	160	204	292	60	24	28	1080	\$ 144,222	\$ 3,600	\$ 21,000	\$ 168,822	