

# Inner Charleston Slough and Sailing Lake Management

Scope of Work – 5/23/19

## Project Understanding

Along its San Francisco Bay shoreline, the City of Mountain View owns and manages Inner Charleston Slough and the Sailing Lake.

The Inner Charleston Slough parcel consists of earth embankments surrounding more than 100 acres of tidal wetlands, which are predominantly mudflat with some fringing tidal marsh. A set of tide gates connects the slough to the Bay, allowing for tidal exchange similar to, but somewhat muted from, Bay tides. The City inherited a mitigation requirement to restore 53 acres of tidal marsh within the parcel that has not yet been met.

The Sailing Lake is a manmade, 50-acre water body within the City park, Shoreline at Mountain View. The City manages the lake for small watercraft recreation based from the Shoreline Aquatic Center. To fill and flush the lake, Bay water is pumped in from Inner Charleston Slough and then gradually drains to lower Permanente Creek and back to the Bay.

Although managed for different primary objectives, these two water bodies are linked hydraulically and operationally. Since the slough is the upstream source for the lake's water supply, the slough sets the baseline water quality for the lake and the slough's conditions constrain pumping operations. For example, water levels are high enough in the slough to allow for pumping only during part of the tidal cycle. Some aspects of water quality then change within the lake, in response to the hydraulic characteristics and other water quality fluxes specific to the lake. Pumping operations, which include predominantly slough-to-lake supply but also include shorter periods of reverse-flow pumping to clear sediment, have the potential to affect habitat in the slough, particularly local to the pump intake.

The City, to better serve its stakeholders and to coordinate with natural resource regulatory agencies, seeks to better understand management options for the slough and the lake, and the extent to which the management of each affects the other. The proposed scope of work addresses management of each of these water bodies in two separate tasks below. While the tasks are separate to recognize the distinctive objectives and time frames for managing each water body, the overall effort would include coordination between the two tasks, to balance management between the two water bodies when performance criteria may be in tension and to identify potential synergistic benefits to both water bodies.

## Scope of Work

### Task 1: Inner Charleston Slough Restoration Plan

In 2018, ESA completed a monitoring study of Inner Charleston Slough. This study focused on monitoring and interpreting current hydrologic, geomorphic, and biologic conditions of the slough, particularly as they relate to the City's tidal marsh mitigation requirement. Based on the interpretation

of these conditions, the report also considered potential management approaches for restoring tidal marsh to meet the mitigation requirement imposed by the Bay Conservation and Development Commission (BCDC).

#### Task 1.1: Regulatory Technical Support

ESA will provide the City with technical support to assist the City in its communications with regulatory agencies. This support may include, but is not limited to: revising prior reporting to meet agency expectations, document review, discussion with City staff, and meetings with regulatory agencies. ESA effort on this task will be on an as-needed basis, at the direction of City staff, and not to exceed the allotted budget.

##### Deliverables

- Revise 2018 monitoring report for regulatory audience
- Phone, email, and in-person communication with City staff and regulatory agencies

#### Task 1.2: Develop Restoration Measures

In this subtask, ESA would revise and expand upon possible restoration approaches that were introduced in the 2018 study to develop specific restoration measures. This development will be based on input from the regulatory agencies, City staff, and other stakeholders, such as the US Fish and Wildlife Service (owners of adjacent wetlands slated for restoration) and the City of Palo Alto, owner of the adjacent Palo Alto Flood Basin. Likely measures to be considered include: vegetation planting, adding wave breaks, raising outboard embankments, managing water levels, importing fill to raise mudflats, and full tidal restoration. The measures will be described at a conceptual level of detail.

##### Deliverables

- Meeting with City staff to discuss site's opportunities and constraints, and to consider management measures
- Memorandum describing up to seven restoration measures

#### Task 1.3: Evaluate Measures

The restoration measures developed in Task 1.2 will be evaluated relative to primary objective of restoring tidal marsh, and also a range of secondary evaluation criteria. Secondary evaluation criteria will likely include flood management, Sailing Lake operations, environmental compliance, consistency with regional management plans, and cost.

##### Deliverables

- Memorandum evaluating up to seven restoration measures
- Meeting with City staff to discuss restoration alternatives

#### Task 1.4: Restoration Plan

Based on the evaluation of restoration measures in Task 1.3, ESA will develop a draft recommended management plan. The plan is assumed to include three or four of the measures and a phased implementation schedule. The descriptions and evaluations of the measures from prior tasks will be updated and refined to a 30% level of design in response to prior comments and revised measure

descriptions. City staff input, as well as input collated by the City from stakeholders and regulators, will be used to revise the plan.

#### Deliverables

- Draft restoration plan
- Revised restoration plan
- Meeting with City staff to discuss draft plan
- Meeting(s) with regulators to discuss plan

### Task 2: Sailing Lake Water Quality Management

#### Task 2.1: Existing Conditions

ESA will review existing water quality monitoring data and prior studies (provided by the City) to describe current status and trends of water quality in the lake. This information will be used to estimate bulk residence time in the lake as a function of pumping operations, and also assess sedimentation rates in the lake (by comparing 2019 bathymetry data with prior bathymetry data).

Existing information about the lake, as well as City staff input and regulatory criteria relating water quality to habitat and human health will be used to draft goals and objectives for the lake, and, to the extent possible, performance criteria, to meet these objectives.

The combination of existing status and trends, goals and objectives, and performance criteria, as well as other constraints (e.g. Inner Charleston Slough management, Permanente Creek conditions), will be used to identify opportunities and constraints for altering lake water quality management. Constraints may include data gaps.

#### Deliverables

- Existing conditions memo identifying goals and objectives, performance criteria, current status and trends in the lake's water quality parameters, opportunities and constraints, and data gaps.

#### Task 2.2: Develop Management Measures

Based on the existing conditions assessment (Task 2.1), as well as City and stakeholder input on the assessment, ESA will develop up to five management measures to help achieve goals and objectives for the lake's water quality. Potential measures may include: modified monitoring, revised pumping operations, modified internal circulation, and alternatives discharge options. The measures will be described at a conceptual level of detail.

#### Deliverables

- Memorandum describing up to five management measures
- Meeting with City staff to discuss management measures

#### Task 2.3: Evaluate Management Measures

The management measures developed in Task 2.2 will be evaluated relative to primary objective of efficient and effective water quality management, and also a range of secondary evaluation criteria. Secondary evaluation criteria will likely include flood management, Inner Charleston Slough habitat, environmental compliance, recreational use, and cost.

## Deliverables

- Memorandum evaluating up to seven management measures
- Meeting with City staff to discuss management alternatives

## Task 2.4: Adaptive Management Plan

Based on the evaluation of restoration measures in Task 2.3, ESA will develop a draft adaptive management plan. Because a full understanding of water quality conditions and the capacity to modify these conditions may be difficult to quantify, the plan may be structured using an adaptive approach. Such an approach would identify key relationships thought to affect water quality, monitor for these relationships, and then implement incremental, reversible measures to test these relationships' contribution towards meeting objectives and performance criteria. The plan may include three or four of the measures, with phased implementation and subsequent phases conditional on response to earlier measures. One measure selected for priority implementation will be updated to a 30% level of design. The descriptions and evaluations of the measures from prior tasks will be updated in response to prior comments and revised measure descriptions. City staff input, as well as input collated by the City from stakeholders and regulators, will be used to revise the plan.

## Deliverables

- Draft adaptive management plan
- Revised adaptive management plan
- Meeting with City staff to discuss draft plan
- Meeting(s) with regulators to discuss plan

## Assumptions

The following assumptions apply to both Task 1 and Task 2 above:

- Measure development and evaluation will rely on existing data (e.g. 2018 Inner Charleston Slough Monitoring Report) and ongoing or proposed data collected by other City efforts (e.g. Charleston Slough water levels, Sailing Lake monitoring, 2019 Sailing Lake bathymetry survey). No additional data collection (e.g. survey, geotechnical coring, biological surveys, hydraulic measurements) is included in this scope of work.
- Evaluation of alternatives will be limited to initial engineering calculations and order-of-magnitude cost estimates. Detailed engineering analysis such as hydraulic or sediment transport modeling is not included in this scope of work.

## Fee Estimte for Inner Charleston Slough and Sailing Lake Management

ESA - 5/23/19

Task #	Task Name	\$/hr	Proj. Manager	Sr. Biologist	Staff Eng.	Staff Bio	Expenses	Total
			\$225	\$240	\$160	\$160		
1.1	Regulatory Technical Support		20	4	12		\$160	\$7,540
1.2	Develop Restoration Measures		20	8	12	4	\$80	\$9,060
1.3	Evaluate Measures		50	16	100	50	\$80	\$39,170
1.4	Restoraton Plan		50	16	100	50	\$190	\$39,280
<b>Subtotal - Task 1</b>			<b>140</b>	<b>44</b>	<b>224</b>	<b>104</b>	<b>\$510</b>	<b>\$95,050</b>
2.1	Existing Conditions		24	4	40	8	\$160	\$14,200
2.2	Develop Management Measures		8	4	8	6	\$80	\$5,080
2.3	Evaluate Management Measures		40	8	40	16	\$80	\$19,960
2.4	Adaptive Management Plan		32	8	30	10	\$190	\$15,710
<b>Subtotal - Task 2</b>			<b>104</b>	<b>24</b>	<b>118</b>	<b>40</b>	<b>\$510</b>	<b>\$54,950</b>
<b>Total</b>			<b>244</b>	<b>68</b>	<b>342</b>	<b>144</b>	<b>\$1,020</b>	<b>\$150,000</b>