

SAN FRANCISQUITO CREEK HEC-RAS MODEL OVERVIEW

San Francisquito Creek Flood Protection Project – Highway 101 to SF Bay

July 9, 2014

Reviewed by: Sergio Jimenez, P.E.

Prepared by: Elizabeth Mesbah, P.E.

A HEC-RAS model of San Francisquito Creek has been used in the evaluation and selection of the Least Environmentally Damaging Practicable Alternative (LEDPA).

During permitting discussions with the resource agencies with jurisdiction over the project, it was established that any increased fluvial flows to the Faber Tract marsh, originally proposed as a project feature by degrading the unmaintained levee between the Creek and the marsh, would create unacceptable impacts to protected species in the Faber Tract. The SFCJPA has conducted analysis on several project alternatives and modifications to limit flows overtopping the existing Faber Tract levee that are equal to or less than the existing condition during a 7,400 cfs fluvial event at a 7.1' (MHHW). A total of 155 cfs spills into the Faber Tract under existing conditions during this event.

A necessary design modification to achieve the post-project condition of not increasing flow into the marsh during this flow and tide scenario is to add fill to the low, slumping area or areas of the unmaintained Faber Tract levee to raise these locations closer to their original design elevation. It is important to all of the parties involved in these discussions to minimize the impacts of importing and placing this fill by optimizing its use (filling the minimum amount needed to maintain existing conditions for discharge to Faber Tract).

HEC-RAS runs were performed for two levee alignments. The first is the SFCJPA-proposed levee alignment, which sets back the levee on the east and south of the creek into the golf course. The second alignment, suggested by the Regional Water Quality Control Board (Regional Water Board), sets the levee back farther into the golf course when compared to the SFCJPA proposal. An additional design modification suggested by the Regional Water Board – to degrade the levee (termed the Bay levee) separating the Creek from an isolated marsh area with open tidal action east of the Faber Tract – proved beneficial to water surface elevation and conveyance when incorporated in to all of the scenarios tested, and, therefore, is included in both of the runs to minimize levee fill further upstream.

Fill height along the Faber Tract levee was then optimized to produce results that were equal to or less than the 155 cfs existing condition threshold. Per the attached profile, a fill height to

approximately 13.0 ft was recommended to reduce the flows to that condition into the Faber Tract.

Two alternatives have been evaluated at the request of the Regional Water Board.

1. LEDPA (which includes the Faber Tract levee height optimized + Bay Levee degraded)
2. LEDPA + additional (i.e. longer and deeper) setback into the Palo Alto Municipal Golf Course from upstream of Friendship Bridge near station 40+00, tying back into the existing levee alignment near station 14+00.

The attached profile compares the difference in water surface elevation between the LEDPA (red line) and the LEDPA + larger setback (purple line), against the existing conditions (blue line). The profile illustrates the difference in water surface elevation caused by the setback, especially between stations 15+00 – 20+00 where an increase in elevation is created because of the constriction imposed by reconnecting the larger setback levee to the exiting levee upstream of the Palo Alto Airport runway.

HEC-RAS model plan files are defined on the next page.

San Francisquito Creek Model Plan Files

Type of File	File Description	File Name	Description
HEC-RAS Project File	SFCreek_FT_HDR_070814	.prj	HEC-RAS model provided to RWQCB on July 8, 2014.
Plan	SFCreek_Existing Conditions	.p05	Existing conditions geometry run at 7,400 cfs fluvial event and 7.1 ft tidal event (MHHW).
Geometry File	Existing Conditions_LatStr_FT	.g04	
Steady Flow File	Other Flow Events, Existing_FT	.f02	
Plan	SFC_FT_LEDPA	.p06	Plan is referred to as the Least Environmentally Damaging Practicable Alternative (LEDPA). Geometry reflects optimized flow overtopping the Faber Tract and the San Francisco Bay levee degraded. Plan run at 7,400 cfs fluvial event and 7.1 ft tidal event (MHHW).
Geometry File	SFC_FT_OvertopOptimize_SFBay_ Degrade	.g03	
Steady Flow File	Flow_7400cfs at 7.1' (ND)	.f01	
Plan	SFC_FT_OvertopOpt_SFBay_ Degr_LrgSetback	.p04	This geometry reflects the optimized flow overtopping into the Faber Tract and San Francisco Bay levee degraded. It also includes a larger levee setback initiating from upstream of Friendship Bridge to upstream of the airport. This is not the recommended project, however, was provided to the RWQCB per their request for comparison purposes only. Plan run at 7,400 cfs fluvial event and 7.1 ft tidal event (MHHW).
Geometry File	SFC_FT_OvertopOptimize_SFB_ Degr_LgSetback	.g05	
Steady Flow File	Flow_7400cfs at 7.1' (ND)	.f01	

San Francisquito Creek

Existing versus Proposed Project Alternatives

7400 cfs at 7.1' Tidal Event (MHHW)

Flows into Faber Tract

Existing Conditions = 155 cfs

FT Levee Raise Optimized + Bay Levee Degraded = 85 cfs

FT Levee Raise Optimized + Bay Levee Degraded + Larger Setback = 105 cfs

Flows into Neighborhoods

Existing Conditions = 2205 cfs

FT Levee Raise Optimized + Bay Levee Degraded = 0 cfs

FT Levee Raise Optimized + Bay Levee Degraded + Larger Setback = 0 cfs

