

# COMPARISON OF RESULTS BETWEEN EXISTING AND PROPOSED (NO DEGRADE) CONDITIONS

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

*December 10, 2013*

Reviewed by: Sergio Jimenez, P.E.

Prepared by: Elizabeth Mesbah, P.E.

### Hydraulic Analysis Summary

This Technical Memorandum presents a summary of the hydraulic analysis completed to compare existing channel conditions to the proposed 95% design project including no degrade of the Faber Tract levee downstream of Friendship Bridge.

This analysis was conducted in HEC-RAS using the same model developed for the San Francisquito Creek levee design project. Three riverine events and two concurrent tidal condition were examined to determine water surface elevations for existing conditions compared to the proposed 95% design (including no degrade) water surface elevation. Table 1 summarizes the riverine and tidal events considered.

*Table 1 - Riverine and Tidal Events*

Riverine Flow (cfs)	Riverine Flow Description	Tidal Elevation (ft)	Tidal Elevation Description
9,400	100-Year	9.6	10-Year Tide
7,500	Approximate 30-Year	9.6	10-Year Tide
4,200	Approximate 8-Year	9.6	10-Year Tide
7,500	Approximate 30-Year	7.1	MHHW

### Results

Lateral structures were added to the HEC-RAS model geometry to compute the quantity of flow overtopping the levees, specifically into the Faber Tract. Table 2 below shows the comparison of flows overtopping the existing levee into the Faber Tract. The proposed condition spills significantly greater quantity of flow into the Faber Tract during high flood events than the existing condition. Equivalent flow spilling into the Faber Tract for existing and proposed conditions occurs near 4,200 cfs at the 9.6 feet tidal condition.

It is assumed for this modeling effort that all flow that overtops the levee leaves the system and does not return to the channel downstream. The height of the lateral structures were modeled using the top of levee elevation at each cross section after confirming that only minor changes in

elevation occur between cross sections. Cross sections are spaced at approximately every 180 feet.

**Table 2 - Faber Tract Flow Comparison**

Modeled Riverine Flow Event (cfs)	Existing Condition Flows into Faber Tract (cfs)	Proposed Condition Flows into Faber Tract (cfs)
9,400 at 9.6'	310	2095
7,500 at 9.6'	260	1025
4,200 at 9.6'	35	30
7,500 at 7.1'	156	975

For reference, the 95% design (with degrade of the Faber Tract), run at 9.6 feet tidal condition, discharges approximately 4,700 cfs into the Faber Tract.

Using data output from the model runs, figures were developed to illustrate the difference in water surface elevation between existing and proposed 95% design (including no degrade) condition for the entire project reach. The data used to develop the figures is included in Attachment 1.

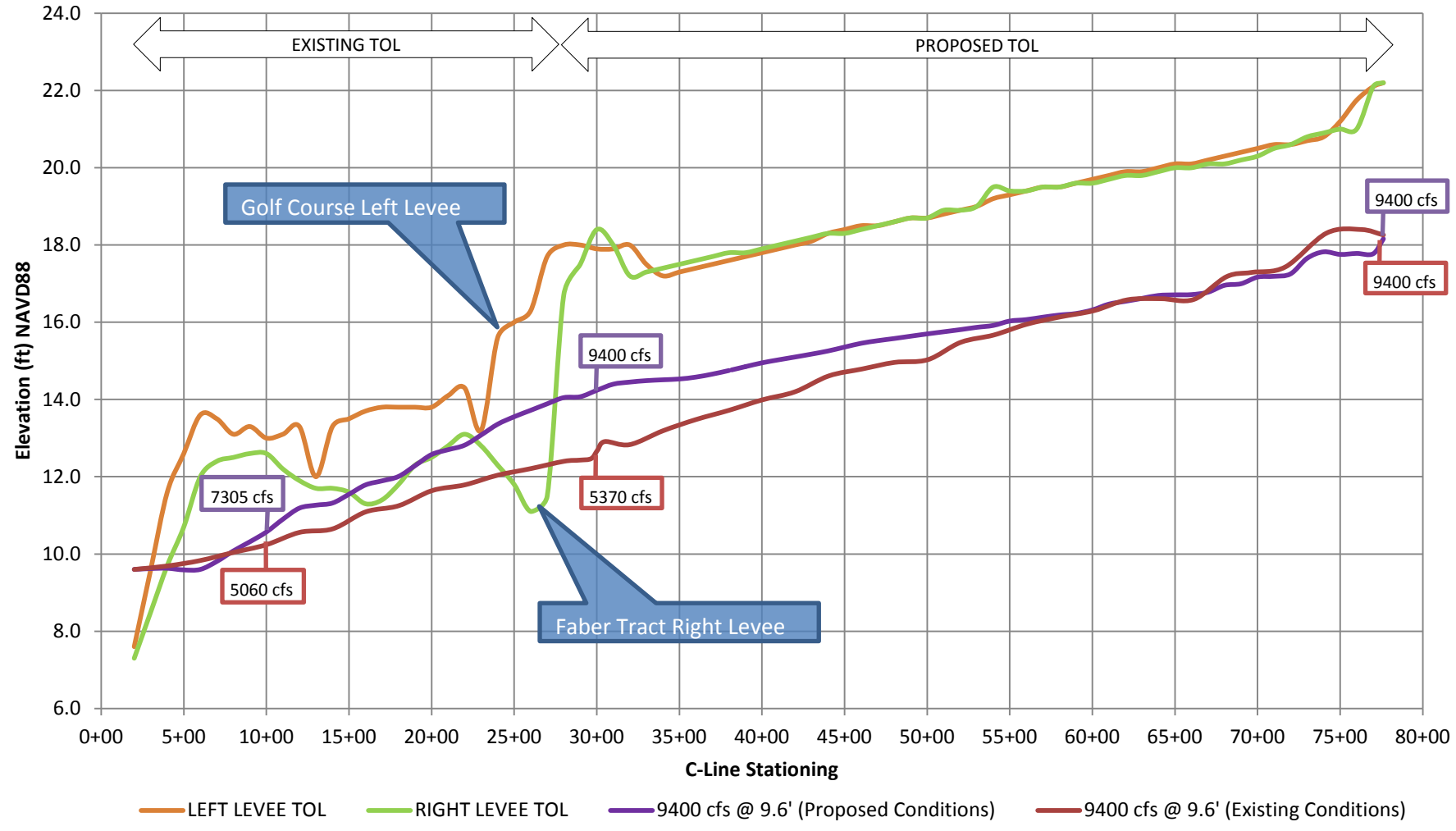
- ◆ Figure 1 illustrates the 100-Year Riverine Event (9,400 cfs) with the 10-year tidal elevation (9.6').
  - ▲ The proposed water surface profile is higher than the existing conditions profile from approximately STA 55+00 to 8+00. This demonstrates that during a 9,400 cfs flooding event, the Faber Tract would receive more flow for the proposed condition compared to the existing condition, as shown in Table 2. This is due to the proposed project containing the flow within the raised levee/floodwall channel while under the existing condition, water overflows in other areas thus reducing overflow into the Faber Tract downstream.
- ◆ Figure 2 illustrates the approximate 30-Year Riverine Event (7,500 cfs) with the 10-year tidal elevation (9.6').
  - ▲ The proposed water surface profile is higher than the existing conditions profile from approximately STA 45+00 to 10+00. This demonstrates that during a 7,500 cfs flooding event, the Faber Tract would receive more flow for the proposed condition compared to the existing condition, as shown in Table 2. This is due to the proposed project containing the flow within the raised levee/floodwall channel while under the existing condition, water overflows in other areas thus reducing overflow into the Faber Tract downstream.
- ◆ Figure 3 illustrates the approximate 8-Year Riverine Event (4,200 cfs) with the 10-year tidal elevation (9.6').
  - ▲ The proposed water surface profile is lower than the existing conditions profile. This demonstrates that during a 4,200 cfs flooding event, the Faber Tract would receive less flow for the proposed condition compared to the existing condition.

This difference is due to the proposed project channel capacity is much larger than the existing condition dropping the water surface profile.

- ◆ Figure 4 illustrates the approximate 30-Year Riverine Event (7,500 cfs) with the MHHW elevation (7.1')
- ▲ The proposed water surface profile is higher than the existing conditions profile from approximately STA 45+00 to 10+00. This demonstrates that during a 7,500 cfs flooding event, the Faber Tract would receive more flow for the proposed condition compared to the existing condition, as shown in Table 2. This is due to the proposed project containing the flow within the raised levee/floodwall channel while under the existing condition, water overflows in other areas thus reducing overflow into the Faber Tract downstream.

Figure 1

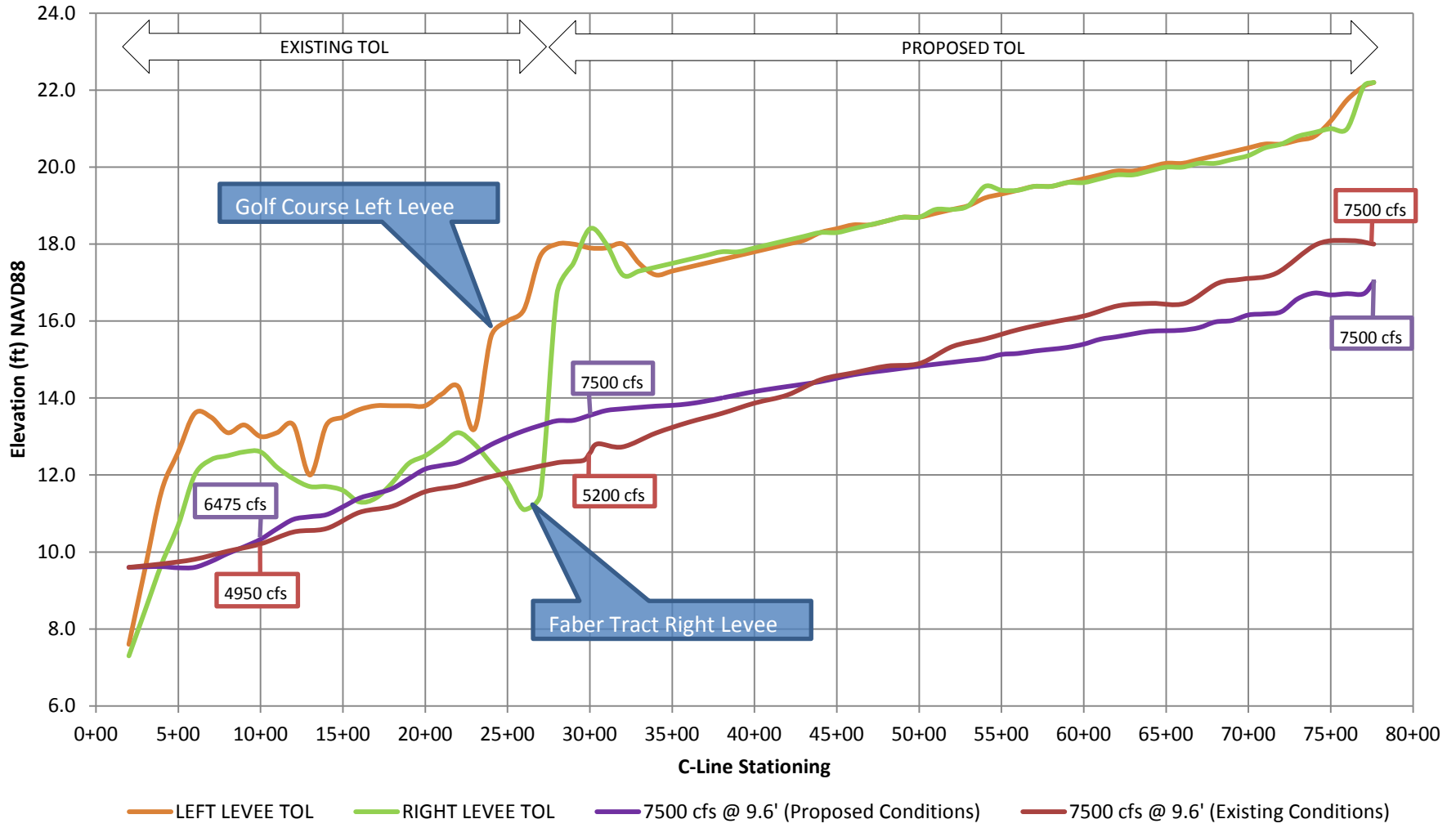
# San Francisco Creek Existing Condition versus Proposed Project Without Levee Degrade Overtopping Allowed 9400 cfs Riverine Event with 9.6' Tidal Event



Submitted 12/5/13

Figure 2

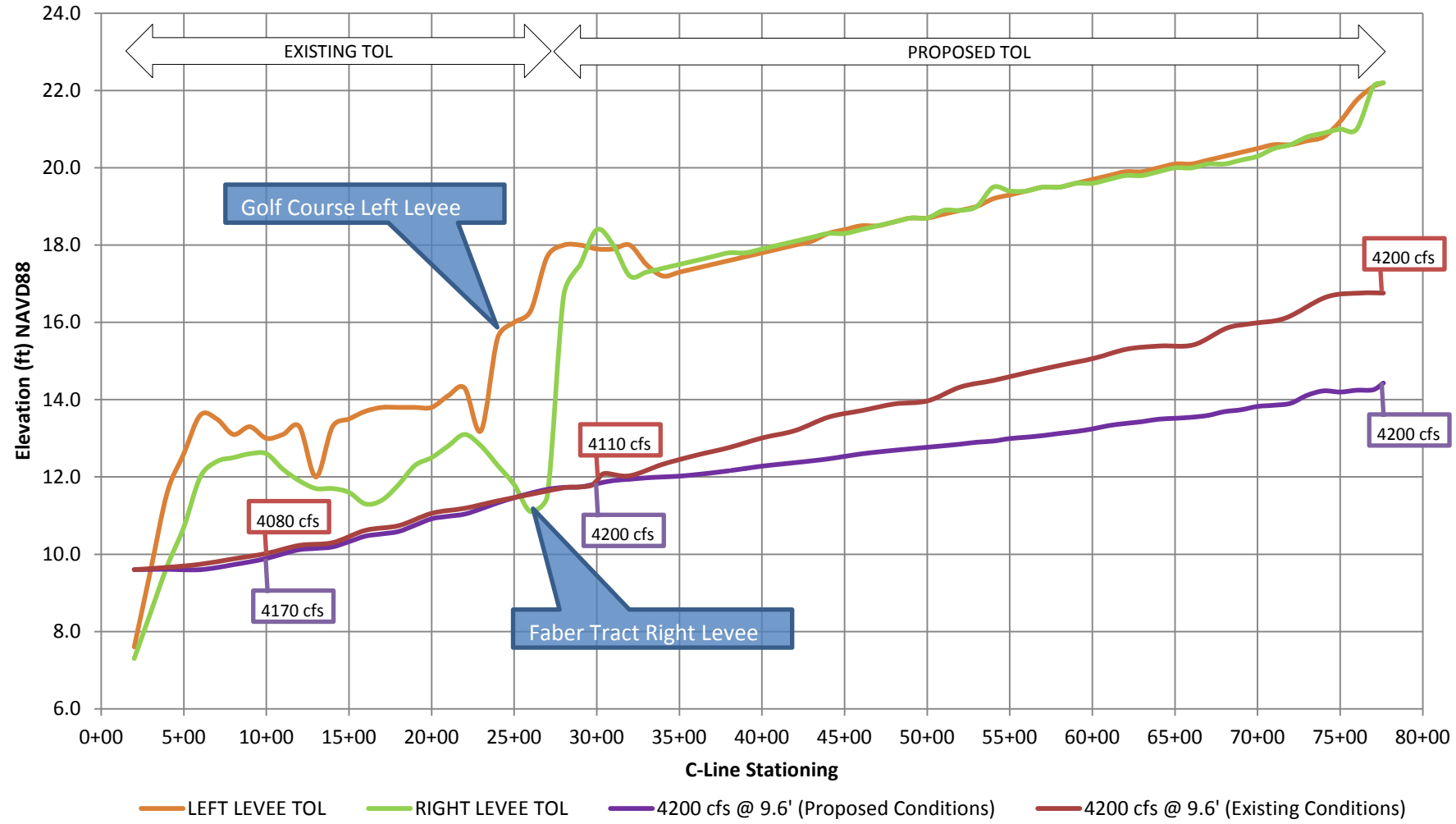
# San Francisco Creek Existing Condition versus Proposed Project Without Levee Degrade Overtopping Allowed 7500 cfs Riverine Event with 9.6' Tidal Event



Submitted 12/5/13

Figure 3

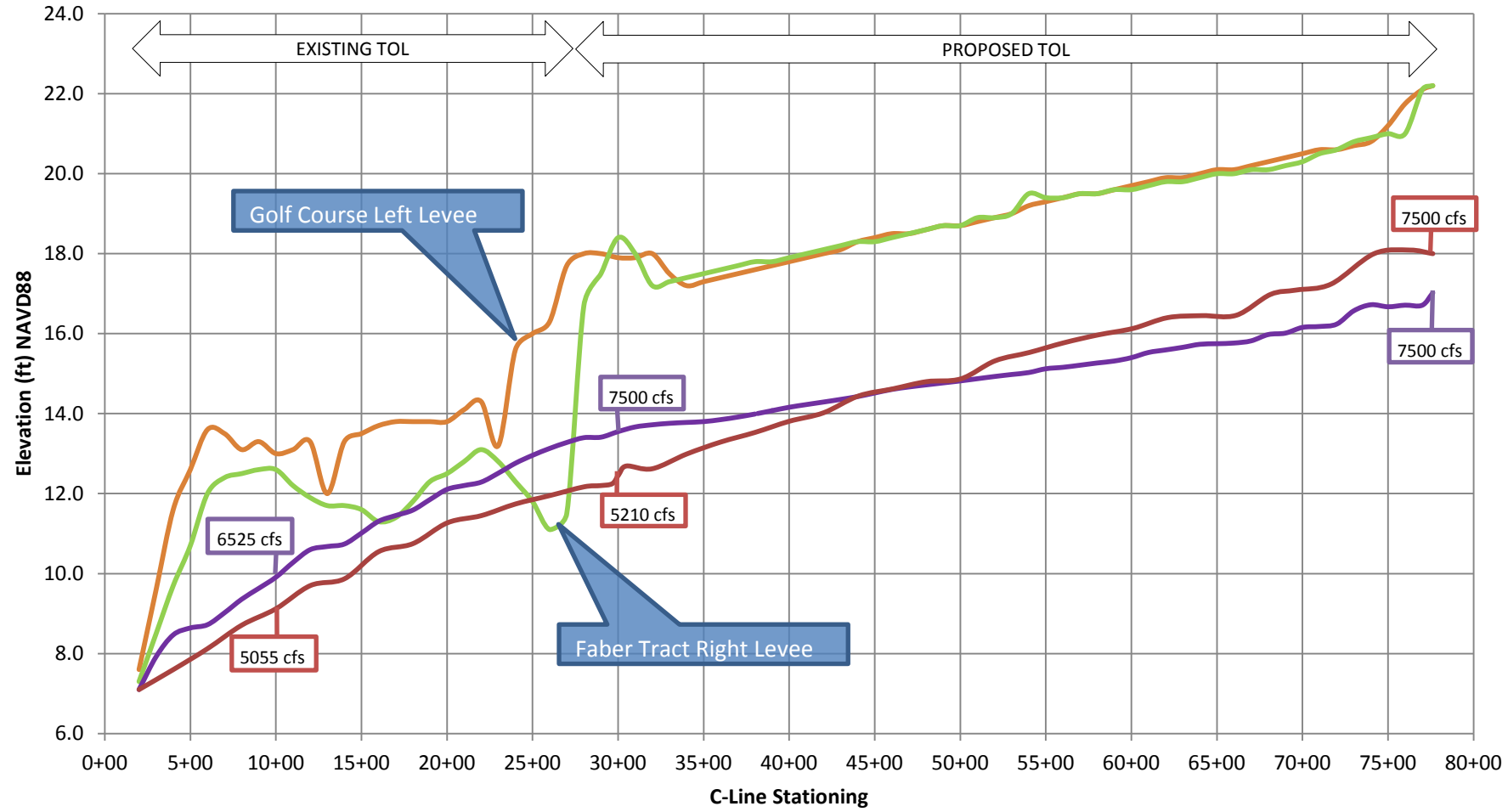
# San Francisco Creek Existing Condition versus Proposed Project Without Levee Degrade Overtopping Allowed 4200 cfs Riverine Event with 9.6' Tidal Event



Submitted 12/5/13

Figure 4

### San Francisco Creek Existing Condition versus Proposed Project Without Levee Degrade Overtopping Allowed 7500 cfs Riverine Event with 7.1' Tidal Event



— LEFT LEVEE TOL    — RIGHT LEVEE TOL    — 7500 cfs @ 7.1' (Proposed Conditions)    — 7500 cfs @ 7.1' (Existing Conditions)

Submitted 12/6/13