
San Francisco Bay Regional Water Quality Control Board

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San Francisquito Creek Joint Powers Authority
Attn.: Kevin Murray
615 Menlo Park Avenue
Menlo Park, CA 94025
E-mail: KMurray@sfcjpa.org

**Subject: Comments on September 2015 Draft Operations and Maintenance Manual
for the San Francisquito Creek Flood Risk Reduction Project**

Dear Mr. Murray:

Water Board staff has reviewed the *Draft Operations and Maintenance Manual* (Manual) for the San Francisquito Creek Flood Control Project Reduction, Ecosystem Restoration, and Recreation Project (Project) (received September 24, 2015). Additional information is necessary to provide more context and better describe the Manual's procedures and requirements. As described further below, our comments address aspects of the Manual, including, but not limited to:

- Operation and maintenance (O&M) roles and responsibilities
- Design criteria that trigger O&M activities
- Consistency with the Santa Clara Valley Water District's (District's) Stream Maintenance Program
- Processes that result in sediment accumulation that are not yet adequately addressed

We are particularly concerned that it does not appear that the JPA has fully evaluated the channel's complex sediment accumulation processes to adequately plan for sediment-related maintenance in the Project reach. Water Board staff prepared a detailed analysis of this concern (Attachment A) for the San Francisquito Creek Joint Powers Authority (JPA) staff to consider in revising the Manual.

In addition, we provide the following comments to assist the JPA in revising the Manual, and to highlight the Water Board's policies:

1. Manual purpose/design criteria. Manual section 1.1 is entitled “Purpose of Manual.” This section states: “The manual provides a consolidation of data and requirements needed by the sponsor to perform operation and maintenance (O&M) activities at San Francisquito Creek.” Please provide more context for the O&M activities. For example, it would be helpful for the JPA to state over-arching design criteria for the Project, including, but not limited to the following:

- The flood flow recurrence interval(s) for which the channel, levees, and floodwalls are designed;
- The channel features that will support and protect steelhead habitat; and
- The list of sensitive species present in or affected by the Project and how the Project is designed to protect them.

The Manual does address some of these criteria; for example, section 2.2 has a vegetation maintenance goal based on a Manning’s n roughness coefficient; and section 4.3 lists seven project elements the JPA will inspect. Owing to the complexity of the Project, a list of the project elements along with the design criteria and anticipated O&M activities in a table or other consolidated format would readily serve as a foundation for the O&M activities subsequently presented in the Manual and could help formalize O&M procedures.

Some of this information is not yet available because it will be included in Biological Opinions still being finalized by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Please revise the Manual criteria list once the Biological Opinions are available. The Project’s 401 Certification, condition 31, requires the JPA revise the Manual no later than 60 days after receiving the Biological Opinions.

2. O&M roles and responsibilities. Section 1.1 states the JPA is responsible for project O&M. Please note that the Water Board requires the JPA to plan and implement O&M for the Project pursuant to the following requirements stated in the 401 Certification, condition 31:

- a. *(Prepare an O&M Manual acceptable to the Executive Officer that shall...) be consistent with the District’s Stream Maintenance Program.*
- b. *Clearly specify the responsibilities of the JPA and its delegates for operations and maintenance in accordance with Resolution 14.11.20 and any future resolutions the JPA may adopt to delegate or otherwise define operations and maintenance responsibilities.*
- c. *Clearly specify any mitigation actions that may be necessary for operations and maintenance activities, which may include, but not be*

limited to, addressing potential sedimentation and erosion and other impacts to ensure: (1) long-term habitat protection and enhancement; (2) flood protection performance; and (3) long-term sustainability of the creek channel and the creek-marsh interface along the Faber Tract Levee in face of sea level rise.

- d. *The revised manual may cover regular creek channel operations and maintenance activities in the Project area.*
- e. *The Operations and Maintenance Manual shall be updated at a minimum every five years to meet the strategies and actions necessary for potential impacts from global climate change, as discussed in the next condition, and to incorporate lessons learned from previous operations and maintenance activities.*

We recognize that the JPA has delegated O&M to the City of East Palo Alto and the District, per JPA Board Resolution 14.11.20 (Resolution) (November 11, 2014) and that the delegates plan to develop an Operations and Maintenance Agreement (Agreement). Please revise the Manual accordingly and update it once the Agreement is available. The JPA may incorporate the Agreement by reference once the Agreement is available.

- 3. Mitigation and Monitoring Plan. Regarding condition 31.c listed in #2 above, please note that the Water Board requires a mitigation and monitoring plan (MMP) pursuant to the 401 Certification, conditions 23, 24, and 25. Please revise the Manual to be consistent with the MMP once the MMP is available, as certain mitigation and monitoring activities will likely impart temporary, repetitive impacts that must be addressed in the Manual.
- 4. Approval of changes. Manual section 1.1 states: "Significant changes to the project or procedures that could potentially impact the operation of the project should be addressed by the JPA for review and approval (see Section 1.2)."

Stanford University has recently determined it intends to transfer sediment currently retained by the Searsville Dam into the San Francisquito Creek channel. The Searsville Dam sediment may impact the operation of the Project. Please revise the Manual to describe the procedures the JPA has established to address the new sediment load. This would be consistent with the 401 Certification, condition 32, which requires the JPA to revise the Manual, acceptable to the Executive Officer, to address adaptive management strategies necessary for the continued healthy functioning of the creek channel within the Project area and the creek-marsh interface along the Faber Tract Levee.

5. Access to Project elements. Section 1.3 provides information about access to Project elements, including: levees, floodwalls, Friendship Bridge, the boardwalk extending from Friendship Bridge, and ramps. Please clarify which entities have access to each Project element. We recommend the JPA include a table listing which entities have access to each element.
6. Regulations. Section 2.1 (second paragraph) states that certain activities may require separate permits and/or authorization to perform work. Water Board staff agrees that certain procedures would require additional permits if the work were to exceed limits in the District's Stream Maintenance Program (SMP) or comparable guidance that the JPA will establish in accordance with 401 Certification, condition 31. It would be appropriate for the JPA to include an outline in this section to describe how it plans to develop O&M procedures consistent with the SMP. Such procedures would help establish the limits within which additional permits would not be necessary. In addition, it would be helpful for the JPA to include a table listing the anticipated maintenance activities and the corresponding agencies with approval authority.
7. Easement contacts table. Please label the table in section 2.1 with a title.
8. Sediment-related maintenance. The Manual does not adequately address the potential for future sediment accumulation and such accumulation's associated maintenance needs. Please review the memo in Attachment A and fully address in the revised Manual how the JPA intends to manage sediment-related maintenance in the Project. It is critical for the JPA to thoroughly analyze the processes that result in sediment accumulation and revise the Manual to include appropriate sediment-related maintenance plans and procedures.

In addition, we have the following comments specific to the following Manual references:

- a. Manual section 2.2.1 states:

From Highway 101 to the San Francisco Bay, sediment deposition accumulated to a continuous elevation 8.0' (NAVD88) will reduce the levee/floodwall freeboard by 50% (1.5 feet) which will require sediment removal..."

This trigger only addresses maintenance of the freeboard goal without any mention of other Project goals that sedimentation could affect, such as fish habitat features that are not yet described in the Manual. Please revise the Manual to address how sediment accumulation will affect maintenance of Project elements including, but not limited to, habitat and multi-purpose trails.

- b. The statement in section 2.2.2, as follows, provides a general assumption that does not appear to be founded on concrete data or analyses:

No sediment deposition is anticipated during normal conditions. Upstream bank failure could provide an amount of sediment that the channel could not accommodate, requiring a maintenance need as a result of an unpredictable event. In the event that tidal deposition reaches an equilibrium at a different elevation than designed, a berm or other means of recapturing freeboard will be installed.

- i. Please revise the Manual to provide the basis for this assumption that no deposition will occur. This is not consistent with the Water Board staff's findings discussed in Attachment A. Please model the sediment accumulation and revise the Manual to address sediment-related maintenance based on the sediment modeling results. Also, please clarify what is meant by "an unpredictable event." Periodic large storms, including those that may result in upstream bank failure, are regular and expected events. As such, it is appropriate to consider their effects as a part of developing the Manual.
 - ii. In addition, a proposal to build a berm as a maintenance activity is premature because it does not yet include the analyses necessary for the relevant agencies to consider approving such an action. These analyses include, but are not limited to, how a berm could affect fish passage, sediment accumulation, flood frequency in the adjacent Faber Tract, and related impacts. Please review the next comment for additional details about a proposal to build a berm.
9. Climate change. While the Project design is intended to consider the potential effects of climate change, on-going maintenance activities that address those effects are not yet adequately specified in the Manual. For example, the Project design has limited capacity to accommodate changes in the tidal prism or storm surges because the channel is constrained at both the north and south banks with very little space for flows to spread out or meander. As noted above, Section 2.2.2 states: "In the event that tidal deposition reaches an equilibrium at a different elevation than designed, a berm or other means of recapturing freeboard will be installed." Instead of providing a speculative remedy without supporting analyses, we recommend the JPA prepare an outline of Project criteria and features to analyze during the first five years of post-Project conditions to establish baseline conditions with which to compare future potential climate change impacts. Such an outline could form the framework for further analysis in the five-year report the JPA will prepare in accordance with the 401 Certification, conditions 31.e and 32.
10. Roughness. Please provide the data and design features, such as extensive marshplain vegetation, used to determine the Manning's n roughness coefficient of 0.038 stated in section 2.2.
11. Vegetation Free Zone. Please explain the basis of the Vegetation Free Zone referred to in sections 2.3 and 2.4. A Vegetation Free Zone would not be consistent with the

planned vegetated marshplains proposed in the Project as certified. Please explain this discrepancy, including how the JPA would be able to meet the required compensatory mitigation requirements if a Vegetation Free Zone is in the Project and what amendments to the 401 Certification, if any, it may need to propose.

12. Flood event triggers. In section 4.2-a, the JPA states that a “major” flood event would trigger an immediate inspection of levees and the channel. Please define what a major flood event would be to better define the non-routine inspection procedures.
13. Earthquake criteria. In section 4.2-b, the JPA states that an earthquake that meets certain criteria would trigger an inspection. The Manual does not indicate if the listed criteria are based on regulatory requirements. If the criteria are drawn from regulations, please list the regulations in the Manual. Otherwise, please cite the source of the listed criteria.
14. Levee settlement inspections. The Manual states that the JPA will inspect the levee for settlement in year-2 and year-4 post-construction of the Project (section 4.3-g). Appendix C of the Manual contains a copy of the District’s “Field Operations Levee Inspection” checklist; which states: “*Levee subsidence surveys are advisable at regular intervals (e.g., 5-year intervals).*” In addition to the planned year-2 and year-4 inspections, please revise the levee inspection and maintenance plan to be consistent with the District’s levee inspection guidance (i.e., to include subsequent inspections at regular intervals of not more than 5 years, and more often, as necessary). Also, since the levee heights could change due to erosion as well as subsidence, the JPA or its delegates should conduct levee height inspections for the life of the Project that consider the range of potential causes of levee impacts.
15. Reports. Please explain the reporting processes and elaborate on the reports discussed in sections 4.3 and 4.4 (e.g., the purpose and audience for each report). We assume that the annual report mentioned in section 3.4 refers to an annual O&M report consistent with the District’s SMP reporting requirements. As with the SMP, the Water Board requires an annual report due January 31 of each year. The JPA also discusses a biannual report in section 4.3, but we are not familiar with the purpose of the biannual report. Please provide additional discussion, as necessary.
16. Glossary. The glossary contains terms that are not included in the Manual main body (although they might appear in the appendices). Please include these terms in the Manual main body and their relevance to the Project O&M activities:
 - 100-year flood
 - Bank protection
 - Design capacity
 - Downtcutting

- Flood protection project
- Floodplain
- HEC-RAS
- In-channel maintenance / In-stream maintenance
- Low-flow channel
- Velocity

17. Glossary: In-Channel Maintenance/Figures 1 & 2. The glossary states that in-channel or in-stream maintenance is maintenance that occurs within the areas delineated as “in stream” in Figures 1 and 2. However, Figures 1 and 2 do not include such a notation. Figure 1.a and 1.b are “Maintenance Downstream” and “Maintenance Upstream,” respectively; and Figure 2 is “Levee Mowing Areas,” but the in-stream boundaries are not demarcated. If Figures 1.a and 1.b were meant to show the in-stream boundaries, please revise the figures accordingly, or include additional figures as needed to show the in-stream boundaries (and revise the text and figure labels to be consistent with each other). In addition, please revise all figures as appropriate based on the USFWS and NMFS Biological Opinions once they are available.

18. Appendix A, Design Documentation Report. The Design Documentation Report (DDR) has been updated since the July 2012 version. It would be helpful for the JPA to list the changes in the DDR with each revision, since the DDR provides the basis for many O&M activities and procedures. For example, the JPA could include a table with changes listed. In addition, we have the following questions and comments on the DDR:

- a. Please define what is meant by “the downstream portion of San Francisquito Creek” mentioned in section 2.0.
- b. Figure 2 is a reproduction of the PWA model (see caption under Figure 2); yet the narrative in section 2.0 states that the “...levee and floodwall layout proposed in the PWA Model has been reconfigured to fit within existing structures, utilities, and recreational facilities in coordination with the JPA right of way acquisition efforts.”

Please clarify whether the figure reproduced from the PWA report is the same as, or different than, the current design and configuration of levees and floodwalls. In addition, please provide a revised figure, as appropriate.

- c. A hydraulic study is mentioned in the DDR, but there is no discussion of the study’s content or findings. Please provide the salient points from the following hydraulic study mentioned in section 4.2:

Due to the complexity of the hydraulic design required for this project, a separate TM was prepared by HDR to address the hydraulic design

features. This TM is titled Hydraulic Review Technical Memorandum, San Francisquito Creek Flood Protection Capital Project, Floodwater Conveyance Improvements from East Bayshore Road to San Francisco Bay, dated July 2014.

- d. Please explain the hand-drawn labels and lines in the figure in the DDR-Appendix B.

19. Appendix D-Best Management Practices (BMPs). Please revise the BMPs based on the following:

- a. GEN-1 and GEN-2 – Revise the work window dates, as necessary, based on the Biological Opinions issued by the USFWS and NMFS.
- b. GEN-3 – This BMP is not applicable since it is specific to the Guadalupe River. However, BMP No. SED-5 addresses sediment characterization issues. Please confirm that SED-5 meets the sediment characterization, reuse, and disposal requirements specified in the 401 Certification, conditions 20 and 21, and revise SED-5 if necessary to meet the requirements.
- c. GEN-6.5 through GEN-15.5 – After the Biological Opinions by the USFWS and NMFS are available, revise these BMPs to incorporate any requirements by USFWS and NMFS for protection of aquatic and terrestrial plants and animals.
- d. GEN-36 –Clarify whether the JPA plans to incorporate the Notice of Proposed Work (NPW) in the District’s SMP NPW or will the JPA issue an NPW separately?

In summary, the Manual contains useful information, but more detail and context are needed to better explain the JPA’s plans to conduct O&M in the Project reach. Please revise the Manual to provide the additional information requested herein. If you have any questions, please contact Susan Glendening of my staff at (510) 622-2462 or via email to Susan.Glendening@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

Attachment A: Water Board Staff Comments on San Francisquito Creek Joint Powers Authority’s Assumptions Used to Develop San Francisquito Creek Maintenance Plan

Cc: San Francisquito Creek JPA, Len Materman, Len@sfcjpa.org

SCVWD:

Melanie Richardson, MRichardson@valleywater.org

Norma N. Camacho, NCamacho@valleywater.org

Michael Martin, MMartin@valleywater.org

Bill Springer, BSpringer@valleywater.org

U.S. EPA:

Luisa Valiela, Valiela.Luisa@epa.gov

Melissa Scianni, Scianni.Melissa@epa.gov

Jennifer Siu, Siu.Jennifer@epa.gov

Corps-SF Regulatory Branch:

Greg Brown, Gregory.G.Brown @usace.army.mil

Katarine Galacatos, Katerina.Galacatos@usace.army.mil

USFWS:

Ryan Olah, Ryan_Olah@fws.gov

Anne Morkill, Anne_Morkill@fws.gov

Joy Albertson, Joy_Albertson@fws.gov

Melisa Amato, Melisa_Amato@fws.gov

Joseph Terry, Joseph_Terry@fws.gov

CDFW:

Brenda Blinn, Brenda.Blinn@Wildlife.ca.gov

Tami Schane, Tami.Schane@Wildlife.ca.gov

SWRCB-DWQ, Stateboard401@waterboards.ca.gov

Water Board:

Victor Aelion, Victor.Aelion@waterboards.ca.gov

San Francisco Bay Regional Water Quality Control Board

TO: Susan Glendening, Environmental Specialist
Watershed Management Division

FROM: A.L. Riley, Staff Environmental Scientist
Setenay Bozkurt Frucht, Water Resources Control Engineer
Planning Division

DATE: October 26, 2015

SUBJECT: Internal Staff Memorandum Regarding San Francisquito Creek Joint Powers Authority's Assumptions Used to Develop San Francisquito Creek Maintenance Plan

This is a review of the San Francisquito Creek Joint Powers Authority's (JPA) assumptions regarding sediment transport and deposition through the San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project (Project), which extends from Highway 101 (Hwy 101) downstream to San Francisco Bay. Based on their assumptions, the JPA developed a draft Operations and Maintenance (O&M) Manual (Manual) for the Project (September 2015). It is our intent for this review to inform Water Board staff's comments on the draft Manual.

The JPA has the following two assumptions that form the basis of the draft Manual:

- 1) The post-Project channel conditions will result in more efficient sediment transport processes; and
- 2) The post-Project conditions will result in no need to remove sediment in the Project reach.

The JPA stated their assumptions in a memorandum dated May 26, 2015, submitted to the U.S. Army Corps of Engineers (Corps) to respond to the National Marine Fisheries Service (NMFS) letter of November 3, 2014, requesting additional information about the Project. These assumptions appear to be based on an overly simplistic view of the environment below Highway 101, and are without adequate or clear consideration for what drives sediment transport.

Specifically, the JPA's analysis of post-project O&M requirements is apparently flawed because it is based on the existing, or "without-Project" conditions. The JPA stated, based on a Corps study from 2011:

The average bed elevation between the Bay and Hwy 101 will increase by 1.24 feet over the next 70 years based on existing conditions. Post-project conditions will provide more efficient sediment transport than existing conditions.

The existing conditions considered in the 2011 report did not account for the new culvert under Highway 101 (Hwy 101) currently under construction by Caltrans. The new culvert will increase the flow capacity at Hwy 101 by 2,000 cubic feet per second (cfs) above existing conditions. The report also assumed the existing breakout of flows at existing hydraulic constrictions upstream of Hwy 101 in Palo Alto and Menlo Park due to bridges (e.g., Newell Road bridge and Pope-Chaucer bridge) would continue, and therefore modeled for a lower discharge through the area upstream of the new culvert at Hwy 101. Currently, the JPA is considering building new floodwalls and modifying bridges to reduce breakout flows. With the new Hwy 101 culvert, and reasonably foreseeable reductions of hydraulic constrictions upstream of the project reach, there will likely be a much higher 100-yr flow discharge through the project reach under post-Project conditions. Therefore, existing conditions (especially as modeled in the 2011 report) should not be used to forecast post-Project conditions.

The JPA also states that sediment transport will be more efficient under post-Project conditions, but does not provide any clear explanations to support this. We note that one of the critical factors driving sediment transport in creeks is the energy slope. The energy slope in this reach is primarily controlled by the downstream boundary conditions formed by the tidal elevations, which fluctuate daily and seasonally, yet the JPA's analysis does not consider these fluctuations. Additionally, the JPA's analysis assumes the same energy slopes under existing conditions and for the post-Project conditions, even though the post-Project high flow channel is wider, which will alter the channel slopes and the resultant energy slopes. Therefore, this analysis does not support the JPA's assumptions that sediment transport will be more efficient under post-Project conditions and that maintenance would not be necessary.

The existing sediment deposition records also contradict the JPA's assumption that no future maintenance will be necessary. Information from Santa Clara Valley Water District maintenance records shows removal of approximately 1,700 cubic yards (CY) of sediment every three years between 1997 and 2007. This translates to an average of 700 tons a year (assuming a bulk density of 1.22 tons/CY). We also note that the recent analysis and presentations prepared by URS/AECOM for Stanford University to plan Searsville reservoir modifications uses a sediment transport model to estimate about 20,000 tons deposition over 50 years, or an average of 400 tons/year. In addition, a study by the U.S. Geological Survey (USGS) (Phillips, 2000) reported that about 30,000 to 40,000 CY (35,000 to 50,000 tons) deposited on the San Francisquito Creek delta during the 1997-98 El Niño storm. Significant deposition also occurred during the 1982 storm, and more than 80,000 CY (100,000 tons) have deposited since the 1950s. The USGS analysis suggests an average annual deposition rate of 2,800 tons. All these sources suggest a range of average annual sediment deposition from 400 to 2,800 tons.

It also should be noted that sediment will deposit episodically and that storms have resulted in depositions of up to 50,000 tons in a single storm event. It is not clear whether the JPA considered the existing sediment deposition records to draw a conclusion that sediment maintenance would not be needed under the post-Project conditions.

We submit the following issues and questions with regard to the two stated assumptions, which the JPA must resolve to revise the draft Manual for the project:

1. The change in hydrology due to the additional 2,000 cfs that will be delivered to the project reach with the new Hwy 101 culvert will increase sediment loads to the project reach. The analysis and the draft Manual appear to assume that this additional flow will be clear water flow during floods, and will not add sediment loads greater than existing conditions to the project area.
2. The proposed project low flow channel dimensions are comparable to those of the existing low flow channel. We have records of deposition following floods and records of maintenance after the 1997-98 flood by the District in the lower channel. Yet, the analysis assumes that the low flow channel will be able to transport any sediment delivered to the reach.
3. A combination of channel slope, channel geometry, discharge, and sediment loads and sizes are important interacting factors in the determination of sediment transport. No effort is made to describe these interacting variables and how they may affect sediment loads. In addition, the tide level, which is a crucial influence on sediment transport, is also not acknowledged or discussed in the analysis. The sizes of the sediment particles reaching the area is a critical unknown.
4. The following post-project conditions will be substantially different than existing conditions, but the JPA does not yet appear to have evaluated these factors to determine future sediment maintenance needs:
 - a. The project will be subject to increased discharges due to upstream modifications, including (but not limited to) the Caltrans culvert at Hwy 101 in progress, and plans to remove hydraulic constrictions in the future;
 - b. The post-project cross-sectional area under high flows is wider than under existing conditions, implying a reduced sediment transport capacity under project conditions.
 - c. Future releases of sediment from Searsville will affect sediment loads transported to the project area.
5. The JPA issued a May 26, 2015, letter that seems to imply that the JPA does not consider the additional sediment from upstream to be their responsibility in the design of this project. While the JPA cannot control the operations of Searsville, the JPA does have an obligation to recognize how the submitted design may respond to different expected and reasonably foreseeable watershed scenarios so that the proposed design anticipates a realistic and anticipated range of future conditions.
6. Since sediment deposition is primarily an episodic event (for instance, up to 50,000 tons/yr during a large storm), a more realistic future maintenance plan that will consider scenarios other than average annual conditions is needed. It appears that considering only average annual conditions will not provide an adequate forecast to prepare the JPA or the District for what the project maintenance may entail.

Please do not hesitate to contact us if you have any questions about this review.