Friday, October 16, 2020

California Fish Passage Forum

Project Name	Wildcat Creek Fish Passage and Community Engagement Project
Contact Name	Juliana Gonzalez
Lead Organization	The Watershed Project
Contact Email	juliana@thewatershedproject.org
Phone Number	(510) 665-3430
Date	Friday, October 16, 2020

PROJECT INFORMATION

1. Location of Project

37.961033, -122.359652 Bottom Elevation 18 ft to 10 ft (NAVD1988)

2. Attach a map of your project

WC_Fish_Passage_Map.pdf

3. Description of project, including, deliverables and outcomes you seek to achieve. Please clearly describe which portion of the project Forum funding would be applied to, and the specific deliverables and outcomes expected to result from this funding.

The primary goal of the project is to develop the final design drawings for the fish passage facility replacement and obtain the necessary permits so that we can then pursue funding for a "shovel ready" project. Currently there are 65% drawings as developed by the Corps of Engineers and NHC in 2014. We were awarded an Urban Streams Restoration Grant from the California Department of Water Resources. Full funding ($784,000) is conditioned on re-evaluating the Corps/NHC design, which adds scope to our original project so we are seeking additional funds from the CA Fish Passage Forum to enable this project to move forward. These funds would be used to support 1) an ecological engineering assessment of the Corps of Engineers and NHC 2014 design drawings, and 2) a community outreach effort to raise awareness of creek ecology and the fish passage restoration project. The following task summaries illustrate our planned scope of work.

Task 1 - Ecological Engineering Assessment
Contra Costa County Flood Control and Water Conservation District submitted the Wildcat Creek Fish Passage Improvement, Flood Risk Reduction, and Community Outreach Project to the California Department of Water Resources (DWR) Urban Stream Restoration Program (USRP) in late 2019. DWR supports that project and is offering to provide $784,000 to complete 100% engineering designs and environmental compliance. DWR requires additional alternatives analysis to Corps and NHC 65% design, which was included in the original scope of work. This ecological engineering assessment will determine the feasibility of design changes within the existing Corps 408 permit process. We have broken this first task into five subtasks below.

Task 1a - Corps Consultation
This task will include a Corps pre-consultation meeting with DWR design engineers, Corps regulatory personnel, Trout Unlimited (TU), The Watershed Project (TWP) and FlowWest. The purpose of this pre-consultation will be to re-open the project with the Corps and start a discussion of the flexibility that the design team has to work with the 408 permitting guidelines. The Corps 408 permit is required because the project will modify the existing fish ladder that fails to provide passage for steelhead trout. During this consultation DWR design engineers, TU, and FlowWEst will present a scope of work for ecological analysis including bed material alternatives and fish passage slope modifications. The design team anticipates to obtain guidance from the Corps on the flexibility to modify the existing 65% design drawings. The design team will conduct analysis, and draft a memorandum of understanding (MOU) documenting design recommendations and a permitting path forward. During this pre-consultation the requirements for ecological engineering analysis will be draft and a schedule developed for completing the ecological engineering analysis and follow up consultations with the Corps and the design team.

Deliverables: Meeting Notes, Scope of Work, and Schedule.

Task 1b - Bed Material Analysis

The Corps and NHC 65% design drawings show a concrete fish passage channel with steep pools. DWR USRP objectives require using natural materials for fish passage structures. DWR design engineers and FlowWest engineers will assess different bed material alternative that remain stable for the modeling hydrology and existing bridges and pipelines under Wildcat Creek. FlowWest will model different bed

materials using HES-RAS to ensure that water surface elevations during flood flows do not increase and that alternative bed materials will remain stable. Rock sizing and shear stress calculations will be summarized in a technical memorandum. Alternatives will include replacement of concrete with natural materials, augmentation of embedded rock to the existing concrete steps and concrete channel bed, and replacement of the concrete channel bed with an articulated concrete mat. The results of the hydraulic modeling and engineering calculations for each alternative will be summarized in a technical memorandum authored by FlowWest.

Deliverables: HEC-RAS model files, Technical Memorandum including engineering calculations.

Task 1c - Fish Passage Slope Analysis

The Corps and NHC 65% design drawings show a slope that steepens near the downstream extent. DWR USRP engineers require and analysis of a consistent slope through the facility to improve fish passage. DWR USRP design engineers and FlowWest engineers will assess a consistent slope for the fish passage channel in terms of meeting fish passage criteria including velocity, depth, and sediment transport and deposition. FlowWest will model different fish passage channel slopes using HEC-RAS to ensure that water surface elevations during flood flows do not increase and that sediment is conveyed through the fish passage channel and into the downstream sediment basin. Alternatives will include a consistent slope using the existing elevation of the upstream extent of the fish passage channel while holding the downstream elevation consistent, and raising the downstream elevation of the fish passage channel. The methods and results of the hydraulic modeling and engineering calculations for each alternative will be summarized in a technical memorandum authored by FlowWest.

Deliverables: HEC-RAS model files, Technical Memorandum including engineering calculations

Task 1-d DWR and Corps Consultation

This take will include a Corps consultation meeting with DWR design engineers, Corps Regulatory personnel, TU, TWP and FlowWest. The purpose of this consultation will be to present results of the channel bed material and slope analysis and potential for modifications to the 65% design drawings. The design team and the Corps will outline a memorandum of understanding (MOU) for modifications of the 65% design drawings during the finalization of the design drawings.

Deliverables: Meeting Notes

Taks 1e - Memorandum of Understanding Agreement

FlowWest will draft a memorandum of understanding in collaboration with DWR USRP design engineers, TU and TWP. The MOU will outline proposed modifications of the 65% design drawings and outline future Corps collaboration and coordination with the design team. The MOU will also provide a regulatory pathway to secure the Corps 408 permit for the project

Deliverables: Memorandum of Understanding

Task 2 - Community Outreach

Recent community outreach efforts (described in Question 30) indicate that this project already has considerable public support in the North Richmond community, but there is a strong desire for community education to accompany the project. Therefore, as part of the design effort, we will provide community education via K-12 school programming, educational resource creation, and sharing project designs with the community. We have broken this second task into four subtasks below, and describe the community

outreach effort in more detail in Question 30.

Task 2a - K-12 Educational Programming
Partner with teachers at one or more elementary schools near the project site to deliver our Me & My Watershed: Creekside program, consisting of 8 lessons about creek and watershed health, including information about native rainbow trout and the nearby fish passage facility. The Watershed Project will provide education programming to two elementary grade levels (approximately 150-200 students).

Deliverables:
- Report on the schools and number of participants reached
- Sample educational lesson plans and materials

Task 2b - Children's Book Creation
Work with local artists, indigenous community leaders, and other partners to create a storybook illustrating the concept of connectivity of the context of the overall watershed, how stream conditions change from the headwaters to the bay, and what we hope to accomplish at the fish passage. Each student participating in the K-12 education programming (Task 2a) will receive a copy of the book, and a print-friendly version of the book will be available at no cost on the project web page, described below in Task 2c.

Deliverables:
- Draft text and illustrations for book
- Completed book

Task 2c - Community-Facing Project Web Page
The Watershed Project will create a landing page on our website describing goals and timeline of the fish passage facility retrofit, including photos, a print-friendly version of the children's book described above, links to resources, and contact information for one or more of the project team members, for community members to contact with any questions or concerns about the project.

Deliverables:
- Completed landing web page

Task 2d - Design Presentations at Community Meetings
Upon completion of design plans for the fish passage facility retrofit, The Watershed Project and FlowWest will present information about the project and design plans to community members and stakeholders at 2-3 community meetings, and address any questions or concerns from the community.

Deliverables:
- Summary of presentations and meeting attendance
- Meeting notes

4. Select all components that apply to your project.

Development of engineering design plans

Barrier assessment

Education/outreach

If you answered "yes" to question 6, please provide the PAD ID number(s).

713481

18. Attach a copy of your monitoring plan, (if available) and indicate the person and/or organization that will be responsible for implementing.**

pdf Maintenance and Monitoring Report - V3.pdf

If you would like to also upload a document to help illustrate the project's timeline (as described above) please do so here.

5. List all partner organizations.

The Watershed Project, Contra Costa Flood Control and Water Conservation District, Trout Unlimited, FlowWest Consultants, and Wildcat-San Pablo Creeks Watershed Council.

6. Does the barrier(s) being addressed through this project have a Passage Assessment Database (PAD) identification number(s)?

YES

7. Describe the barrier(s) under "average" conditions, if it is a complete, temporal, or partial barrier, how often passage is provided for both adult and juvenile anadromous fish, and if the information is available (e.g., meets fish passage criteria for adults 45% of the time and 0% of the time for juveniles). Please specify which species you are referring to when describing barrier status.

In report titled "Fisheries Habitat Inventory & Assessment for Lower Wildcat Creek" February 2007 states: "Based on CDFG's culvert criteria, the East Bay Regional Park District fisheries department hypothesizes that this structure is intermittently passable year round with possibility dependent on water velocity at a

specific time." The species for which this assessment was made were adult steelhead and rainbow trout. A monitoring study conducted during the winter of 2017-2018 indicated that the current facility is subject to clogging with sediment and debris which further adversely affects the passability of this structure.

8. Indicate how you determined that this barrier is a high priority project and/or addresses a high priority barrier. (Please check all that apply.)

- Barrier is listed in a key restoration plan for the region (see question 9 below)
- Endorsed by an agency
- Local knowledge/conversation with local representatives

9. List the name(s) of the recovery plans and the specific task that name this barrier/project as a high priority, the agency that endorsed this project, or the local representative that names this project as a priority.

1) Fisheries Habitat Inventory & Assessment for Lower Wildcat Creek, prepared by East Bay Regional Park District for Urban Creeks Council, 2007.
2) Wildcat Creek Restoration Action Plan, prepared by Urban Creeks Council, 2010.
3) Sean Cochran, local CDFW fisheries biologist
4) Joe Sullivan, EBRPD fisheries biologist
5) Bert Mulchaey, EBMUD fisheries biologist

10. The California Fish Passage Forum (Forum) has seven (7) overall objectives. Please check each objective your project will help to address. (check all that apply)

- 1. Remediate barriers to effective fish migration.
- 2. Facilitate coordination and communication among agencies, agency staff, and other entities that may propose, review, or promulgate fish passage criterial within California.
- 3. Coordinate funding mechanisms to remove fish passage barriers.
- 7. Implement education and outreach activities, targeting both the general public and fish passage practitioners.

11. Provide a brief explanation of how your project addresses all of the checked boxes in question 10.

The primary goal of the overall project is to replace a failed fish passage facility constructed in mid 1990's by the Army Corps of Engineers. This is one of 3 significant barriers to steelhead migration in Lower Wildcat Creek. This project will involve coordination amongst the US Army Corps of Engineers, the CA Department of Water Resources, the Contra Costa Flood Control and Water Conservation District in developing and permitting an effective replacement fish passage facility. This project would coordinate funding between the CA Department of Water Resources Urban Stream Restoration Program and the CA Fish Passage Forum. Community outreach and education is critical element in the success of this project. The project is located in a disadvantaged community that is currently involved in a stream trail enhancement effort and near an elementary school which could benefit from a nearby restoration effort.

12. Select each anadromous fish species that will benefit from your project (select multiple if applicable).

- Steelhead/rainbow trout
- Threespine stickleback

13. Provide all relevant data on anticipated outcomes of implementing this project. *

- **1 1/8 miles** Stream miles restored or enhanced
- **~ 13 acres** Acres of habitat restored
- **1** Number of barriers removed/remediated
- **150-200 K-12 students reached through educational programming, 150-200 print copies of children's book distributed, print-friendly children's book available online, completed project web page, 2-3 presentations at community meetings.**

Outreach accomplishments (number of presentations given, materials produced, individuals reached etc.)

14. Provide the location and distance in stream miles to downstream river structures, and whether each structure represents an insignificant, partial, or total barrier to fish passage.

none

15. Provide the location and distance in stream miles to upstream river structures, and whether each structure represents an insignificant, partial, or total barrier to fish passage.

1) Railroad Trestle, (300 ft, passable PAD ID # 713482) 2) Vale Road Grade Control (1 mile, intermittent, 705633) 3) Mall Parking Lot Concrete Culvert (1 1/8 mi, 705634, complete) 4) Hwy 80 drop structure (1 1/4 mi, 723719, intermittent) barrier assessment taken from Fisheries Habitat Inventory & Assessment for Lower Wildcat Creek, Urban Creeks Council, 2007.

16. Indicate which of the Forum's priority habitats that will be enhanced or restored as a result of this project (choose all that apply).

Spawning habitat | Rearing habitat

17. Has the owner and/or responsible organization/agency of the barrier(s) proposed for removal and/or remediation been identified, notified, and given permission for this project to proceed as proposed?

YES

If YES, please provide the name of the entity that owns/is responsible, and describe how consent to proceed was obtained/documented, and their role (if any) in any monitoring.

Contra Costa Flood Control and Water Conservation District owns, operates and maintains facility. District is key project partner and has assisted with monitoring, maintenance and design. District also is sponsoring agency for CA Department of Water Resources Urban Streams Restoration Grant.

***The Forum recommends, as a bare minimum, applicants use the California Fish Passage Forum's Fish Passage Barrier Removal Performance Measures and Monitoring Worksheet, and one year minimum pre- and post-project monitoring.*

19. Will your project be implemented within 12-18 months?

YES

20. Describe below the project's timeline (including permits), as well as implementation and monitoring dates. Please describe any issues that exist, if any, that could delay project implementation.

We anticipate starting on Task 1a as soon as we are given the notice to proceed. Likely, a pre-consultation with the Corps will take one month to schedule. We anticipate that the engineering analysis will take three months to complete. Consultation with the Corps will take another month. Lastly, we anticipate another month to complete the MOU with the Corps. During the engineering and permitting work, TWP will lead the community outreach component of the project. We anticipate that the entire project will take 12 months to complete.

Once this project is complete, we estimate the final design, permitting, and community involvement will take two years to complete. Assuming implementation funding is secured after the first year of the DWR USRP project, implementation could start in three years and construction would be completed in one season.

21. Attach any designs of your project as well as any photos.

pdf 65 PERCENT PLANS.pdf

PROJECT COSTS & BUDGET

22. Total Project Cost. 879000

23. Total funding amount being requested from the Forum. 90000

24. Total matching contributions (cash and in-kind) that will be included in your project. Include all matching contributions that have been secured and that are anticipated/requested. 789000

25. Total matching funds or in-kind support secured at time of application. 5000

26. List all partner contributions (cash and/or in-kind) using the table below:

	Match Source	Cash Contribution	In-Kind Contribution	Total Contribution
Partner 1	DWR	$784000		$784000
Partner 2	TU		5000	$5000
Partner 3				
Partner 4				
Partner 5				
Partner 6				
Partner 7				

27. Will the project be fully funded if funding being requested from the Forum is awarded? YES

28. Attach a project budget sheet below that describes the overal project budget. Budgets MUST include:

- Total cost of project
- Total funding request from the Forum clearly indicating how/on what those funds will be spent.
- Monitoring costs
- Accompanying narrative explaining budget categories, amounts listed, what will be accomplished, and what deliverables are expected, etc. as needed.

If you do not have a detailed budget for your project, you can find a template and other resources on the

Funding page of the Forum's website.

Attach a project budget, including a narrative that describes the overall project budget and a detailed budget breakdown. (Word, .pdf, or .xls)

Budget Narrative.pdf

FPF Wildcat Creek Budget .pdf

PROJECT TEAM CAPABILITIES

29. Describe the experience and capabilities of up to three of the project leaders relative to their ability to implement this project. Please also describe any other Forum-supported projects project leaders have been involved with.

The Watershed Project

The Watershed Project is headquartered in Richmond, CA, a city where massive industrial pollution has created a very low-income community. By working side-by-side with this community since 1997, TWP has taken a lead role in addressing the often-overlooked needs of underserved, inner-city audiences. Our programs also reach 10 other Bay Area communities -- including San Francisco, Oakland, San Pablo, and others in the East Bay -- and our education programs currently serve over 1,400 students each year in 10 middle/high schools and 7 elementary schools. Stated in terms of watershed geography, we serve all of the people who live, work, and go to school on the land that drains rainwater into our common body of water, the San Francisco Bay. In Richmond, as in all our program areas, TWP collaborates with a diverse mix of community partners, school districts, and government agencies. Our organization's reach and effectiveness is increased as we continue to strengthen, deepen, and develop more lasting collaborations.

The Watershed Project - Juliana Gonzalez, Executive Director

Juliana Gonzalez is a watershed planning and policy expert. She holds a Ph.D. in Geography from King's College London and an M.S. in Environmental Sciences from the State University of New York. Juliana has been an active community organizer in Richmond since 2008, connecting communities, volunteers and students to their local watersheds through education, restoration and design projects. Known for her local knowledge of the area, she became Executive Director of The Watershed Project in 2015. After immigrating to the United States over 20 years ago, Juliana used her policy and ecology background to work on community based solutions to ecological problems prevalent in urban environments. Most recently, she has led the way in multiple community based climate adaptation and mitigation planning efforts around Richmond California and the neighboring communities.

FlowWest

FlowWest is an interdisciplinary team of problem solvers working on the most challenging water resources and aquatic ecosystem challenges. Our passion, innovative use of technology, and commitment to building a diverse and inclusive team drives our ability to deliver unique and highly effective solutions. Our core values include objectivity, technical quality, collaboration, creativity, equity, empathy and respect. We provide a wide array of planning, analysis, design, restoration construction, management, data science, and decision support services. FlowWest brings a wealth of relevant

experience gained through extensive work managing and restoring West Coast rivers for two decades. Our engineers, scientists, planners, and data scientists work seamlessly together to bring clear and quantitative understanding of the watershed processed. FlowWest is especially well known for our ability to translate ecological, hydrological, hydraulic, and fluvial geomorphic analyses into improved understanding and management of ecological functions and design of restoration projects. We have applied this capability on high profile watershed planning and conservation efforts throughout California, in the Klamath Basin and in the Sacramento-San Joaquin Bay Delta. Finally. FlowWest takes great pride in our ability to work with water resources and ecosystem managers from every corner of the complex water systems of the West. We regularly work with local, state, and federal agencies, private companies, environmental NGOs, and water districts, always delivering objective, data-driven solutions to client challenges.

FlowWest is a California small business (1190062) and an Oakland-Certified Small Local Business Enterprise (SLBE).

FlowWest - Anthony Falzone, C.F.M., M.L.A. Project Manager/Principal
Geomorphologist. Mr. Falzone is a founding partner of FlowWest with two decades of experience in the field of geomorphology, design, and permitting. Anthony holds a B.A. and M.L.A. from UC Berkeley, and he has devoted his career to restoration, flood control, and environmental planning. Mr. Falzone's Northern California experience has given him an in-depth understanding of hydrology, sediment dynamics, historical ecology, geomorphic processes, and the regulatory and social dynamics. Anthony is a Certified Floodplain Manager (CFM) and has been the project manager for a series of fish passage design, restoration design, environmental compliance, and environmental planning projects in the Bay Area. For fish passage and restoration projects, Mr. Falzone manages a team of technical experts including fish passage design engineers, hydrologic and hydraulic modelers, fisheries biologists, and environmental planners. FlowWest deploys multi-disciplinary teams on our projects to develop innovative, sustainable, and implementable projects. Mr. Falzone places the highest emphasis on the client relations component of project management and has developed long-term relationships with all of his clients. Mr. Falzone specialized in bringing technologies to design and permitting and is a FAA certified UAV pilot and uses data science tools to complete analysis for his clients. Mr. Falzone leads the financial committee on the Wildcat-San Pablo Creeks Watershed Council. The Council is the oldest watershed council in California and provided a collaborative forum for planning among agencies and stakeholders for Wildcat and San Pablo Creeks. Mr. Falzone brings his passion for watershed advocacy in restoration, design and planning to all of his active projects.

Trout Unlimited, John Muir (East Bay) Chapter

Peter Mangarella represents Trout Unlimited on the Team. He has advanced degrees in Civil Engineering and worked as a project manager with various environmental consulting firms in the Bay Area, specializing in urban hydrology, water quality, and green infrastructure design. He currently volunteers as the Conservation Chair for the John Muir Chapter. He led a collaborative effort in 2017/2018 to clean out the fish passage and followed with sediment monitoring and a report that addressed problems with the current fish passage facility. He also has monitored water quality and participated in macro-invertebrate surveys of Wildcat Creek with The Watershed Project. His role in the project will be to assist The Watershed Project in meeting contractual requirements associated with the design review component of the project.

OUTREACH

30. Does your project have a public and/or community outreach component? If so, please describe (e.g., public workshops, tours, signs, scientific journal articles, scientific conference

presentations, educational forums, professional photo/video development, website, press release, newsletter, social media outreach, volunteers, schools, etc.)

This project already has considerable public support in the North Richmond community; in a recent outreach effort to determine community spending priorities on water-related projects, 65% of community members described the fish ladder retrofit as “definitely needed” or “most urgently needed” (as opposed to “somewhat,” “not urgently,” or “not at all” needed). Nearly half of community members listed the fish passage project as being one of their top 5 most important projects in North Richmond, a score surpassed by only 2 out of 14 other possible projects. Community members value habitat restoration projects like the fish passage project that will provide benefits to wildlife, but have also expressed a strong desire for community education to accompany such projects, especially programs designed to introduce children to new experiences and knowledge. Therefore, as part of the design effort, we will provide community education via K-12 school programming and educational resource creation.

We will partner with teachers at one or more elementary schools near the project site to deliver our Me & My Watershed: Creekside program, consisting of 8 lessons. Students will investigate the guiding questions, “How am I a part of my watershed?” and “How does the health of our creeks affect the health of our community?” The lessons in this program will provide students with a foundational understanding of what a watershed is, how they are connected to the local watershed, and the importance of creek health. Through nature journaling, students have the chance to explore, observe, and personally reflect on these connections. The format of the lessons will be flexible depending on COVID-19 health restrictions on how teachers are able to interact with their students and distribute materials to them, but may include a combination of live video lessons, online student-directed assignments, and physical curriculum kits for students containing handouts and project materials. If school district health guidelines allow, programming will include socially-distant in-person lessons outdoors, and a visit to the fish passage facility if possible. If school closures due to COVID-19 persist, lessons will be designed to be completed at home, but will also encourage students to safely explore their neighborhoods outdoors. Students will learn about native rainbow trout and the nearby fish passage facility, and will be encouraged to visit it with their families. The Watershed Project will provide education programming to two grade levels (approximately 150-200 students) at one or more elementary schools within a mile of the project site (Verde, Downer, Dover, and/or Lake Elementary).

We will also work with local artists, indigenous community leaders, and other partners to create a storybook, appropriate for ages 9 and up, illustrating the concept of connectivity of the context of the overall watershed, how stream conditions change from the headwaters to the bay, and what we hope to accomplish at the fish passage. This educational story would introduce key players in the stream’s past, present and future, including community and tribal connections to the stream, and partner organizations who monitor and work to restore it. The Watershed Project has already worked with partners to design a similar children’s book about the Rheem Creek Watershed, so many of these local connections are already in place.

We will publish a print-friendly version of the book, available at no cost, on a project landing page on The Watershed Project’s website. The landing page will describe the goals and timeline of the fish passage facility retrofit, which will be updated periodically as project milestones are reached. The landing page will include photos of the project site, information about each of the project partners, and links to additional resources. We will also provide contact information for one or more of the project team members, for community members to contact with any questions or concerns about the project.

Finally, upon completion of design plans for the fish passage facility retrofit, The Watershed Project and FlowWest will present information about the project and design plans to community members and stakeholders at 2-3 community meetings, and address any questions or concerns from the community.

ALIGNMENT WITH NATIONAL PRIORITIES

31. Which National Fish Habitat Partnership (NFHP) National Conservation Strategies will be addressed by your project? (select all that apply)

2. Restore hydrologic conditions for fish.

3. Reconnect fragmented fish habitats.

Review the *NFHP National Conservation Strategies*.

32. What U.S. Fish & Wildlife Service (USFWS) Climate Change Strategies will be addressed by your project? (select all that apply)

3.1 Take conservation action for climate-vulnerable species.

3.2 Promote habitat connectivity and integrity.

3.5 Conserve coastal and marine resources.

Review the *USFWS: Rising to the Urgent Challenge – Strategic Plan for Responding to Accelerating Climate Change*.

33. Provide specific information about how your project addresses the climate change strategy you checked in question 32.

3.1) Central California Coast Steelhead are a federally listed species that can be adversely affected by climate changes associated with a change in the hydrologic or thermal regime of the stream. And, although Wildcat Creek is currently not a steelhead stream, it has the potential for restoring steelhead which would add to the "portfolio" of streams that support steelhead.
3.2) The ultimate goal of the project is to replace a fish passage barrier with a fish passage facility that (along with similar efforts envisioned for other barriers upstream - see item 15 above) will reconnect the headwaters of Wildcat Creek with San Francisco Bay. The headwaters are fully contained within the jurisdiction of the East Bay Regional Park District, and contains a resident population of trout.
3.5) This project would help conserve coastal and marine resources by providing additional spawning and rearing habitat for anadromous fish.

34. Would an existing tribal, commercial, recreational, or subsistence fishery be enhanced as a result of the project? If yes, please describe. If not, is there a future fishery that would potentially be restored through increased habitat as a result of this project? If so, describe.

From headwaters in the Berkeley hills, Wildcat Creek flows through Wildcat Canyon, between the Berkeley hills and San Pablo Ridge. The East Bay Regional Park District (EBRPD) owns and manages 4,500 acres within the canyon, approximately 80 percent of the Wildcat Creek watershed drainage area. EBRPD manages two parks within the canyon, Tilden and Wildcat Canyon, which host miles of trails, natural open space, and habitat. Once the creek exits the canyon, it flows westward through the urban communities of San Pablo, Richmond and North Richmond before reaching the tidally-influenced Wildcat Marsh, its industrialized edges, and the San Pablo Bay. Roughly 90 percent of Wildcat Creek's channel remains open (i.e. not culverted) and lined by a thin band of vegetation within the lower watershed, but a large portion of the channel banks have been revetted to prevent erosion and protect private property. Within the creek's urban reaches of the alluvial plain, the streamed typically dries during the summer. To protect private property, a U.S. Army Corps flood control project protects the watershed downstream of the project site including the unincorporated community of North Richmond (Wildcat Creek Restoration Action Plan, 2010).

The EBRPD, the City of San Pablo, Contra Costa County Flood Control and Water Conservation District, TWP, TU and the Wildcat San Pablo Creeks Watershed Council is engaged in numerous restoration projects to restore Wildcat Creek from the headwaters to San Pablo Bay. (http://www.wcspcouncil.org/map/). EBRPD is currently studying the feasibility of removing the dam that

forms Jewel Lake and replacing the bridge at Alvarado Park. The City of San Pablo, TWP and Urban Tilth have taken on numerous bank enhancements and trail projects. Planning is also being conducted to replace the culvert under Interstate 80. The replacement of the failed fish ladder with a fish passage channel will remove the downstream most barrier for steelhead trout. This project presents a unique opportunity to restore steelhead habitat this is anchored but the EBRPD lands in the upper watershed.

Thank you for your interest in the Forum, and for taking the time to submit this proposal. You will be contacted by the Forum to discuss the outcome of this funding process.

Contra Costa County
Flood Control
and Water Conservation District
255 Glacier Drive
Martinez, CA 94553
(925) 313-2000

WILDCAT CREEK FISH PASSAGE AND COMMUNITY ENGAGEMENT PROJECT

N
W E
S

0 50 100 200
Feet

Prepared 8/27/2019

Document Path: G:\fldctl\Watershed Planning - Engineering\Zone 7 - Wildcat Creek\Fish_Ladder_Retrofit\GIS\WC_Fish_Passage_USRP.mxd

Wildcat Creek Fish Ladder Maintenance and Monitoring Report

Peter Mangarella, Trout Unlimited

July 2019

Preface

This Report was prepared by Peter Mangarella with Trout Unlimited, on behalf of the Wildcat Creek San Pablo Council (WCSP Council).

Volunteers and staff from the following organizations assisted in the plan development, equipment installation, cleanout of fish ladder, monitoring, and/or review.

California Department of Fish and Wildlife
Contra Costa County Flood Control and Water Conservation District
Coordinated Outreach, Referral, Engagement (CORE) Program
East Bay Municipal Utility District
East Bay Regional Park District
Office of John Gioia, Contra Costa County Supervisor
San Pablo Wildcat Creek Watershed Council (Balance Hydrologics)
Trout Unlimited (John Muir Chapter)
Watershed Project

Overview

During the 2018-2019 wet season, WCSP Council conducted a Maintenance and Monitoring Study of the Wildcat Creek Fish Ladder to evaluate the feasibility of maintaining the ladder to avoid clogging by trash and sediment. The ladder is designed to facilitate fish passage along the Wildcat Creek Flood Control Channel, however, it is prone to clogging with trash/sediment and when clogged, it becomes a barrier to fish passage. Moreover, maintenance of the ladder to remove trash/sediment is difficult and expensive, and is often deferred. In this study, the ladder was cleaned out in the fall of 2018, and then monitored for sediment/trash accumulation and to the extent feasible, trash that blocked the ladder removed. The study thus documented the accumulation of trash/sediment over the 2018-2019 season in response to hydrologic conditions in the watershed.

Background

The Wildcat Creek watershed is spans 8.8 square miles and extends approximately 13.5 miles from its headwaters (elevation 1900 feet) to the Bay (SFEI, 2001). The watershed is often described in terms of Upper and Lower Wildcat Creek where Upper Wildcat Creek watershed is about 2/3rds of the total watershed area (Wise et al, 2007). Upper Wildcat Creek is contained almost exclusively within the undeveloped East Bay Regional Park nature reserve and recreational lands, and is fed by springs and lakes Anza and Jewel such that the stream is perennial. The stream is for the most part natural with a natural riparian zone.

The Upper watershed is fairly steep and subject to landslides and erosion such that during high flow events, the channel may convey a high sediment/gravel load (SFEI, 2001).

Water flows through Wildcat Creek Canyon onto the urbanized alluvial plain, the setting for Lower Wildcat Creek. Here the stream is intermittent and conveyed primarily through closed and open conveyance channel structures in the cities of San Pablo, Richmond, and unincorporated Contra Costa County.

The most important up migrating period for steelhead are the months of October through March (NOAA, 1996). Flow in Wildcat Creek is recorded at the Vale Road Gaging Station maintained by Balance Hydrologics (http://www.balancehydrologics.com/wildcat/index.php). Vale Road is approximately 1.5 miles upstream of the Flood Control Channel. Analysis of flow gage records indicate the mean monthly flows in Wildcat Creek tend to be significantly higher during the months of January through March (nhc, 2011). So January through March is the critical period during which the ladder ideally would be operable.

Fish Ladder Design

The Lower Wildcat Creek Flood Control Channel was completed in 1995 to mitigate flooding in the City of San Pablo. The design consists of 3 concrete rectangular bays, each 14 feet wide and approximately 400 feet long. In the central bay there is a low flow channel that is 4 feet wide and 2.5 feet deep. The flow capacity of the low flow channel was estimated at 16 cfs (nhc, 2011).

The low flow channel contains a set of opposing baffles called Washington Baffles.
Looking upstream on the left side of the channel (the north side of the channel) the baffle is inclined upstream, the baffle on the opposing side of the channel extends perpendicular into the stream. There is a space or gap between the ends of the baffles of approximately 6 inches. Each set of baffles is spaced 10 feet apart, and there is a total of 36 sets of Washington baffles. The baffle configuration is designed to facilitate fish movement through the gaps between the baffles by providing a meandering flow pattern and resting areas for fish moving upstream.

At the downstream end of the fish ladder there is a 40 foot segment of the low flow channel with a series of metal vanes that are referred to as a Denil Ladder. A sedimentation basin was constructed downstream of the Flood Control Channel to settle out sediment that would otherwise enter a natural section of Wildcat Creek and potentially alter the geomorphology of that reach. The accumulation of sediment also has sifted in the Denil portion of the fish ladder.

Fish Ladder Design Deficiencies

A 2007 study conducted by East Bay Regional Park District determined that the Wildcat Creek fish ladder was an intermittent barrier defined as "the barriers are intermittently passable when water is present but streamflow is below California Department of Fish and Wildlife (CDFW) criteria" (Urban Creeks Council, 2007). This report also states that "in the rainy season debris occlusion in the baffles may render the fish ladder impassable to rainbow trout."

The Washington Baffle design also has been criticized in the CDFW Salmonid Stream Habitat Restoration Manual, Appendix IX-A Fish Passage Criteria states "for many years Washington (offset) baffles were the recommended baffle type. However, field experience has shown these baffles are highly prone to clogging by debris and sediment and they are believed to create hydraulics unsuitable for juvenile salmonids and other weaker swimming fish" (CDFW, 2009).

There are a variety of fish passage criteria for culverts and fish ladders (CDFW, 2009). With respect to flow, nhc conducted a flow duration analysis of 15 minute flow data for the months of January through March at the Vale Road gauge (nhc, 2011). Their analysis indicated that for adult fish, the preferred flow range is approximately 3 to 170 cfs, which, according to the flow duration analysis, occurs in Wildcat Creek about 50% of the time in the months of January through March. nhc also estimated the capacity of the low

flow channel at 16 cfs, and that the percent of flows in the range of 3-16 cfs was about 30%. Due to these reasons, the current ladder is undersized with respect to the CDFW flow criteria.

In 2000, recognizing these design deficiencies in the ladder, a Section 1135 investigation was initiated by the Army Corp of Engineers (ACOE) Waterways Experiment Station which ultimately led in 2014 to a preliminary retro-fit design developed by Northwest Hydraulics Consultants consistent with current CDFW fish passage criteria (nhc, 2014). The nhc recommendations also included the design of training walls to help stabilize the low flow channel in the sedimentation basin. The fish ladder retrofit implementation was estimated at about $0.54 M in 2011 dollars ($0.63M adjusted for inflation to 2020) (nhc, 2014).

Maintenance and Monitoring Plan

Given the cost of a retrofit, a Maintenance and Monitoring Plan was developed that had two goals:

1) Determine if a regular program of maintenance is sufficient to keep the ladder open for fish migration throughout the wet season.
2) Improve our understanding of the dynamics of sedimentation and clogging in the fish ladder which could potentially inform the design of a retrofitted ladder.

So as a result this study was envisioned to better understand the sediment dynamics affecting the fish ladder and the extent to which maintenance could help alleviate the clogging problem. The level of maintenance was limited to removing trash and debris which tends to obstruct the gap between the baffles and exacerbate the accumulation of sediment within the low flow channel.

The maintenance and monitoring plan consisted of the following elements:

1) Remove accumulated sediment and debris from the ladder prior to the winter rain, and record location and amount of sediment removed;

2) Conduct approximately monthly sediment measurements throughout the 2018-2109 wet season in response to runoff;

3) Recommend next steps in terms of continued maintenance, retrofitting and/or replacement; and

4) Document results in a report to be shared with stakeholders, including CDFW.

Monitoring Methods and Timeline

On September 15, 2018 (Coastal Cleanup Day), sediment/trash was removed by a group of 13 (volunteers and Flood Control staff and on September 29, additional sediment/trash were removed by a group of 10 volunteers/staff. Sediment and trash had to be removed manually (with shovels and picks) and material was then placed to either side of the low flow channel where it was picked up with small track front-end loaders and stockpiled for later removal from the flood control channel.

Prior to the cleanout effort, the Flood Control District maintenance staff, in coordination with their subcontractor CORE, worked to remove homeless from the area and assisted in cleaning up trash and debris. On September 12, additional trash and debris were removed by the Watershed Project and a group of volunteers from Chevron.

Sediment deposition monitoring (and associated maintenance) was then conducted on the following dates:

Sampling Round 1 - December 12, 2018
Sampling Round 2 - January 24, 2019
Sampling Round 3 - February 19, 2019

Sampling was conducted by TU volunteers and Watershed Project Interns. The sampling consisted of measuring the depth to sediment (or if no sediment, the depth to the floor of the low flow channel) from a small bar that was placed across the low flow channel (Photo 1).

Measurements were obtained above and below each set of Washington Baffles. The depth of sediment was then estimated by subtracting the depth to sediment from 2.5 feet (depth of low flow channel). Water depth was also measured at 4 locations (spaced approximately equidistant) along the ladder using fixed depth gauges installed by the District maintenance staff. Velocity measurements were attempted using a Pygmy current meter, but the flow within the ladder between the sets of baffles is very non-uniform. A few measurements of velocity in the gap between the baffles were also obtained.

2018-2019 Wet Season Hydrology

Sediment transport and accumulation in the fish ladder are associated with storm events, so sediment sampling rounds were chosen to the extent feasible, to follow major storm events.

Monthly and event rainfall statistics for this period * were:

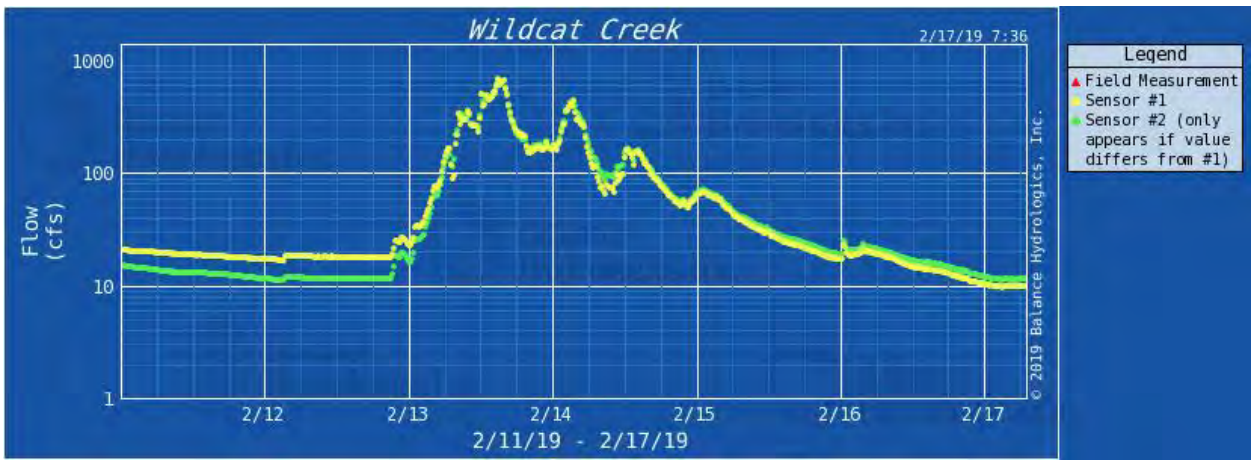
Month	year	Monthly Rainfall (inches)	Major Daily Totals and Event Totals where applicable (in)
October	2018	0.05	
November	2018	4.07	0.83 (Nov. 21), 0.92 (Nov. 22) 0.42 (Nov. 23) - 2.17 (total) 0.14 (Nov. 27), 1.06 (Nov. 28) 0.68 (Nov. 29) - 1.88 (total)
December	2018	0.67	
January	2019	4.20	0.69 (Jan.15), 0.83 (Jan. 16), 0.40 (Jan. 17) - 1.92 (total)
February	2019	7.14	0.26 (Feb. 12), 2.09 (Feb. 13) 0.96 (Feb. 14) - 3.31 (total)
March	2019	4.16	0.71 (Mar. 2), 0.23 (Mar 5) 0.71 (Mar. 6) 0.84 (Mar. 20) 0.42 (Mar. 22) 0.45 (Mar. 25)
April	2019	0.35	
Total		20.64	

*https://www.usclimatedata.com/climate/oakland/california/united-states/usca2500/2018/11

The total precipitation to date for Water Year 2019 is 20.64 inches. November 2018 and January, February and March 2019 were the wetter months. December 2018 was relatively dry. Multi day storm events (often

about 3 days in duration) were in the range of 1.9 -3.3 inches. The highest one day total was February 13 at 2.09 inches.

Flow data were obtained from the Wildcat Creek at Vale Road Gage (http://www.balancehydrologics.com/wildcat/index.php). Peak flows associated with the storm events were generally around 300 cfs and mean daily flows were on the order of 100 cfs. However, the largest event on February 13 generated a peak flow at the Vale Road estimated to be 680 cfs with a mean daily flow of 245 cfs. The runoff stage and flow hydrograph for that event is shown below.



Flow Hydrograph at Wildcat Creek Vale Road Gage for February 13-16, 2019

Cleanout of Fish Ladder

To initiate the study, we wanted to remove the sediment and other material that had accumulated in the fish ladder. In order to estimate the initial amount of material that would have to be removed a sediment accumulation survey was conducted on August 14, 2018 which indicated that there was approximately 30 yd3 of material that had accumulated in the ladder since the last cleanout.

The cleanout was performed by a combination of volunteers aided by maintenance staff from the Flood Control District. The work was conducted on September 15, 2018 (Coastal Cleanup Day) and September 29, 2018. Over the two days, there was a total of 23 persons (volunteers and maintenance staff) involved. The total person hours was approximately 140. The work was very labor intensive as the material must be removed by shovels and picks (Photo 1).

Sediment Accumulation Results

Sampling Round 1 - December 12, 2018

Sediment accumulation in the fish ladder was minimal for this initial sampling event. The primary location for accumulated gravel and coarse sediment was collected behind the inclined baffles along the northern side of the fish ladder (Photo 2). This accumulation was further limited to only those half dozen or so baffles at the head end of the ladder.

Sampling Round 2 - January 24, 2019

The sediment depth measurements for this sampling event are shown in Table 1. The table shows the depth of sediment in feet upstream and downstream of each baffle starting upstream and moving downstream. Three measurements (left, middle and right facing upstream) were taken approximately 6 inches upstream of the baffle, and 6 inches downstream of the baffle. Where the Table indicates a sediment accumulation of 2.5 feet; this corresponds to the depth of the low flow channel that contains the fish ladder and means the ladder is completely clogged. The Notes column indicates the nature of trash and debris that was trapped by the baffles.

Table 1 shows that sedimentation in the fish ladder was limited to the most upstream cells. The blockage was caused by a large tree trunk (and associated debris) that was lodged upstream of baffle #3. This tree was approximately 8 inches in diameter at its thickest point and was approximately 15 feet long. One of the ends of the limbs was blackened by fire, and it appears that the tree trunk had been in a fire pit. This obstruction was removed from the ladder during this sampling round.

Sampling Round 3 - February 19, 2019

This sampling round followed the February 13-16 storm event, the largest of the season (see above). Table 2 shows the sediment accumulation depths. The contrast with the prior sampling event is noteworthy. Most of the fish ladder is now full of sediment including cobbles and rocks that were quite rounded and smooth. This observation would suggest that the material originated from a historic deposit of river rocks upstream of the ladder. It also emphasizes the large erosional and transport capacity of Wildcat Creek during large runoff events. Also observations indicated that this runoff event transported and deposited a great deal of finer sediment in the downstream sediment basin.

The extensive deposition of heavy rock in the ladder also was attended by much trash and debris that tended to collect immediately upstream of the baffles. Such debris included a wheel barrow, clothes. carpets and other materials. These materials were often lodged under much rock and could not be removed except by a concerted effort like was done in the original September 2018 cleanout of the ladder.

Conclusions

Washington Baffles are very prone to trapping trash and debris - the design of the Washington Baffles tend to trap trash and debris which then causes a blockage of sediment and rock upstream of the blockage. Any future retrofit must provide for a design that allows trash and debris to move downstream through the ladder.

Fish Ladder Clogging is very episodic in response to runoff - In this study, the fish ladder remained essentially open during the initial part of the wet season, but a major runoff event in mid-February 2019 transported significant amount of trash, debris, sediment and gravel such that the ladder was almost completely clogged by the end of the event.

Annual Maintenance is not sufficient to keep the ladder open - In this study, the ladder was manually cleaned out in September of 2018. However that was not sufficient to prevent clogging of the ladder after the February 2019 runoff event. The present design can only be maintained by hand and is very time consuming and labor intensive,

Recommendations

Limit Trash and Debris from entering ladder - Most observations of clogging were caused by trash and debris that is trapped behind the Washington Baffles. These consisted of a variety of materials including woody debris, shopping carts, clothes, rugs, bicycles, and tires. Minimizing this material from entering the stream during high runoff events would help keep the ladder open.

Retrofit the fish ladder - The current fish ladder, rather than facilitating fish passage, is too prone to clogging at which point it is a barrier to fish passage. This has been recognized by the Army Corps of Engineers who have developed a new design that eliminates the Washington Baffles and replaces them with a combination of a roughened channel section and a step pool section. The revised design also increases the size of the low flow channel consistent with CDFW fish passage flow criteria. Funding for this, or an equivalent design, should be pursued.

Incorporate the need for access and maintenance in the revised design. Even well designed drainage and fish passage facilities require maintenance. The current design of the fish ladder is such that access is limited and maintenance is labor intensive. Although improving access and maintenance ability is constrained by the fish ladder setting, any new design should try to make it easier to maintain in the future.

TABLES AND PHOTOS

Table 1 January 24, 2019 Sediment Depth (ft) Upstream and Downstream of Baffles

Baffle No.	upstream of baffle			downstream of baffle			Notes
	left*	middle	right	left	middle	right	starting upstream and moving downstream
1	1.1	0.7	0.7	0.9	1.1	1.1	completely clogged
2	1.4**	1.5**	1.3**	1.4**	1.5**	1.3**	Gravel/sediment at or near top of baffle
3	??	??	??	??	??	??	Woody Material - cannot access baffles
4	0.8	0.4	0	1	0.9	0.7	Clogged
5	0	0	0.2	0.2	0.4	0.3	Notch Open
6	0	0	0.2	0.8	0.5	0.9	Notch Open
7	1.4**	0.3	0	0.7	0.2	0.2	debris & shopping cart /clogged
8	0.2	0	0.1	0.1	0	0.2	blanket removed/ reopened notch
9	0.1	0	0	0	0	0	removed log lodged in notch/reopened
10	0	0	0	0	0	0	open
11	0.7	0.2	0.1	0.5	0.6	0.6	debris & children's car removed/reopened
12	0.2	0.4	0	0	0.1	0.4	debris removed/reopened
13	0	0	0	0.3	0	0	major clog - shopping cart and large log
14	0.1	0	0	0	0	0	open
15	0.1	0	0	0	0	0.1	blankets removed/reopened
16	0	0	0	0	0	0	open
17	0.1	0	0	0.3	0.1	0	debris removed/notch reopened
18	0.3	0.1	0.2	0	0.1	0	car seat, blanket removed/notch reopened
19	0	0	0	0.5	0.1	0.2	carpet removed/notch reopened
20	0	0	0	0	0	0	open
21	0	0	0	0	0	0	debris removed/notch reopened
22	0	0.1	0.2	0	0	0.1	open
23	0	0	0	0	0	0	trash removed/notch reopened
24	0	0	0	0	0	0	open
25	0.1	0	0	0	0	0	tent removed/notch reopened
26	0	0	0	0	0	0	debris removed/notch reopened
27	0	0	0	0	0	0.1	clothing removed/reopened
28	0	0	0	0	0	0	open
29	0.1	0	0	0	0	0	blanket/tire removed/reopened
30	0	0	0	0	0	0	debris removed/reopened
31	0	0	0	0	0	0	tire removed/reopened
32	0.2	0	0	0	0	0	open
33	0	0	0	0	0	0	open
34	0.3	0	0	0	0	0	open
35	0.1	0	0	0	0	0	open
							* as viewed looking upstream
							** sediment is at or near top of baffle

Table 2 February 19, 2019 Wildcat Creek Fish Ladder Sediment Accumulation (ft)

Baffle No.	upstream of baffle			downstream of baffle			Notes
	left	middle	right	left	middle	right	starting upstream and moving downstream
1	1.1	1.7	1.4	0.6	0.6	0.8	blocked by large rock
2	1.4	1.3	0.5	1	0	0.5	blocked by large rock
3	0.2	0.8	0.5	0	0.1	0.3	
4	0.3	0	0	1.5	0	0	open, no blockage
5	0	0	0	0.4	0	0	open with small rocks (~6in diameter) upstream of baffle
6	0.9	0.4	0.4	1,4	0.7	0.6	
7	1.3	2.1	1.4	1.2	1.1	1.1	notch blocked
8	2	2.1	1.4	1.6	1	0.8	heavily blocked with trash and wood
9	1.3	1.1	0.9	1.4	0.7	0.8	blocked by wheel barrow
10	1.9	1.9	1.9	2.5	2.5	2.5	cobble/gravel fill low flow channel; difficult to determine extent of clogging
11	2,5	2,5	2,5	2,5	2,5	2,5	ditto
12	2,5	2,5	2,5	2,5	2,5	2,5	ditto
13	2,5	2,5	2,5	2,5	2,5	2,5	ditto
14	2,5	2,5	2,5	2,5	2,5	2,5	ditto
15	2,5	2,5	2,5	2,5	2,5	2,5	ditto
16	2,5	2,5	2,5	2,5	2,5	2,5	ditto
17	2,5	2,5	2,5	2,5	2,5	2,5	ditto
18	2,5	2,5	2,5	2,5	2,5	2,5	ditto
19	2,5	2,5	2,5	2,5	2,5	2,5	ditto
20	2,5	2,5	2,5	2,5	2,5	2,5	ditto
21	2,5	2,5	2,5	2,5	2,5	2,5	ditto
22	2,5	2,5	2,5	2,5	2,5	2,5	ditto
23	2,5	2,5	2,5	2,5	2,5	2,5	ditto
24	2,5	2,5	2,5	2,5	2,5	2,5	ditto
25	2,5	2,5	2,5	2,5	2,5	2,5	ditto
26	2,5	2,5	2,5	2,5	2,5	2,5	major obstacle ?
27	1.5	1.4	1.2	1.5	1	1.1	
28	0.7	0.5	0.9	1.1	0.6	0.7	remove tire
29	1.2	0.6	0.9	0.9	0.6	1	
30	1.5	0.4	0.8	0.9	0.5	1.1	remove mattress cover
31	1.4	0.7	0.9	1.1	1.1	0.7	tire removed/reopened
32	1.1	1.1	1.2	0.9	1.2	1.4	water up to top of low flow channel
33	1.4	1.7	1.4	1.1	1	0.5	clogged with red circular object?
34	0.8	0.7	0.6	1.5	1	1.1	water up to top of low flow channel
35	1.8	1.8	1.8	2.5	2.5	2.5	backwater effect?

Photo 1 - Volunteers and Flood Control District Staff Removing Sediment from Fish Ladder - September 15, 2018

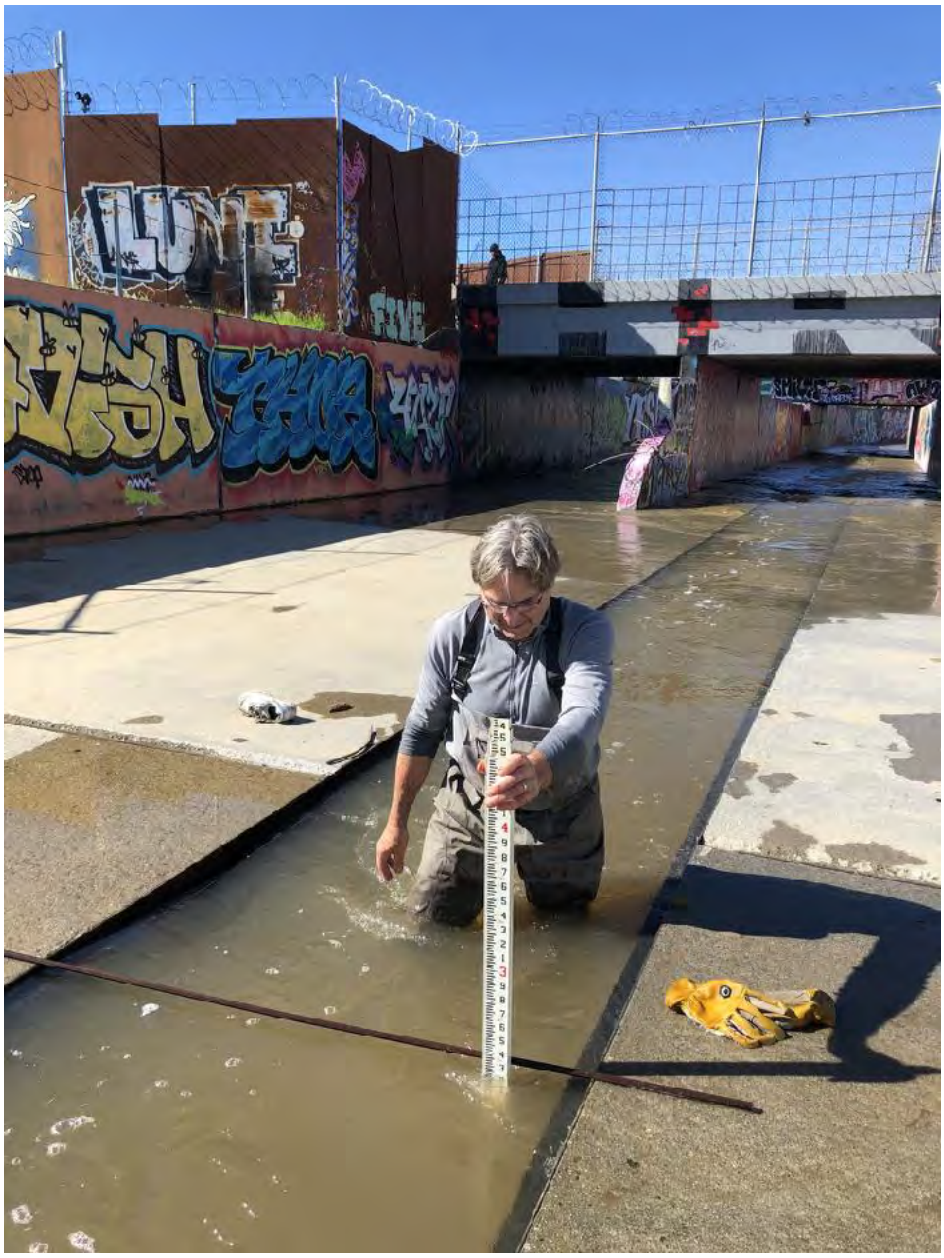


Photo 2 Measuring Sediment Accumulation - February 19, 2019

Photo 3 - Woody Debris Blocking Fish Ladder Following January 15-17 Runoff Event - January 24, 2019.

Photo 4 - Large, Smooth Cobble Deposited in Fish Ladder Following February 13-14, 2019 Runoff Event (February 19, 2019)

US Army Corps
of Engineers
San Francisco District

WILDCAT CREEK
FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT

CONTRA COSTA COUNTY, CALIFORNIA

CONTRACT NO: W912P7-08-D-0004

FY: 2014

nhc northwest hydraulic consultants
3950 industrial blvd, suite 100C
west sacramento, california 95691
(916) 371-7400 fax: (916) 371-7475
www.nhcweb.com

PRELIMINARY
NOT FOR
CONSTRUCTION

US Army Corps
of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103

nhc
northwest
hydraulic
consultants

Approved
Chief, Engineering Division — Date:
Prepared Under the Direction of
Col, Corps of Engineers — District Engineer

Drawing Code:
Designed by: bgw
Drawn by: tvs
Spec. No.
Design File No.:

Approved Functional Adequacy
Chief, Design Branch — Date:
Prepared by
SAN FRANCISCO DISTRICT
DESIGN BRANCH
Date:

CALIFORNIA
SONOMA COUNTY
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design
TITLE SHEET

Sheet reference number:
G1.0

GENERAL NOTES:

1. ALL WORK SHALL BE IN CONFORMANCE WITH THE STANDARDS, SPECIFICATIONS, AND ORDINANCES OF USACE.

2. THE CONTRACTOR SHALL CONTACT THE ENGINEER AS NECESSARY TO CLARIFY ANY IMPROVEMENT THAT THE CONTRACTOR BELIEVES THERE IS NOT SUFFICIENT DETAIL OF ON THE DRAWINGS TO CONSTRUCT. IF DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, THESE NOTES, OR FIELD CONDITIONS OCCUR, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH WORK. CHANGES MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SPECIFIED DIMENSIONS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS.

3. THE SITE TOPOGRAPHY IS BASED ON LIDAR SURVEY DATA PROVIDED BY THE USACE AND AS-BUILT DRAWINGS OF THE CONCRETE CHANNEL. ANY DIFFERENCES IN TOPOGRAPHY SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING.

4. CONTRACTOR SHALL POST ON THE PROJECT SITE, EMERGENCY TELEPHONE NUMBERS FOR AMBULANCE, POLICE AND FIRE DEPARTMENTS.

5. THE CONTRACTOR SHALL PROTECT EXISTING ADJACENT STRUCTURES, ROADS AND UTILITIES FROM DAMAGE. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER. BARRICADES, SIGNS, LIGHTS, ETC., REQUIRED FOR THE PROTECTION OF PERSONNEL, PROPERTY AND MATERIAL SHALL BE PROVIDED FOR AND MAINTAINED DURING CONSTRUCTION BY THE CONTRACTOR, AND SHALL CONFORM TO ALL GOVERNING CODES, ORDINANCES AND REGULATIONS.

6. THE CONTRACTOR SHALL MAINTAIN GOOD HOUSEKEEPING PRACTICES AT THE JOB SITE. ALL BUILDING MATERIAL AND DEBRIS ARE TO BE KEPT WITHIN WORK OR STAGING AREAS AT ALL TIMES. EXCESS BUILDING MATERIALS AND DEBRIS SHALL BE REMOVED PROMPTLY FROM THE JOB SITE AND DISPOSED OF AT AN APPROPRIATE DUMPSITE. ALL TOUCH UP WORK SHALL BE COMPLETED. ALL COMPLETED WORK SHALL BE PROTECTED AT ALL TIMES AGAINST SUBSEQUENT DAMAGE, UNTIL FINAL ACCEPTANCE BY THE OWNER.

7. CONTRACTOR IS RESPONSIBLE FOR PRESERVATION AND/OR PERPETUATION OF ALL EXISTING MONUMENTS WHICH CONTROL SUBDIVISIONS, TRACTS, BOUNDARIES, STREETS, HIGHWAYS, OR OTHER RIGHT-OF-WAY, EASEMENTS, OR SURVEY CONTROLS WHICH WILL BE DISTURBED OR REMOVED DUE TO CONTRACTOR'S WORK.

WORK SCHEDULE NOTES:

1. CONTRACTOR SHALL SCHEDULE WORK BETWEEN _____ AND _____.

2. CONTRACTOR SHALL SCHEDULE IN STREAM WORK BETWEEN _____ AND _____.

3. WORKING HOURS FOR THE CONTRACTOR WILL BE BETWEEN THE HOURS OF ____ AND ____ MONDAY THROUGH FRIDAY. IF THE CONTRACTOR DESIRES TO WORK DURING PERIODS OTHER THAN THESE, HE/SHE MUST OBTAIN APPROVAL FROM THE OWNER THREE DAYS IN ADVANCE.

EROSION AND SEDIMENT CONTROL NOTES:

1. INSTALLATION AND MAINTENANCE OF EROSION CONTROL MEASURES ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF SIGNIFICANT EROSION AND SILTATION ENTERING WILDCAT CREEK, NATURAL DRAINAGE COURSES AND/OR INTRUDING UPON ADJACENT ROADWAYS AND PROPERTIES. WINTERIZATION AND EROSION CONTROL SHOWN ON THESE PLANS IS INTENDED AS A GUIDE. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER. THIS RESPONSIBILITY SHALL APPLY THROUGHOUT THE COURSE OF CONSTRUCTION AND UNTIL ALL DISTURBED AREAS HAVE BECOME STABILIZED AND SHALL NOT BE LIMITED TO WET WEATHER PERIODS.

2. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPS) DURING THE CONSTRUCTION PERIODS.

3. WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES PAVED AREAS OR ACCESS ROADS, STABILIZED CONSTRUCTION ACCESS SHALL BE CONSTRUCTED AND MAINTAINED UNTIL THE COMPLETION OF CONSTRUCTION. ADJACENT ROADS SHALL BE MAINTAINED FREE OF DEBRIS AND SEDIMENT THROUGHOUT THE COURSE OF THE PROJECT.

UTILITY NOTES:

1. CONTRACTOR MUST NOTIFY USA (800) 227-2600 A MINIMUM OF 48 HOURS PRIOR TO COMMENCING EARTHWORK.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES SHOWN ON THE DRAWINGS AND THOSE NOT SHOWN ON THE DRAWINGS, BUT MADE KNOWN TO HIM/HER.

3. UNKNOWN SUBSURFACE STRUCTURES AND UTILITIES ENCOUNTERED DURING THE WORK SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY AND WORK SHALL NOT PROCEED IN THESE AREAS WITHOUT THE ENGINEERS APPROVAL.

EARTHWORK NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL STOCKPILE, GRADED AND EXCAVATED AREAS FROM EROSION.

2. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY OF ANY DIFFERENCES IN TOPOGRAPHY FROM THAT SHOWN ON THE DRAWING.

VERTICAL DATUM NOTES:

1. ALL ELEVATIONS REFERRED TO IN THESE PLANS ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. ELEVATIONS OF EXISTING FISHWAY WERE CONVERTED TO NAVD88 FROM NGVD29 BY ADDING 2.68 FEET TO THE NGVD29 ELEVATIONS. THIS CONVERSION WAS OBTAINED FROM CORPCON VERSION 6.0.

DRAWING SCHEDULE	
COVER SHEET	G1.0
NOTES, ABBREVIATION, AND LEGEND	G2.0
SITE ACCESS PLAN	G3.0
DEWATERING & DEMOLITION PLAN	G4.0
FISHWAY IMPROVEMENT PLAN	C1.0
BASIN IMPROVEMENT PLAN	C2.0
PROFILE AND SECTIONS SHEET	C3.0
DETAILS SHEET	D1.0

LEGEND

- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING CONTOURS (MAJOR) — 60
- EXISTING CONTOURS (MINOR) — 61
- EXISTING FENCE
- EXISTING BUILDINGS & STRUCTURES
- EXISTING OVERHEAD ELECTRICAL — OHE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED FILL OR CUT SLOPE

PRELIMINARY
NOT FOR
CONSTRUCTION

US Army Corps of Engineers
San Francisco District

nhc
northwest hydraulic consultants

Rev.	Description	Date	Approved
Symbol			

Date: xx/xx/2014
Design file no.:
Drawing Code:
File name:
Plot date:
Dwg scale:

Designed by: bga
Dwn by: tvs
Spec No.:
Reviewed by: bga
Submitted by:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

SAN FRANCISCO DISTRICT
XXXXXXXXXX
XXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design
CALIFORNIA

NOTES, ABREVIATIONS, & LEGEND

Sheet reference number:
G2.0

STAGING & STORAGE AREA

WILDCAT CREEK TRAIL

WILDCAT CREEK

97+00

98+00

99+00

100+00

101+00

96+00

95+00

CONCRETE WEIR

94+00

ACCESS VIA GIARAMITA ST TO THE WILDCAT CREEK TRAIL

102+00

103+00

104+00

105+00

106+00

WILDCAT CREEK TRAIL

93+00

92+00

91+00

90+00

WILDCAT CREEK

ACCESS VIA GIARAMITA ST TO THE WILDCAT CREEK TRAIL

NOTE:
1. ACCESS TO THE PROJECT SITE SHALL BE FROM GIARAMITA STREET TO WILDCAT CREEK TRAIL. THE CONTRACTOR WILL COORDINATE WITH CONTRA COSTA COUNTY FOR ACCESS PRIOR TO CONSTRUCTION.

N

0' 50' 100' 150' 200'

SCALE 1"=50'

PRELIMINARY NOT FOR CONSTRUCTION

US Army Corps of Engineers
San Francisco District

nhc
northwest hydraulic consultants

Rev.	Description	Date	Approved
Symbol			

Date: xx/xx/2014
Spec No.:
Design file no:
Drawing Code:
File name:
Plot scale:
Dwg scale:

Designed by: bgw
Dwn. by: tvs
Reviewed by:
Submitted by:
Chief, XXX Des. Sec.

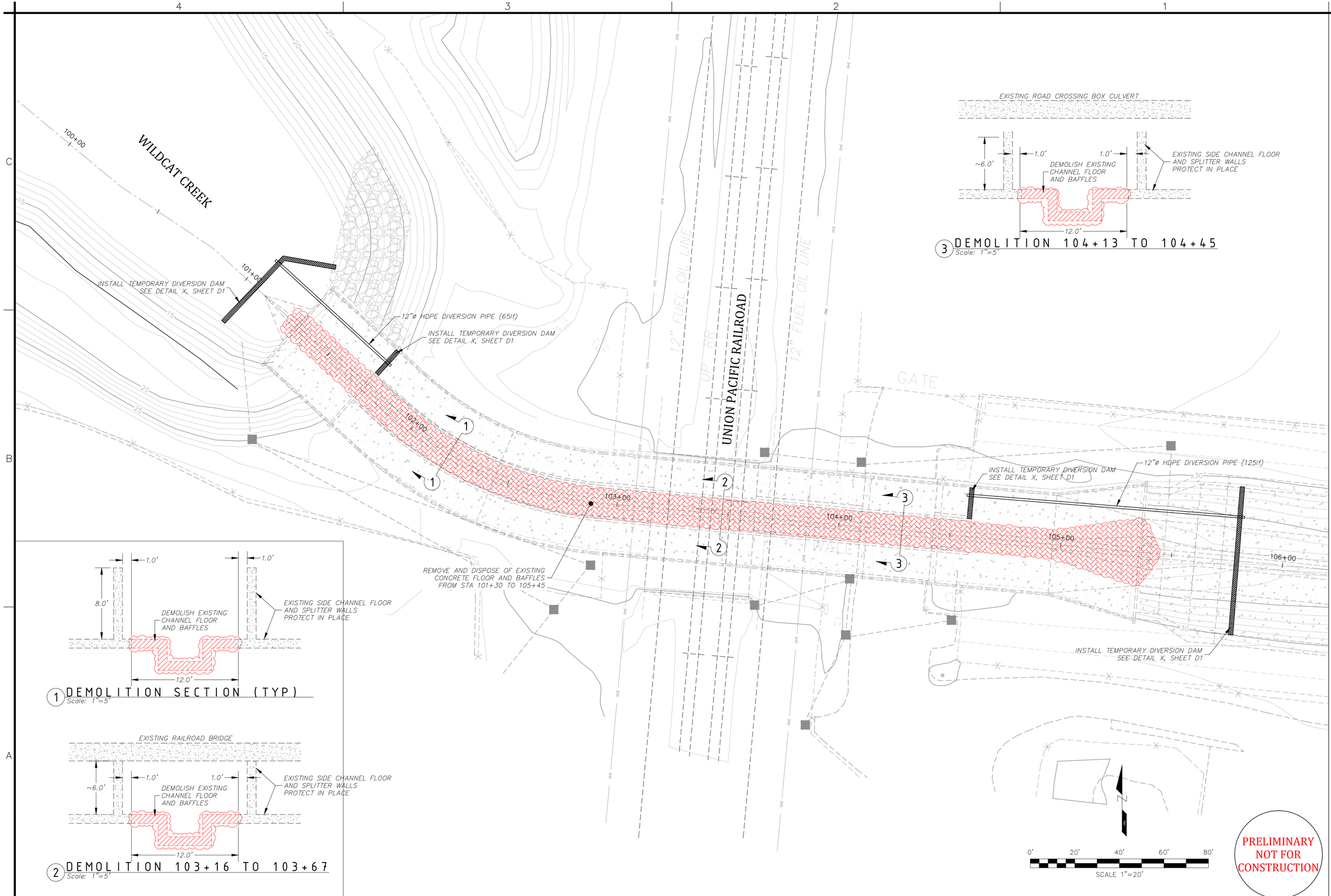
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

SAN FRANCISCO DISTRICT
XXXXXXXXXX
XXXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY
CALIFORNIA
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design
SITE ACCESS PLAN

Sheet reference number:
G3.0

UPDATE



3 DEMOLITION 104+13 TO 104+45
Scale: 1"=5'

1 DEMOLITION SECTION (TYP)
Scale: 1"=5'

2 DEMOLITION 103+16 TO 103+67
Scale: 1"=5'

PRELIMINARY
NOT FOR
CONSTRUCTION

US Army Corps of Engineers
San Francisco District

nhc northwest hydraulic consultants

Rev.	Description	Date	Approved

Date: xx/xx/2014
Designed by: bgw
Drawn by: txs
Reviewed by:
Submitted by:
Spec No.:
Drawing Code:
File name: Plot date: Dwg scale:
Chk'r, XXX Des. Spc.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

SAN FRANCISCO DISTRICT
XXXXXXXXXXX
XXXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY CALIFORNIA
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design

DEWATERING & DEMOLITION PLAN

Sheet reference number:
G4.0

UPDATE

4 3 2 1

C B A

3.0'
17.5
1.5:1
1.5:1
117.3'
CONSTRUCT FLOW TRAINING DIKE
SEE DETAIL E, SHEET D1
100+00
101+00
WILDCAT CREEK
25.0
25.0
10:1
3:1
3:1
17.0
17.0
17.0
CONSTRUCTION MAINTENANCE ACCESS RAMP
AND DREDGING PLATFORM (20'x18')
SEE DETAIL F, SHEET D1
UNION PACIFIC RAILROAD
12" FUEL OIL LINE
12" FUEL OIL LINE
GATE
102+00
FLOW
STEP POOLS
SEE DETAIL A, SHEET C3
EXISTING CHANNEL AND CHANNEL WALLS
(PROTECT-IN-PLACE)
EMERGENT BOULDER
SEE DETAIL D, SHEET C3
103+00
104+00
105+00
FLOW
BOULDER BUTTRESS (TYP)
SEE DETAIL B, SHEET C3
ROUGHENED CHANNEL
SEE DETAIL C, SHEET C3
N
0' 20' 40' 60' 80'
SCALE 1"=20'
PRELIMINARY
NOT FOR
CONSTRUCTION

US Army Corps
of Engineers
San Francisco District

nhc
northwest
hydraulic
consultants

Rev.	Description	Date	Approved
Symbol			

Date: xx/xx/2014
Design file no.:
Spec No.:
Drawing Code:
File name:
Plot date:
Dwg scale:

Designed by: bgw
Dwn. by: tvs
Reviewed by:
Submitted by:
Chkr. XXX Des. Spc.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

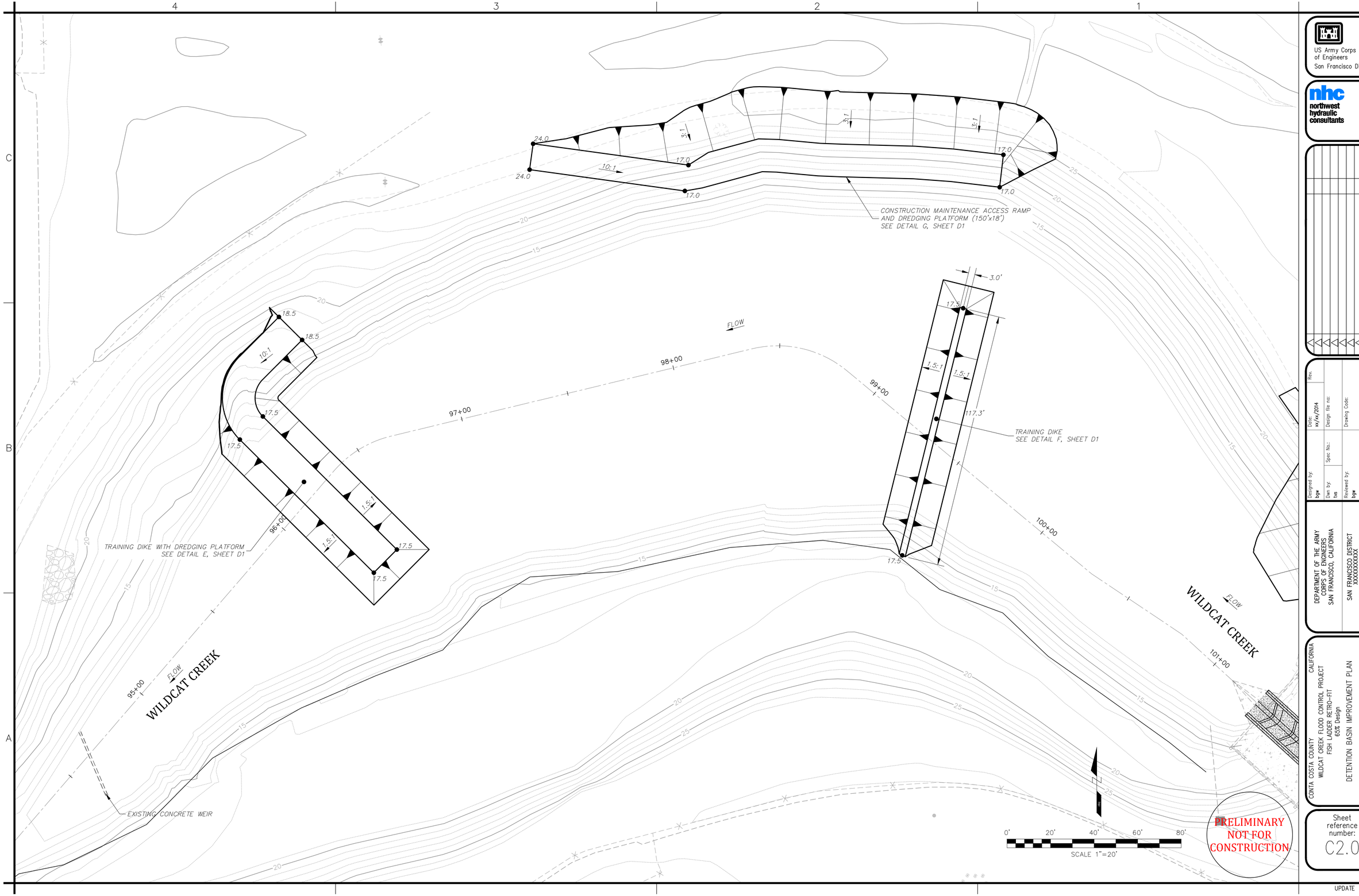
SAN FRANCISCO DISTRICT
XXXXXXXXXXX
XXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design

FISHWAY IMPROVEMENT PLAN

Sheet
reference
number:
C1.0

UPDATE



US Army Corps of Engineers
San Francisco District

nhc
northwest hydraulic consultants

Rev.	Description	Date	Approved
Symbol			

Date: xx/xx/2014
Design file no(s):
Spec No.:
Drawing Code:
File name:
Project #:
Dwg scale:

Designed by: bgw
Dwn by: tvs
Reviewed by: bgw
Submitted by:
Chief, XXXX Des. Sec.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

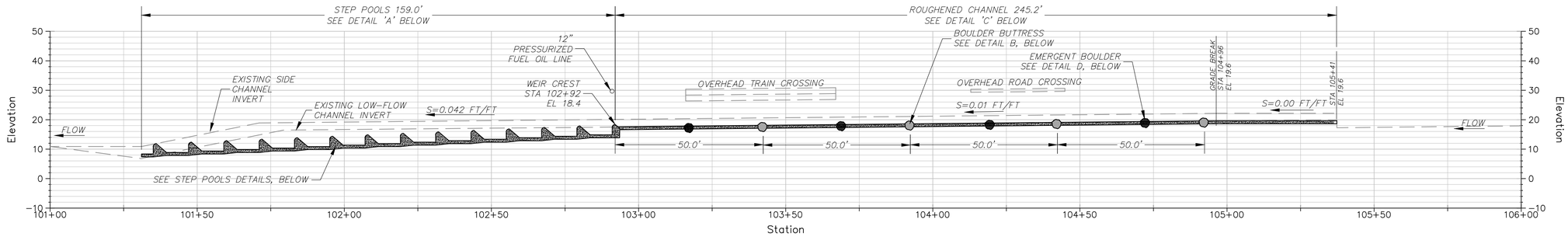
SAN FRANCISCO DISTRICT
XXXXXXXXXXXX
XXXXXXXXXXXXXXXX, CA

CONTA COSTA COUNTY CALIFORNIA
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design

DETENTION BASIN IMPROVEMENT PLAN

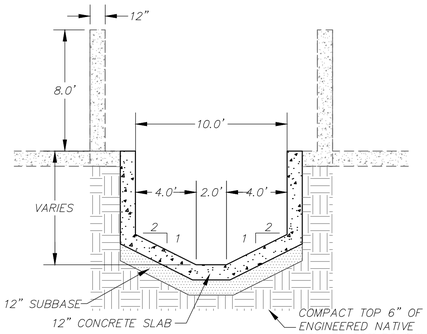
Sheet reference number:
C2.0

UPDATE



FISHWAY IMPROVEMENT PROFILE

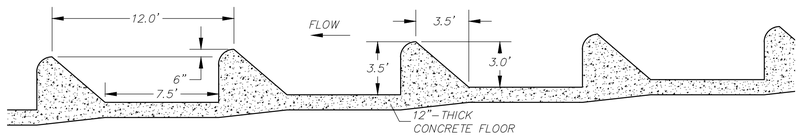
H: 1"=20' V: 1"=20'



A STEP POOLS-SECTION

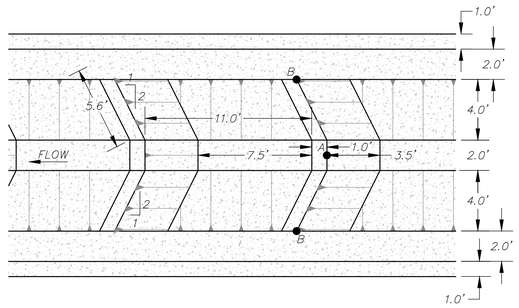
Scale: 1"=5'

STEP POOLS ELEVATIONS		
STATION	WEIR CREST (A)	TOP ELE (B)
102+97	18.4	20.4
102+80	17.9	19.9
102+68	17.4	19.4
102+56	16.9	17.9
102+44	16.4	18.4
102+32	15.9	17.9
102+20	15.4	17.4
102+08	14.9	16.9
101+96	14.4	16.4
101+84	13.9	15.9
101+72	13.4	15.4
101+60	12.9	14.9
101+48	12.4	14.4
101+36	11.9	13.9



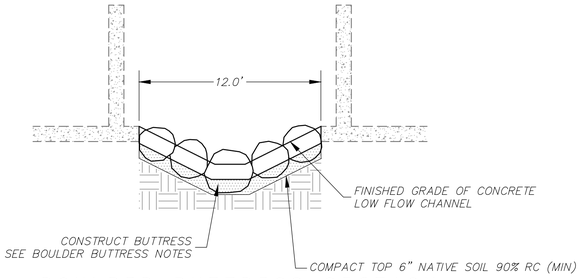
STEP POOLS-CENTERLINE PROFILE

Scale: 1"=5'



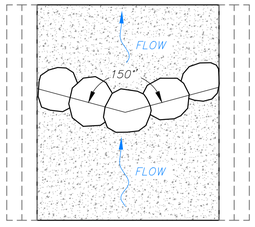
STEP POOLS-PLAN

Scale: 1"=5'



B BOULDER BUTTRESS-SECTION

Scale: 1"=5'

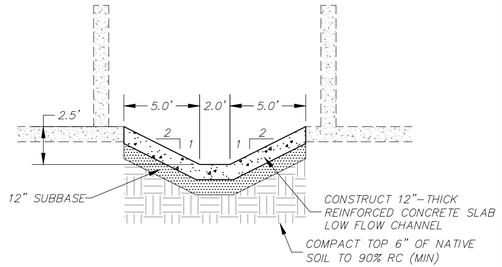


BOULDER BUTTRESS-PLAN

Scale: 1"=5'

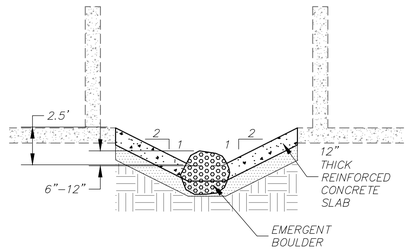
BOULDER BUTTRESS NOTES:

1. BOULDER BUTTRESS TO BE CONSTRUCTED WITH FIVE (5) ANGULAR ROCKS (B-AXIS = 2.0'ø TO 3.0'ø).
2. ROCK PLACEMENT SHALL BE SUPERVISED BY FIELD ENGINEER.
3. RECOMMENDED CONSTRUCTION SEQUENCE:
   - 3.a. AFTER DEMOLITION OF EXISTING CHANNEL FLOOR AND BAFFLE, EXCAVATE TO APPROXIMATELY 12" BELOW FINISHED GRADE
   - 3.b. COMPACT NATIVE BED MATERIAL TO MINIMUM 90% RELATIVE COMPACTION RATIO
   - 3.c. PLACE BOULDERS FROM EDGE TO CENTER UNDER DIRECTION OF FIELD ENGINEER
   - 3.d. FILL TO FINISHED GRADE WITH CONCRETE GROUT. THE BOULDER CREST SHALL BE EXPOSED 6" (MIN) TO 12" (MAX) ABOVE FINISHED GRADE



C ROUGHENED CHANNEL-SECTION

Scale: 1"=5'



D EMERGENT BOULDER DETAIL

Scale: 1"=5'

EMERGENT BOULDER NOTES:

1. EMERGENT BOULDERS ARE LARGE ROCKS (B-AXIS = 2.0'ø TO 3.0'ø) PLACED IN THE CENTER OF THE ROUGHENED CHANNEL TO ADD CHANNEL COMPLEXITY.
2. ROCK PLACEMENT SHALL BE SUPERVISED BY FIELD ENGINEER. ROCKS WILL BE PLACED AT ABOUT 25 FOOT SPACING FROM BOULDER BUTTRESSES
3. RECOMMENDED CONSTRUCTION SEQUENCE:
   - 3.a. AFTER DEMOLITION OF EXISTING CHANNEL FLOOR AND BAFFLE, EXCAVATE TO APPROXIMATELY 12" BELOW FINISHED GRADE
   - 3.b. COMPACT NATIVE BED MATERIAL TO MINIMUM 90% RELATIVE COMPACTION RATIO
   - 3.c. PLACE BOULDER
   - 3.d. PLACE REINFORCEMENT FOR CONCRETE SLABS AROUND BOULDER
   - 3.e. FILL TO FINISHED GRADE WITH CONCRETE GROUT. THE BOULDER CREST SHALL BE EXPOSED 6" (MIN) TO 12" (MAX) ABOVE FINISHED GRADE

PRELIMINARY NOT FOR CONSTRUCTION

US Army Corps of Engineers
San Francisco District

nhc northwest hydraulic consultants

Symbol	Description	Date	Approved

Rev.

Date: xx/xx/2014
Design file no:
Drawing Code:
File name: Plot date: Dwg scale:

Designed by: bgw
Spec No.:
Drawn by: tvs
Reviewed by:
Submitted by:
Chief, XXXX Des. Sec.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

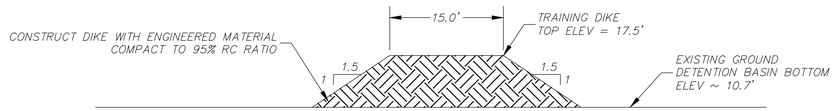
SAN FRANCISCO DISTRICT
XXXXXXXXXXX
XXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design

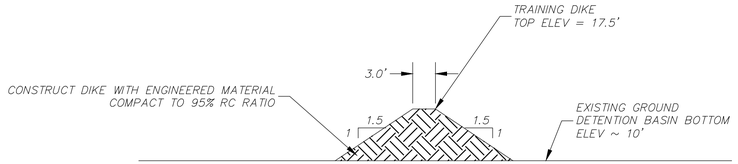
PROFILE AND SECTION SHEET

Sheet reference number:
C3.0

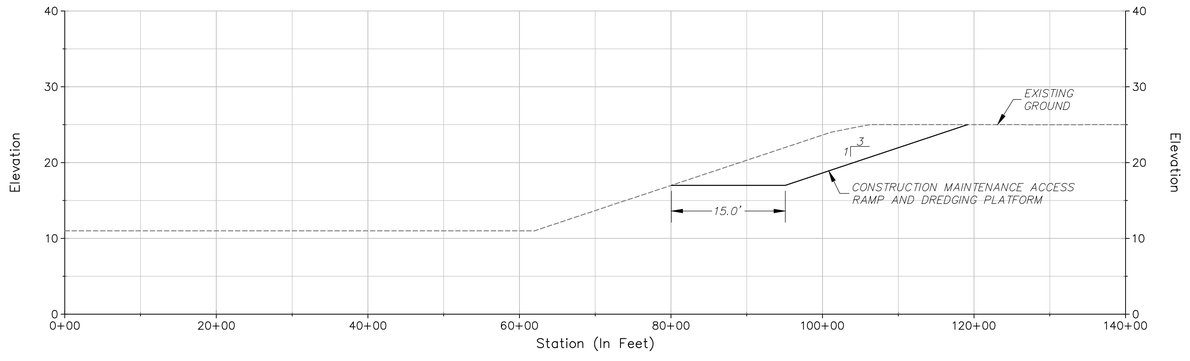
UPDATE



E TRAINING DIKE WITH DREDGING PLATFORM
Scale: 1"=10'



F TRAINING DIKE
Scale: 1"=10'



G MAINTENANCE ACCESS RAMP AND DREDGING PLATFORM
Scale: 1"=10'

PRELIMINARY
NOT FOR
CONSTRUCTION

US Army Corps of Engineers
San Francisco District

nhc
northwest hydraulic consultants

Rev.	Description	Date	Approved
Symbol			

Designed by: BGW
Drawn by: JJP
Reviewed by:
Submitted by:
Date: 01/17/2014
Design file no.:
Spec. No.:
Drawing Code:
File name:
Plot date:
Dwg scale: AS_NOTED
Civil, XXXX Dec. Sec.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

SAN FRANCISCO DISTRICT
XXXXXXXXXXXX
XXXXXXXXXXXXXXXX, CA

CONTRA COSTA COUNTY
WILDCAT CREEK FLOOD CONTROL PROJECT
FISH LADDER RETRO-FIT
65% Design
DETAIL
CALIFORNIA

Sheet reference number:
D1.0

UPDATE

Budget Narrative

The total project budget is $879,000, which includes a $784,000 cash contribution from the DWR USRP Grant Program, $90,000 cash contribution from the Fish Passage Forum Grant, and $5000 in-kind contribution from Trout Unlimited.

The $784,000 cash contribution from the DWR USRP is a verbal committment (conditioned on conduct of a design review that includes the DWR USRP design engineers, as well as the Army Corps of Engineers from whom the project will require a 408 permit.)

The $90,000 FPF request reflects $30,000 for The Watershed Project who would administer the Grant and develop and implement the community outreach.The remaining $60,000 budget would go towards Professional Services for FlowWest for the technical analysis and coordination associated with the design review tasks.

The in-kind contribution of $5000 would be from volunteers with Trout Unlimited who have been involved in monitoring the current fish passage facility, assisting in grant applications, and providing technical and scientific fisheries support.

Project Budget Template

PLEASE ENSURE YOU PROVIDE THE OVERALL PROJECT COSTS, AND HOW YOU INTEND T

Name of Project: Wildcat Creek Fish Passage and Community Outreach Project

Category	CFPF Funding Requested	Partner Contributions (cash)	Partner Contributions (in-kind)	Total
Salaries and Wages	$14,000.00		$5,000.00	$19,000.00
Employee Benefits	$6,000.00			$6,000.00
Supplies	$1,000.00			$1,000.00
Professional Services	$60,000.00	$784,000.00		$844,000.00
Administrative Overhead	$9,000.00			$9,000.00
Contracted Services				
Travel				
Grand Total	$90,000.00	$784,000.00	$5,000.00	$879,000.00
