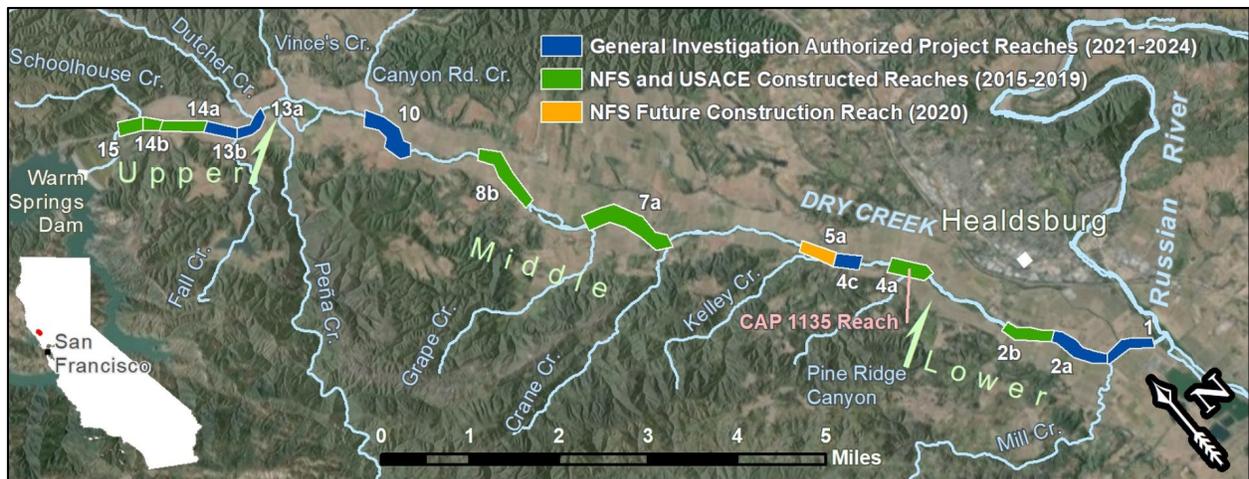


REVIEW PLAN

Dry Creek Ecosystem Restoration Sonoma County, California Preconstruction, Engineering, and Design Phase P2# 353490



MSC Approval Date: 28 March 2020
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U. S. Army Corps of Engineers
San Francisco District

FINAL DRAFT
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**US Army Corps
of Engineers**®
Albuquerque District

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1 - PURPOSE AND REQUIREMENTS

1.1 Purpose.

This document outlines the review plan for the Dry Creek Ecosystem Restoration Project which defines the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers' (USACE) decision, engineering design and implementation, and operations and maintenance documents and work products. The documents covered by this review plan consist of plans, specifications, design documentation reports (DDR), operation maintenance repair replacement and rehabilitation (OMRR&R) manuals, and miscellaneous contract documents required ahead of construction. The review plan was developed in accordance with Engineering Circular (EC) Civil Works Review Policy 1165-2-214, dated 20 February 202018.

1.2 Requirements.

As stipulated in EC 1165-2-217, implementation documents are required to undergo three distinct review processes. The three processes are: a district quality control (DQC) review, an agency technical review (ATR), biddability, constructability, operability, environmental and sustainability review (BCOES), and under some circumstances, an independent external peer review (IEPR). Each of the reviews will investigate the quality of workmanship which in itself minimizes the risk of failure. For this project, the South Pacific Division (SPD) approved feasibility phase review plan that determined neither Type I nor Type II IEPR is required as none of the mandatory triggers were met. More importantly, the San Francisco District Chief of Engineering has determined that there is no significant risk to life and safety. Table 1 summarizes the applicable reviews for the Dry Creek project.

- 1) District Quality Control. DQC is the review of basic science and engineering work focused primarily on fulfilling the project quality requirements for the Dry Creek project. DQC is an internal review process inherent in most products implemented within USACE. Generally the DQC is implemented during the development process as a check of adequacy for the work product. DQC efforts will include the necessary expertise to address compliance with published USACE policy. Compliance with any necessary National Environmental Policy Act (NEPA) documents and other environmental requirements, or any other services provided by the local sponsor(s) will be reviewed during DQC. The district quality manuals will prescribe specific procedures for the conduct of DQC efforts, including documentation requirements and maintenance of associated records for internal audits to check for proper DQC implementation.
- 2) Agency Technical Review. EC 1165-2-217 characterizes the ATR effort as an in-depth review managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the design effort. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR is mandatory for any and all decision and implementation documents. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. For each ATR event, the ATR team may review relevant DQC records and provide written comment in the ATR report as to the apparent adequacy of the DQC effort. Compliance with any necessary NEPA documents and other environmental requirements, or any other services provided by the local sponsor(s) will be reviewed by the ATR team.

- 3) Biddability, Constructability, Operability, Environmental and Sustainability Review. Per ER-415-1-11, BCOES reviews are required to minimize problems during the construction phase of the project. This is done through effective review of the design documents prior to advertising of the project. The BCOES review will be performed by personnel within the home district who have sufficient knowledge and expertise. ER-415-1-11 defines BCOES as follows:
 - a) Biddability is defined as the clarity of the acquisition documents, the soundness of the government's evaluation and selection criteria for negotiated acquisitions, and the ease of bidders or proposers to understand the government's requirements, allowing the submission of a competitive bid or proposal that is responsive to the government's requirements.
 - b) Constructability is defined as the ease of constructing a specified or designed project according to the government's requirements, including the proposed construction duration, and the ease of understanding and administering the contract documents during their execution.
 - c) Operability is defined as the ability to efficiently operate and maintain a facility or facilities over their life cycle when the facility or facilities are built according to the project's plans and specifications.
 - d) Environmental is defined as the ability to best achieve stewardship of air, water, land, animals, plants, and other natural resources when constructing and operating the project, and complying with the environmental impact statement or assessment, or other environmental related project requirements. The USACE Environmental Operating Principles (EOP) in ER 200-1-5 provide direction on achieving synergy between the environment and the execution of projects. The environmental part of a BCOES review shall address all EOPs including compliance with all applicable local, state, and federal environmental requirements.
 - e) Sustainability is defined as using methods, systems, and materials that optimize incorporation of a site's natural land, water, and energy resources as integral aspects of the development and minimize or avoid harm to the air, water, land, energy, human ecology, and nonrenewable resources on- and off-site of the project.
- 4) In Kind Contributions by Project Non-Federal Sponsor. Prior to finalization, this draft review plan will be updated to reflect the sponsor's specific tasks or portion of the project 35% cost share during the preconstruction engineering and design (PED) phase and construction.
- 5) Review Plan Approval and Posting. In order to ensure the review plan is in compliance with the principles of EC 1165-2-217 and the Major Subordinate Command's (MSC) quality management plan, the review plan must be approved by the applicable MSC, in this case the Commander, South Pacific Division (SPD). Once the review plan is approved, the San Francisco District (SPN) will post it to the District's public website and notify SPD.

1.3 References.

- EC 1165-2-217, Civil Works Review Policy, 15 December 2012
- ER 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews, 1 January 2013
- ER 1110-1-12, Quality Management, 30 September 2006
- ER 1110-1-8159, Engineering and Design, DrChecks, 1 January 2015
- ER 1180-1-6, Construction Quality Management, 30 September 1995

– Engineering and Construction Bulletin, Technical Lead for E&C Deliverables, 19 Oct 2015

Table 1. Summary of the Reviews Required for Dry Creek Project (Requirements as Noted in the Civil Works Review Policy, EC 1165-2-217)

Review Type	Acronym	Management	Applicable	Notes:
Review Plan Approval	RPA	-	Required	Approved by: MSC Commander
District Quality Control	DQC	SPN	Required	Review during design and solicitation process
Agency Technical Review	ATR	RMO	Required	Review during design process
Biddability, Constructability, Operability, Environmental, and Sustainability Review	BCOES	Construction and Operation	Required	BCOES finalized after all ATR comments resolved, RE permit completed and award document is cleared by legal reviewer.
Safety Assurance Review	IEPR	HQUSACE	Not Required	Requirement waived.
Policy and Legal Compliance Reviews	-	MSC	Required	Recommended Plan is approved during feasibility and additional legal sufficiency review will be done before award for construction.

2 - PROJECT INFORMATION

2.1 Introduction and Purpose

The project is located in the Dry Creek watershed in the interior coast range of northern Sonoma County, approximately 30 miles from the Pacific Ocean and 60 miles north of San Francisco Bay. Starting from the downstream of Warm Springs Dam (WSD) to its confluence with the Russian River, Dry Creek meanders near the City of Healdsburg for approximately 13.9 miles. The 13.9 mile is delineated in three segments; upper segment (river mile 13.9 to river mile 11) that has very low to no sediment and tributary influence, middle segment (river mile 11 to 3) that has greater sediment supply due to unregulated tributaries, and lower segment (river mile 3 to 0) that has high sediment supply due both the tributaries and the influence of the Russian River (Figure 1). The Dry Creek General Investigation (GI) Ecosystem Restoration project includes restoration sites within all the segments identified above (see Figure 2 for specific location of the selected restoration sites).

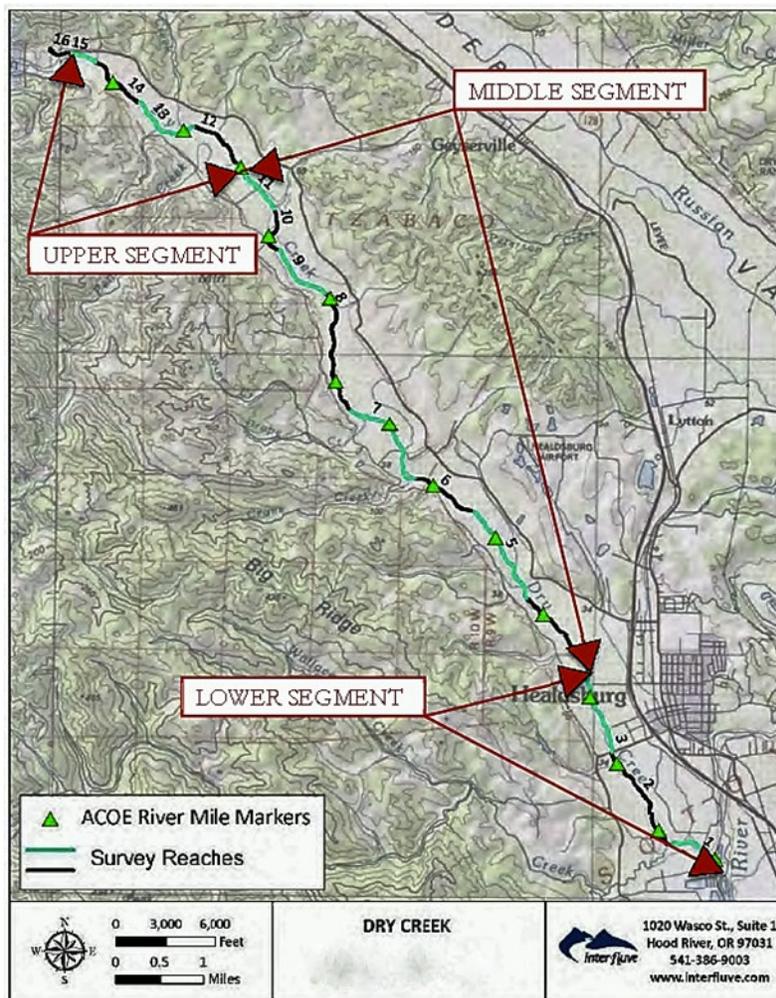


Figure 1. Lower Dry Creek Segments and Mile Markers

The U.S. Army Corps of Engineers (USACE) constructed the WSD in 1983 to provide flood control, water storage, and outdoor recreation. During summer months, the WSD water supply releases into Dry Creek causing higher water levels at higher velocities than would naturally occur in summer. During the winter, WSD flood risk management operations reduce channel forming flows. The altered hydrology resulting from WSD regulation of stream flow on Dry Creek has created ideal conditions for riparian vegetation overgrowth while failing to provide large enough flood events to erode vegetated bars and expose bare surfaces for primary vegetation succession. The combination of altered hydrology caused by the dam's regulation of the stream and vegetation growth patterns has curtailed the fluvial processes which would otherwise create complex channel and floodplain habitats. Without these fluvial processes, the creation of stream habitats such as alcoves, backwaters, and side channels that are important for all life stages of salmonids and other native fish and wildlife species has been severely limited below the dam (Inter-Fluve 2011).

The construction and operation of the dam also directly resulted in the loss of upstream spawning and rearing habitat for the Russian River salmonids. Between 1995 and 1999, the three species of salmonids native to the Russian River watershed were listed under the Endangered Species Act as threatened or endangered, including the endangered Central California Coast Coho salmon (*Oncorhynchus kisutch*), the threatened California Coastal Chinook salmon (*O. tshawytscha*) and Central California Coast Steelhead salmon (*O. mykiss*). Since this time, USACE has been involved in many programs and partnerships aimed at restoring salmonid populations. A September 24, 2008 biological opinion issued by the National Oceanic and Atmospheric Administration (NOAA) requires that USACE and the Sonoma County Water Agency (Sonoma Water) perform various reasonable and prudent alternatives to save threatened salmonid species in the Russian River watershed. These include the enhancement of six miles of Dry Creek between WSD and its confluence with the Russian River to provide near ideal summer rearing conditions for Coho and Steelhead salmon.

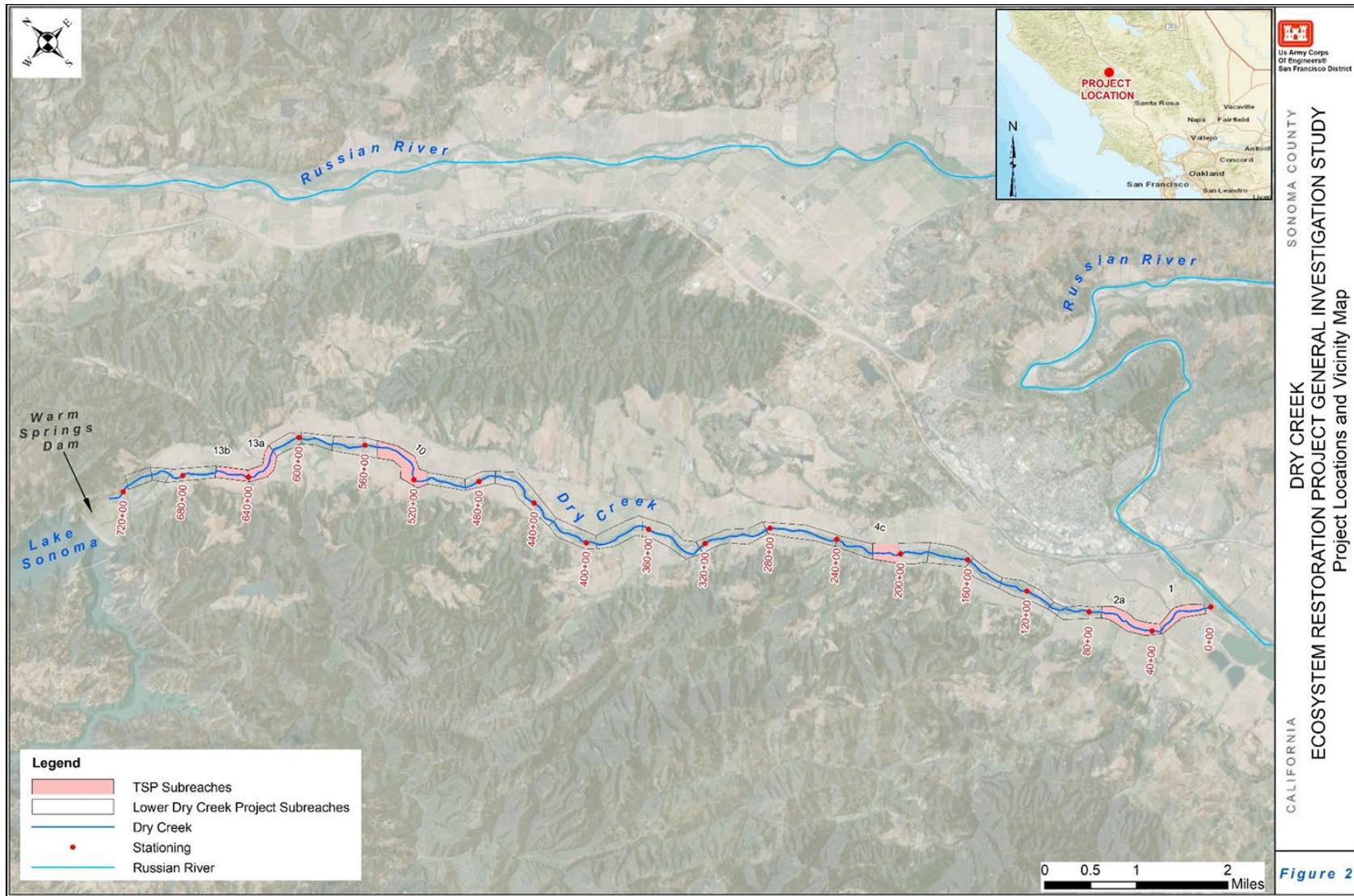


Figure 2. Project Location and Vicinity Map with Channel Centerline Station Markers

While the 2008 Biological Opinion is taken into consideration, the federal objective for ecosystem restoration projects is to maximize net national ecosystem restoration benefits. Further, the planned ecosystem restoration under this project must not conflict with the authorized purposes of the existing project. The plan formulation process for this study identified the water and related land resources problems and opportunities in the study area and built on that foundation to develop planning objectives, constraints, measures, and alternatives.

2.2 Project Goals and Objectives

The overall project goal is to restore the quality, complexity, and diversity of habitat along the lower Dry Creek by restoring the instream and floodplain and channel habitat complexity, riparian vegetation diversity, and productive backwater habitat by reconnecting Dry Creek to the available floodplain. The following objectives will achieve this goal:

- Restore and enhance stream channel and floodplain complexity and diversity, and increase submerged and closely overhanging cover to benefit aquatic species along Dry Creek's mainstem.
- Improve lateral stream-floodplain connectivity.
- Reduce non-native vegetation and increase native riparian vegetation successional complexity to promote habitat diversity for riparian wildlife, to provide food and cover for aquatic wildlife, and to shade Dry Creek and associated floodplain features such as backwaters and side channels.
- Restore and enhance high quality instream and floodplain habitat conditions along areas of Dry Creek's mainstem to benefit listed salmonid species throughout their life cycle.

2.3 Tentatively Selected Plan (TSP)

The feasibility phase found that the TSP reasonably maximizes ecosystem restoration benefits compared to costs, considering the cost effectiveness and incremental cost of implementing other restoration options. The TSP is efficient, acceptable, complete and effective in meeting project objectives by increasing habitat complexity and connectivity. The TSP also decreases invasive plant species, restoring riparian vegetation diversity, and restoring high quality instream and floodplain habitat conditions to benefit the listed salmonid species throughout their life cycle.

The TSP consists of the construction of a combination of both off-channel and main channel habitat along the lower Dry Creek. The sites selected to be restored are distributed along the three segments described in Section 2.1 (Figure 1). Reach 1 and the lower portion of subreach 2a are located in lower segment of Dry Creek. The upper portion of subreach 2a and subreach 4c are located in the middle segment of Dry Creek. Lastly, reach 10 and subreach 13a and 13b are located in the upper most segment of the lower Dry Creek. See Figure 3 as an example for the type of the restoration features planned along the lower Dry Creek under this project.

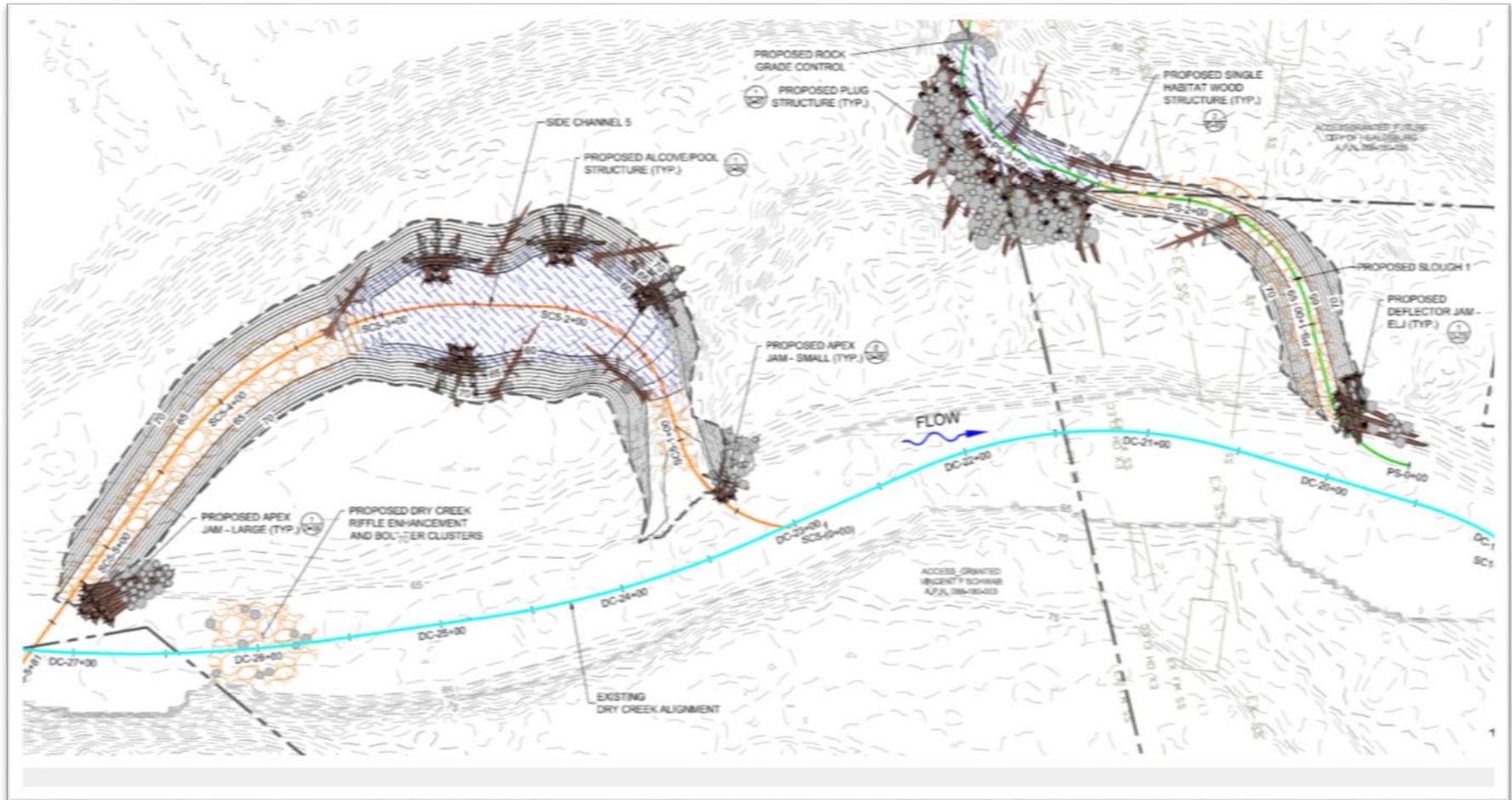


Figure 3. Sample Plan View of Restoration Site and Features - Reach 1 at 30% Design

2.4 Project Current Design Status

All of the sites considered for restoration under this project are currently at a 60% design level. In order to complete construction of the first phase in 2021, the project delivery team (PDT) has advanced to the development of the next level of the project design (90%). Due to the numbers and sizes of the sites considered to be restored under this project, the design and review process is anticipated to take the entirety of FY2019 and FY2020. The project partnership agreement (PPA) is anticipated to be signed in October of 2020. The construction is phased in three segments and full completion is anticipated to take four years or end of FY2024.

3 - DESIGN CONSIDERATIONS

3.1 Design Criteria.

Design criteria will follow ER 1110-2-1150, *Engineering and Design for Civil Works Projects*. Additional project specific design criteria standards were also developed prior to the start of the study phase and had been followed all along the design life of the project. The design criteria standard was a collective effort of the Sonoma Water, the National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (DFW) that included the design criteria recommended by the Russian River biological opinion.

3.2 Design Complexity.

The project includes proposed construction features for which the engineering analyses and design is considered to be of low complexity as they are based on the successful implementation of similar restoration features in the same project area. These features include the construction of several side channels, alcoves, pools and erosion protection measures. Features also include the placement of several large wood structures, topple logs, riffles, boulder clusters; planting of live poles (live willows), brush mats; establishing of native vegetation on disturbed area; and vegetation management. The majority of the feature placements are within the newly created secondary channels and connection to the main channel.

3.3 Construction Complexity.

Construction of the project components is considered minimally complex. The nature of land use and infrastructure along lower Dry Creek presents logistical challenges for the construction phase of the habitat restoration effort. Existing transportation corridors consist of relatively narrow, winding two-lane roads and few heavy load capacity stream crossings, with substantial recreational and farm traffic. Furthermore, the narrow incised creek corridor and proximity to vineyard operations limit available access corridors and staging areas. Preliminary access routes to the project site are currently identified for most of the subreaches. In few locations access to the channel is only possible from one side. In this instances temporary stream crossing will be installed to construct all the design features. Dust control is also a significant issue due to the sensitivity of vines growing in close proximity to the creek. Nevertheless, the local sponsor has engaged with local landowners and stakeholders for several years. Their engineering and communication teams are active in resolving logistical challenges and concerns and carefully vet the access routes and staging areas that are proposed on the design.

The typical in-water work period for the region is June 15 to October 15 in order to minimize impacts on migrating adult salmonids and to concentrate ground disturbing activity during the dry season. In order to satisfactorily construct the restoration measures and prevent excessive turbidity to the active flowing stream, it may be necessary to divert the stream around and/or dewater active work zones. Pumped

diversion systems provide the benefits of moving the water out of the creek corridor, and maximize the available work space in the corridor, which will facilitate efficient and competent completion of the work, including concurrent completion of work at multiple sites within a reach. However, the high daily expense of a pumped diversion system will be weighed as the project goes through the different level of design phase against the potential limitations of less expensive approaches as each project nears implementation.

4 - SCOPE OF REVIEW

This section describes the anticipated review activities for the project which are focused primarily on the design package and construction cost estimate. Reviews are expected to occur thru the FY2019-FY2021 time period, with the review plan periodically updated to reflect current schedule and progress of the review process. The project technical lead in collaboration with the project manager coordinates the review, communicates with the review disciplines selected, facilitates DrChecks access, and provides review document through DrChecks (ProjNet) or other commonly accessible file sharing medium.

Table 2 summarizes the review activities needed for the project. A check mark in the table indicates the type of review needed for a particular document or event.

Table 2. Documents and Type of Review Needed for the Dry Creek Ecosystem Restoration Project

Document / Activity	DQC	ATR	BCOES
Plans	√	√	√
Design Documentation Report (DDR): Civil Structural, Hydraulic & Hydrology, and Environmental reports and analysis with appendices	√	√	√
Cost Estimate, Revised Cost & Schedule Risk Assessment	√	√	
Specifications + Contract Front End Document	√		√
Engineering Consideration and Instruction to Field Personnel	√		√
Operation Maintenance Repair, Replacement and Rehabilitation (OMRR&R) Manual	√	√	

4.1 District Quality Control (DQC)

DQC is the review of basic science and engineering work focused primarily on fulfilling the project quality requirements for the Dry Creek project, the requirements of which are defined in the project management plan. The DQC is managed in the San Francisco District (SPN) and may be conducted by in-house staff as long as the reviewers are not doing the work involved in the study, including contracted work that is being reviewed. Basic quality control tools also include internal quality checks and reviews, supervisory quality assurance (QA) reviews, and project delivery team (PDT) reviews. As part of DQC, all work products will undergo a peer or discipline review using DrChecks before being submitted to the PDT so that the PDT may conduct a cross discipline coordination review with the other design disciplines before going out to a formal review DQC and ATR reviews.

The PDT is responsible for a complete review of all design and specification milestone packages in order to assure overall integrity. At the completion of the project construction and before the project is handed over to the non-federal sponsor, the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) manual will be prepared by the District and go through DQC.

4.1.1 Resolution

DrChecks (<https://www.projnet.org/projnet/>) shall be used to document all peer and DQC comments, responses, and associated resolution accomplished. DQC reviewers shall backcheck responses and either close the comment or attempt to resolve any disagreements. A reviewer may close a comment if the comment is addressed and resolved by the response, or if the reviewer determines that the comment was not a valid technical comment as a result of rebuttal, clarification, or additional information, or because the comment was advisory, primarily based on individual judgment, opinion, or editorial. If the reviewer and responder cannot resolve a comment, it should be brought to the attention of the PDT technical lead. If the technical lead cannot resolve, the PDT technical lead and design discipline chief will attempt to resolve before being elevated to the vertical team for resolution by branch or divisional chiefs. The vertical team will be informed of any unresolved comments, policy variations, or other issues that may cause concern during subsequent higher level reviews.

4.1.2 Certification

DQC certification is required for the final design package and OMRR&R manual. A summary report of all comments and responses will be available throughout the review process. Table 3 summarizes the ATR review timeline for the Project.

Table 3. District Quality Control/Assurance (DQC) Review

60% Design Package			
Activities	Duration	Start	Finish
Review and comment entering	60	1-Sep-19	31-Oct-19
Evaluate and incorporate DQC comments	30	1-Nov-19	31-Jan-20
Back check	30	1-Mar-20	31-Mar-20
Certification	30	31-Mar-20	30-Apr-20
90% Design Package			
QC/QA on 90% design submittal, resolving all outstanding technical issues with AE and package documents for ATR review	3	02-Mar-20	05-Mar-20
99% Design Package			
QC/QA on 99% design submittal, resolving all outstanding technical issues with AE and package documents for BCOES #2 review	3	03-Aug-20	06-Aug-20
100 % Design Package			
QC/QA on 100% design submittal with BCOES #2 comments Resolved	3	02-Dec-20	05-Dec-20
OMRR&R Manual			
Kick-Off meeting & DQC review	60	TBD	TBD
Evaluate and incorporate DQC comments	30	TBD	TBD
Back check and Certification	30	TBD	TBD

4.2 Agency Technical Review (ATR)

For design plans and specifications, the ATR is managed by the review management organization (RMO). For this project, the RMO is the South Pacific Division (SPD). SPD will identify individuals capable of performing the ATR, or may identify an ATR lead who will then identify the various individuals to perform ATR.

4.2.1 ATR Lead

An ATR lead shall be designated by the RMO for the ATR process. The proposed lead will have expertise in design and construction. The ATR lead shall provide the following:

- Information necessary to team members on the project, the schedule, and the information necessary to conduct a proper review.
- Setting up the communication with the PDT, for providing a summary of critical review comments, collecting grammatical and editorial comments from the ATR team, facilitating the resolution of the comments, and certifying that the ATR has been conducted and resolved in accordance with policy.

To ensure independence, the ATR lead shall be from outside the home MSC (division). EC 1165-2-217 requires that DrChecks (<https://www.projnet.org/projnet/>) be used to document all ATR comments, responses, and associated resolution accomplished.

4.2.2 Agency Technical Review Team (ATRT)

The ATRT will be comprised of individuals that have not been involved in the development of the decision or implementation documents and will be chosen based on expertise, experience, and/or skill. The members will roughly mirror the composition of the PDT and will reside outside of the District Office. Each review team member will have a minimum 10 years of experience and education in their respective discipline. A statement of qualifications is required for acceptance of review team members. The ATRT members will be identified by the lead RMO prior to the review being conducted. Either SPN or SPD may nominate ATRT members.

If other disciplines/functions are needed to be involved in the project, they shall have similar general experience and educational backgrounds.

4.2.3 Communication

The communication plan for the ATR is as follows.

- The technical lead will notify the ATR lead when the document has been posted for review.
- The team will use DrChecks to document the ATR process. The technical lead will facilitate the creation of a project portfolio in the system which allows PDT and ATR member's access. An electronic version of the document or products for review (design drawings, specification, and DDR) will be posted on DrChecks or through SharePoint to the team at least one business day prior to the comment period.
- The ATR lead will notify the technical lead as to when comments in the system are final.
- A revised electronic version of the documents with comments incorporated shall be posted on DrChecks or SharePoint for use during back checking of the comments.

4.2.4 Review

The ATRT shall review the product and the scope of work to gain an understanding of the project. Comments on preliminary drawings and scope shall be submitted into DrChecks. The ATRT shall pay particular attention to one's discipline but may also comment on other aspects as appropriate. ATRT reviewers that do not have any significant comments pertaining to their assigned discipline shall provide a comment stating this and thus the comment shall be acknowledged by the PDT team for backcheck and close-out.

Grammatical and editorial comments shall be provided, particularly for the specification portion of the package submittal. However, these comments should not be submitted into DrChecks.

Grammatical comments should be submitted to the ATR lead via electronic mail using email or the track changes feature in the MS Office compatible document or as a hard copy mark-up. The ATR lead shall provide these comments to the technical lead. Review comments shall contain these principal elements.

- A clear statement of concern
- The basis for the concern, such as principle, policy, or guidance
- Significance for the concern
- Specific actions or recommendations to resolve the comment
- The "Critical" comment flag in DrChecks shall not be used unless the comment is discussed with the ATR lead first.

4.2.4.1 *PDT responsibilities*

Depending on the responsibility for the work effort, either the PDT or the architect-engineer (A-E) shall review comments provided by the ATRT in DrChecks and provide responses to each comment using "Concur, Non-Concur, or For Information." Concur responses shall state what action was taken and provide revised text from the report if applicable. Non-concur responses shall state the basis for the disagreement or clarification of the concern and suggest actions to negotiate the closure of the comment. PDT members shall contact ATRT members, either by telephone or email, to discuss any "Non-Concur" responses prior to submission.

4.2.5 Resolution.

ATRT reviewers shall backcheck PDT responses and either close the comment or attempt to resolve any disagreements. Telephone calls shall be used to resolve any conflicting comments and responses.

A reviewer may close a comment if the comment is addressed and resolved by the response, or if the reviewer determines that the comment was not a valid technical comment as a result of rebuttal, clarification, or additional information, or because the comment was advisory, primarily based on individual judgment, opinion, or editorial. If the reviewer and responder cannot resolve a comment, it should be brought to the attention of the ATR lead. If the ATR lead cannot resolve, the ATR lead and the PDT technical lead will attempt to resolve.

When resolution is not readily achievable, the RMO should engage the Planning Center of Expertise (PCX) or MSC subject matter experts (SME) to help facilitate resolution, and they in turn may choose to engage USACE Headquarters (HQUSACE) SMEs. The vertical team will be informed of any unresolved comments, policy variations, or other issues that may cause concern during subsequent higher level reviews. A comment may also be closed when it has been addressed or deferred to the policy compliance review process by HQUSACE.

4.2.6 Certification.

ATR certification is required for the final design package and OMRR&R manual. A summary report of all comments and responses will be available throughout the review process. Table 4 summarizes the ATR review timeline for the project.

Table 4. Agency Technical Review (ATR)

(ATR) – 90% Design Package			
Activities	Duration	Start	Finish
ATR Kick-Off meeting and ATR review	55	06-Mar-20	30-Apr-20
AE provides response to ATR comments in DrChecks	30	1-May-20	31-May-20
Backcheck documents on 99% design package	45	30-Jul-20	13-Sep-20
ATR review report and certification	15	13-Sep-20	28-Sep-20
(ATR) - OMRR&R Manual			
ATR Kick-Off meeting and ATR review	60	TBD	TBD
Evaluate and incorporate ATR comments	30	TBD	TBD
Backcheck	30	TBD	TBD
Report and Certification	15	TBD	TBD

4.3 **Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Review.**

ER 415-1-11 establishes policy and systematic procedures for conducting effective reviews of a project's BCOES characteristics. ER 415-1-11 will be followed during the design phase of the project. If procuring an A-E for the design, the BCOES review results are to be incorporated into the procurement documents for all construction projects. This regulation applies to all USACE organizations that perform design or award or administer contracts requiring construction or design-build (D-B) construction activities. BCOES reviews will be conducted by SPN engineering, operations, environmental, and construction division staff. A BCOES review is conducted to ensure:

- Contract documents can be understood, bid, administered, and executed.
- That the project being reviewed can be constructed according to the government's requirements and proposed duration, and the ease of understanding and administering the contract documents during their execution.
- That the project can be operated and maintained efficiently over the facility's life cycle.
- That natural resources are unaffected by construction and operation of the project.

BCOES team members will review the work products for biddability, constructability, operability, and environmental by placing all comments in DrChecks. The BCOES team, upon review of the revised final work products, shall complete the BCOES certification. The work products for which BCOES will be applicable are the design package, specifically the design set of drawings and the engineering considerations and instructions to field personnel (ECIFP) as appropriate. Table 5 summarizes the review steps and estimated dates.

Table 5. Bidability, Constructability, Operability, Environmental and Sustainability (BCOES)

(BCOES) - 99% Design Package			
Activities	Duration (Days)	Start	Finish
Initial BCOE review #1			
Initial BCOES (BCOES #1)	60	17-Sep-19	31-Dec-19
BCOE review #2			
Phase I BCOE #2 review and BCOES #1 Backcheck	45	14-Aug-20	28-Sep-20
AE evaluates and provided response to BCOES comments in DrChecks	10	29-Sep-20	9-Oct-20
Backcheck	10	29-Oct-20	8-Nov-20
Phase I - BCOES Certified	10	28-Nov-20	8-Dec-20

4.4 Phases of Reviews.

The Dry Creek plans, specifications, and engineering reports will be provided to the reviewers by the project technical lead. For this project, the review will be required at specific product delivery phases. In the case of the design package, reviews will be required for 60%, 90%, and for final 99% design package. The tables provided in the corresponding review stages are an estimated delivery date for the various product reviews. The start and finish dates of the reviews are subject to change based on the approval date of the PPA.

The ATR of the cost estimate may be conducted by pre-certified district personnel within the region as designated by the Walla Wall Cost Mandatory Center of Expertise (MCX). A pre-certified list of cost personnel has been established and is maintained by the Cost MCX.

4.5 Value Engineering Studies

USACE current policy requires that value engineering (VE) studies be performed on all USACE projects or project elements with a programmed cost of \$2,000,000 or more unless a determination can be made that a study would not be cost effective. Early coordination has been made during the study phase of the project with the District's value management specialist. Further discussion and evaluation of the project has resulted in determination of the study being done during the PED phase of the project. Per the VE Management Plan (VMP), the PDT will coordinate with the VE specialist to head start the process so that any valuable outcome of the study can be incorporated into the design early on. Below are the estimated timelines for the study.

(VE) - 60% Design Package:			
Activities	Duration (Days)	Start	Finish
Coordination	16	1-Oct-19	16-Oct-19
Contract ¹	105	17-Oct-19	9-Feb-20
Perform VE	5	9-Dec-19	13-Dec-19
Present results and recommendation	2	16-Dec-19	17-Dec-19
Prepare Value Engineering Report	10	18-Dec-19	9-Feb-20
Report Review	12	9-Jan-20	21-Jan-20

¹ The contract was delayed due to impacts from the Kincaid fire in Sonoma County, CA and the study was rescheduled to December..

Final Report Submittal	4	22-Jan-20	27-Jan-20
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4.6 Model Certification.

Planning studies and engineering designs shall generally use well-known and proven USACE developed or commercially available software. The utilization of Community of Practice preferred software is strongly recommended, unless circumstances dictate otherwise.

The criterion identified for model certification is technical soundness. Technical soundness reflects the ability of the model to represent or simulate the processes and/or functions it is intended to represent. The performance metrics for this criterion are related to theory and computational correctness. In terms of the theory, the certified model should: 1) be based on validated and accepted “state of the art” theory; 2) incorporate USACE policies and requirements; 3) properly incorporate the conceptual theory into the software code; and, 4) clearly define the assumptions inherent in the model.

In terms of computational correctness, the certified model should: 1) employ proper functions and mathematics to estimate functions and processes represented; and, 2) properly estimate and forecast the actual parameters it is intended to estimate and forecast. A certified model will stand the tests of technical soundness based on theory and computational correctness, efficiency, effectiveness, usability, and clarity in presentation of results. However, a certified model is not required for Continuing Authorities Program (CAP) studies.

The following engineering model is anticipated to be used before the design is finalized and is ready for construction:

Model Name and Version	Brief Description of the Model and How It Will Be Applied	Cert/Approval Status
HEC-RAS 4.1.0	The software will allow to perform one-dimensional steady flow, one and two-dimensional unsteady flow calculations, sediment transport/mobile bed computations, and water temperature/water quality modeling. The designer (A-E) used the 1-D hydraulic model of Dry Creek downstream of WSD to develop the general dimensions for the proposed grading and secondary channel dimensions.	USACE Approved for Use

4.7 Meeting Reports.

Meeting reports will be prepared for significant meetings with the sponsor. Any meeting, at which decisions are made, action items are assigned, or agreements reached must be documented. All actions will be noted in the meeting report.

5 - CUSTOMER REVIEW

A customer review will be conducted to ensure the customer’s expectations as agreed upon for the project are met. The customer review will take place concurrently with the ATR, and will likely occur as design milestones are completed.

6 - PUBLIC REVIEW

The public will have the opportunity to review the Dry Creek review plan. Public dissemination of the documents will be posted at the USACE website. <http://www.spn.usace.army.mil/Media/USACE-Project-Public-Notices/> for a minimum of 45 days after the review plan has been finalized and approved by the commander. Comments received by the public during the posting period could impact the schedule depending on the severity of the issues in question. The website will note that the public can seek comments from scientific or professional societies. A compilation of all comments shall be forwarded to the ATR team lead within two weeks of receipt, and may ultimately be forwarded to the design and/or construction team for inclusion as part of the overall work if deemed necessary. Upon completion of the review, comments shall be consolidated in a matrix and addressed, if needed. A comment resolution meeting shall take place, if needed, to decide upon the best remediation of issues and resolution of comments. A summary of the comments and resolutions will be included in the document.

7 - REVIEW COSTS

The current cost for all the reviews including DQC, ATR, VE, and BCOES is estimated at \$300,000 (Table 6). The estimated costs shown in the table below are based on past experiences, level of complexity, stage of the design, as well as the number of specific disciplines the project review process may need. The cost to review the design package includes the plans, specifications, and project design documents.

Table 6. Review Costs

Type of Review	Cost
DQC	\$95,000
ATR	\$65,000
Value Management for VE	\$115,000
BCOES 1 and 2	\$65,000
Total Estimated Review Cost	\$340,000

8 - DOCUMENTATION

The engineering technical team lead will maintain a file of quality control records for the project. Documents to be stored in the project quality control file will include, but not be limited to, the review plan, DrChecks comments for all reviews, and review certifications.

9 - POINTS OF CONTACT

9.1 Project Delivery Team.

The PDT is comprised of those individuals directly involved in the scoping and the review of the design package. Individual contact information and disciplines are presented in Appendix A. All work products associated with this project will undergo review by the PDT for a determination of adequacy.

9.2 Vertical Team.

The Vertical Team includes District management, Division Support Team (DST), and Regional Integration Team (RIT) staff. Caleb Conn is the district support team lead for the vertical team.

Contact information: Caleb Conn at 415-503-6558.

9.3 Review Plan Points of Contact.

The points of contact for questions and comments to this review plan are as follows:

- SPN Point of Contact: Legese Abebe at 415-786-0972
- RMO Point of Contact: Boni Bigornia at 415-533-7989
- Vertical Team Contact: Caleb Conn at 415-503-6558

Appendix A – Review and Delivery Teams

PROJECT DELIVERY TEAM

Name	Discipline	Phone	Email
USACE			
Joel Flannery	Project Management	(415) 503-6848	Joel.R.Flannery@usace.army.mil
Legese Abebe	Civil Design / Technical Lead	(415) 503-6933	Legese.T.Abebe@usace.army.mil
Brian Hubel	Geotechnical Engineer	(415) 503-6916	Brian.A.Hubel@usace.army.mil
Patrick Sing	Hydraulic/Hydrology Engineer	(415) 503-6743	Janice.M.Lera-Chan@usace.army.mil
Ellie Covington	Environmental	(415) 503-6839	Ellie.L.Covington@usace.army.mil
Ali Hajali	Cost Engineer	(415) 503-6826	Ali.A.Hajali@usace.army.mil
Bonivee Delapaz	Realty Specialist	(415) 503-6745	Bonivee.A.Delapaz@usace.army.mil
David Franzen	Project Construction Engineer	(415) 503-6896	David.W.Franzen@usace.army.mil
TBD	Operations		
Sonoma Water and Consulting Firms			
David Manning	Environmental Resources Manager, Sonoma Water	(707) 547-1988	David.Manning@scwa.ca.gov
Neil Lassetre	Environmental Specialist; Effectiveness Monitoring	(707) 547-1951	Neil.Lassetre@scwa.ca.gov
Jason White	ESA, Restoration Hydrologist	(707) 796 7002	JWhite@esassoc.com
Josh Epstein	Inter-Fluve, Geomorphologist /H&H	(541) 716 5371	jepstein@interfluve.com
Mitchell Katzel	Cardno, Principal Geomorphologist/Hydrologist	707 833 2687	Mitchell.Katzel@cardno.com

DISTRICT QUALITY CONTROL TEAM

Name	Discipline	Phone	Email
Patricia Smith	Civil Design	(415) 503-6890	Patricia.S.Smith@usace.army.mil
Tessa Beach	Environmental	(415) 503-6713	Tessa.E.Bernhardt@usace.army.mil
Brian Hubel	Geotechnical Engineer	(415) 503-6916	Brian.A.Hubel@usace.army.mil
Warren Tan	Cost Engineer	(415) 503-6866	Warren.H.Tan@usace.army.mil
Janice Lera-Chan	Hydraulic/Hydrology Engineer	(415) 503-6743	Janice.M.Lera-Chan@usace.army.mil
David Franzen	Civil Engineer Constructing North Bay Resident Engineer	(415) 503-6896	David.W.Franzen@usace.army.mil
TBD	Operations		
Greg Guensch	Sonoma Water: Engineering, Design and construction, Sonoma Water (Evaluator)	(707) 547-1972	Gregory.Guensch@scwa.ca.gov
Dave Cuneo	Sonoma Water: Environmental specialist; CEQA Compliance, Permitting; Implementation Monitoring, Sonoma Water	(707) 547-1935	David.Cuneo@scwa.ca.gov

AGENCY TECHNICAL REVIEW TEAM

Name	Discipline	Phone	Email
Derek McCurdy (NWS), ATR Lead)	Hydraulic Design/Geomorphology	503 808 4867	Derek.R.Mccurdy@usace.army.mil
TBD	Geotechnical Engineering		
Matthew Fraver	Hydraulic Design/Geomorphology	(503)808-4855	Matthew.R.Fraver@usace.army.mil
TBD	Civil Engineering		
TBD	Environmental Planning		
Juan Gonzalez	Operations SME	(916) 557-7936	Juan.M.Gonzalez@usace.army.mil
TBD	Construction		

BIDDABILITY CONSTRUCTABILITY OPERABILITY ENVIRONMENTAL AND SUSTAINABILITY (BCOES) REVIEW TEAM

Name	Discipline / Position	Phone	Email
Minh Ly	Civil / Structural Engineer Construction Quality Assurance	(415) 571-4508	Minh.H.Ly@usace.army.mil
Jere Harper	Civil Engineer North Bay Area Engineer	(415) 289-3310	Jere.B.Harper@usace.army.mil
Iris Gallegos	Civil Engineer Construction QA Project Engineer	(415) 289-3313	Iris.L.Gallegos@usace.army.mil
Tessa Beach	Environmental Compliance	(415) 503-6713	Tessa.E.Beach@usace.army.mil
Son Ha	Chief of Engineering	(415) 503-6821	Son.Ha@usace.army.mil
TBD	Operations		

VALUE ENGINEERING STUDY TEAM

Name	Discipline	Phone	Email
Arnecia Williams	SPN Value Engineering Coordinator / Specialist	(213) 452-3747	Arnecia.N.Williams@usace.army.mil
Charles Zervas	Cost Engineering	(507) 208-0026	Charles.Zervas@hdrinc.com
Kevin Fellows	Civil Engineering	(916) 817-4792	Kevin.Fellows@hdrinc.com
Dragoslav Stefanovic	Water Resources/Geomorphology	(858) 712-8318	Dragoslav.Stefanovic@hdrinc.com
John Spranza	Environmental	(916) 679-8858	John.Spranza@hdrinc.com
Ed Woo	Geotechnical Engineering	(510) 285-1131	Edwin.Woo@hdrinc.com
Jose Theiler	Facilitator (Alternate)	(561) 386-3879	Jose.Theiler@hdrinc.com
Mark Watson	Facilitator	(816) 412-1287	Mark.Watson@hdrinc.com

VERTICAL TEAM

Name	Discipline	Phone	Email
Josephine Axt	Chief of Planning and Policy	(415) 503-6590	Josephine.R.Axt@usace.army.mil
Maryann Blouin	Assistant Division Counsel	(415) 503-6634	Maryann.Blouin@usace.army.mil
Boniface Bigornia	Levee Safety Program/RMO Manager	(415) 503-6567	Boniface.G.Bigornia@usace.army.mil
Nedenia Kennedy	Biological Sciences/ Environmental	(415) 503-6585	Nedenia.C.Kennedy@usace.army.mil
Cindy Tejada	Watershed and Floodplain Program	(415) 503-6591	Cindy.L.Tejeda@usace.army.mil
Charles Rairdan	Chief of Real Estate Acquisition	(415) 503-6592	Charles.C.Rairdan@usace.army.mil

NOTE: *Personnel names shown on all tables are subject to change due to workload, unavailability, and other unforeseen future changes. As a result, the list will be constantly updated as review period approaches.*

Appendix B - Acronyms

A-E	Architect-Engineer
ATR	Agency Technical Review
ATRT	Agency Technical Review Team
BCOES	Biddability, Constructability, Operability, Environmental and Sustainability
CAP	Continuing Authorities Program
D-B	Design-Build
DDR	Design Documentation Report
DQC	District Quality Control
DST	Division Support Team
DFW	California Department of Fish and Wildlife
EC	Engineer Circular
ECIFP	Engineering Considerations and Instructions to Field Personnel
EOP	Environmental Operating Principles
ER	Engineers Regulation
ESA	Endangered Species Act
GI	General Investigation
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IEPR	Independent External Peer Review
MCX	Mandatory Center of Expertise
MSC	Major Subordinate Command
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
PCX	Planning Center of Expertise
PDT	Project Delivery Team
PED	Preconstruction, Engineering and Design
PMP	Project Management Plan
PPA	Project Partnership Agreement
QA	Quality Assurance
QC	Quality Control
RCP	Reinforced Concrete Pipeline
RIT	Regional Integration Team
RMO	Review Management Organization
SCWA	Sonoma County Water Agency
SME	Subject Matter Expert
SPN	San Francisco District
SPD	South Pacific Division
USACE	U.S. Army Corps of Engineers
VE	Value Engineering
WSD	Warm Springs Dam