FINAL REPORT

US Fish and Wildlife Service
Fish Passage Forum
Agreement #F13AC00686

Project Title: Branciforte Dam Removal Project

Project Narrative: The project reach is located on Branciforte Creek, a tributary to the San Lorenzo River, in Santa Cruz County, CA (please refer to Exhibit A, Project Location Map) which supports habitat for steelhead (*Oncorhynchus mykiss*) and coho *(Oncorhynchus kisutch)*. A dam structure (refer to Figure 1 below) had created a partial barrier to three miles of upstream rearing and spawning habitat on Branciforte Creek. The dam was approximately 8 ft. tall, 40 ft. long, and 1.5 ft. wide at its crest, tapering to a wider dimension at lower elevations. The dam was constructed in 1931, with the original materials estimate including 10 cubic yards (CY) of gravel, 12.5 CY of sand, 20 CY rock, 240 sacks of concrete, 1,800 lbs. of 0.5 inch (in.) square reinforcing steel and 6 automobile chassis. The downstream face of the dam contained ~1 ft. diameter rocks set into the concrete. The initial purpose of the dam appears to have been water supply, recreation and fire protection, though it was no longer being used for these purposes. A steep-pass Denil-type aluminum fish ladder had been installed in the early 1990's, replacing a earlier passage structure comprised of rock step pools. There was a 22 inch (in.) diameter low level grated drain structure within the dam (as seen in the photo) which conveyed stream flow until its capacity was surpassed or became plugged, at which point the dam would fill and spill down the fish ladder and then subsequently over the dam crest.

Figure 1. Dam, pre-construction (photo provided by Alnus Ecological)

While there are other known fish passage barriers on Branciforte Creek, the Branciforte Dam Removal project was identified as a priority project by NOAA, California Department of Fish and Wildlife (DFW) and the County. Upstream of the Branciforte Dam, there are three flashboard dams that are partial barriers during low flow conditions. Two of these dams will be the focus of future barrier removal efforts in Branciforte Creek. The third flashboard dam is three miles upstream where Branciforte Creek transitions into the smaller Blackburn Gulch. Due to its high location in the watershed, this dam is not a current priority for fish passage by NOAA, California Department of Fish and Wildlife (DFW), or County fisheries biologists. While there are two partial low flow barriers upstream of the Branciforte dam, neither are considered to be full passage barriers to diadromous fish. Downstream of Branciforte

Dam, there are four structures that may be partial barriers under specific flow conditions. Two of these structures, the Branciforte Flood Control Channel and collapsed bridge abutments, are partial barriers during low flow conditions. The other two flashboard dam structures can be partial passage barriers if the flashboards are not removed during the migration season. None of these structures are currently priority for fish passage by NOAA, DFW or County fisheries biologists due to their low potential for impeding fish passage upstream.

The Branciforte Dam Removal Project is a decade long effort by NOAA, DFW and the County to remove a known priority fish passage barrier in the San Lorenzo Watershed. As this project was a high priority for resource agencies, the project was selected and developed through the Resource Conservation District of Santa Cruz County's (RCD) Integrated Watershed Restoration Program (IWRP), which is a collaborative program that brings together federal, state and local resource and funding agencies to select and oversee the design and implementation of high priority projects to restore watersheds and improve water quality. The State Coastal Conservancy played a pivotal role in the development of this project, by providing critical funding for designs and permits, technical assistance to develop projects with the resource agency guidance, and helping leverage funding for implementation. Through funding provided by the State Coastal Conservancy, the RCD worked collaboratively with resource agencies participating on the IWRP Technical Advisory Committee (TAC) and the USDA Natural Resources Conservation Service (NRCS) to develop the project design (please refer to Exhibit B, Designs and Specifications). Based on the project design, scope and scale, the project fit within the parameters of the RCD's streamlined Partners in Restoration Permit Coordination Program (PIR) and the RCD secured all required permits, with the exception of the DFW's Streambed Alteration Agreement, which was applied for separately (please refer to Exhibit C, Permits). The RCD applied for grant funding for the implementation phase and was awarded grant funding through the American Rivers/NOAA's Community-Based Restoration Program, U.S. Fish and Wildlife's (USFWS) Fish Passage Forum and the County of Santa Cruz.

The goals of the project were as follows: a) remove the dam to improve passage to three miles of upstream spawning and rearing habitat; b) improve in-stream habitat conditions by allowing deposited sediment, on the upstream side of the dam, to transport downstream and allow buried substrates to re-surface where it can be utilized by spawning salmonids, and; c) improve habitat complexity within the stream reach through the installation of a large woody debris (LWD) structure on the right bank. The goals were accomplished in the short term and several adjustments to the channel and bank morphology will continue over the long term.

Methodology: Provided below is a list of project methodology and milestones. All construction was completed by the contractor, Hanford A.R.C., with ongoing engineering oversight completed by cbec, inc. eco-engineering (cbec) and biological and project monitoring completed by RCD staff, Kelli Camara and *Alnus* Ecological. The site was inspected daily by a biological monitor to check the block nets and the project area for listed species. A majority of the concrete and material associated with the dam and fish ladder were

Figure 2. During construction, crews planting bank

removed and disposed of offsite. While in some instances the construction deviated from the design, cbec approved all changes and has approved project completion (with the exception of six month plant maintenance period which is still in progress).

1. **Mobilization**: Equipment and materials were delivered to project site and staged on landowner's driveway throughout construction. Landowners had access to their driveway throughout construction.

2. **Access:** An access route was selected using location of existing access trail to minimize impacts. Vegetation was removed and a route was cleared from top of bank to creek. The chosen access route differed from the access indicated in the construction documents, but was approved by the project engineer.

3. **Fish relocation:** Upstream and downstream block nets were installed, site was electrofished and fish were relocated. Fish relocation efforts were completed by NOAA, *Alnus* Ecological, Mike Podlech, Kelli Camara and RCD staff.

4. **Dewatering:** Dewatering was conducted in several phases. The first phase included the installation of an upstream longitudinal cofferdam at dam; notching dam on left; hand construct diversion channel to left bank; and diversion of flow to the notch on the left side of the dam. Once phase 1 was complete sediment was excavated to facilitate pipe installation; a hole was created in dam for bypass pipe; a 24" HDPE pipe bypass was installed; 24" pipe was covered with sediment to allow access; a channel spanning sandbag coffer dam was installed upstream and stream flow diverted to bypass pipe, with its outlet downstream of the disturbed area

5. **Channel excavation:** Excavated and placed fill on both banks and within the channel bed downstream of dam location to meet elevations called for in construction documents.

6. **Dam removal:** Hanford A.R.C. started removal on left bank (if facing downstream) and worked towards right bank and the fish ladder was removed. The contractor used a combination of a Bobcat T190 tracked skid-steer loader with a jackhammer attachment to dissemble the dam and hand crews and a Komatsu PC88 excavator to off haul material. Portions of the dam that were originally keyed into the right bank, and had become integral to bank stability, were left in place. Portions of the dam in the streambed were originally going to be left in place to minimize disturbance were actually removed once the vertical extents of the dam were confirmed.

7. **Rock and LWD installation:** Imported and placed rock slope protection on right bank; delivery and installation of large wood structure; placed and compacted soil above rock slope protection and LWD

8. **Re-watering:** Removal of bypass system and cofferdams.

9. **Restore access:** The access route was restored: the bank and hillside were re-contoured to their original slope, erosion control fabric was installed over disturbed areas and woody vegetation was planted.

10. **Erosion Control:** Hanford A.R.C installed an erosion control blanket on right bank (if facing downstream) and the RCD installed an erosion control blanket on the left bank, as requested by the landowner after construction was complete.

11. **Demobilization:** All materials in staging area were hauled off and the driveway surface was repaired for construction related damage.

12. **Install plants:** Native grasses, shrubs and trees were planted on the right bank (if facing downstream) where the project access route was.

13. **Ongoing maintenance and monitoring:** Six month plant maintenance period in progress by Hanford A.R.C., with assistance from the RCD and AmeriCorps volunteers. RCD and AmeriCorps volunteers will monitor site for next three to five years.

Results:

Timeline

- Project development, designs and permitting: February 2012- July 2013
- Construction: August 2013-October 2013
- Maintenance and Monitoring: November 2013-ongoing for three to five years

Challenges and Lessons Learned

1. As per RCD Board adopted policy, the RCD competitively bid the project. However, only one bid was received as it was late in the summer season by the time funding had been secured and a bid could be solicited. Local contractors had already committed to other projects. The bid was well over the RCD's grant budget allocation, but without finding the additional funds, the project would have had to be delayed until 2014, which was unacceptable to the project landowner. As such, the RCD sought additional funding from project partners and funding agencies, which ended unsuccessfully. The RCD then contacted American Rivers/NOAA who provided the additional funding in order to award the construction contract which was awarded to Hanford A.R.C. In an increasingly competitive time for limited grant funding, securing adequate funds within a quick timeframe to facilitate implementation will continue to be a challenge. It will continue to be and will be increasingly important to collaborate with project proponents and partners to find adequate funding to implement high priority projects. The RCD cannot take on this task independently and continue to successfully address county-wide priorities.

2. The RCD has continued to learn the importance and efficiency of working with an experienced contractor, such as Hanford A.R.C., that has worked in/around stream channels and in sensitive habitats. This limits required staff and engineering oversight, limits change orders and reduces construction impacts on the natural resources and private property.

3. During construction, the need for additional rock was identified. As such, the contractor requested a $4,000 change order. Having awarded a construction contract well over our project budget, the RCD had a very small contingency budget. The importance of budgeting for contingency funding in order to properly plan for unforeseen circumstances during the bid and/or construction process is well-known by the RCD, but will continue to be a challenge with declining grant funds, as discussed above. Looking for creative solutions and donations by project partners will be critical to addressing unforeseen circumstances.

4. On numerous occasions throughout construction, there were drastic fluctuations in stream flows that were visually observed. The fluctuations were resulting from unknown diversion activities

upstream of the project. This created a challenge for dewatering and fish relocation (see item 5 below).

5. The dewatering and fish relocation process were more challenging than anticipated. Fish relocation efforts were originally conducted on 8/23/13, relocating what appeared to be the majority of fish in the reach. Although it was clear that a few fish remained within the exclusion reach, the decision was made to avoid repeated exposure to electrofishing and allow the remaining fish to recover until the following week when the contractor would begin installing the dewatering system and the remaining fish could be relocated. However, on 8/29/13, the RCD was made aware by the contractor that the pool upstream of the dam was inadvertently dewatered without a biologist. The Hanford A.R.C crew had notched the left side of the dam by hand and hand excavated a channel in the sand bar with the intention of lowering the water level by two feet, and diverting the channel to the left bank to facilitate the bypass pipe installation on the right bank. The reason for the open channel instead of installing a pipe on the left bank was to keep the area behind the dam watered, with the assumption that the water behind the dam would equalize by flowing through the sand. Upon diverting the flow away from the right bank, the area behind the dam dewatered rapidly, did not equalize, and fell below the elevation of the water in the open channel. The Hanford A.R.C. crew then addressed turbidity from this flow by installing filter fabric at the outlet to the pool immediately below the dam and then ceased work for the day. Following the crew leaving, the flow dropped substantially (see item 4 above) which began to isolate and dry the pool. Upon visiting the site in the late afternoon of 8/29/13, Kelli Camara relocated stranded fish and also observed two fish mortalities in the pool above the dam. The RCD immediately notified NOAA of the situation and worked in coordination with the contractor, engineer and *Alnus* Ecological on a solution to address the challenge with the upstream pool. On 8/30/13, Aquatic Ecologist, Mike Podlech, Kelli Camara and RCD staff relocated additional fish in the upstream reach and the contractor worked with the engineer on a final dewatering plan. Additional fish were relocated by net on 9/2/13 and the construction site was fully dewatered on 9/6/13 and additional fish were relocated by Mike Podlech and Kelli Camara at that time. Just before construction finalized, there was an abrupt increase in stream flows (as per item 4 above) and a rush of unusually turbid water flowed through and nearly overtopped the block nets. Kelli Camara and the RCD assessed the site and approved the continuation of work.

6. One of the private landowners had numerous requests and concerns brought up throughout construction. The RCD worked through each of these with the landowner, project team and contractor. While the project team met with this landowner during the project planning phase to discuss the scope of the project, we were reminded of the importance of this step and how critical it is to emphasize (and potentially document) all of the potential impacts early in the planning stage to avoid/ limit confusion later in the process. Examples of the array of requests and concerns are as follows:

    a) <u>Request that construction access not be located on landowner's side of the creek:</u> The project was specifically designed to honor this request and construction access took place on opposite bank on a neighboring property.

    b) <u>Request to keep valve from dam:</u> Contractor delivered this to landowner's property.

c) Request to not park on pull-out across from landowner's house: With the exception of some of the delivery trucks, all vehicles parked elsewhere throughout construction.

d) Request for installation of a footpath access to creek: The removal of the dam resulted in a steepened slope where landowner had accessed the creek for decades. The landowner requested the construction of a new access route in a similar location to the previous route. The RCD and cbec explained to the landowner that there were concerns with constructing a new access route in a steep area that would be adjusting and changing over time and discussed the option of using the existing access route located just downstream but the landowner insisted on a new access near the previous pathway. The project team evaluated options, walked through the proposed route that was identified with the landowner and the contractor moved forward with constructing the footpath.

e) Blocking the previous access route on landowner's bank: The landowner requested that material be placed to block the previous access route due to safety concerns. The RCD asked the contractor to place large material to block the previous access point, which they did. The landowner then requested that the wood material be anchored so it doesn't get moved and the RCD is currently working with the contractor on this request.

f) Movement of downed bay on landowner's bank: There was a miscommunication about a downed bay tree on landowner's bank. Someone allegedly told the landowner that they would chop the bay into fire wood but the wood was instead incorporated into a large wood structure on the opposite bank. We apologized for the miscommunication and tried to remedy the miscommunication by asking the contractor to deliver several pieces of bay wood from the trees felled on the opposite bank to the landowner's property.

g) Outstanding concern with condition of bank on landowner's side: Landowner requested that bank protection measures be installed along the bank on their side of the creek because landowner was concerned about the stability of the bank during storm events. Such bank protection measures were not originally included in the project design because it's expected that this bank will continue to adjust and it's our understanding this possibility had been communicated to landowner early on in the design/project planning process. During excavation of sediment required to implement the dam removal, the contractor did not encounter any "natural" bank material on landowner's bank. Everything that was excavated, and all that is currently exposed is fluvial sediment, not former bank or hill slope material. This kind of material is there because of the deposition environment created by the dam, and there is no reason to expect it to stay there without the dam in place. As such, this bank is expected to be dynamic over the first 1-2 winters as sediment entrained, transported and deposited as the channel reaches a new equilibrium state. It's expected that there will be a lot of adjustment before the channel reaches this equilibrium state in the future. It's for this reason, protection measures for this bank were not included in the design and any measures that we could implement would be expected to function incorrectly because the bed and banks will be actively adjusting. For example, if erosion control blanket was installed, it's anticipated that the

creek flows would alter the configuration of the toe of bank, and potentially detach and/or alter the blanket which will make it ineffective and may potentially create more problems at the site, or downstream. These points were communicated to the landowner but they continued to express concern and insisted on the installation of additional bank protection measures. While it's not expected that an erosion control blanket will function correctly if exposed to creek flows while the bed and bank are adjusting and there is no additional grant budget to purchase, install or maintain additional erosion control materials, the RCD and cbec agreed to install an erosion control blanket to try and address the landowner's concerns. cbec offered to purchase the materials and lead a work day to place erosion control fabric on landowner's bank. cbec selected the location and methods for placing the fabric to maximize its effectiveness and cbec, the RCD and AmeriCorps volunteers installed erosion control blanket on the landowner's bank and explained that the landowner would be responsible for monitoring and maintaining the erosion control blanket.

7. The dam was much more difficult to decommission than originally expected due to its solid construction which was comprised of *significant* amounts of rebar, several automobile chassis, rock and concrete. The dam was decommissioned piece-by-piece using a combination of a Bobcat skid-steer loader with a jackhammer attachment to dissemble the material (as seen in Figure 3), hand crews, and an excavator to off haul the material to the staging area. This component of the project took much more time for the contractor than the contractor anticipated.

Figure 3. Bobcat chipping away at dam structure

8. During the construction of the main access route to the creek, the root system of a cluster of bay trees was significantly disturbed. There was significant concern regarding the stability of the trees, so the RCD asked the contractor to have their arborist inspect the trees. Per the arborist's recommendation, the contractor removed four (4) bay trees to avoid the potential of these falling and impacting both stream banks. RCD staff collaborated with agency staff to approve this change in designs.

Table 1. Habitat Type and Number of Stream Miles Opened

Habitat Type	Actual Stream Miles Opened for Fish Access	Projected Stream Miles Opened for Fish Access
In-stream	3	3

Monitoring and Maintenance Activities:

- Photo monitoring (refer to Exhibit D, Photo Documentation) was conducted pre-, during- and post-construction. The RCD collaborated with NOAA and cbec on the installation of time lapse cameras which were installed upstream and downstream of the dam. Time lapse photos are in the process of being compiled and a copy of the final time lapse product will be sent to NOAA and American Rivers upon completion. Time lapse cameras will be left up during at least the first season of storm events to document changes to the channel morphology. Additional photos were taken by the project team throughout construction.

- Daily biological monitoring inspections were completed prior to the commencement of construction activities each day. Biological monitors were also onsite during the following project milestones: electro-fishing and fish relocation efforts; dewatering activities; installation of coffer dams; removal of concrete blocks in-stream, and; re-watering of the stream.

- Engineering construction oversight was completed by cbec to ensure the project was constructed according to the designs and specifications. All design changes encountered during construction were reviewed and approved by cbec. Because this was a PIR project, the NRCS was also required to conduct pre-, during- and post construction inspections.

- RCD staff and IWRP Coordinator, Jim Robins, conducted ongoing construction oversight to ensure the project was being completed in accordance with permits.

- The contractor, Hanford A.R.C, will be completing a six month monitoring and maintenance period for the plantings installed as part of the project to ensure that the established success criteria is met (to be funded through the County of Santa Cruz).

- RCD, in coordination with volunteers through the Watershed Stewardship Project, will conduct annual maintenance and monitoring for three (3) to five (5) years, as required through the RCD's PIR program.

Community Involvement: AmeriCorps volunteers, through the Watershed Stewards Project (WSP) have/ will continue to assist with plant maintenance and ongoing monitoring activities over a 3-5 year period. The mission of WSP is to conserve, restore and enhance anadromous watersheds for future generations by linking education with high-quality scientific practices. WSP is a project of the California Conservation Corps, is administered by California Volunteers and sponsored by the Corporation for National and Community Service.

Outreach Activities: The RCD is in the process of working with NOAA and cbec on compiling a time lapse video of the project pre-, during- and post-construction, including at least the first winter following construction to document changes to the channel morphology adjusts. A copy of this photo project will be provided to American Rivers and made available to project partners as an outreach tool. The RCD and landowner also hosted a tour for the RCD Board of Directors to provide an overview of the project and address long term goals for habitat restoration and dam removal in the watershed.

Additional Project Benefits: An additional goal of this project is to have this be a demonstration project for additional dam removals in the San Lorenzo Watershed as there are several known dams throughout the watershed, including additional dams on Branciforte Creek.

Supporting Materials:

Please refer to Exhibit A-Project Location Map, Exhibit B-Designs and Specifications, Exhibit C-Permits and Exhibit D-Photo Documentation.

As the project location is not directly visible to the public, the RCD requested an exemption for the signage requirement which was approved by American Rivers on 8/16/13 and NOAA on 8/19/13.

Funding Information (Cash and In-kind):

Table 2. Itemized Budget Table

Budget Category	USFWS Budget		Match (non-federal)		Match (federal)		Total
	Original	Actual	Match	Description	Match	Description	
PERSONNEL							
Salaries	$2,497.00	$2,497.00	$13,633.50	State Coastal Conservancy cash match ($7,677.50) and James Irvine Foundation private match ($2,706)	$12,510.00	American Rivers/NOAA cash match	
Volunteer			$618.75	RCD Board Tour 10 x 2.5 hr @ CA volunteer rate of $24.75			
CONTRACTUAL							
Design Contract							
cbec			$39,093.75	State Coastal Conservancy cash match			
Construction							
Hanford ARC	$10,000.00	$10,000.00	$8,155.00	County cash match ($4,425) and Hanford ARC cash match ($3,730)	$92,364.00	American Rivers/NOAA cash match	
Vaughn Forestry					$2,000.00	American Rivers/NOAA cash match	
Consultant Fees							
Mike Podlech					$1,150.00	American Rivers/NOAA cash match	
CCMI			$575.00	County cash match ($4,425) and Hanford ARC cash match ($3,730)	$815.00	American Rivers/NOAA cash match	
CBEC (conservation ovrsite)			$13,217.50	State Coastal Conservancy cash match ($8,400) and consultant in kind ($4,817.50)			
Alnus Ecological			$13,407.07	State Coastal Conservancy cash match ($8,400) and consultant in kind ($4,817.50)			
County of Santa Cruz			$3,962.00	County in-kind			
OTHER COSTS							
Permit Fees			$840.25	State Coastal Conservancy cash match			
Travel			$358.30	State Coastal Conservancy cash match	$200.65	American Rivers/NOAA cash match	
Supplies			$1,925.47	State Coastal Conservancy cash match ($986) and CBEC personal match ($939.47)	$192.14	American Rivers/NOAA cash match	
Filing Fee-NOC					$22.00	American Rivers/NOAA cash match	
Administrative Costs			$3,135.00	State Coastal Conservancy cash match	$868.49	American Rivers/NOAA cash match	
Project Overages			$122.71	Local RCD match			
TOTAL	**$12,497.00**	**$12,497.00**	$99,044.30		$110,122.28		**$221,663.58**

Budget Narrative

- Personnel: RCD's grant funded time included: grant management including invoicing, reporting and budget management; contracting with consultants, contractor and landowners; project oversight; biological monitoring, and; project-close out tasks. Match included personnel time to review of design materials and drafting permit applications and PIR materials. Leveraged personnel funding supported construction oversight and project close-out activities.

- Volunteer: Match included in-kind time for the RCD Board of Directors tour of the project to educate Board members about the project and to discuss long term restoration goals in the watershed.

- Contractual Costs:
  - Hanford A.R.C: This company was awarded the construction contract during the competitive bid process. They were, however, the only bid received and the bid received was over the grant budget originally available.
  - Mike Podlech: Match activity consisted of fish relocation activities. As described in the sections above, dewatering and fish relocations took more time than anticipated. Original fish relocation efforts were completed by *Alnus* Ecological and NOAA but due to availability and required time for this phase of the project, the RCD allocated grant funding for a Fisheries Ecologist to provide additional fish relocation services.
  - Vaughan Forestry: The RCD purchased the log and rootwad from Vaughan Forestry using funding from American Rivers/NOAA grant. These materials were delivered to the site by Vaughan Forestry and installed by Hanford A.R.C for the in-stream LWD structure.
  - Contractor Compliance and Monitoring, Inc. (CCMI): The RCD contracted with CCMI to monitor federal prevailing wage requirements. A portion of this service is funded by the American Rivers/NOAA grant and the ongoing portion for Hanford A.R.C.'s maintenance phase will be funded by the County.
  - cbec: Through match grant funding from the State Coastal Conservancy, cbec completed the engineering design (in coordination with NRCS and the IWRP TAC) and provided engineering construction oversight. cbec also allocated in-kind time to the project.
  - *Alnus* Ecological: Through match grant funding from the State Coastal Conservancy, *Alnus* Ecological coordinated with the IWRP TAC throughout all phases of the project, provided ongoing technical throughout all phases of the project, assisted with fish relocation efforts and provided biological monitoring during construction.

- Other Costs:
  - Permit fees: Match included the $840.25 DFW permit fee funded by the State Coastal Conservancy.
  - Travel: This includes all trips to and from the project by all members of the project team (grant and match funded), a trip to the County to file the Notice of Completion and a trip to Monterey to compile and meet with NOAA about the time lapse photos.

More travel time was needed for the oversight and coordination of this project so the RCD allocated a portion of funding from other line items.

- Supplies: Supplies funded through the American Rivers/NOAA grant included waders and measuring tape for the RCD and AmeriCorps' project monitoring activities. One of the landowners also requested a photo of the dam pre-construction so the RCD printed and prepared a framed photo for the landowner. The total cost of supplies was less than initially anticipated so remaining funds in this line item were allocated to other budget categories that required additional funds. Match included survey equipment during the design and implementation phases, purchase of a time lapse camera and erosion control materials funded through the State Coastal Conservancy and cbec.
- Filing Fee-Notice of Completion: County of Santa Cruz has a $22 fee for filing a Notice of Completion for construction projects.
- Project Overages: The RCD provided match for the overage cost associated with the American Rivers/NOAA budget in the amount of $122.71.
- Administrative costs: Includes projected administrate costs that can't be recovered in other budget categories including utilities, office space rental, phone and copying directly related to the project. Match included administrative time during the design and permitting phase.

Restoration Information

What indirect benefits resulted from this project? (e.g. improved water quality, increased awareness/stewardship)?

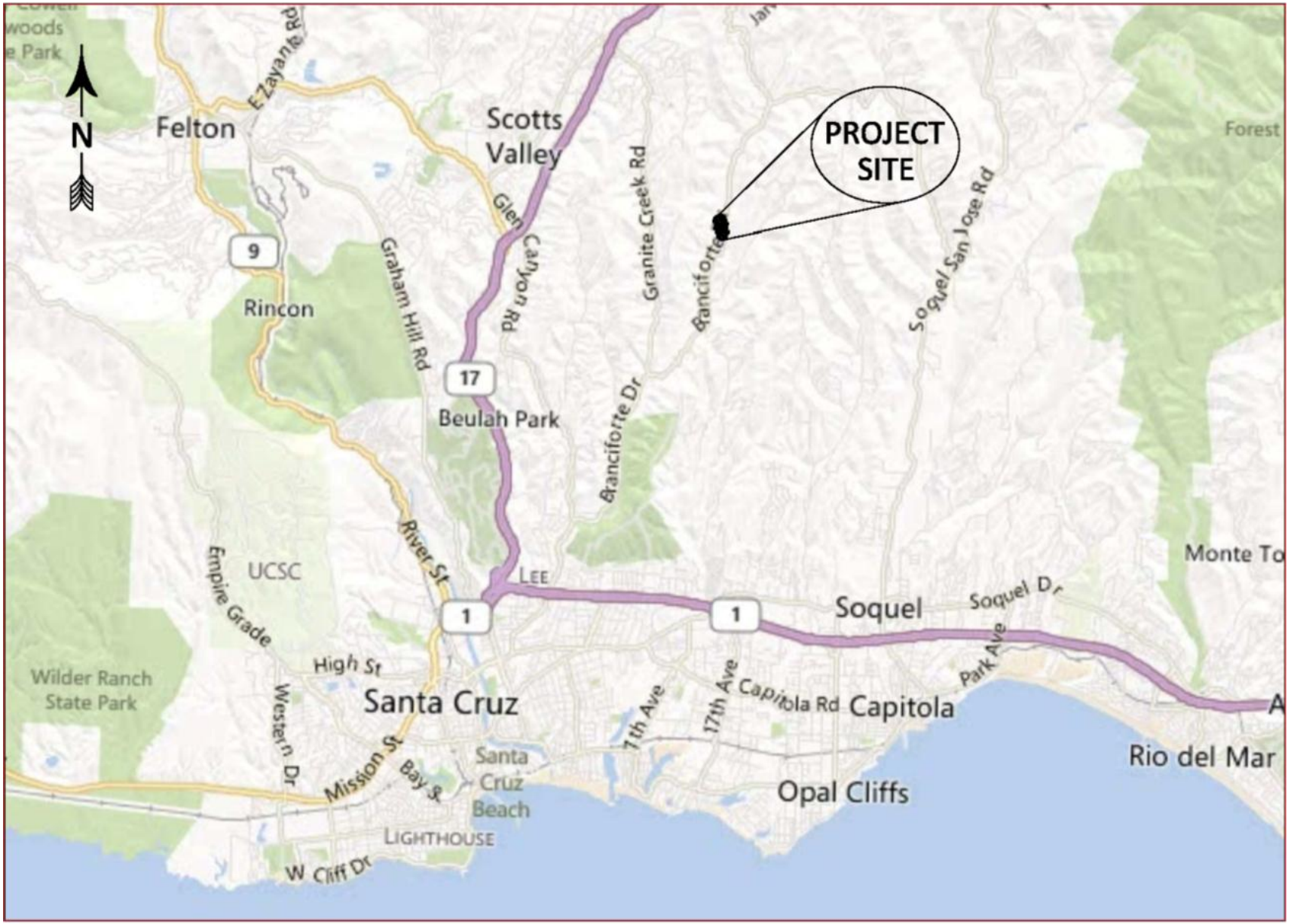
As outlined in the *Project Challenges and Lessons Learned* section, the project team and contractor visually observed significant fluctuations in stream flows throughout construction. This project has already resulted in further agency staff investigations into water use on Branciforte Creek.

Additional indirect benefits of this project are both the economic and regulatory relief to the landowners. The time, permitting, cost and complexity of this project would be a significant challenge for the individual landowners to pursue. The RCD was able to assist the landowners with securing grant funding for nearly every aspect of the project, including designs, permits and construction. The RCD was able to accomplish this in an extremely time efficient manner due to the IWRP and PIR processes which are effective mechanisms at developing and implementing high quality project in a short period of time. While the RCD is non-regulatory, we often work with landowners on regulatory compliance and/or relief. In this particular case, the landowners were being required by NOAA and DFW to remove the dam. The RCD played a pivotal role in working with the landowner on implementing the project and thereby relieving regulatory pressure. It's our hope that the project's direct and indirect benefits will allow this to be a demonstration project for other landowners in the watershed that have dams and expressed willingness to remove them once the Branciforte Dam project was complete.

Report Prepared By:  12/31/13

Signature Date

Exhibit A. Project Location Map



cbec
eco engineering

Hydraulics | Hydrology | Geomorphology | Design

DRAWING AND SPECIFICATIONS

Branciforte Dam

Dam Removal Project
Job Code: 395

Prepared by: CBEC Eco Engineering
April, 2013

MEMORANDUM

Date:	April 5, 2013
To:	Jim Robins, Alnus Ecological; John Morely, RCDSCC
From:	Chris Hammersmark, PhD, PE; Ben Taber, BS, EIT
Project:	12-1007 – Branciforte Dam Removal Design
Subject:	Branciforte Dam Removal - Basis of Design Report and 100% Complete Plan Set

Introduction

This memorandum summarizes the basis of design, design details and construction considerations for the proposed modification/removal of Branciforte Dam on Branciforte Creek. The attached engineering plans have been developed to a 100% level of completion, and stamped.

Site Description and Background

Branciforte Dam is located on Branciforte Creek near Happy Valley in Santa Cruz County at an elevation of ~240 feet (ft) (Lat.: 37.0380, Long.: -121.9848). The dam is ~8 ft tall (visible portion excluding sub-grade foundation), 40 ft long, and 1.5 ft wide at its crest, tapering to a wider dimension (3+ ft) at lower elevations (Figure 1). The dam was constructed in 1931, for a price of $630 with the original materials estimate including 10 cubic yards (CY) of gravel, 12.5 CY of sand, 20 CY rock, 240 sacks of concrete, 1,800 lbs of 0.5 in square reinforcing steel and 6 automobile chassis. The downstream face of the dam contains ~1 ft diameter rocks set into the concrete. The initial purpose appears to have been water supply and recreation; however it is no longer used for these purposes. It has withstood many large flow events (i.e., floods of 1940, 1956, and 1982) without the need for major repair (Ben Cahill, pers. comm.). A steeppass Denil-type aluminum fishway is present (not original), as well as evidence of an earlier passage structure which the present fishway replaced. There is a 22 inch (in) diameter low level grated outlet positioned above grade, which conveys flows until its capacity is surpassed or it becomes plugged, at which point the dam fills and then spills down the fishway and then subsequently over the dam crest.

Fish Passage

Steelhead trout utilize Branciforte Creek to spawn and rear. At present, the dam poses an impediment to both upstream and downstream migration. Passage is possible at some flow rates either through the low level outlet (if not blocked by debris) or the fishway. The barrier is 6-8 ft tall depending on

flow/tailwater conditions. Fisheries surveys have observed steelhead upstream of the dam, so it is believed that adult fish can pass upstream during some flow conditions.

Design Objectives

The primary objectives of the dam removal are to:

- improve upstream and downstream migration/passage of anadromous fish by increasing the range of flow conditions at which passage can occur;
- restore the downstream transport of sediment and organic matter;
- mimic the naturally occurring channel morphology; and
- allow the creek to perform a majority of the work performed in transporting, sorting and redistributing the sediment impounded upstream of the dam.

Secondary objectives of the project include:

- reduce the risk of bank failure in the steep banks found downstream of the dam; and
- provide a large wood structure to induce scour, providing habitat as well as a location to extract water for fire suppression purposes.

While DFG and NMFS fish passage criteria were considered, the project was not designed explicitly with achieving these prescribed depth and velocity criteria for adult and juvenile anadromous salmonids, rather it is intended that the channel will return to a condition similar to its pre-dam form.

Hydrology and Geomorphology

The drainage area upstream of the dam site is ~3.5 square miles, with an average elevation of ~669 ft and a maximum elevation of ~1274 ft. Peak flow statistics for commonly referenced recurrence interval events were generated with the USGS StreamStats program based upon regional regression equations (Waananen and Crippen, 1977). These peak flow statistics for the dam location are: 2-yr recurrence interval peak flow rate (Q_2) = 369 cubic feet per second (cfs), Q_5 = 691 cfs, Q_{10} = 900 cfs, Q_{25} = 1,150 cfs, Q_{50} = 1,330 cfs, and Q_{100} = 1,520 cfs. A gage was operated by the USGS several miles downstream on Branciforte Creek (~1 mi upstream from the confluence with the San Lorenzo River, with a drainage area of 17.3 square miles) with records available from January 1940 – September 1943 and March 1952 – September 1960; however these data have not been used in the design analysis.

The dam is situated in a laterally confined bedrock controlled canyon reach adjacent to Branciforte Drive (Figures 2 and 3). Upstream from the dam an impounded sediment wedge is present comprised of primarily sand and gravel sized material, as well as inter-bedded organic material. Contaminant testing has not been performed, but it is presumed that these impounded sediments are not contaminated. Immediately downstream of the dam, bedrock is visible on river left (Figure 4), and partially undercut portions of the at grade sill are visible at lower flow rates. Parts of the river right bank (adjacent to the fishway) have been armored with concrete, presumably to arrest erosion occurring in the current condition or perhaps due to the configuration of an earlier fishway. In some areas additional bank/bed scour around the margins of this concrete is present (Figure 4). Immediately below the dam a plunge

pool occurs on the margins of the channel, but along the centerline a lobe of fine sediment was present at the time of reconnaissance and channel topographic survey. The volume, composition and configuration of the sediments stored in the pool are variable depending upon recent flow history (Jim Robins, pers. comm.). Upstream of the impounded sediment wedge (~250 ft upstream of the dam) and downstream of the dam the channel bed is comprised of a framework of exposed bedrock, boulders and cobbles, with finer material present in the lee of larger features (see Reference Reach Section below).

Reference Reach

A reference reach was selected downstream of the dam. The reach begins ~50 ft downstream of the dam and extends ~250 ft (Figure 3). The reference reach exhibits a transitional morphology exhibiting characteristics of both step-pool and plane-bed morphologies using the Montgomery and Buffington (1997) classification system for mountain streams. Some small steps are present, primarily occurring in conjunction with bedrock outcrops on one or both banks, which constrict the channel. However, the steps present don't really occur in a repeating pattern as would be expected for a pure step-pool morphology type. Indeed the channel slope (2.2%) falls within the range identified for reaches displaying a plane-bed morphology (1.5-3%).

The grain size distribution of the bed materials in the reference reach were sampled at three locations using the modified Wolman pebble count method proposed by Bunte and Abt (2001). The grain size distributions are plotted in Figure 5. The three samples collected in the reference reach are plotted individually, as well as combined into one conglomerate sample. The median grain size (D_{50}) for the reference reach ranged from 1.1-2.5 in (28-64 mm) spanning the coarse gravel to small cobble size classes. The larger elements of the channel bed as summarized by the D_{84} range from 8.1-8.7 in (206-222 mm) qualifying as large cobbles. An additional sample collected upstream of the bridge (~325 ft upstream of the dam) showed a similar gradation of material. In contrast, a sample collected along the thalweg within the sediment wedge (which is coarser than most of the surface of the impounded sediments) had a D_{50} of 0.4 in (10 mm) and a D_{84} of 1 in (25 mm).

Roughness and energy dissipation in the reference reach are provided by: 1) large particles within the channel (occasionally arranged as steps); 2) channel banks typically composed of large particles or bedrock outcroppings; 3) large woody material (not abundant, but a few logs were present along the banks); and 4) woody vegetation (typically small alder trees) growing near the channel margins. In addition to topographic measurements taken at four cross sections within the reference reach (described below), the active channel width was also measured at five additional locations. Using this suite of measurements, the channel width ranged from 14-22 ft, with an average of 17.5 ft. The channel slope through the reference reach is ~2.2%, although it is locally steeper or more gradual through various individual morphological units. The characteristics of the reference reach were used to guide elements of the channel design.

Topographic Survey

The site was surveyed with a total station on May 3-4, 2012 in order to develop a surface model of the existing condition (Figure 6). This surface model was used to generate: 1) a current and anticipated long profile (Figure 7), 2) estimates of the volume of sediment impounded by the dam (Figure 8), and 3) cross sections of the current and potential future condition (Figure 9). Interpolating the high points of the long profile present downstream (comprised of bedrock, boulders and large cobbles), through the impounded sediment zone to bedrock/boulder/large cobble controlled riffles upstream, yields a channel slope of ~2.2%. The crest of several high points present in the long profile fall along this interpolated slope, with the majority of portions extending above this grade being primarily composed of finer sediments (sand and gravel) deposited due to the hydraulic influence of the dam, although the depositional feature present ~240 ft upstream of the dam is composed of larger cobble sized particles. Pools are present both above and below the dam. Downstream one naturally occurring forced pool is present ~250 ft downstream and a plunge pool is found immediately downstream of the dam. Upstream, two pools are present in the long profile. One formed by large wood on river right ~210 ft upstream of the dam, and another at the hydraulic constriction formed by the abutments of the bridge ~275 ft upstream of the dam.

The channel cross section immediately downstream of the dam is wider (~34 ft bottom width) than the reference reach downstream (discussed in the preceding section), exhibiting steeper bank slopes (including undercut and overhanging areas) than those occurring upstream or downstream. This localized channel widening is presumably due to bank erosion associated with hydraulic conditions resulting from the dam. In the past, the floodplain/terrace feature on river left upstream of the dam (turquoise area on Figure 6), used to extend downstream, until a large redwood tree was undermined and fell into the river (Ben Cahill, pers. comm.). At present the redwood tree which is remaining has an undercut bank with bedrock exposed at the toe of the bank (Figure 4). On the right bank, adjacent to the fishway, concrete has been placed on the bank, presumably to arrest erosion and the potential undercutting of a tree (Figure 4). Within 15 ft downstream, bedrock is visible at the toe of the right bank.

Volume of Impounded Sediment

The existing condition topographic surface was used to generate two estimates for the volume of impounded sediment with both utilizing the 2.2% assumed equilibrium grade. The first estimate uses the current downstream channel width (~34 ft) and tapers back to the channel width upstream at the point where the design grade daylights, providing an estimate of approximately 810 CY of impounded sediment (Figure 8). The second estimate utilizes a narrower bottom width more similar to the widths observed in the reference reach downstream (acknowledging that the channel immediately downstream is over-widened), with which 480 CY of impounded sediment is estimated. The major contribution to this increased estimate in method one, is the terrace on the river left bank upstream of the dam (turquoise are in Figure 6, and red area in Figure 8). Portions of this terrace are up to 9 ft above the design grade. Old tree stumps and large (cobble-boulder size) particles are present at various points of the bank toe along this feature indicating a former stream bank at the current bank location rather

than several feet to the east. For these reasons, 480 CY is a more reasonable estimate of the volume of material that will be delivered downstream following dam removal, however the higher estimate has been provided as an upper bookend. Using the average width of the reference reach and the design grade, cross sections were generated in the reach with impounded sediment present. These cross sections for select locations are shown in Figure 9.

Design Alternatives Considered

Various options were considered for the design and post-project condition. The options include:

- Partial removal or full removal of the dam
- Inclusion of designed step-pools (using either rock or logs)
- Removal of impounded sediment
- Imposition of channel form
- Inclusion of large wood

Several of these options were discussed at a Technical Advisory Committee meeting held on August 15, 2012, with representatives from California Department of Fish and Game, National Marine Fisheries Service, Santa Cruz County, and the Resource Conservation District of Santa Cruz County participating in the discussion.

Extent of Dam Removal

The entire dam, including the foundation portions keyed into the bed and banks could be removed. While it is appealing to remove the entire man made structure, it is likely that this would result in a large degree of disturbance to the channel bed and banks. This disturbance could lead to possible bank failure, or channel incision. Apart from the aesthetic desire to removal all things man-made, we believe that a partial removal would result in smaller amounts of disturbance to the bed and banks, and retained portions could help to prevent possible incision and/or bank instability.

Various degrees of partial removal are possible. The first partial removal option would remove all exposed sections of the dam as viewed from the downstream. The foundation/sill of the dam would be left in place to provide grade control. A second partial removal option would remove the dam down to the equilibrium grade (leaving the sub-grade portions) however the lateral extents of the dam along the banks would be left such that the bottom width matches the average channel bottom width downstream. A third option could be used where the bottom width at the design grade is less than the channel width, providing a “low-medium flow notch.” A fourth option considered would involve the removal of the dam, and then installation of a rock step spanning the entire channel, set roughly at the design grade.

The TAC determined that a full removal was unnecessary; however the removal of all parts visible from the downstream was preferred. The proposed design has included this suggestion; however a small portion of the dam has been left well below the anticipated equilibrium grade. The upper most limit of the retained portion within the channel bed was set to an elevation of 242 ft, which is 2 ft below the

anticipated equilibrium grade at the location of the dam, and ~1 ft below the invert elevation of the next riffle present downstream of the dam that provides hydraulic control. A depth of 2 ft below the design grade was chosen as it is greater than two times the D_{90} (the diameter that 90% of the rocks in the channel are smaller than, Figure 5), a typical amount of scour which may occur if the entire channel bed has mobilized during high flow conditions.

Designed Step-Pools

The condition of the bed below the sediment wedge is unknown; however it is unlikely that large sediment particles and bedrock were removed beyond the area immediately surrounding the dam. Given the agreement of the long profile upstream and downstream of the sediment wedge, it is likely that the channel bed is similar to that found downstream in the reference reach, and that the construction of engineered rock steps is not necessary for grade control or energy dissipation. Further support for this conclusion can be gained from the reference reach where well developed step pools are not prevalent. Furthermore, such installations would require a larger amount of effort, cost, and disturbance to the reach rather than focusing on just the dam area.

Impounded Sediment

The fine sediment impounded above the dam could be removed entirely (or almost entirely), partially, or left in the channel and redistributed. If full or partial removal of the impounded sediment was deemed necessary it would likely require the construction of an access road to allow for transport. However if the sediment was allowed to remain in place, it could be re-contoured as necessary to provide a pilot channel through the depositional wedge. This channel would begin to adjust immediately, and the caliber of sediment present would be fairly easily mobilized by the creek. Despite the large volume of sediment present, representatives of the fisheries and water quality agencies agreed that leaving the sediment within the channel was acceptable.

Channel Form

It is likely that the pre-dam channel form is still present beneath the sediment impounded by the dam. For the reach upstream of the dam, removing the dam and allowing the stream to mobilize the impounded sediments is all that is necessary to restore a functioning channel morphology. However at the dam, the pre-dam bed and banks were likely disturbed by the construction of the dam. Furthermore, downstream of the dam, the channel is much wider, with near vertical and overhanging banks (Figure 4). Downstream of the dam the channel width is ~34 ft wide, while the reference reach was on average roughly half that width. It is likely that this downstream reach would narrow naturally, with sediment depositing on the margins, forming local small floodplains leading to a narrower channel. However the banks in this area are already undercut, and if the concrete armoring the right bank is removed there is the potential for instability of the bank.

To address the potential instability of the right bank, as well as to provide roughness elements similar to the reference reach, one bankline consisting of longitudinal peaked stone toe protection (LPSTP; McCullah and Gray, 2005) has been included in the design. Erosion control fabric (woven coir) and two

types of vegetation are included in the design upslope of the LPSTP. The vegetation consists of an herbaceous community consisting of sedges and rushes (*Carex praegracilis, Carex barbarae* and *Juncus balticus*) on the lower bank, as well as a woody riparian community consisting of alder, dogwood and hazelnut (*Alnus rubra, Cornus sericea* and *Corylus cornuta*) higher up the bank. These vegetation types will provide root strength to the bank, and are consistent with the riparian communities observed in the area. The areas between the LPSTP and the existing steep banks will be back-filled and compacted with sand and gravel, excavated from upstream of the dam, and then covered with erosion control fabric.

The left bank will receive a different treatment. On the left bank, the banks will be cut back to a stable slope, and downstream of the dam, sediment will be placed and compacted. LPSTP, erosion control fabric and vegetation will not be installed on this bank. This bank will be allowed to adjust naturally. The channel may adjust its width in response to the hydraulic conditions which occur as it reaches its new equilibrium condition.

The channel bottom width through the design reach is set initially at 17 ft, at the upstream extent of excavation, based upon the dimensions observed in the reference reach, and then widen gradually to meet the existing banks ~25 ft downstream of the dam. Downstream of the dam, both sides of the channel will be filled. Both the fill and the LPSTP on the right bank will key in the large wood habitat element discussed in the next section.

Boulder clusters have been included in the design. While they were not discussed at the TAC meeting, large cobbles and boulders in the channel provide an important form of roughness and velocity refugia in the reference reach. They have been included in the design in order to provide mid-channel roughness elements similar to those occurring in the reference reach. It is not known what the historic channel bed looks like immediately upstream of the dam, however it is reasonable to speculate that some channel cleaning was done immediately upstream of the dam during the construction of the dam. Large sediment particles may or may not be present. Immediately downstream of the dam, boulder size particles are not present as a large pool (which is sometimes filled with fine sediment) is present. The boulder clusters will provide velocity refugia to fishes under higher flow conditions. They will also provide a mechanism to initiate the deposition of sediment, encouraging the natural process of sediment sorting, in what will otherwise be a fairly homogeneous bed. These boulder clusters may settle and adjust as the channel is evacuated of the impounded sediment during its evolution to its new equilibrium condition. This adjustment should be expected and should not be considered a failure, as adjustment of the bed is not only likely, it is expected.

Large Wood

A large wood habitat feature has been included in the design for multiple reasons including providing habitat to replace pool features which may be lost due to the dam removal, as well as providing roughness similar to what is observed in the reference reach. It was deemed desirable to impose some physical mechanism to support a pool in the vicinity of the dam. The dam removal will remove the physical forces which sustain the plunge pool that is currently present. A large wood structure will add roughness, and induce deposition and scour resulting in sediment sorting and topographic complexity.

A pool resulting from naturally occurring large wood is present ~200 ft upstream of the dam. As the profile of the upstream channel adjusts to the dam removal, it is likely that this pool will not persist in its present form, so this habitat element will partially mitigate for this potential loss of pool habitat.

Construction Alternatives

Various options were considered regarding the demolition, deconstruction and removal of the dam.

Demolition methods considered include:

- Hand labor crew using jack-hammers;
- Heavy equipment, equipped with a hydraulic hoe ram and/or concrete saw; or
- Explosives.

Material removal options include:

- Wheel barrows and hand labor using existing trails;
- A skid chute, material cart and winch;
- Some sort of a cable way to hoist material out of the canyon;
- Hoisting material out of the canyon via a crane position on the bridge upstream; and
- Construction of an access road to allow equipment to repeatedly access and haul material.

Based upon initial discussions with members of the TAC as well as a site visit by a local contractor (David Sands of Go Native), an intermediate approach was deemed the most time/cost efficient, providing a minimum of impact to the stream channel and banks in the area. A small rubber tracked excavator (~ 7 ft width) will be walked down to the upstream side of the dam via the river right bank adjacent to the dam. The grade in this area will allow this equipment access with only minor modifications required at the toe of the slope. In addition, this access would require little, if any, impact to existing woody vegetation. The excavator will be equipped with a hydraulic hoe ram, used to break the dam into smaller pieces.

A skid chute will be constructed of steel plates, or crane/timber bearing mats to armor and protect the bank. The chute will follow the fall line of the western bank approximately in line with the dam. A cart will be constructed that will travel up and down the skid chute, carrying the demolished materials out of the channel, as well as rock and wood into the channel. This cart will be winched up and down with a carry deck crane positioned at the top of bank on the river right, in the driveway. The cart will then be off loaded into dump trucks or dumpsters for transport to an offsite concrete recycling facility.

Potential Risks

There are risks associated with the removal of Branciforte Dam. If grade control is not provided by naturally occurring boulders and bedrock, or a retained portion of the dam, incision could occur via a migrating head cut. This incision could undermine portions of the bridge abutments upstream. However, given the composition and caliber/stability of the channel bed upstream and downstream, the

risk of incision is very low. Regardless, the design has retained a portion of the dam's foundation to provide grade control as there is no significant disadvantage to including this in the design.

Removal of the dam could result in local bank instability. The channel immediately below the dam is wider than other areas, presumably due to hydraulic forces induced by the dam. If the concrete bank protection which is currently present on the right bank is removed, a portion of this bank could be further undercut. It is not known where bedrock begins (although it is present at the toe slightly downstream. In undisturbed systems, this bank undercutting is a natural physical process, responsible for the contribution/delivery of large wood to mountain streams. However, bank failure following the dam removal could be perceived as some form of failure of the project. To address this risk, as well as to impose more appropriate dimensions on the channel longitudinally peaked stone toe protection and large wood have been included in the design along the right bank, and the extent of concrete removal from the banks has been limited. In addition to these hard elements, the right bank will be covered with erosion control fabric and revegetated with native plant species. Along the left bank, sediment will be placed and compacted, however it is expected that this bank will adjust as the channel reaches a new equilibrium condition.

As-built Vs. Future Conditions

The proposed design will not leave the channel in an equilibrium condition immediately following construction (as-built). Once construction is complete, the impounded sediment will initially provide a steeper slope upstream of the dam alignment, which will affect the local hydraulics. The caliber of sediment upstream of the dam will be easily mobilized. Morphological adjustments will begin as soon as flow is returned to the design reach, and should progress rapidly once typical winter flows begin to occur.

There will be a period where the channel evolves to its future form. This evolution will include erosion (i.e., incision and widening) upstream of the dam and deposition downstream of the dam. The length of this evolution cannot be exactly quantified (because of hydrologic variability as well as other factors), but it is anticipated that the majority of the evolution will occur within the first two flow seasons flowing removal (provided they are average or better runoff years). If a large runoff event occurs, much of this adjustment could take place during just one event.

Hydraulic estimates of the as-built and future conditions indicate that the channel in both topographic conditions is competent to transport the material observed at the surface of the impounded sediment (see next section). During the period of morphological adjustment, it is possible that some features of the design (large wood, LPSTP, boulder clusters) will be partially or fully buried, only to be unearthed at a future time as sediment continues to be transported downstream. Furthermore, because of the composition of the as-built channel bed downstream of the dam (sand and gravel excavated from upstream of the dam) some portions of the LPSTP and boulder clusters may be undercut and redistributed. This potential adjustment is expected and desirable to provide variability in the channel morphology and provide larger particles to the bed in the design reach. It is not anticipated that the large wood will move, however it may be buried as the bed aggrades prior to reaching equilibrium.

Hydraulic Modeling

A one dimensional hydraulic model was developed using the HEC-RAS modeling platform (Brunner, 2010) and the topographic data collected during the field survey. The model extends ~300 ft downstream of the dam, and ~270 ft upstream, encompassing the area influenced by the dam, as well as the reference reach downstream. The model was used to simulate hydraulic characteristics (depth/water surface elevation, velocity, shear stress) for three topographic conditions: 1) existing conditions with the dam in place, 2) as-built (non-equilibrium, but dam removed), and 3) estimated future conditions once the sediment has been transported downstream. The model results are provided in Figures 10-14. Results are provided for several flow rates including: 1 cfs, 3 cfs, 5 cfs, 10 cfs, 25 cfs, 37 cfs (10% of Q_2), 50 cfs, 74 cfs (20% of Q_2), 111 cfs (30% of Q_2), 150 cfs, 185 cfs (50% of Q_2), 369 cfs (Q_2), 900 cfs (Q_{10}), 1,150 cfs (Q_{25}), and 1,520 (Q_{100}). Results are provided for the hydraulic conditions likely to occur immediately post-construction (as-built), as well as in a future condition once the impounded sediment has been evacuated from the channel. Figure 12 shows high velocity conditions occurring upstream of the dam (station 300-400), in the as-built condition, as would be expected because this reach will initially be locally steeper. Figure 13 shows that these velocities will reduce as the sediment is redistributed and a new equilibrium channel slope is reached. In the future condition, channel velocity is lower downstream of the dam (station 200-300) than upstream of the dam (station 300-500) because of channel width. Downstream of the dam the channel is overly wide (as discussed above) and this explains the differences in simulated velocity.

A rating curve of velocity vs. flow rate is provided at the location of the dam as well as ~50 ft upstream in the impounded sediment reach (Figure 14). Velocities which occur at the dam are lower than those observed upstream, and downstream in the reference reach because of the wider channel section downstream of the dam. Velocities in the upstream reach are comparable to the velocities simulated in the reference reach. In the future condition the velocities simulated for 185 cfs (50% of Q_2) do not exceed 6 ft/s (Figure 13). In the as-built condition, velocities in excess of 6 ft/sec occur at 185 cfs as flows accelerate off of the sediment wedge through the locally steeper section. Although the velocities simulated upstream of the dam in the as-built condition are higher than those simulated for the future condition; compliance with this fish passage criterion is achieved at the dam cross section in the as-built condition at a flow of 185 cfs. It should be noted that the results of a cross section averaged one-dimensional model do not accurately reflect the velocity field which will actually occur. As noted, large particles and large wood are present in the bed and banks, and these particles will provide hydraulic variability resulting in velocity refugia providing more adventitious upstream passage conditions to aquatic organisms.

Design Review

An earlier draft of this report along with construction plans, specifications and a cost estimate developed to a 60% level of completion were provided to the project TAC and the landowners. Comments to these documents were provided by Marcin Whitman of California Department of Fish and

Game (now California Department of Fish and Wildlife), Devin Best of the National Marine Fisheries Service, Kristen Kittleson of the County of Santa Cruz, Mark Barnett of National Resource Conservation Service, Kelli Camara and John Morely of the Resource Conservation District of Santa Cruz and Jim Robins of Alnus Ecological, consultant to Resource Conservation District of Santa Cruz. In addition, site visits were conducted with representatives of California Department of Fish and Game, National Marine Fisheries Service, National Resource Conservation Service, Alnus Ecological, Go Native Inc., and the landowners at various times during the design development process. Each comment provided in these site visits and document review process was thoughtfully considered and incorporated into the final design package.

Conclusion

This basis of design document, and the attached construction plans, specifications and cost estimate have been developed to a 100% level of completion, and are stamped by the project engineer. We look forward to working with the Resource Conservation District of Santa Cruz during the project implementation, currently scheduled for late summer and/or early fall of 2013.

References

Brunner, G.W. 2010. HEC-RAS, river analysis system user's manual, version 4.1. U.S. Army Corps of Engineers, Institute for Water Resources, Hydrologic Engineering Center, Davis, CA.

Bunte, K. and S.R. Abt. 2001. Sampling surface and subsurface particle-size distributions in wadable gravel-and cobble-bed streams for analyses in sediment transport, hydraulics, and streambed monitoring. pp. 448 *in*: US Department of Agriculture (ed.), General Technical Report RMRS-GTR-74. USDA, Rocky Mountain Research Station. Fort Collins, CO.

Montgomery, D.R., and J.M. Buffington. 1997. Channel-reach morphology in mountain drainage basins. Geological Society of America Bulletin 109:596-611.

McCullah, J. and D. Gray. 2005. Environmentally Sensitive Channel- and Bank-Protection Measures (NCHRP Report 544), Transportation Research Board, Washington, D.C.

Waananen, A.O. and J.R. Crippen. 1977. Magnitude and frequency of floods in California: U.S. Geological Survey Water-Resources Investigations Report 77-21, 102p.

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

UTILITY CHECK SHEET

Business Name Hanford ARC

Job Location 4363 Branciforte Drive, Santa Cruz

County Santa Cruz Farm/Tract No. _____

NRCS Official RCD Landowner/Operator Hanford ARC

Identified Utility NONE IDENTIFIED

Utility Location _____

Work Affected _____

Work Requirements _____

Identified Utility _____

Utility Location _____

Work Affected _____

Work Requirements _____

Identified Utility _____

Utility Location _____

Work Affected _____

Work Requirements _____

Important: Utilities may exist which were not identified in the field inspection. Landowner/Operator must call Dig Alert (811) a minimum of 2 working days before any earthwork begins.

NRCS Official Signature _____

Landowner/Operator Signature _____ Mark Cederborg 2013.08.29 11:18:45 -07'00'

COST ESTIMATES

Cost Estimate

Item	Quantity	Unit Cost	Units	Total
Prepare and Restore Access Ramp		$7,200	LS	$7,200
Build/Acquire Access Cart		$1,500	LS	$1,500
Install and Remove Dewatering System		$5,500	LS	$5,500
Excavate, Place and Compact Sediment	130	$28	CY	$3,640
Demolish Dam	100	$200	HR	$20,000
Remove Concrete Debris from Site	40	$250	HR	$10,000
Debris Disposal		$3,000	LS	$3,000
Rock Purchase and Delivery	20	$50	TON	$1,000
Install LPSTP	40	$75	LF	$3,000
Wood Purchase and Delivery	1	$2,500	LS	$2,500
Install Wood and Boulder Clusters	1	$3,000	LS	$3,000
Finish Grading		$7,200	LS	$7,200
Purchase Plant Materials		$800	LS	$800
Purchase and Install Erosion Control Fabric	60	$5	SY	$300
Install Plants		$1,600	LS	$1,600
Install Irrigation		$1,500	LS	$1,500
Maintain Plants and Irrigation		$1,500	LS	$1,500
Construction Total				$73,240
Construction Monitoring	40	$140		$5,600
Biological Monitoring	1	$4,000	LS	$4,000
Post-project Topographic Survey	1	$4,000	LS	$4,000
Monitoring/Survey Total				$13,600
Mobilization/Demobilization				$3,662
Sub-total				$90,502
Contingency			10%	$9,050.20
Total				$99,552.20

PRACTICE REQUIREMENTS

U.S DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CALIFORNIA

PRACTICE REQUIREMENTS
FOR
395 – STREAM HABITAT IMPROVEMENT AND MANAGEMENT

For: Project Name Branciforte Creek Dam Removal Project

County Santa Cruz RCD Santa Cruz

Prepared By Bruce Quintana-Jones Date 7/17/2013

IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO OBTAIN ALL NECESSARY PERMITS AND/OR RIGHTS, AND TO COMPLY WITH ALL ORDINANCES AND LAWS PERTAINING TO THIS INSTALLATION.

Installation shall be in accordance with the following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

1. Drawings: 12-1007 pages 1-5

2. Practice Specifications: See attached specifications by CBEC Eco Engineering

3. Practice Requirements:

- Completely dewater project site and install dust and debris netting before beginning demolition
- Protect in place existing pump structure and galvanized pipe downstream of dam
- Remove existing deflector log, dam, fish ladder and concrete footing, salvage ball valve
- Install longitudinal peaked stone toe protection and boulder clusters per design drawings
- Install large wood features per design drawings
- Grade stream banks to 1.5:1 or 2:1 slopes per design drawings
- Remove dewatering facilities and restore disturbed areas to pre-construction conditions

4. Maintenance Requirements:

- Monitor steam channel profile changes, protect existing infrastructure as necessary
- Monitor stream bank for slope stability, protect existing infrastructure as necessary
- Monitor rock protection and replace rock if necessary for slope stability
- Maintain vigorous growth of channel vegetation

PRACTICE APPROVAL:

This job does not exceed any of the limits for the practice per Table 1 of the Procedures for Complying with the Santa Cruz Countywide Partners in Restoration Coordination Program for Environmentally beneficial Projects in Santa Cruz County.

Limiting elements:	Units
Project Length	120 ft
Dewatered Length	300 ft
Dam Removal Size	45 x 13 ft

Design Approved by: D. Ramirez Date: 8/2/2013

Desideria Ramirez, Area Engineer

LANDOWNER'S/OPERATOR'S ACKNOWLEDGEMENT:

The landowner/operator acknowledges that:

a. He/she has received a copy of the construction drawings and specification, and that he/she has an understanding of the contents, and the requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by: James Mc Date: 10-22-13

RCD BOARD PRESIDENT

PRACTICE COMPLETION:

I have made an on site inspection of the site (or I am accepting owner/contractor documentation), and have determined that the job as installed does conform to the drawings and practice specifications.

Completion Certification by:

/s/ D. Ramirez Date 10/21/2013

OPERATION & MAINTENANCE

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

395 – STREAM HABITAT IMPROVEMENT AND MANAGEMENT

OPERATION AND MAINTENANCE

Project Name: **Branciforte Creek Dam Removal** Date: **7/17/2013**

Address: **Branciforte Drive, Santa Cruz, CA**

Location GPS Coordinates Map Datum: **NAD83** E **-121.9484** N **37.0380**

A properly maintained stream habitat improvement and management project is an asset to your property. This practice was designed and installed to provide suitable habitat for desired aquatic species and diverse aquatic communities, to provide channel morphology and associated riparian characteristics important to desired aquatic species, and/or to provide aesthetic values and recreation opportunities associated with stream habitats such as angling and fish viewing. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation to maintain satisfactory performance. Additional permits may be required to perform this work. Here are some recommendations to help you develop a good operation and maintenance program.

GENERAL RECOMMENDATIONS

- Monitor steam channel profile changes, protect existing infrastructure as necessary
- Monitor stream bank for slope stability, protect existing infrastructure as necessary
- Monitor rock protection and replace rock if necessary for slope stability
- Maintain vigorous growth of channel vegetation

PRACTICE SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

for the

BRANCIFORTE DAM REMOVAL DESIGN PROJECT

Santa Cruz County, California

Prepared for
The Resource Conservation District
Of Santa Cruz County

Prepared by
cbec, inc.

April 5, 2013

These documents are intended solely for the use and benefit of the Resource Conservation District of Santa Cruz County. No other person or entity shall be entitled to rely on the details contained herein without the express written consent of cbec, inc., eco engineering, 2544 Industrial Boulevard, West Sacramento, CA 95691.

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish all labor, equipment, materials, and supplies needed to implement the Branciforte Dam Removal on Branciforte Creek in Santa Cruz County, California. Work includes, but is not limited to, reinforced concrete demolition, excavation, fill placement within a creek, large wood placement within a creek, rock placement within a creek, stream diversion, dewatering, spoiling of excess excavated material, revegetation, irrigation, and erosion control fabric installation.

B. Provide all materials and components necessary to result in 100 percent complete and usable systems and facilities.

1.2 LOCATION OF THE WORK

A. Physical location of the work is identified as Branciforte Creek Dam, off Branciforte Creek Road near Santa Cruz, California (see map and directions on title page of Contract Drawings).

B. The work site shall be accessed from the gravel driveway located at 4363 Branciforte Creek Road and as shown in the Contract Drawings and as specified by the Project Lead or RCDSCC staff.

1.3 TIMING OF THE WORK

A. Construction work and demobilization shall be restricted to the period between May 1 and October 30, with revegetation occurring until November 30. Work before or beyond that date shall only be performed with explicit clearance from the Project Lead.

1.4 INQUIRIES

A. Questions should be directed to:
cbec, Inc., 2544 Industrial Blvd., West Sacramento, California 95694;
Chris Hammersmark; (530) 574-6079
Or to
Alnus Ecological, 3725 Canon Avenue, Oakland, California 94602;
Jim Robins; (510) 332-9895

1.5 DEFINITIONS

A. Observer means the designer or other qualified person assigned by cbec, Inc. to observe the work.

B. Engineer means the registered engineer assigned by cbec, Inc.
C. Project Lead or Project Manager means Jim Robins, Alnus Ecological.
D. Land Owner means Ben Cahill (east side) or Jim Boyle (west side).

1.6 SPECIAL NOTICES

A. Necessary permits will be provided by the Project Lead.

B. Construction work shall comply with all applicable federal, state, and local environmental and biological laws, regulations and permits. This condition applies to, but is not limited to, laws and regulations governing noise levels, air and water quality standards, and cultural and biological resources.

C. The Project Lead and Engineer or Observer shall be given seven days notice prior to start of on-site work.

D. Contractor will provide a project schedule to Engineer or Observer and Project Lead. Engineer or Observer will identify key points during construction which require inspection and approval, including but not limited to: installation of dewatering system; preparation of access path; excavation of sediment upstream of dam; extents of removal of concrete; alignment , assembly and placement of rock and wood structures; final grading; revegetation staking; and irrigation system.

E. Work may not begin until a Notice to Proceed has been issued by the Resource Conservation District of Santa Cruz County.

F. The Contractor or the Contractor's Designated Representative (who will oversee the actual construction work) shall attend a pre-work conference with the Engineer or Observer and Project Lead at the project site prior to commencement of activity at the site. All workers must attend a pre-construction meeting regarding sensitive species and water quality protection measures.

G. Hazardous Materials: This project entails no known contaminated soils.

1.7 CONTRACT DRAWINGS

A. The plans for this project consist of contract drawings with the following sheets:

Sheet No.	*Title*
1	Cover Sheet
2	Existing Conditions
3	Site Preparation & Dewatering
4	Grading Plan
5	Sections and Details

1.8 COORDINATION OF DOCUMENTS

A. The Specifications and associated Contract Drawings are intended to be mutually supplementary to describe and provide for a complete work product.

1.9 CONTRACT ADMINISTRATION

A. Authority of the Engineer or Observer is limited to the following functions:

1. Observe and accept or reject work and materials including approval or disapproval of materials submittals.

2. Clarify Specifications and Contract Drawings.

3. Provide input on elements of the design which require field-fitting due to conditions unknown at the time of construction

B. The Engineer or Observer is not authorized to take the following actions, all of which remain the sole responsibility of the Project Lead:

1. Make changes to the contract provisions, period of performance, or change any contract terms and conditions.

2. Make decisions concerning any claims and disputes.

C. Close liaison will be maintained by the Engineer, Observer, Project Lead, and the Contractor. The Engineer or Observer shall notify the Project Lead immediately of any problems encountered, including but not restricted to maintaining completion schedules.

D. Construction Observation:

1. The Engineer and/or Observer shall have free access to the jobsite at all times while work is in progress, and the Contractor shall furnish such information and assistance as necessary.

2. The Engineer and/or Observer shall monitor construction for conformance with the Contract Drawings and Specifications.

3. The Engineer and/or Observer must inspect and approve all materials prior to installation and may reject unsuitable materials or work that does not conform to the Contract Drawings and Specifications.

E. Performance of Work by the Contractor:

1. The Contractor shall furnish the Engineer or the Observer all reasonable facilities for obtaining information respecting the character of the materials and progress of the work.

1.10 GENERAL TECHNICAL REQUIREMENTS

A. Perform the work in accordance with the Specifications and other provisions of this contract.

B. In any instances where the Contract Drawings and Specifications are unclear, the contractor shall contact the Engineer or Observer.

C. Field-verify all dimensions and conditions. Notify the Engineer or the Observer of any conflicts.

1.11 CONSTRUCTION SUPPORT

A. The Contractor shall furnish any temporary facilities and utilities needed including light, power, water, telephone, sanitary facilities, job offices, storage enclosures, safety devices, construction aids, and support equipment.

1.12 PROTECTION

A. Protect adjacent trees, vegetation, property, structures, access driveway, ground surfaces, and improvements from damage. Contractor shall be responsible for replacing all damaged trees at the Contractor's expense.

B. Contain work within the grading limit lines shown on the Contract Drawings or as instructed in the field by the Engineer, Observer, Land Owner or the Project Lead.

1.13 PUBLIC ACCESS

A. Install signage as directed by the Project Lead or Land Owner to direct pedestrians around the project site for the duration of construction. Signs shall state that pedestrians may not enter the staging areas, access paths, and project site for the duration of construction.

1.14 CLEAN UP

A. Dispose of debris legally at licensed disposal facilities.

B. Upon completion of the work and immediately prior to the final inspection, clean the construction area and remove any temporary facilities and utilities that were brought on to the project site.

C. Restore or replace fences, gates, stairs, vegetation, trees, ground surfaces, and disturbed areas to original condition or as directed by the Project Lead and Land Owner.

D. Restore the gravel driveway and turnout to pre-project conditions where staging and access are indicated on the plans.

1.15 FINAL INSPECTION

A. Notify the Project Lead and Engineer at least seven days prior to the anticipated date of completion of all work. The Project Lead will coordinate the final inspection as promptly as practicable.

B. The Contractor representative responsible for the work shall be present at the final inspection and shall submit a preliminary list of any unfinished work.

SECTION 01 57 36

TEMPORARY CREEK DIVERSION SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for preventing surface water from entering excavations, from ponding on prepared subgrades, and from flooding the project site and surrounding areas and thus preventing the proper execution of the work. The Contractor shall be responsible for implementing the stream diversion works shown on the Contract Drawings including cofferdams, pumps, and discharge facilities, as needed over the duration of the project.

B. The systems shall be furnished and installed, maintained and removed as shown on the Contract Drawings, as specified herein, and as directed by the Engineer.

1.2 SUBMITTALS

A. Prior to implementation, submit a site specific stream diversion plan for the work based on the configuration shown in the Contract Drawings. The stream diversion plan shall indicate temporary water pollution control measures to be employed during diversion placement and temporary onsite power facilities.

1.3 MEASUREMENT AND PAYMENT

A. Temporary creek diversion system placement, operation, and removal shall be measured and paid as lump sum.

PART 2 – PRODUCTS

2.1 PUMP

A. A pump and pumping apparatus shall be used for the temporary stream diversion and shall be of the submersible type with sufficient capacity to pump 2000 gallons/minute (GPM) in the configuration as shown on the Contract Drawings, and identified in these specifications.

B. It shall be the Contractor's responsibility to provide back-up power and/or equipment as needed to assure that the temporary creek diversion operates 24 hours per day, every day that work within the banks of the creek channel is being performed.

2.2 TEMPORARY SANDBAGS

A. Sand bag fabric shall be woven polypropylene, polyethylene or Polymide with a minimum unit weight of 0.25 lb/SQYD. The fabric shall have a mullen burst strength of at least 300 psi, per ASTM Designation: D3786 and an ultraviolet (UV) ability exceeding 70 percent.

B. Sand bags shall have a length of 24 to 32 inches, width of 16 to 18 inches, thickness of 6 to 8 inches, and weight of 90 to 120 lbs. Bags containing multiple sand bags may be used if they are placed effectively and properly sealed.

C. Sand bag fill material shall be non-cohesive sand, free from deleterious material, silt, clay or fines.

2.3 IMPERMEABLE PLASTIC SHEETING

A. The material shall be suitable for use as protective liner and shall be commercial quality polyethylene with a minimum thickness of 0.25 mm or Mirafi 700X or equal approved by the Engineer. All plastic sheeting shall be free of cracks, cleavages, or other defects adversely affecting the protective characteristic of the material.

2.4 FISH SCREEN

A. A fish screen shall be provided by the Contractor to prevent fish from entering the pump for the duration of all construction activities. The fish screen will meet the conditions outlined in the permits granted by the National Marine Fisheries Service.

2.5 DISCHARGE PIPING

A. Discharge piping and couplings will be of the size as needed. The material shall be selected for flexibility and durability to allow for the occasional relocation of the diversion piping during construction activities.

PART 3 – EXECUTION

3.1 GENERAL

A. Contractor shall visit the worksite and become aware of any and all existing conditions that may affect execution of the work under this contract.

3.2 INSTALLATION OF DIVERSION SYSTEM

A. The temporary creek diversion shall be installed as a first order of work to maintain a dry work area. The temporary creek diversion system will only be installed after block nets have been installed and fish have been relocated by the consulting biologist.

B. The temporary creek diversion shall require the construction of one cofferdam at the upstream limit of the work as shown on the Contract Drawings. Cofferdams shall be constructed of sandbags or equivalent non-sedimenting materials, and shall have a minimum height of 1.5-feet above the channel bed. Alternative cofferdam construction materials and methods may be used only with prior approval by the Engineer.

C. The temporary creek diversion shall require the construction of a temporary diversion pipe at the approximate location shown on the Contract Drawings. Final location and alignment of the temporary pipe shall be approved in the field by the Engineer, Observer or Project Lead.

D. The temporary creek diversion shall require the installation of pumps at the approximate locations shown on the Contract Drawings.

E. The temporary creek diversion shall require the installation of a fish screen at the approximate location shown on the Contract Drawings.

3.3 REMOVAL OF DIVERSION SYSTEM

A. Use of the temporary creek diversion system is restricted to the period between May 1 and October 30. Any permit extensions and/or addendums required for the extended work shall be procured by Project Lead at Contractor's expense.

B. When the work within the channel banks has been completed, the temporary creek diversion system will only be removed once an inspection by the Engineer or Observer has occurred.

C. Following the inspection, the diversion system shall be removed with the consulting biologist present.

SECTION 01 71 13

MOBILIZATION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Mobilization shall include mobilization of all construction equipment, materials, supplies, appurtenances, facilities, and the like, staffed and ready for commencing and executing the work.

1.2 MEASUREMENT AND PAYMENT

A. Mobilization shall be measured and paid as lump sum.

1.3 TOOLS AND SUPPLIES

A. Contractor shall provide personnel, products, construction materials, equipment, tools, and supplies of the types and quantities necessary to facilitate the timely execution of the work and at the time they are scheduled to be installed or utilized.

1.4 DEMOBILIZATION

A. Upon completion of the work, remove construction tools, apparatus, equipment, mobile units and buildings, unused materials, supplies, and plants, and personnel from the jobsite. Restore all areas utilized for staging, access and mobilization to their original, natural state or, when called for in the Contract Documents, complete such areas indicated. Restoration of staging, access, mobilization and other disturbed areas shall be approved by the Project Lead or the Land Owner.

SECTION 02 41 00

DEMOLITION

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section includes requirements for demolition of the concrete dam structure shown on the Contract Drawings, including but not limited to: materials, equipment, facilities, permits, fees, protection of existing creek bed, demolition, removal, and disposal of removed materials and debris.

B. The Contractor shall be held responsible for the completion of all demolition shown on the Contract Drawings, as specified herein, and as directed by the Engineer.

1.2 RELATED SECTIONS

A. Section 31 00 00, Earthwork

1.3 SUBMITTALS

A. Demolition Plan: Submit a comprehensive demolition plan, clearly and accurately describing the proposed sequence, methods, and equipment for demolition, removal, and disposal of the structure. The demolition plan shall include the proposed material, method of installation, and method of removal to be used for the dust and debris net shown on the Contract Drawings. Do not proceed with demolition until the Project Lead has given written approval of the demolition plan.

B. Permits: Submit copies of applicable demolition, hauling, and debris disposal permits and required notices for record purposes. Include description of proposed haul routes.

C. Private Property Owner's Release: If material demolished and removed from the site will be deposited on private property, submit two copies of written releases not more than 15 days before the start of work. Releases shall absolve the Land Owner from responsibility in connection with the depositing of material on private property, and shall be signed by the owners of such property on which the material will be deposited.

1.4 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for demolition shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in demolition, including but not limited to protection of existing creek bed, removal and disposal of materials and debris, and complying with the requirements of this Section, as specified in these technical Specifications, and as directed by the Engineer.

1.5 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI A10.6 Safety Requirements for Demolition Operations

A. State of California, Department of Transportation (Caltrans), Standard Specifications, Section 15, Existing Highway Facilities.

PART 2 – PRODUCTS

2.1 MATERIALS, EQUIPMENT, AND FACILITIES

A. The Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities, and services as required for performing the demolition and removal work.

PART 3 – EXECUTION

3.1 GENERAL

A. Contractor shall visit the worksite and become aware of any and all existing conditions that may affect execution of the work under this contract.

B. The Contractor shall obtain all special permits and licenses and give all notices required for performance and completion of the demolition and removal work, hauling, and disposal of debris.

3.2 SITE CONDITIONS

A. Protection of Persons and Property:

1. Protect utilities, creek bank and bed, vegetation, trees, and facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by demolition operations.

2. Protect the existing creek bed around the concrete dam from concrete dust and debris by installing a dust and debris net in the locations shown on the Contract Drawings. The dust and debris net shall be a plastic, impermeable material. Alternatively, a permeable material may be used if approved by the Engineer or Project Lead.

B. Protection of Utilities:

1. Protect active sewer, water, gas, electric, and other utilities; and drainage and irrigation lines indicated, on the Contract Drawings, found or otherwise made known to the Contractor before or during demolition work. If utility is damaged, immediately notify the utility owner for corrective action.

1. Arrange with and perform work required by utility companies and municipal departments for discontinuance or interruption of utility services due to demolition work.

C. Noise and Dust Abatement:

1. Provide continuous noise and dust abatement as required to prevent disturbance and nuisance to the public and workers and to the occupants of adjacent premises and surrounding areas. Dampen or cover areas affected by demolition operations as necessary to prevent dust nuisance.

2. When a certain level of noise is unavoidable because of the nature of the work or equipment involved, and such noise is objectionable to the occupants of adjacent premises, make arrangements with Land Owner to perform such work or operate such equipment at the most appropriate time periods of the day.

A. Unknown Conditions:

1. The Contract Drawings and related documents may not represent all conditions at the site and adjoining areas. The known surface conditions are as indicated, and shall be compared with actual conditions before commencement of work.

2. If existing active services or facilities encountered interfere with construction activities, notify the Project Lead and Land Owner immediately and in writing, requesting instructions on their disposition. Take immediate steps to ensure that the service provided is not interrupted, and do not proceed with the work until written instructions are received from the Project Lead.

3. Composition, lateral and vertical extent of the existing dam structure is estimated, and does not imply the actual composition or extent. Contractor shall remove and dispose of whatever materials as required to achieve the geometries and elevations as shown on the Contract Drawings.

3.3 DEMOLITION

A. Perform demolition in accordance with the approved Demolition Plan. Perform demolition work in accordance with ANSI A10.6 and the California Code of Regulations, Title 8 and Title 24, as applicable.

B. All rebar or other reinforcing metals shall be cut flush with the finished grade concrete and shall be grouted over. No rebar or other reinforcing metals shall be exposed on the finished surface.

A. Finished surfaces on the dam shall be non-uniform, with finished grade tolerances as specified in Section 31 00 00 Earthwork: Part 1, Article 8B.
B. Backfill and compact depressions caused by excavations, demolition, and removal in accordance with applicable requirements of Section 31 00 00, Earthwork.

3.4 MISCELLANEOUS REMOVAL

A. Existing fish ladder and associated foundation, wood log deflector, metal handrails and concrete footing downstream of the dam shown on the Contract Drawings shall be completely removed and disposed of.

3.5 DISPOSAL OF REMOVED MATERIALS AND DEBRIS

A. Removed materials, trash, and debris shall become the property of the Contractor and shall be removed from the site and disposed of in a safe, acceptable manner, in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Exceptions to this include the ball valve located on the east side of the dam which is to be salvaged and delivered to Ben Cahill.

B. Burying of trash and debris on the site will not be permitted. Burning of trash and debris at the site will not be permitted. Exceptions to this include the rocks placed in the downstream face of the dam, which may be used as foundation materials for the large wood structure and longitudinal peaked stone toe protection, if approved by the Engineer.

C. Remove trash and debris from the site at frequent intervals so that their presence will not delay the progress of the work or cause hazardous conditions for workers and the public.

SECTION 31 00 00

EARTHWORK

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section includes requirements for rough grading and filling, excavation, compaction, backfilling, finished grading, and field quality control for the design grading shown in the Contract Drawings.

B. The Contractor shall be held responsible for the completion of all earthwork shown on the Contract Drawings, as specified herein, and as directed by the Engineer.

1.2 RELATED SECTIONS

A. Section 02 41 00, Demolition

B. Section 31 23 19, Dewatering

1.3 SUBMITTALS - NONE

1.4 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for earthwork shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in grading, including but not limited to rough grading and filling, excavation, compaction, backfilling, finished grading, field quality control, and complying with the requirements as depicted on the Contract Drawings or described in this Section, as specified in these technical Specifications, and as directed by the Engineer.

1.5 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D1557 Standard Test Methods for Laboratory Compaction

1.6 DEFINITIONS

A. Backfill: Soil or soil-rock material used to backfill excavations and to backfill excavated spaces around foundation walls, building walls, retaining walls, head walls, and abutments.

B. Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of material as compacted in the field to the maximum dry density of the same material as determined by laboratory test ASTM D1557.

1.7 CLASSIFICATION OF EARTHWORK

A. For specification purposes, earthwork shall be classified as follows:

1. Excavation: All excavation involved in grading and construction of the creek bed, and any other excavation associated with repair of banks, access routes, or staging areas.

2. Backfill: Includes furnishing, placing, and compacting backfill material to complete the grades shown on the plans.

1.8 QUALITY CONTROL

A. Quality Control: The Contractor shall provide proper quality control measures to assure compliance with specified requirements.

B. Tolerances:

1. Construct finished surfaces to plus or minus 3-inches of the elevations indicated, except on the dam, where finished surface shall be constructed to a tolerance of plus or minus 1-inch for the area between by the upstream and downstream face of the dam.

2. Complete embankment slopes to plus or minus 6-inches of the slope line indicated on the plans.

3. Maintain the moisture content of fill material as it is being placed within plus or minus five-percent of the recommended moisture content of the material.

1.9 SITE CONDITIONS

A. Unfavorable Weather Conditions:

1. Excavating, filling, backfilling, and grading work shall not be performed during weather conditions which might damage or be detrimental to the condition or quality of existing ground or in-progress work or completed work.

2. Soil material that is too wet for compaction shall be left to drain, to be aerated and dried by disking and harrowing or other approved methods until the moisture content of the area is uniform and within the specified limits.

B. Prevention of Erosion:

1. Prevent erosion of stockpiles, ditches, embankments, filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

2. Perform "protective grading" to provide positive drainage and to minimize ponding of surface water.

PART 2 – PRODUCTS

2.1 FILL AND BACKFILL MATERIALS - GENERAL REQUIREMENTS

A. Material used for fill and backfill in the creek shall originate from the creek bed within the grading limit line shown on the Contract Drawings.

B. Unless approved by the Project Lead, no fill or backfill material shall be imported to the project site. If material import is approved, the material shall be approved prior to import by the Engineer, Project Lead, or Land Owner.

PART 3 – EXECUTION

3.1 STAKING AND GRADES

A. Lay out the work, establish all necessary markers, bench marks, grading stakes, and other stakes as required for completion of the work.

3.2 EXISTING UTILITIES

A. Verify on site the location and depth (elevation) of all existing utilities and services before performing any excavation work. Excavation within 3 feet of an active utility line shall be performed by hand.

B. Abandoned sewers, piping, and other utilities encountered in the progress of the excavating shall be removed and the ends plugged. Exceptions to this are shown on the Contract Drawings

C. Active utility lines encountered, which are not indicated in the Contract Drawings, shall be reported immediately to the Project Lead and utility owners involved. The Project Lead and utility owners shall be permitted free access to determine the measures deemed necessary to repair, relocate, or remove the utility.

3.3 EARTHWORK GENERAL REQUIREMENTS

A. Erosion Protection: Prevent erosion of the site at all times. Construct temporary berms and dikes and cut temporary swales to promote natural drainage of site as necessary.

B. Construction Traffic: Disperse travel paths of traffic and construction equipment over entire width of access and staging routes so as to avoid excess wear or damage to existing surfaces. Protect exposed soil layers having high moisture content from excessive wheel loads.

C. On-Site Excavation: Do not excavate or remove any material from the project site which is not within the designated grading limit, as indicated by the Contract Drawings, without authorization from the Project Lead or Engineer.

D. Stockpiling of Fill and Backfill Material: Establish excavated material stockpiles on site only in locations indicated for staging in the Contract Drawings where they will not interfere with the progress of the work.

E. Disposal of Surplus Material:

1. All surplus creek bed materials shall be spoiled along banks as shown on the Contract Drawings and specified herein.

F. Maintenance of Excavations and Slopes:

1. Excavate and remove material outside the limits of the excavation which is unstable and constitutes potential slides, and material which comes into excavations for any reason.

2. Maintain slopes until substantial completion and acceptance of the work. Promptly repair slides, slipouts, washouts, settlements, and subsidences that occur for any reason, and refinish the slope or embankment to the indicated lines and grades.

3.4 SUBSURFACE EXTRACTION

A. No subsurface facilities are known within the grading limits shown on the Contract Drawings. Should the Contractor encounter subsurface facilities within the grading limits that interfere with construction, Contractor shall notify the Project Lead promptly for corrective determination.

3.5 ROUGH GRADING AND FILLING

A. Prior to commencement of earthwork, perform such soil and rock removal and filling as may be required to facilitate the progress of the work.

B. Fill or backfill and compact as herein specified in layers not exceeding 12-inches in uncompacted thickness.

3.6 EXCAVATION

A. General Excavation Requirements:

1. Perform excavations as required for demolition of the existing dam, construction of the fish passage, and grading in the channel.

2. Comply with applicable requirements of CCR, Title 8, Trench Construction Safety Orders and CAL-OSHA safety standards.

3. The bottoms of excavations shall be clean and free from debris and foreign matter.

4. Excavations shall be supported and maintained by providing structural support of earth walls, if required or directed by the Project Lead, so that sides are stable and will not move.

5. Limits of excavations shall allow for adequate working space and as required for safety of personnel.

6. Dewater excavations as specified in Section 31 23 19, Dewatering. Construct cofferdams or berms around excavations as specified in Section 01 57 36, Temporary Creek Diversion System, or as required to prevent surface water and runoff from entering the excavation.

7. Excavations for convenience of the Contractor shall be approved by the Project Lead.

8. Place excavated material at a sufficient distance from edge of excavation so as not to cause cave-ins or bank slides, but in no case closer than 3 feet from the edge of excavations.

9. Excavated earth material shall be placed along the banks as depicted in the Contract Drawings or as directed by the Project Lead, Observer, or Land Owner.

10. Excess material shall be placed along banks to a maximum height of 3 feet.

3.7 COMPACTION

A. Compaction Density: Compact each layer of fill and backfill material to not less than 90 percent relative compaction as determined by ASTM D1557.

B. Place material from creek bed along banks in 12-inch lifts and compact firmly without damaging the bank or bank vegetation.

3.8 BACKFILLING

A. Use materials removed from site excavations for backfilling if such material meets the requirements specified herein.

B. Backfilling is required around all substructures, such as vaults, shafts, holes, pits, and other voids.

C. Place backfill in layers not to exceed 12-inches of loose material, and compact each layer to specified density before the next layer is placed.

D. Do not use compaction equipment and methods that produce excessive horizontal or vertical earth pressures on structures. Excessive horizontal earth pressures are those in excess of at rest earth pressures. Excessive vertical earth pressures are those in excess of overburden pressures.

3.9 FINISH GRADING

A. Finish grading shall prepare the excavated and backfilled areas to uniform surface free of debris.

B. Verify that grades are correct. If discrepancies occur, notify the Project Lead and do not commence finish grading work until instructed by the Project Lead.

C. Smooth grade breaks and slope transitions and eliminate uneven areas so that they are gradual and provide positive drainage.

D. Remove trash, debris, rubble, and other deleterious materials.

SECTION 31 23 19

DEWATERING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for preventing surface and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the project site and surrounding areas in a manner that would present the proper execution of the work. The Contractor shall be responsible for designing and implementing the specific dewatering strategy as needed over the duration of the project.

B. This Section also includes requirements for extracting, containing, and discharging, ground water that accumulates in excavations during the progress of work.

C. This Section also includes designing, furnishing, installing, operating, and maintaining a temporary dewatering and dewatering control system.

1.2 RELATED WORK

A. Section 31 00 00, Earthwork

B. Section 01 57 36, Temporary Creek Diversion System

1.3 SUBMITTALS

A. Submit a site specific dewatering plan for the work based on the configuration shown in the Contract Drawings. The dewatering plan shall indicate temporary water pollution control measures to be employed during dewatering and temporary on-site power facilities. If the Contractor wishes to deviate from the configuration shown on the Contract Drawings, the Contractor shall only proceed with the authorization of the Engineer.

B. Maintain on-site copies of any special permits required for performing the work of this Section, including but not limited to permits provided by the Project Lead.

1.4 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for dewatering shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in dewatering, including storage and disposal of water, permits, discharge fees, and complying with the requirements of this Section, as specified in these technical Specifications, and as directed by the Engineer.

B. Full compensation for dewatering trenches, pits, and other excavations as specified herein shall be considered as included in the contract lump sum price paid for dewatering and no additional compensation will be allowed therefore.

1.5 SYSTEM DESCRIPTION

A. The Contractor shall remove water that accumulates in all excavations during the progress of work so that all work can be done in the dry, unless otherwise approved by the Engineer. Excavated areas shall be kept free from water while underground utilities or structures are constructed, while grout is setting and until backfill has been placed to a sufficient height to anchor the work against possible flotation or leakage.

B. The Contractor shall, at all times, have on the project site sufficient pumping equipment for immediate use, including standby pumps for use in case other pumps become inoperable. Water shall be disposed of in accordance with the detailed requirements specified herein and so as to cause no injury to personnel or the public, damage to public or private property, nor menace to the public health.

C. The Contractor's dewatering system shall be designed to prevent pumping fines from below grade or disturbing materials exposed at the excavation bottom.

D. The Contractor's dewatering system shall capture groundwater such that it does not contact grout or any disturbed concrete surface during demolition.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for providing the necessary dewatering work and facilities. Provide back-up equipment as necessary for replacement and for unanticipated emergencies.

PART 3 – EXECUTION

3.1 DEWATERING

A. Except as otherwise noted herein, dewatering shall be performed only as needed to accomplish a lowering of measured static ground water level to an elevation which is suitable for construction.

B. When pumping is required to reduce groundwater levels it shall be accomplished in a manner non-disruptive to the surrounding environment.

C. The Contractor shall be permitted to use generators to operate the dewatering pumps. The generators shall meet all Federal, State and City requirements for allowable noise limits as per the approved Dewatering Plan. Contractor shall minimize offsite noise to the maximum extent feasible.

3.2 DISCHARGE OF EXTRACTED GROUNDWATER

A. The Contractor shall not discharge any water that exceeds the discharge requirements set forth by any permit conditions.

B. Subject to any discharge restrictions identified in the applicable permits, effluent from dewatering shall be discharged directly to the channel downstream of the project limits. Measures shall be taken to ensure erosion and disturbance of the channel at the outfall location does not occur.

SECTION 45 00 00

LONGITUDINAL PEAKED STONE TOE PROTECTION, BOULDER CLUSTERS AND LARGE WOOD ANCHORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for the size and gradation of rock used for the longitudinal peaked stone toe protection (LPSTP) and boulder clusters. The Contractor shall be responsible for procuring and installing rock in a manner consistent with the Contract Drawings.

1.2 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for the installation of LPSTP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in rock placement, including storage, and necessary earthwork as specified in these technical Specifications, Contract Drawings and as directed by the Engineer.

B. Full compensation for rock installation as specified herein shall be considered as included in the contract lump sum price paid for channel restoration and no additional compensation will be allowed therefore.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for providing the necessary rock placement work and facilities. Provide back-up equipment as necessary for replacement and for unanticipated emergencies.
B. Installed LPSTP rock shall conform to the following criteria:
    1. Well graded stone, such that:
        a. D100 = 24”
        b. D50 = 12”
        c. D20 = 6”
        d. D10 = 3’
        e. D85/D15 must be >2
    2. Rock shall be free of fines – no stone smaller than 2”.
    3. Rock shall be angular, evenly proportioned in dimension; blocky as opposed to elongated. River cobble is not accepted.
    4. Unit weight shall not be less than 150 pcf.
C. Installed Boulder Cluster rock shall conform to the following criteria. Each cluster will be composed of a minimum of 5 rocks, with a minimum size of 12”. At least one rock in each cluster must be at least 24’
D. Two anchor boulders a specified for the large wood element on the Contract Drawings. The distal anchor (farthest from the centerline of the channel) shall be a 1-ton boulder (minimum). The anchor closest to the root wad shall be a 2-ton boulder (minimum).
E. Prior to installation, all rock shall be inspected and approved by the Engineer.

PART 3 – EXECUTION

3.1 LPSTP PLACEMENT

A. LPSTP shall be placed along the alignment indicated in the Construction Drawings, unless otherwise instructed by the Engineer based upon field conditions observed following excavation.
B. LPSTP shall be placed in a trench excavated to a minimum of 1 foot below the design grade shown in the Construction Drawings. The peak of the LPSTP shall rise to a height of 3.5 feet, or 2.5 feet above the design grade. Rock shall be placed as triangular peak such that the river and bank sides are sloped at approximately 1:1.
C. LPSTP shall be placed in such a manner that the larger stones are uniformly distributed, the smaller rocks serve to fill the spaces between the larger stones and that excessive segregation of the various stone sizes does not occur. Sufficient placing and leveling shall be done to produce a firmly bedded neat and uniform surface conforming to the thickness, shape and dimensions shown on the Construction Drawings.

D. LPSTP alignments shall be keyed into existing bank features to provide a continuous bank feature. Bank excavation and backfilling may be necessary if bank features are not discovered during grading as specified in the Construction Drawings.
E. The area of placement shall not exceed the dimensions shown on the plans or as directed by the Engineer.
F. Backfill area between placed stone and bank with soil, rock, or gravel after LPSTP has been placed.

3.2 BOULDER CLUSTER PLACEMENT

A. Boulder Clusters shall be placed at the direction of the Engineer.

SECTION 47 00 00

REVEGETATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for the installation, irrigation and maintenance of vegetation as specified in the Contract Drawings. The Contractor shall be responsible for procuring and installing vegetation in a manner consistent with the Contract Drawings.

1.2 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for the installation, irrigation and maintenance of vegetation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in vegetation installation. Irrigation and maintenance as specified in these technical Specifications, Contract Drawings and as directed by the Engineer.

B. Full compensation for as specified herein shall be considered as included in the contract lump sum price paid for channel restoration and no additional compensation will be allowed therefore.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for providing the necessary vegetation installation, irrigation and maintenance. Provide back-up equipment as necessary for replacement and for unanticipated emergencies.
B. Bank Toe vegetation shall consist of equal proportions of *Carex praegracilis, Carex barbarae* and *Juncus balticus*, in containers not smaller than 2 in x 2 in x 5 in, or equivalent.
C. Mid Bank vegetation shall consist of equal proportions of *Alnus rubra, Cornus sericea* and *Corylus cornuta,* in containers not smaller than 1 gallon or 4 in x 4 in x 14 in, or equivalent.
D. Plants must be grown from genetic material naturally occurring in Santa Cruz County and preferably the San Lorenzo River watershed.
E. Plants shall be presented to the Engineer for inspection before installation to ensure adequate quality and vigor.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Plant bed shall be loosened and roughened, free of weeds, rocks, trash, and debris.
B. Vegetation shall be installed in the areas specified on the Contract Drawings.
C. The Bank Toe vegetation shall be installed from the top of the LPSTP (~2.5 feet above channel grade) to an elevation of 4.5 feet above the channel bottom. Bank Toe vegetation shall be planted at a density of 1 container per square foot (i.e., 1 foot spacing).
D. The Mid Bank vegetation shall be installed above 4.5 feet to an elevation where existing ground and vegetation are present, unless otherwise instructed by the Engineer based upon field conditions. Mid Bank vegetation shall be planted at a density of 1 container per 16 square feet (i.e., 4 foot spacing).
E. Irrigation shall be provided, as designed by Contractor.
F. Prior to installation, contractor shall submit an irrigation plan to the Engineer for approval.
G. Irrigation shall comply with NRCS approved irrigation requirements
H. Vegetation shall be planted and irrigated in a manner to ensure maximum survival.

3.2 MAINTENANCE

A. The Maintenance Period shall extend from the time of seeding to 6 months thereafter. The intent of the Maintenance Period is to sustain the plants shown on the Drawings by providing supplemental water and weed control.
B. The Contractor shall be responsible for establishing and maintaining healthy plants throughout the Maintenance period. The Contractor will check the foliage of each plant for symptoms of disease, size, color, wilting, defoliation, new growth, browsing by wildlife, insect damage, and vandalism. The Contractor will check the wood and root crown of each plant for symptoms of disease, browsing by wildlife, insect damage, girdling, structural deformities, dieback, and

sunburn. The Contractor shall be responsible for reporting any deficiencies to the Engineer and taking corrective actions as required in order to remedy all identified deficiencies.

C. Maintenance activities prescribed within this Section shall include, but are not limited to:
    1. Operating and maintaining the irrigation system if necessary for plant establishment,
    2. Watering plants,
    3. Controlling weeds,
    4. Maintain mulch,
    5. Maintaining plant protection devices,
    6. Removing debris,
    7. Installing replacement plants.

SECTION 49 00 00

EROSION CONTROL FABRIC

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for the installation of erosion control fabric as specified in the Contract Drawings.

1.2 MEASUREMENT AND PAYMENT

A. The contract lump sum price paid for the installation of erosion control fabric and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in erosion control fabric installation and maintenance as specified in these technical Specifications, Contract Drawings and as directed by the Engineer.

B. Full compensation for as specified herein shall be considered as included in the contract lump sum price paid for channel restoration and no additional compensation will be allowed therefore.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for providing the necessary erosion control fabric installation. Provide back-up equipment as necessary for replacement and for unanticipated emergencies.
B. Erosion control fabric shall consist of woven coir able to withstand velocities of 12 feet per second.
C. Staking materials shall comply with materials types prescribed by the manufacturer of the erosion control fabric used.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Bank shall be graded back preferably to a slope gradient no steeper than 1V:1½H and smoothed so that it is free of any projections or depressions.
B. Fabric Orientation: Erosion control fabric shall be rolled/oriented parallel to stream flow in the re-contoured bank area. Erosion control fabric installed in conjunction with restoration of the access ramp may be rolled/oriented perpendicular to the slope until the re-contoured bank area is reached.
C. Blanket manufacturers normally provide recommended staking patterns and densities (stakes/unit area) which are dictated by slope gradient, soil type, and estimated hydraulic loading conditions. Contractor shall use staking materials and density as recommended by the erosion control fabric manufacturer. Live stakes can be uniformly interspersed with inert fasteners but shall be limited to no more than one-third of the total number of fastening devices used to secure a blanket.
D. Anchor Trenching: Anchor Trenching to secure fabric edge is a fundamental element of blanket installation on difficult sites. It is especially critical to bury leading (upstream) edges to prevent lifting and tearing. Trenches shall be at least 6 in deep and wide, then backfilled with common fill or topsoil and compacted. Blanket edges parallel to flow may also be trenched in a variety of ways for maximum erosion protection.
E. Check Slots: Check slots shall be oriented perpendicular to the stream flow (i.e., up and down slope) with not more than 20 ft of separation between an anchor trench and a check slot. Check slot trenching follows the specifications for anchor trenching.
F. Fabric Overlap: Upstream and upslope edges should always be lapped, or "shingled" over downstream and down slope edges.
G. Transitions: Transitions between adjacent bank treatments (i.e., treated and untreated areas) require special attention. Trenches in these areas should be at least 12 in deep and wide.

SECTION 50 00 00

ADDITIONAL STANDARDS AND SPECIFICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

In addition to the specifications provided in these technical Specifications and those provide on the Contract Drawings, the following National Resource Conservation District (NRCS) Conservation Practice Standards and Specifications apply:

- Critical Area Planting (342) Standard and Specification;
- Riparian Forest Buffer (391) Standard and Specification;
- Stream Habitat Improvement (395) Standard;
- Obstruction Removal (500) Standard;
- Streambank and Shoreline Protection (580) Standard and Specification;
- Earthfill (903) Specification; and
- Rock Riprap (907) Specification.

DESIGN CRITERIA

A-Oblique View

B-View from Downstream

C-View from Upstream

Notes:	cbec eco engineering	*Branciforte Dam Removal* **Photographs of Branciforte Dam**		
		Project No. 12-1007	Created By: CTH	**Figure 1**

A-From Bridge Looking Downstream, Dam in Distance

B-From Dam Looking Upstream

C-From Dam Looking Downstream

Notes:

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Branciforte Dam Removal

Photographs of Branciforte Dam Reach

Project No. 12-1007	Created By: CTH	**Figure 2**

A-Reference reach with bed exposed

B-Reference reach with channel inundated

C-Reference reach typical bed conditions

Notes:	cbec eco engineering	*Branciforte Dam Removal* **Photographs of Reference Reach**		
		Project No. 12-1007	Created By: CTH	**Figure 3**

A-Right Bank Downstream of Dam

B-Left Bank Downstream of Dam

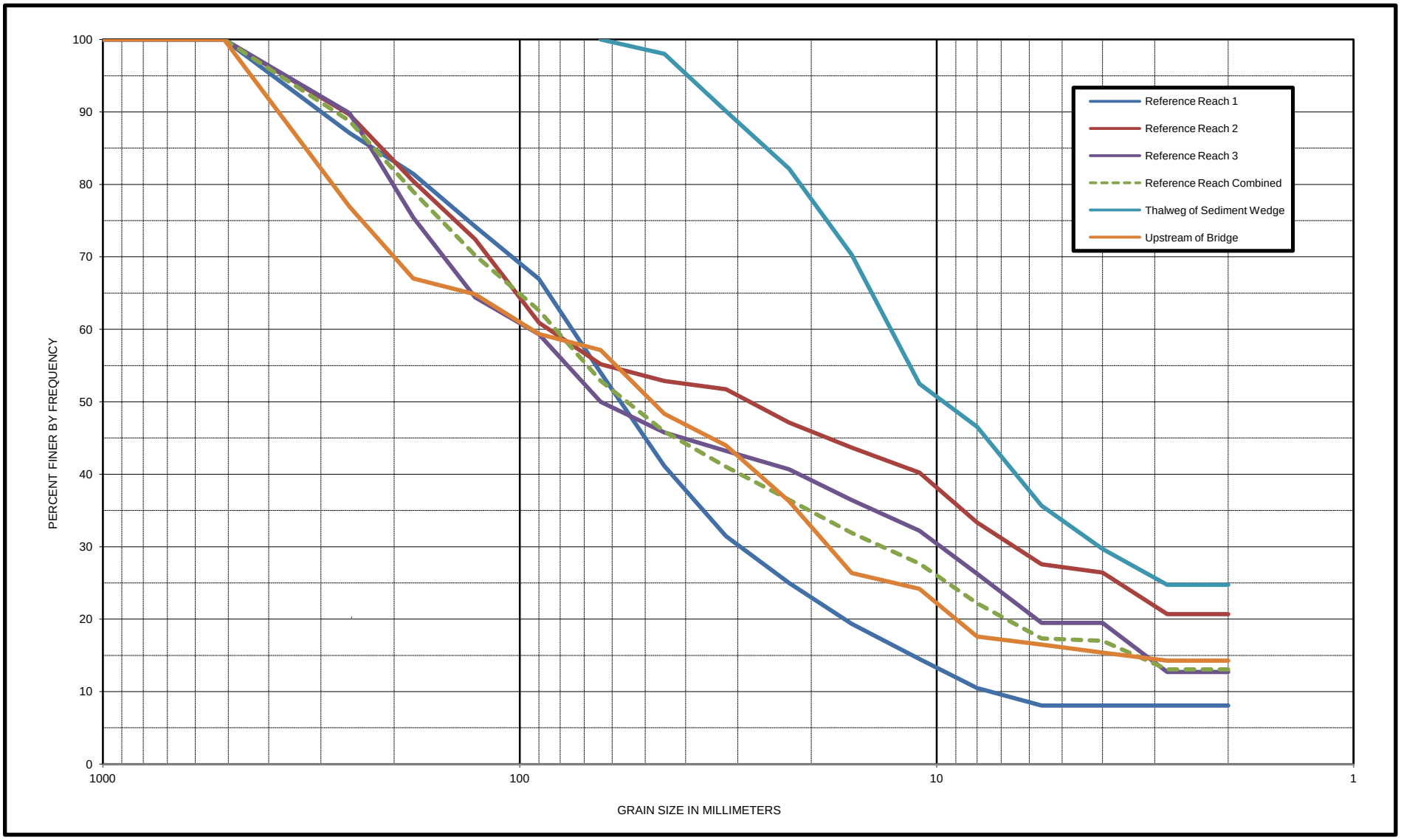
Notes:

Branciforte Dam Removal

Photographs of Banks Downstream of Dam

Project No. 12-1007	Created By: CTH	**Figure 4**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 4_Bank Photos.docx
11/16/2012



Notes: Data collected via pebble counts using the methodology described by Bunte and Abt (2001). "Thalweg of Sediment Wedge" sample was collected by sampling particles along the main flow line through the sediment wedge, not by equal interval sampling across the channel as was done at the other locations.

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Branciforte Dam Removal

Grain Size Distribution

Project No. 12-1007	Created By: CTH	**Figure 5**

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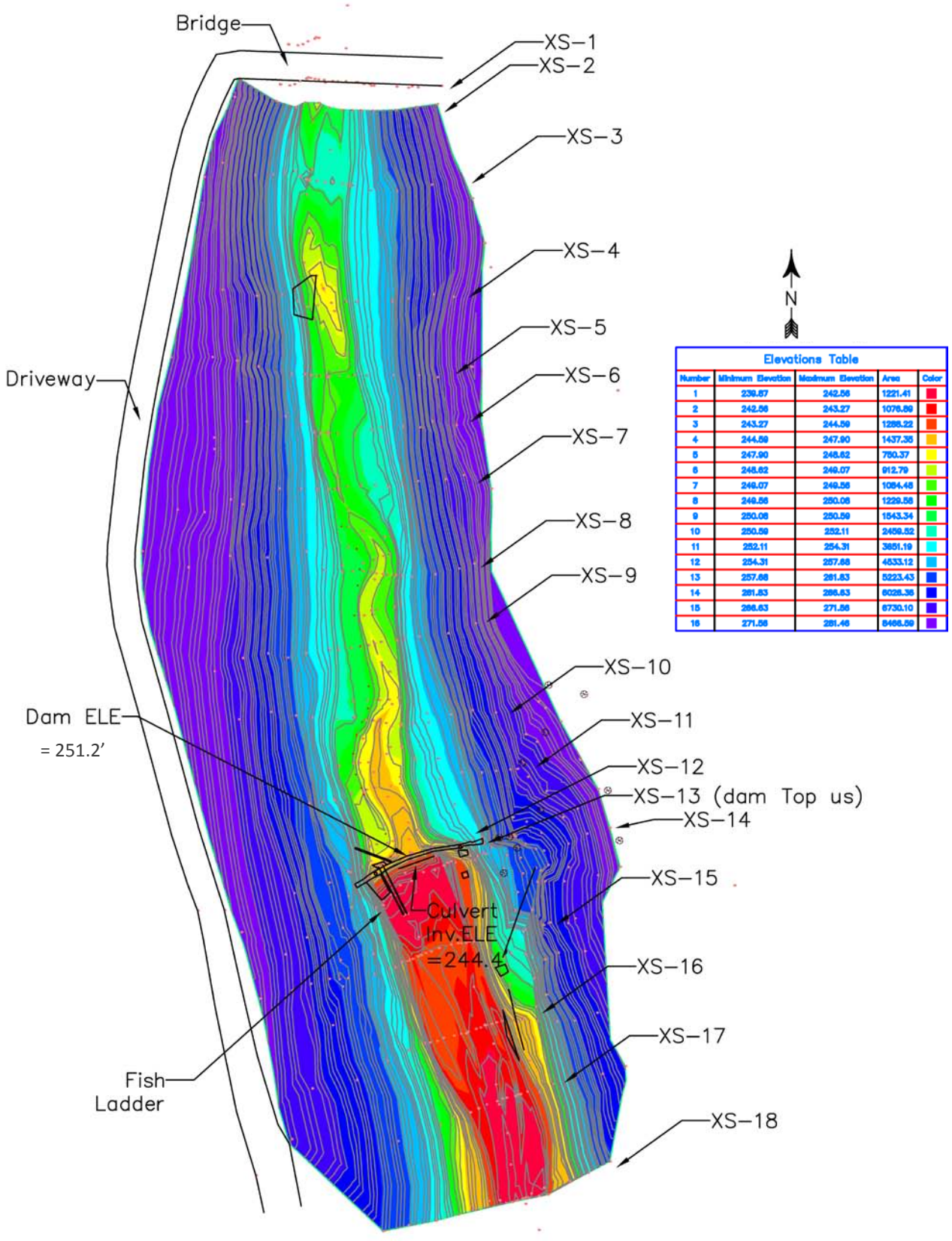
4/3/2013



Notes: Contour interval is 0.5 ft.

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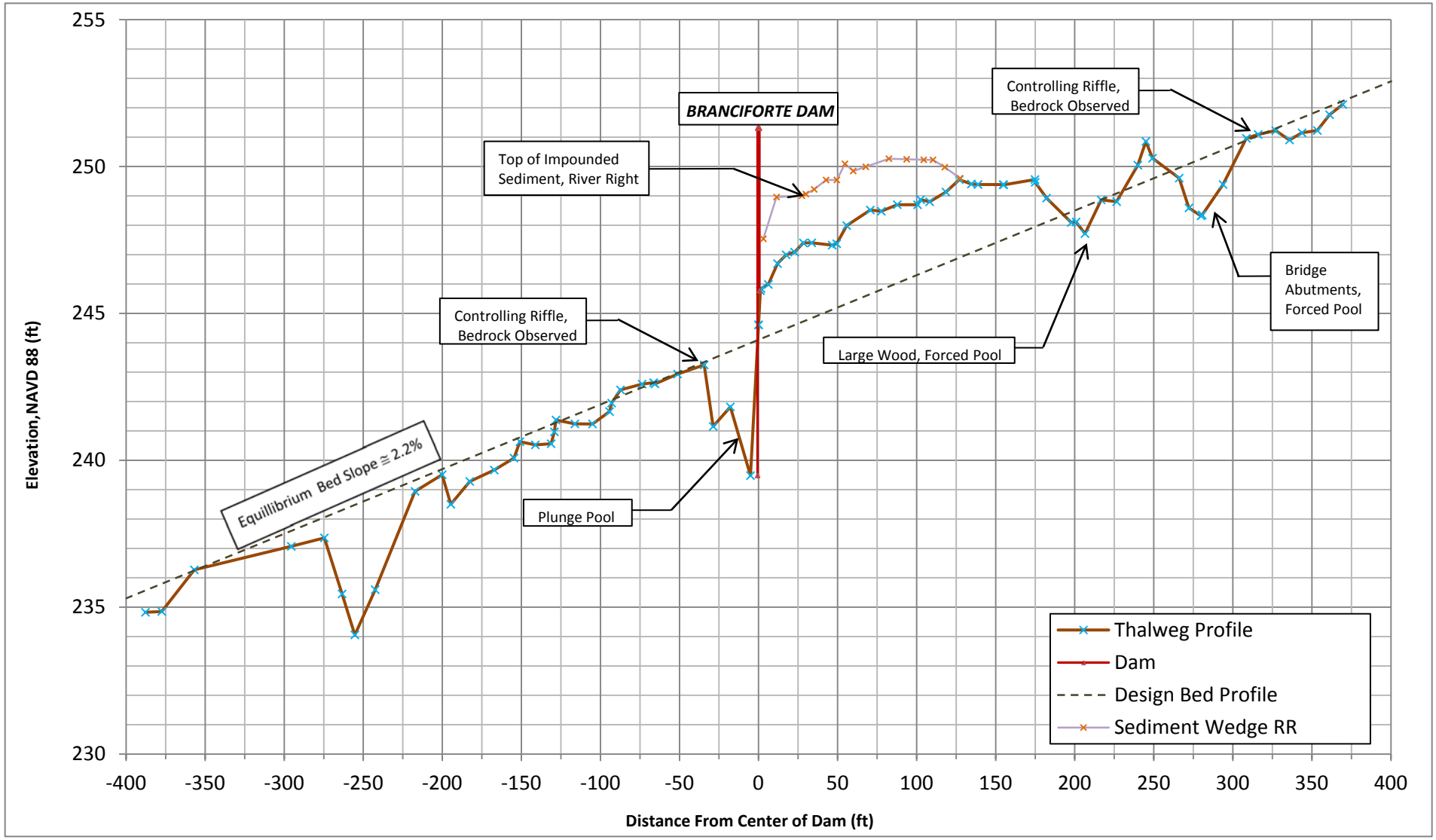
Branciforte Dam Removal

Existing Topography and Features

Project No. 12-1007 | Created By: BST | **Figure 6**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 6_EC-TOPO.docx
11/16/2012



Notes: Topographic survey conducted May 3-4, 2012 using RTK GPS and a total station.

Branciforte Dam Removal

Long Profile

Project No. 12-1007	Created By: BST	**Figure 7**

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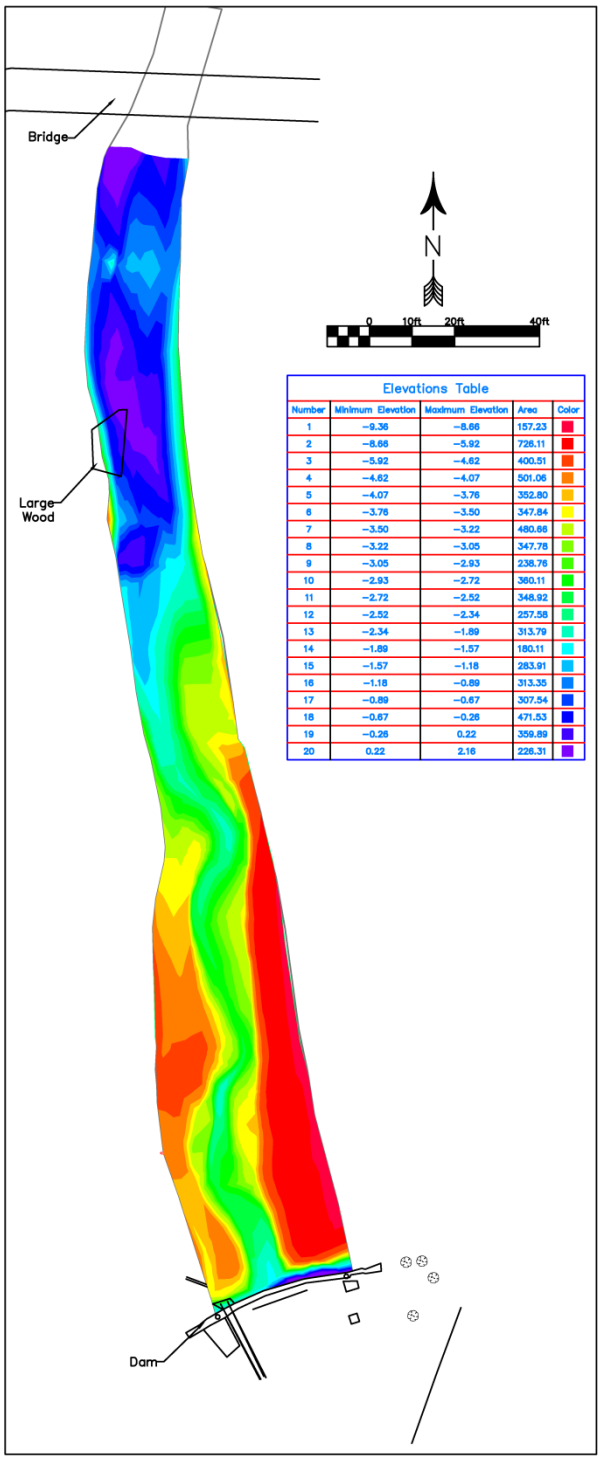
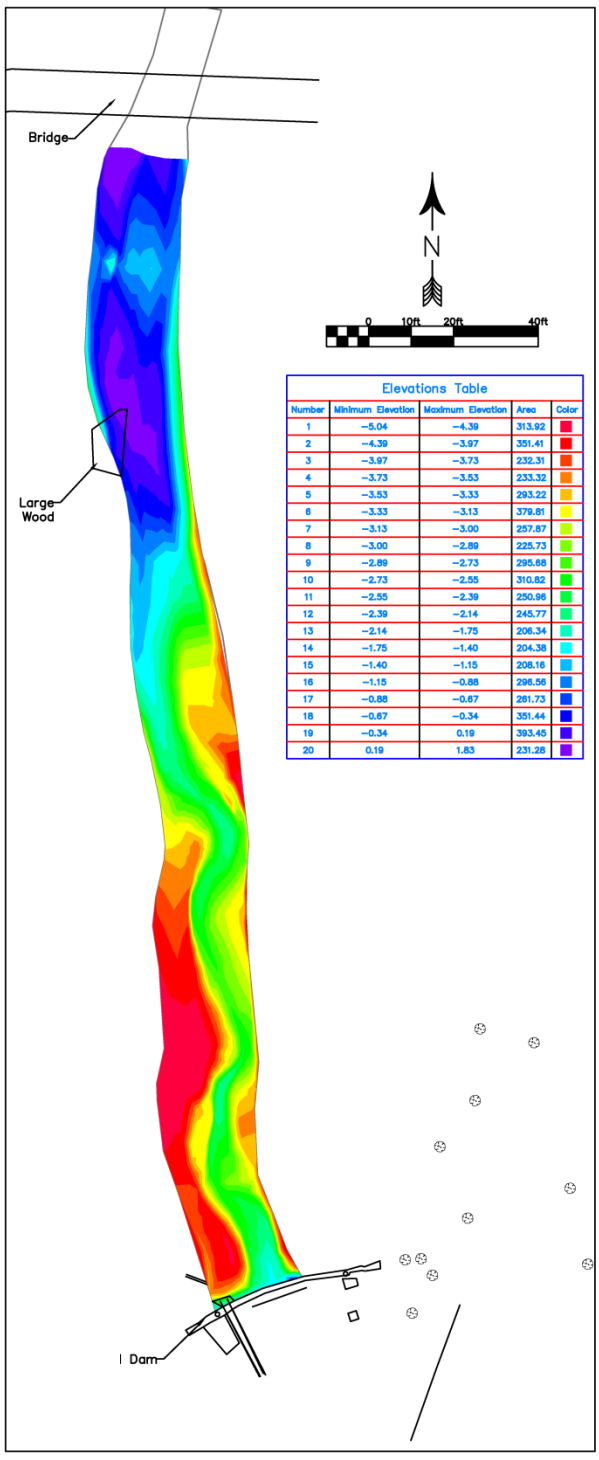
11/16/2012



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	−9.36	−8.66	157.23	
2	−8.66	−5.92	726.11	
3	−5.92	−4.62	400.51	
4	−4.62	−4.07	501.06	
5	−4.07	−3.76	352.80	
6	−3.76	−3.50	347.84	
7	−3.50	−3.22	480.66	
8	−3.22	−3.05	347.78	
9	−3.05	−2.93	238.76	
10	−2.93	−2.72	360.11	
11	−2.72	−2.52	348.92	
12	−2.52	−2.34	257.58	
13	−2.34	−1.89	313.79	
14	−1.89	−1.57	180.11	
15	−1.57	−1.18	283.91	
16	−1.18	−0.89	313.35	
17	−0.89	−0.67	307.54	
18	−0.67	−0.26	471.53	
19	−0.26	0.22	359.89	
20	0.22	2.16	226.31	

Sediment Volume ≅ 810 CY
Design channel width based on projection of observed bank toe locations and wdith immediately downstream of dam ≅34 ft. Includes terrace on river left (red area).



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	−5.04	−4.39	313.92	
2	−4.39	−3.97	351.41	
3	−3.97	−3.73	232.31	
4	−3.73	−3.53	233.32	
5	−3.53	−3.33	293.22	
6	−3.33	−3.13	379.81	
7	−3.13	−3.00	257.87	
8	−3.00	−2.89	225.73	
9	−2.89	−2.73	295.68	
10	−2.73	−2.55	310.82	
11	−2.55	−2.39	250.96	
12	−2.39	−2.14	245.77	
13	−2.14	−1.75	206.34	
14	−1.75	−1.40	204.38	
15	−1.40	−1.15	208.16	
16	−1.15	−0.88	296.56	
17	−0.88	−0.67	281.73	
18	−0.67	−0.34	351.44	
19	−0.34	0.19	393.45	
20	0.19	1.83	231.28	

Sediment Volume ≅ 480 CY
Design channel width based on maximum width of downstream reference reach ≅21.5ft.

Notes: Each plot has a different scale to its elevation color ramp.

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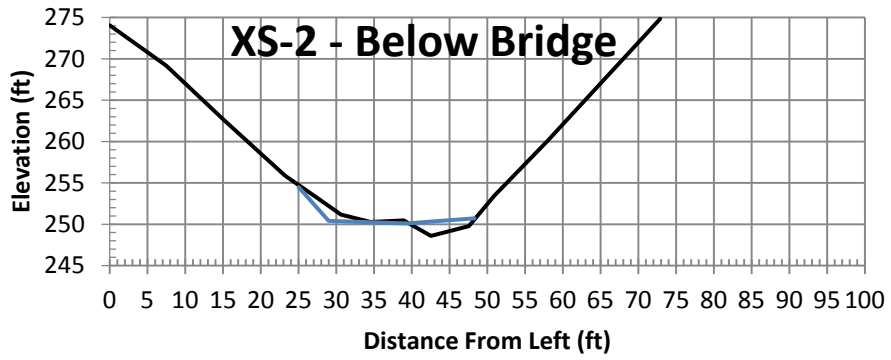
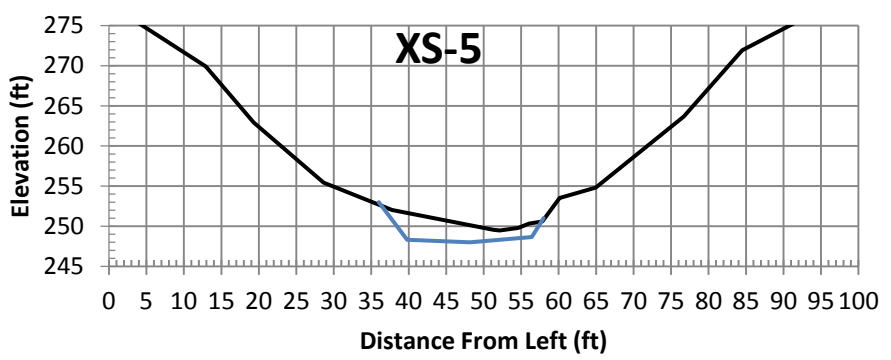
Branciforte Dam Removal

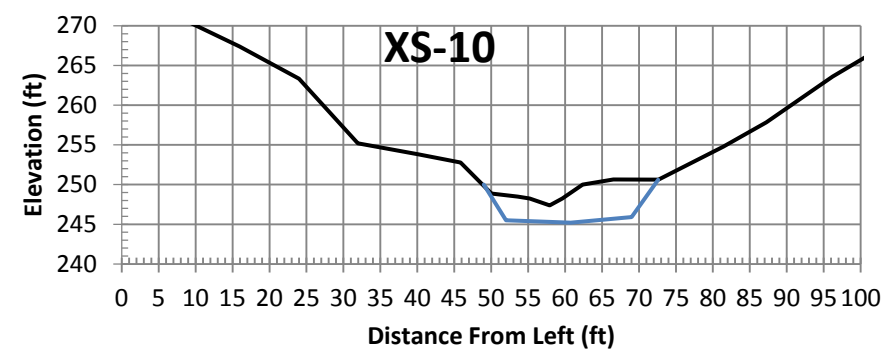
Volume Estimates of Impounded Sediment

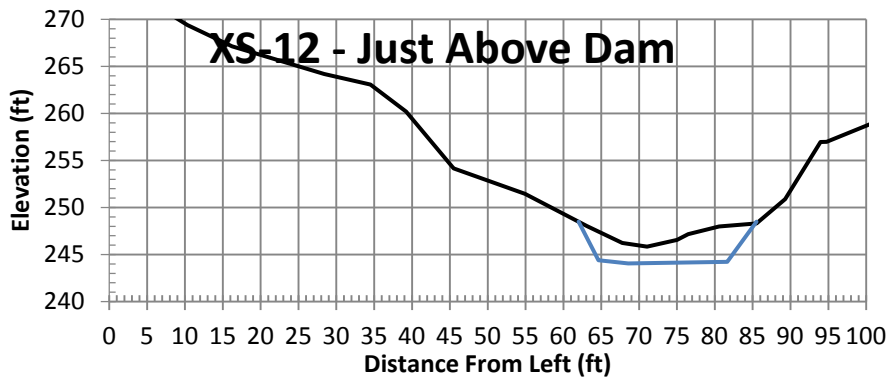
Project No. 12-1007	Created By: BST	**Figure 8**

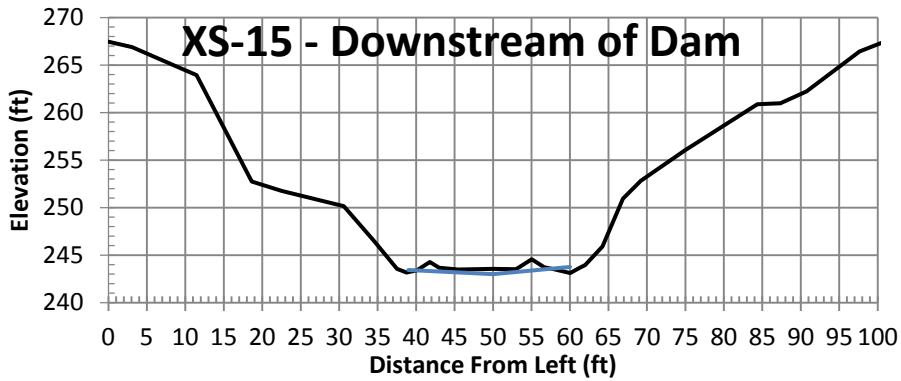
C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 8_Vol_Comp.docx
11/16/2012











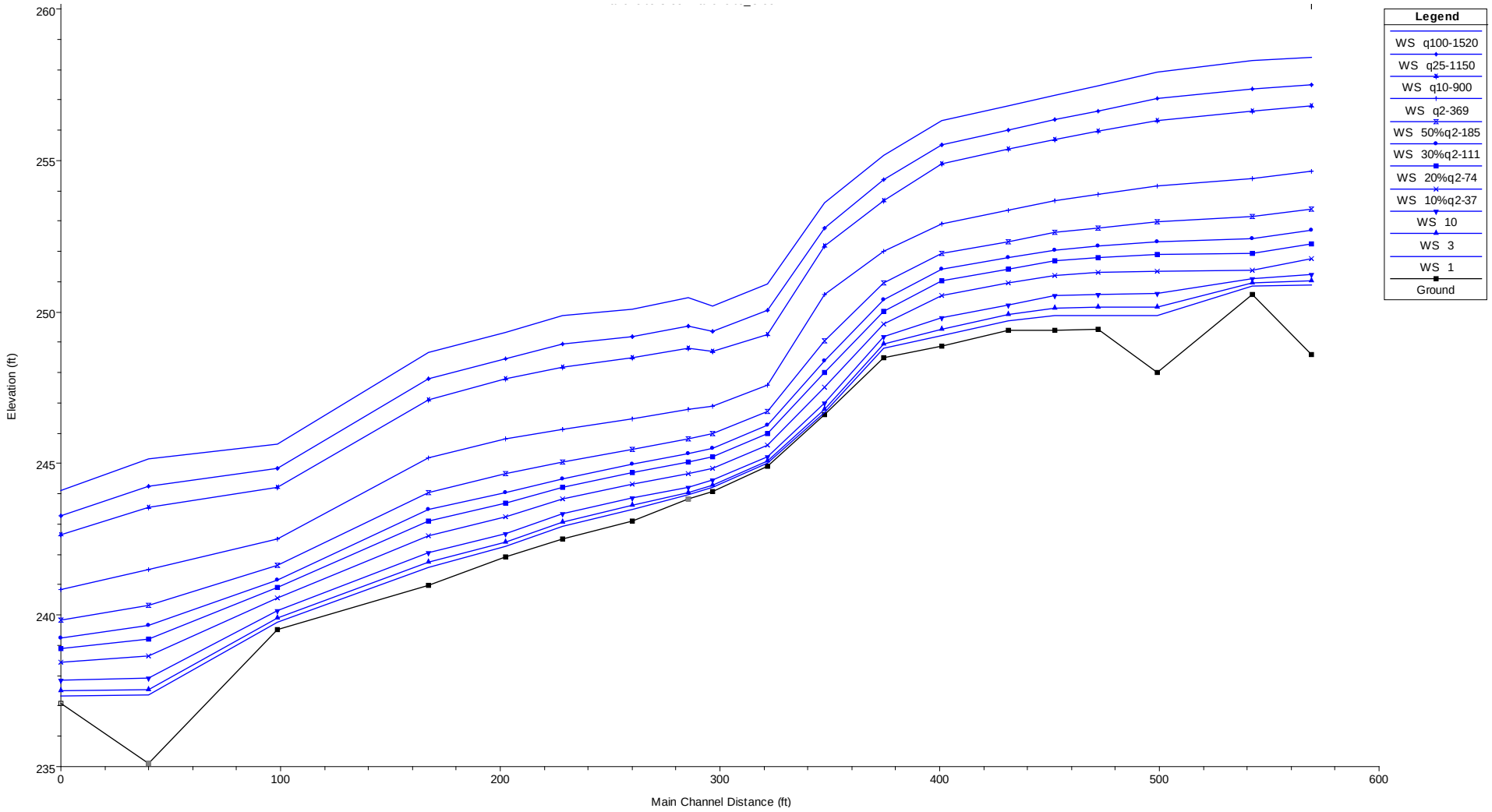
Notes: Black = Existing Conditions; Blue = Future Conditions.
Cross Section locations shown in Figure 6.

Branciforte Dam Removal

Select Cross Sections with Existing and Future Conditions

Project No. 12-1007	Created By: BST	**Figure 9**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 9_XS.docx
11/16/2012



Notes:

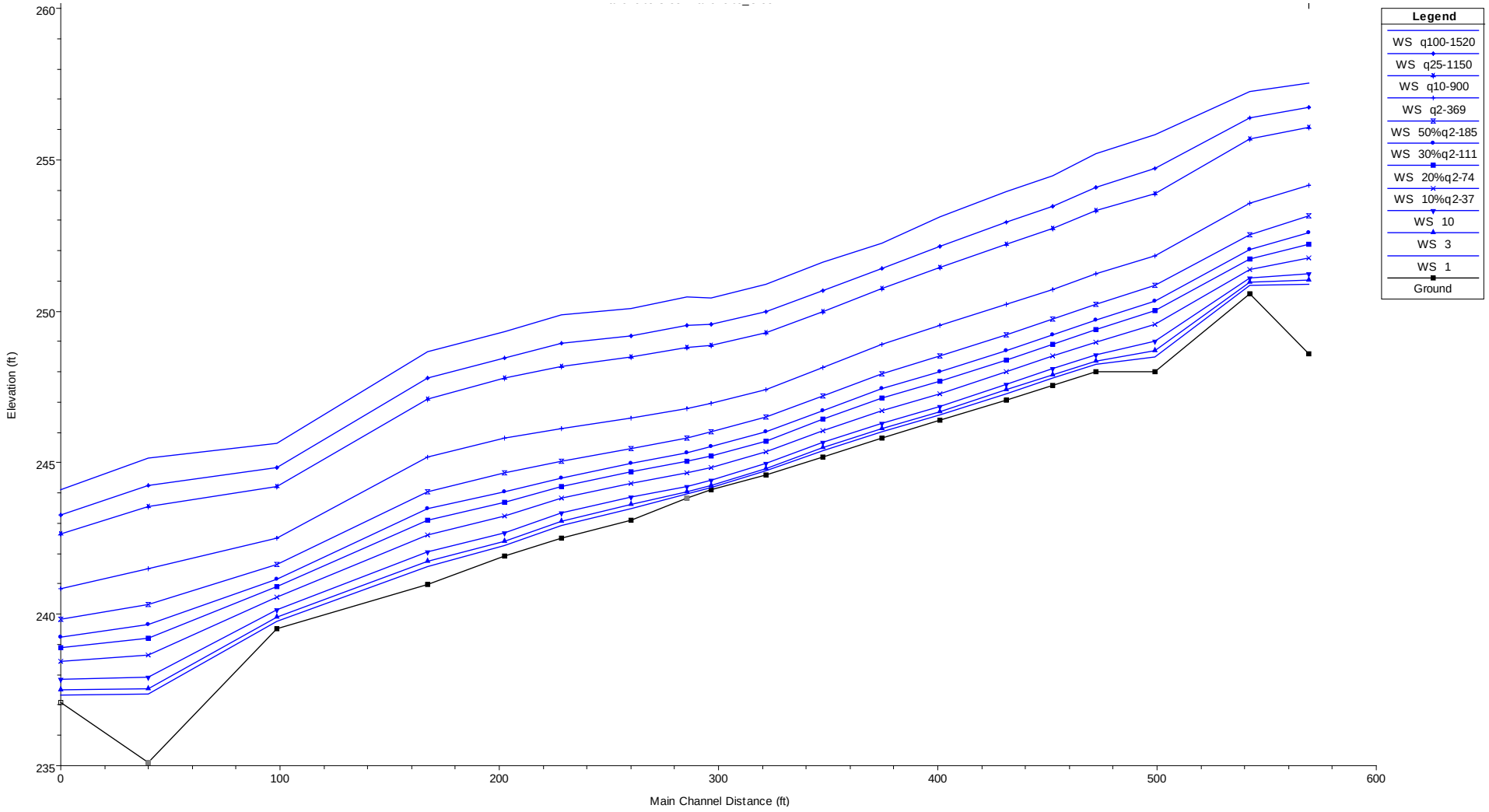
1) Values shown in the legend are flow rates in cfs.
2) The dam is located at station 296.

Branciforte Dam Removal

Water Surface Elevations for the As-Built Condition

Project No. 12-1007	Created By: BST	**Figure 10**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig10_AB_WSE.docx
11/16/2012



Notes:

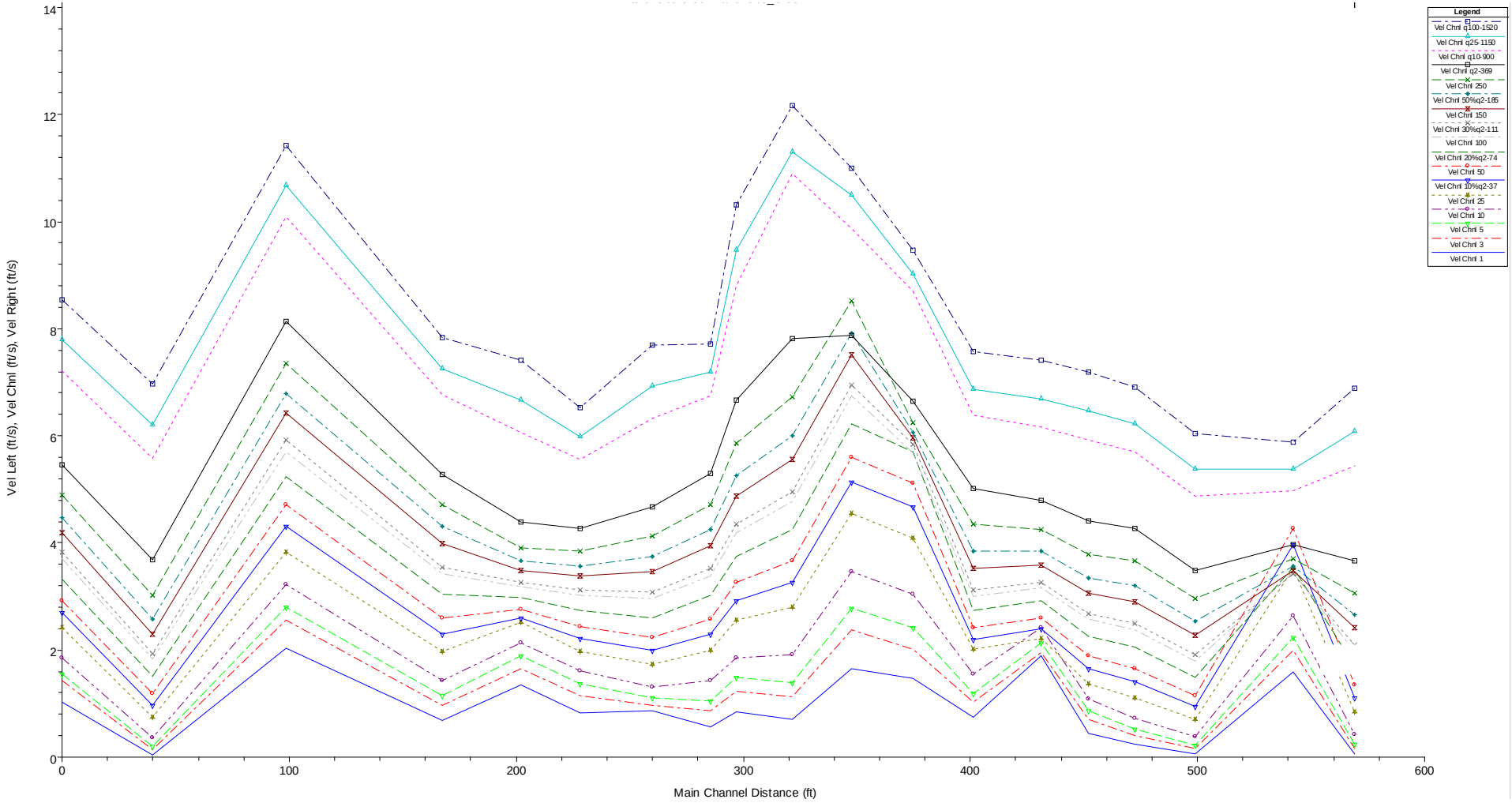
1) Values shown in the legend are flow rates in cfs.
2) The dam is located at station 296.

Branciforte Dam Removal

Water Surface Elevations for the Future Condition

Project No. 12-1007	Created By: CTH	**Figure 11**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 11_Future_WSE.docx
11/16/2012



Notes:

1) Values shown in the legend are flow rates in cfs.
2) The dam is located at station 296.

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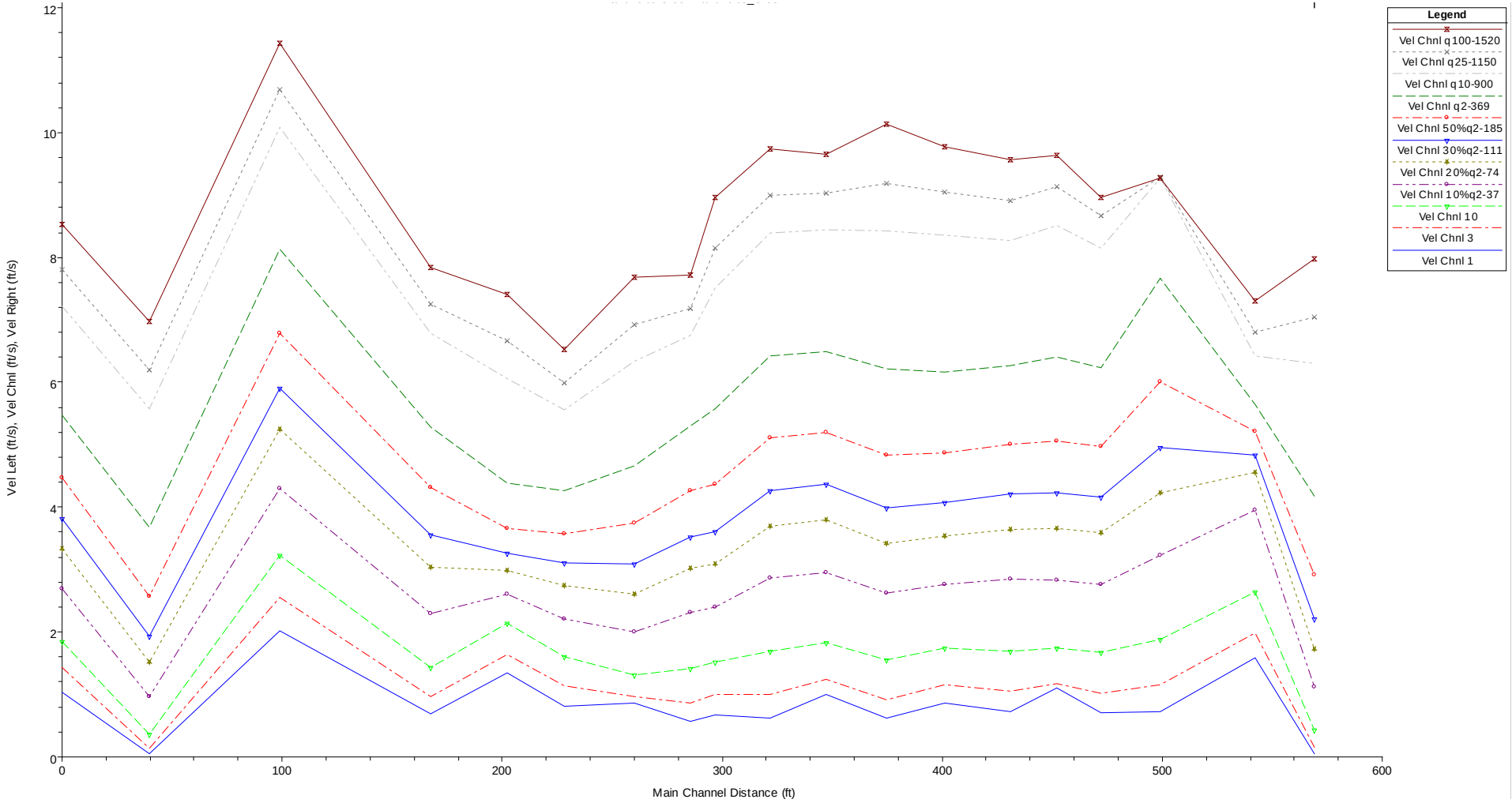
Branciforte Dam Removal

Channel Velocity for the As-Built Condition

Project No. 12-1007	Created By: CTH	**Figure 12**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 12_AB_Vel.docx
11/16/2012



Notes:

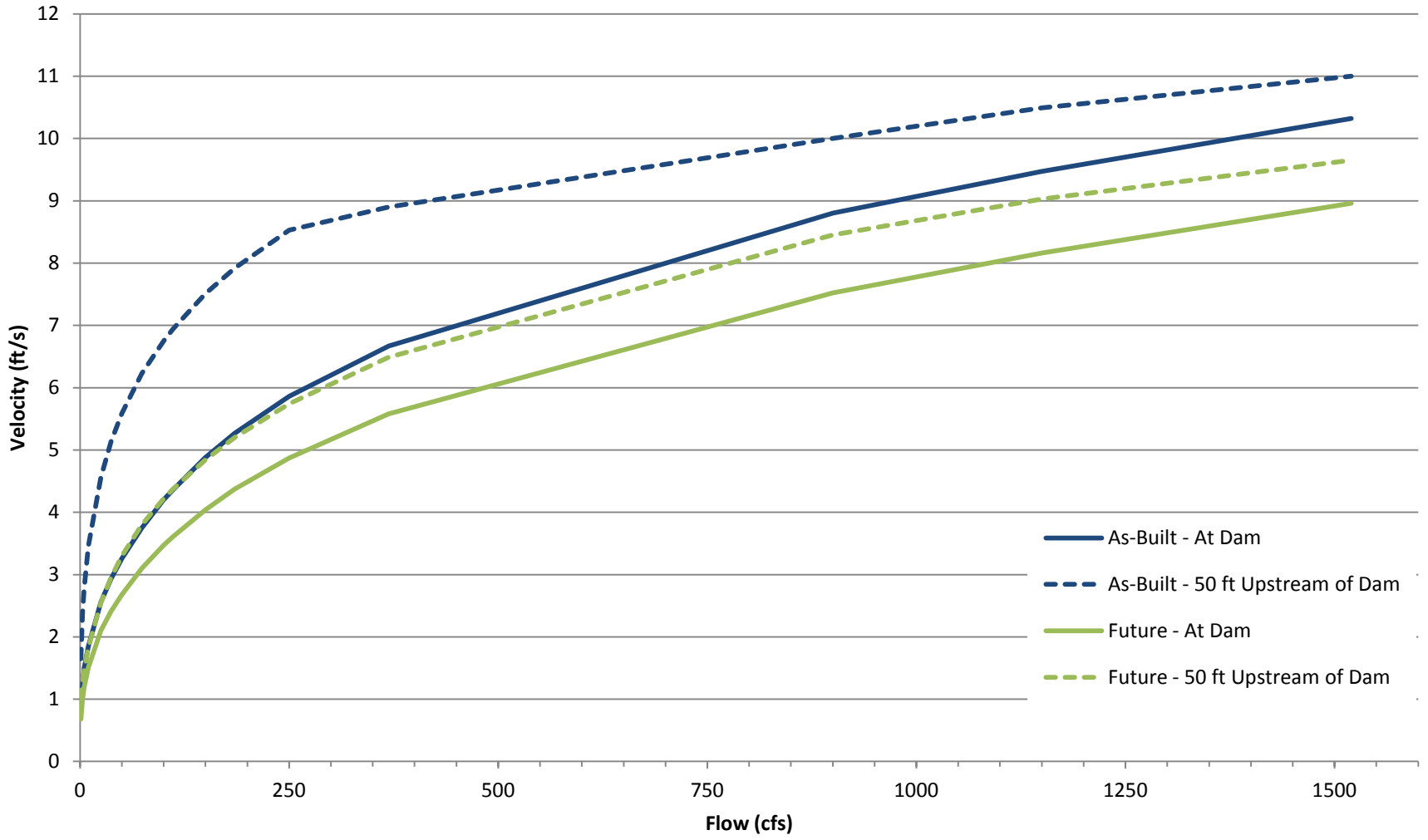
1) Values shown in the legend are flow rates in cfs.
2) The dam is located at station 296.

Branciforte Dam Removal

Channel Velocity for the Future Condition

Project No. 12-1007	Created By: CTH	**Figure 13**

C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 13_Future_Vel.docx
11/16/2012



Notes:

1) Velocities are cross section averages as simulated with HEC-RAS

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Branciforte Dam Removal

Flow vs. Velocity for Future and As-Built Conditions

Project No. 12-1007	Created By: CTH	**Figure 14**

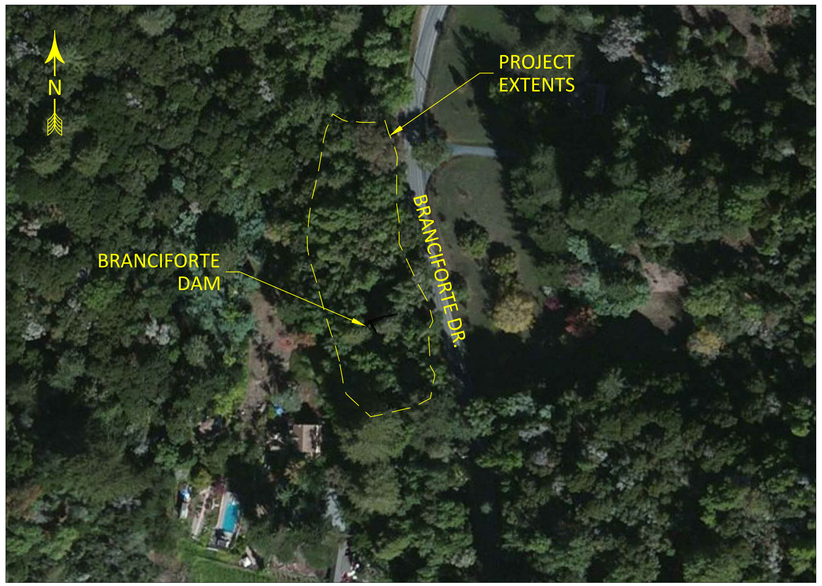
C:\Work\Projects\12-1007_Branciforte_Dam_Removal\Basis of Design\Fig 14_Vel_Rating Curve.docx
11/16/2012

DESIGN DRAWINGS

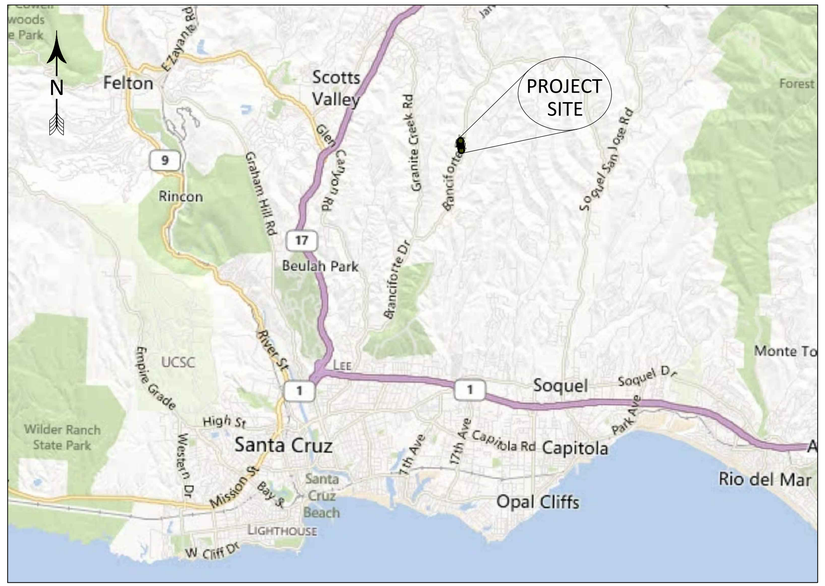
BRANCIFORTE DAM REMOVAL DESIGN PROJECT

BRANCIFORTE CREEK,
(LAT:37.0380, LONG:-121.9484)

THE RESOURCE CONSERVATION
DISTRICT OF SANTA CRUZ COUNTY
APRIL 5, 2013



LOCATION MAP

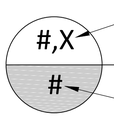


VICINITY MAP

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THESE DRAWINGS, ATTACHED SPECIFICATIONS, AND THE FOLLOWING NATIONAL RESOURCE CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS: 342 - CRITICAL AREA PLANTING STANDARD AND SPECIFICATION; 391 - RIPARIAN FOREST BUFFER STANDARD AND SPECIFICATION; 395 - STREAM HABITAT IMPROVEMENT STANDARD; 500 - OBSTRUCTION REMOVAL STANDARD; 580 - STREAMBANK AND SHORELINE PROTECTION STANDARD AND SPECIFICATION; 903 - EARTHFILL SPECIFICATION; AND 907 - ROCK RIPRAP SPECIFICATION. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE - NATURAL RESOURCES CONSERVATION SERVICE'S NATIONAL ENGINEERING HANDBOOK PART 654: STREAM RESTORATION DESIGN AND THE CALIFORNIA DEPARTMENT OF FISH AND GAME CALIFORNIA SALMONID STREAM RESTORATION MANUAL, 3RD EDITION. TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGMENT, AND BELIEF, THESE PLANS MEET APPLICABLE NRCS STANDARDS AND SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING COMPLIANCE WITH APPLICABLE NRCS STANDARDS AND SPECIFICATIONS.
2. THIS PROJECT IS LOCATED IN AN ENVIRONMENTALLY SENSITIVE AREA AND WORK SHALL COMPLY WITH ALL PERMIT REQUIREMENTS INCLUDING, BUT NOT LIMITED TO, DEWATERING OF THE WORK AREA, AVOIDANCE OF SENSITIVE HABITAT AREAS, AND COORDINATION WITH BIOLOGICAL MONITORING CONSULTANTS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES. SPECIAL SAFETY PRECAUTIONS TO BE TAKEN WHEN WORKING IN THE VICINITY OF GAS, OIL AND ELECTRICAL LINES. CONTACT THE STATE'S ONE CALL SYSTEM, "CALL BEFORE YOU DIG - UNDERGROUND SERVICE ALERT (USA)" AT (800) 227-2600 PRIOR TO ANY CONSTRUCTION TO IDENTIFY ANY UTILITIES WITHIN THE CONSTRUCTION OR ACCESS AREAS.
4. ALL LINES AND GRADES SHOWN ON THESE DRAWINGS ARE APPROXIMATE. EXCAVATION LIMITS, FILL LIMITS, BOULDER, LPSTP AND WOOD STRUCTURE ALIGNMENTS SHALL BE STAKED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE PROJECT ENGINEER.
5. CONTACT THE PROJECT ENGINEER AND PROJECT MANAGER AT LEAST 7 DAYS PRIOR TO CONSTRUCTION.

LEGEND



CONTACTS

RCDSCC	JOHN MORELY, PROGRAM ASSISTANT	831-464-2950 x26
ALNUS ECOLOGICAL	JIM ROBINS, PROJECT MANAGER	510-332-9895
cbec	CHRIS HAMMERSMARK, PROJECT ENGINEER	530-574-6079
LAND OWNER	BEN CAHILL	831-423-9167
LAND OWNER	JIM BOYLE	831-425-3561

TOPOGRAPHIC DATA REFERENCE CALIFORNIA STATE PLANE, ZONE 3, NAD83 FEET.
VERTICAL DATUM IS NAVD88, FEET.

DRAWING LIST

DOCUMENT RELEASE
100% PLANS
REVISION NOTES

DESIGNED CTH/BST
DRAWN BST
REVIEWED SLD
APPROVED CTH

PREPARED BY
cbec eco engineering

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER TREVOR HAMMERSMARK C 66585 Exp 6-30-14 CIVIL STATE OF CALIFORNIA

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

PREPARED FOR
THE RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

CALIFORNIA
SANTA CRUZ
BRANCIFORTE DAM REMOVAL DESIGN PROJECT
COVER SHEET

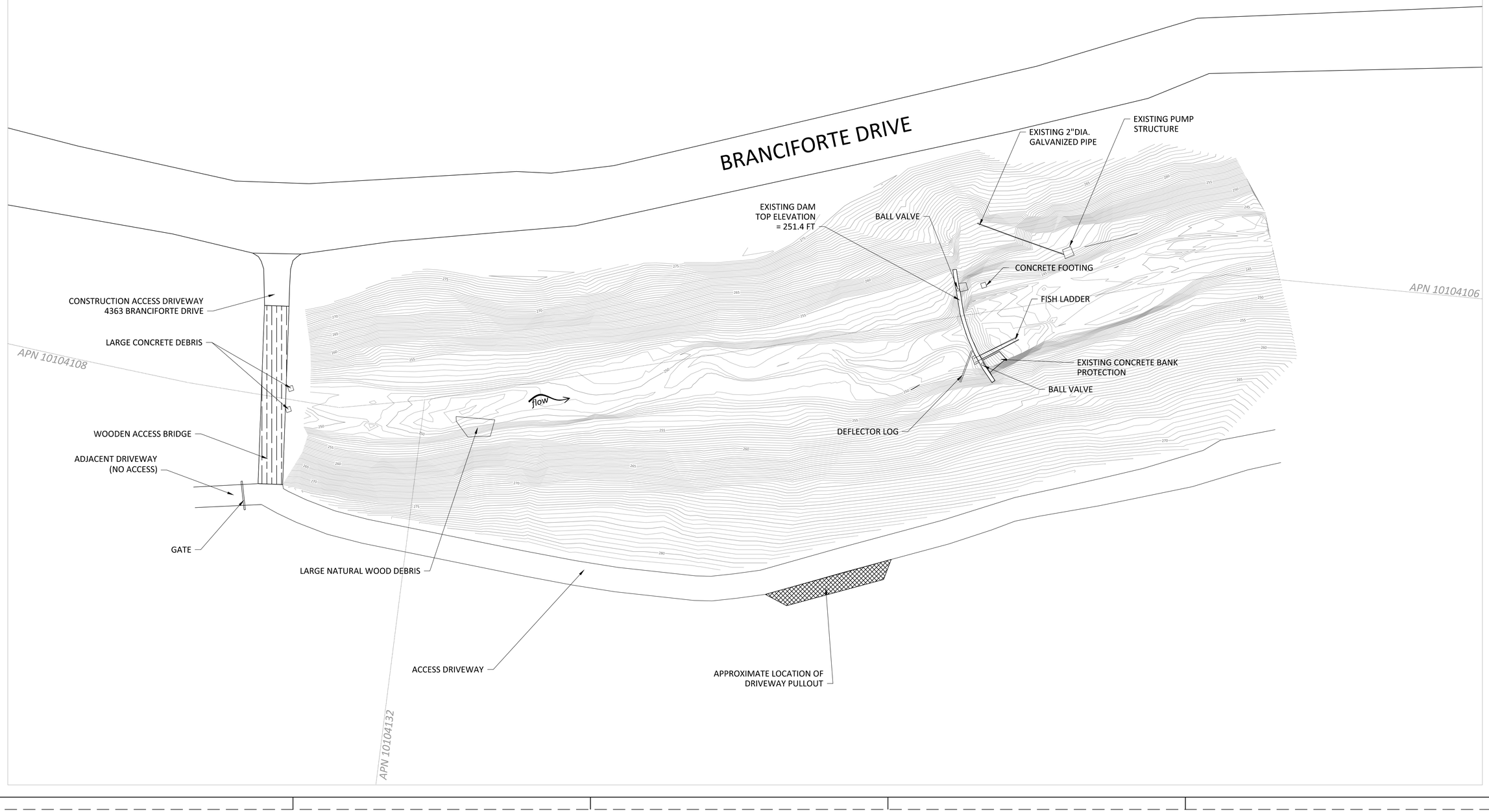
FILE NAME
1_BDR_COVER.DWG
JOB NUMBER
12-1007
DATE
APRIL 5, 2013
SHEET NO.
1 OF 5

NOTES:

1. SCALES SHOWN ARE FOR AN ANSI D (22X34 INCH) SHEET SIZE.
2. PROPERTY LINES ARE APPROXIMATE, NOT TO TAKE PRECEDENCE OVER COUNTY PARCEL RECORDS.
3. EXISTING CONDITIONS REFLECT TOPOGRAPHY AS SURVEYED ON MAY 3-4, 2012. CHANNEL CONDITIONS MAY HAVE CHANGED BY THE TIME OF PROJECT IMPLEMENTATION.

N

0 20' 40' 80'



DOCUMENT RELEASE
100% PLANS

REVISION NOTES

DESIGNED	DRAWN	REVIEWED	APPROVED
CTH/BST	BST	SLD	CTH

PREPARED BY

cbec eco engineering

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER TREVOR HAMMERMAN C 66585 Exp 6-30-14 CIVIL STATE OF CALIFORNIA

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

PREPARED FOR
THE RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

CALIFORNIA
SANTA CRUZ

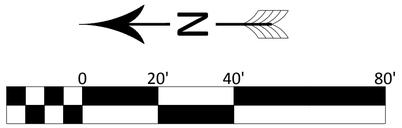
BRANCIFORTE DAM REMOVAL DESIGN PROJECT
EXISTING CONDITIONS

FILE NAME
2_BDR_EC.DWG

JOB NUMBER
12-1007

DATE
APRIL 5, 2013

SHEET NO.
2 5
OF

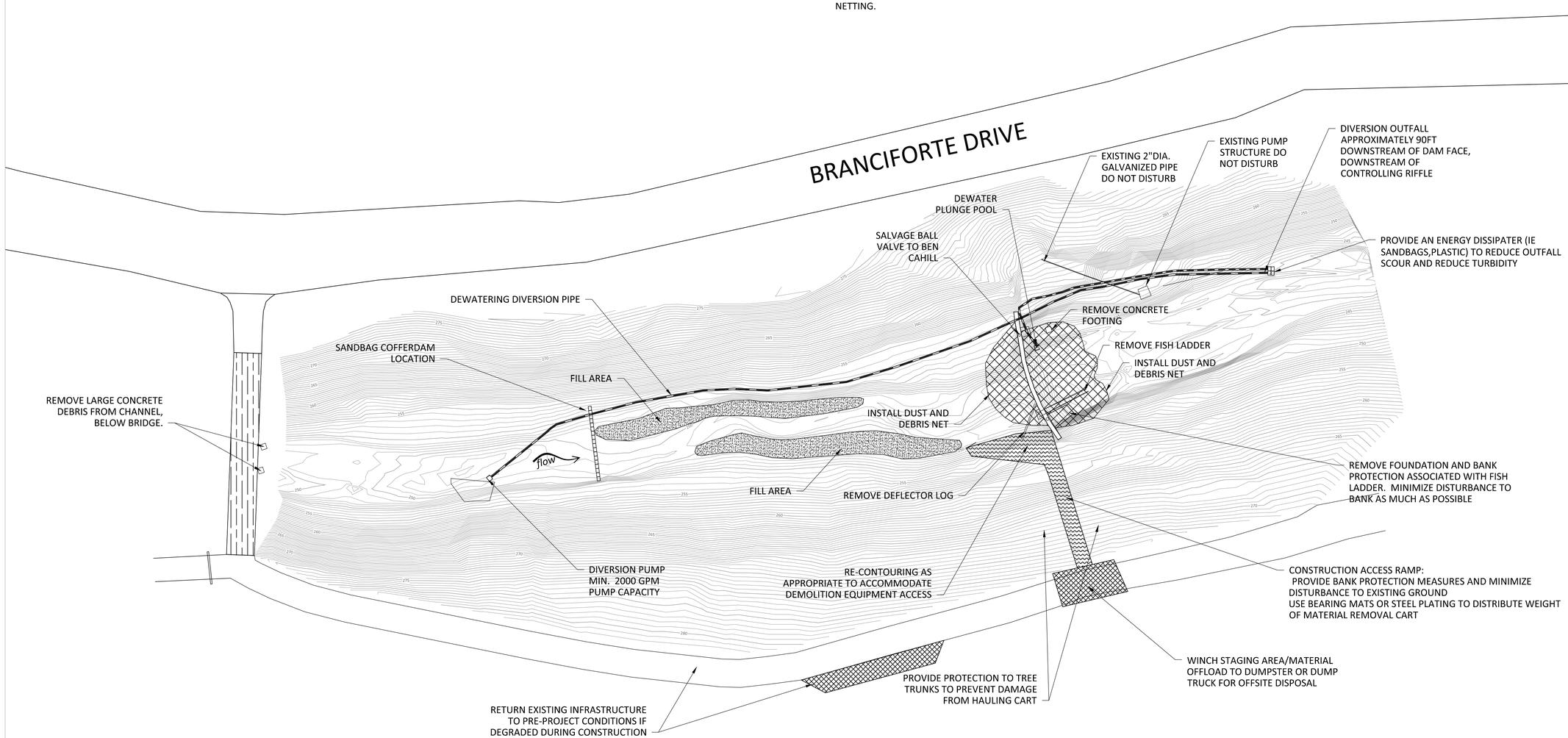


NOTES:

1. SCALES SHOWN ARE FOR AN ANSI D (22X34 INCH) SHEET SIZE.
2. CONTRACTOR SHALL ENSURE NO DAMAGE TO NATIVE VEGETATION OR DISTURBANCE TO EXISTING SOILS IN SURROUNDING AREAS NOT SPECIFICALLY IDENTIFIED AS CONSTRUCTION ZONES WITHIN THESE PLANS.
3. THE BYPASS PIPE AND DAM SHALL BE LEAK PROOF. CONSTRUCTION SHALL NOT BEGIN UNTIL ALL DEWATERING HAS BEEN ACCOMPLISHED.
4. WHILE CONSTRUCTING AND USING THE PROPOSED ACCESS RAMP, CONTRACTOR SHALL ENSURE NO DAMAGE TO EXISTING LARGE WOODY VEGETATION AND MINIMIZE DISTURBANCE TO NATIVE SOILS AS MUCH AS POSSIBLE. THE ACCESS RAMP FOOTPRINT MAY BE MODIFIED AS A RESULT OF AVOIDING DESTRUCTION OF LARGE WOODY VEGETATION.
5. EXCAVATED MATERIALS FROM CHANNEL BED SHALL BE PLACED ON LOW TERRACED FILL AREAS AS SHOWN. IF ADDITIONAL ROOM IS NEEDED, SPOILED MATERIALS MAY BE PLACED UPSTREAM OF THE NORTHERNMOST GRADING LIMIT (SEE SHEET 4) WITHIN THE CHANNEL BED BUT NOT IN THE THALWEG, OR AS APPROVED BY THE ENGINEER.

CONSTRUCTION SEQUENCE:

1. ATTEND PRE-WORK CONFERENCE WITH PROJECT MANAGER AND PROJECT ENGINEER.
2. PROVIDE PROJECT SCHEDULE TO PROJECT MANAGER AND PROJECT ENGINEER.
3. ALL WORKERS SHALL ATTEND PRE-CONSTRUCTION MEETING REGARDING SENSITIVE SPECIES AND WATER QUALITY PROTECTION MEASURES.
4. BLOCK NET INSTALLATION AND FISH REMOVAL (COMPLETED BY BIOLOGICAL CONSULTANT).
5. MOBILIZE EQUIPMENT.
6. INSTALL COFFERDAM AND DEWATERING SYSTEM.
7. DEWATER UPSTREAM OF DAM.
8. DEWATER DOWNSTREAM OF DAM.
9. INSTALL PROTECTION FOR WOODY VEGETATION NEAR ACCESS RAMP.
10. INSTALL ACCESS RAMP.
11. REMOVE DEFLECTOR LOG.
12. EXCAVATE UPSTREAM OF DAM TO ALLOW ACCESS TO CONCRETE FOR REMOVAL. PLACE MATERIAL DOWNSTREAM OF DAM AS FEASIBLE.
13. INSTALL DUST AND DEBRIS NETTING.
14. SALVAGE BALL VALVE TO BEN CAHILL.
15. REMOVE DAM, FISH LADDER AND CONCRETE FOOTING. REPOSITION DUST AND DEBRIS NETTING AS NEEDED TO ENSURE CONTAINMENT OF DEBRIS.
16. ONCE CONCRETE REMOVAL IS COMPLETE, REMOVE DUST AND DEBRIS NETTING.
17. PLACE AND COMPACT SEDIMENT ON CHANNEL BOTTOM AND LEFT BANK DOWNSTREAM OF DAM.
18. REMOVE DEWATERING PUMP FROM DOWNSTREAM OF DAM.
19. EXCAVATE ADDITIONAL SEDIMENT AS NEEDED UPSTREAM OF DAM
20. STAKE OUT ALIGNMENTS OF LPSTP AND WOOD.
21. EXCAVATE TRENCHES FOR LPSTP AND WOOD.
22. INSTALL WOOD AND ASSOCIATED ANCHOR BOULDERS.
23. INSTALL LPSTP.
24. BACKFILL AND COMPACT SLOPES BEHIND AND ABOVE LPSTP.
25. INSTALL BOULDER CLUSTERS.
26 FINISH BANK GRADING WITH EQUIPMENT.
27. REMOVE EQUIPMENT FROM THE CHANNEL.
28. REMOVE ACCESS RAMP.
29. FINALIZE BANK GRADING WITH HAND LABOR.
30. INSTALL EROSION CONTROL FABRIC ON RIGHT BANK AND ALONG DISTURBED AREAS OF ACCESS RAMP.
31. PLANT VEGETATION (MAY BE MOVED AFTER #34)
32. INSTALL IRRIGATION SYSTEM (MAY BE MOVED AFTER #34)
33. REMOVE DEWATERING SYSTEM.
34. RESTORE DISTURBED AREAS (ROADS, STAGING AREAS, UPPER BANKS) TO PRE-PROJECT CONDITION.
35. FINAL INSPECTION.



DESIGNED CTH/BST
DRAWN BST
REVIEWED SLD
APPROVED CTH

DOCUMENT RELEASE
100% PLANS
REVISION NOTES

PREPARED BY
cbec eco engineering

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THEWOR HAMMERMAN C 66585 Exp 6-30-14 CIVIL STATE OF CALIFORNIA

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

PREPARED FOR
THE RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

SANTA CRUZ | CALIFORNIA

BRANCIFORTE DAM REMOVAL DESIGN PROJECT

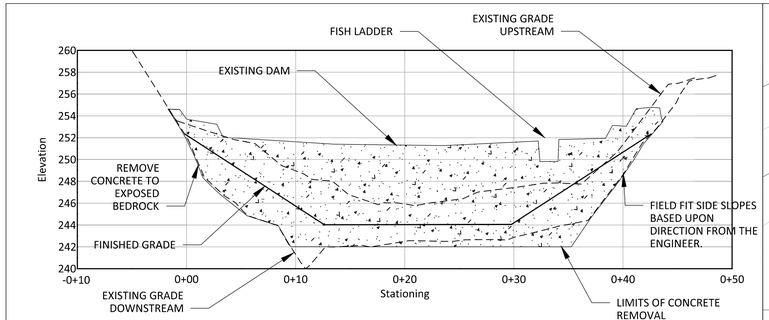
SITE PREPARATION/ DEWATERING

FILE NAME
3_BDR_SP.DWG

JOB NUMBER
12-1007

DATE
APRIL 5, 2013

SHEET NO.
3 OF 5

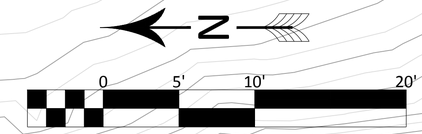


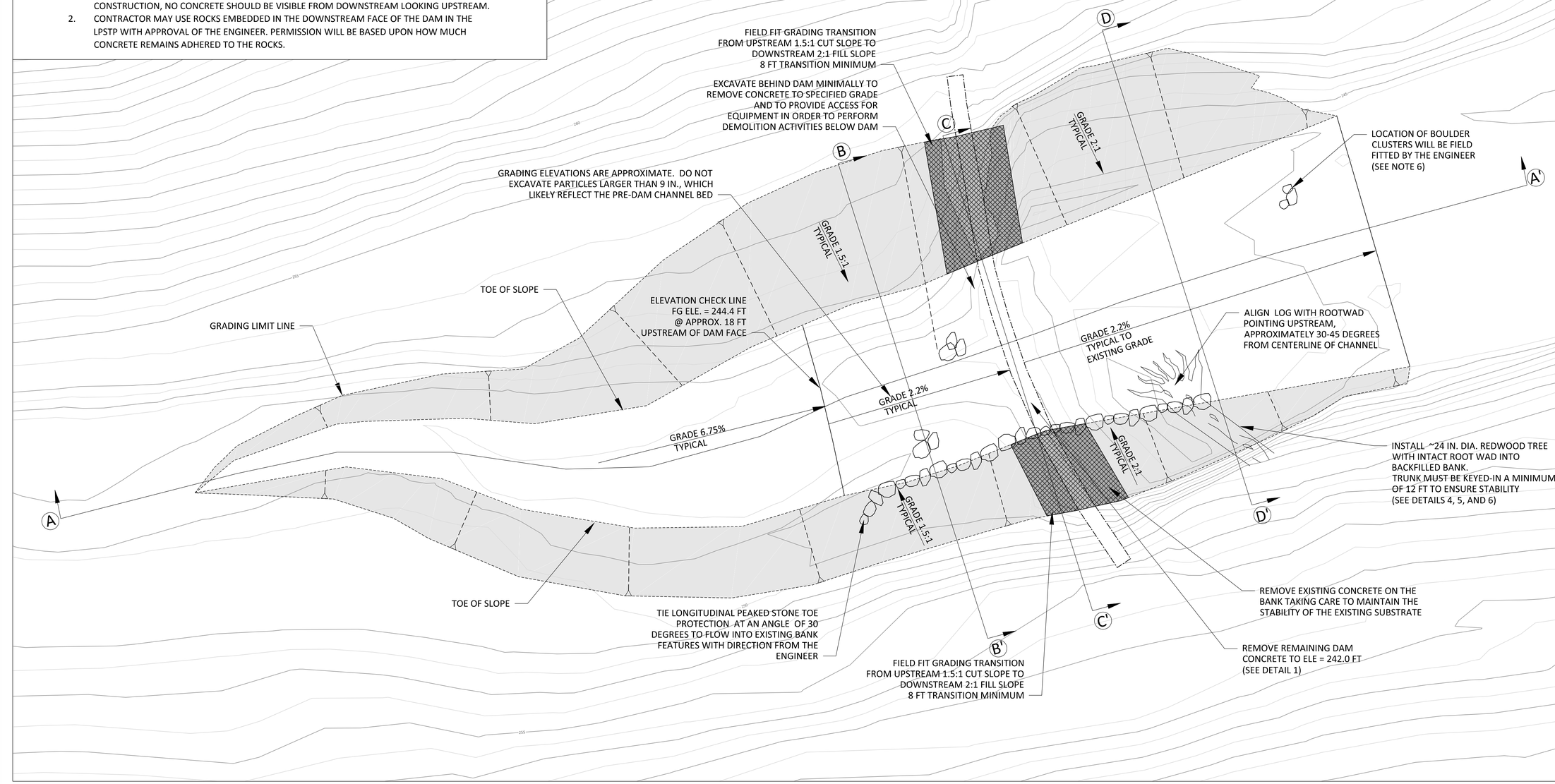
1
3 DAM REMOVAL
NOT TO SCALE

1. WHERE POSSIBLE, REMOVE ALL DAM CONCRETE TO AN ELEVATION OF 242.0 FEET. POST CONSTRUCTION, NO CONCRETE SHOULD BE VISIBLE FROM DOWNSTREAM LOOKING UPSTREAM.
2. CONTRACTOR MAY USE ROCKS EMBEDDED IN THE DOWNSTREAM FACE OF THE DAM IN THE LPSTP WITH APPROVAL OF THE ENGINEER. PERMISSION WILL BE BASED UPON HOW MUCH CONCRETE REMAINS ADHERED TO THE ROCKS.

NOTES:

1. SCALES SHOWN ARE FOR AN ANSI D (22X34 INCH) SHEET SIZE.
2. THESE PLANS DO NOT TAKE PRECEDENCE OVER FIELD CONDITIONS, A SMALL AMOUNT OF FIELD FITTING MAY BE REQUIRED WITH APPROVAL FROM THE ENGINEER OR PROJECT MANAGER.
3. DAM SHALL BE REMOVED BASED UPON DIMENSIONS AND GUIDANCE PROVIDED IN DETAIL 1.
4. CUT GRADING SHALL BE USED AS A GUIDE, IF BEDROCK OR LARGE ROCKS GREATER THAN 9 INCH DIAMETER ARE OBSERVED, USE THE NATURAL GRADE OF THE CHANNEL.
5. LONGITUDINAL PEAKED STONE TOE PROTECTION SHALL BE PLACED BELOW THE DESIGN GRADE AT THE TOE OF THE DESIGNED CHANNEL. EXCAVATE A DITCH 2 FT WIDE BY 1 FT DEEP AT THE TOE. SEE DETAIL 3.
6. IN REFERENCE TO "BOULDER CLUSTERS" SHOWN ON PLAN: LARGE ROCKS RANGING IN SIZE FROM 12 IN. TO 24 IN . DIAMETER, SITUATED IN CLUSTERS, SHALL BE PLACED IN THE DESIGN SECTION (BETWEEN THE ELEVATION CHECK LINE AND THE DOWNSTREAM LIMIT OF GRADING) WITH THE DIRECTION OF THE ENGINEER OR PROJECT MANAGER. EACH CLUSTER WILL INCLUDE ONE 24 INCH (~½ TON) DIAMETER ROCK.





DOCUMENT RELEASE
100% PLANS
REVISION NOTES

DESIGNED CTH/BST
DRAWN BST
REVIEWED SLD
APPROVED CTH

PREPARED BY
cbec eco engineering

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THREVOR HAMMERMARK C 68588 Exp 6-30-14 CIVIL STATE OF CALIFORNIA

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

CALIFORNIA PREPARED FOR
THE RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

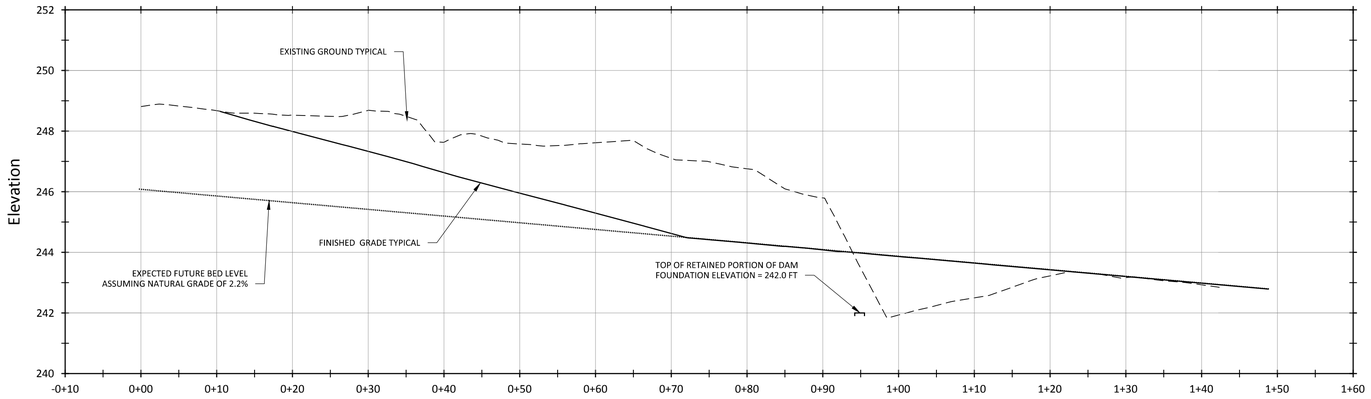
SANTA CRUZ
BRANCIFORTE DAM REMOVAL DESIGN PROJECT
GRADING PLAN

FILE NAME
4_BDR_GD.DWG

JOB NUMBER
12-1007

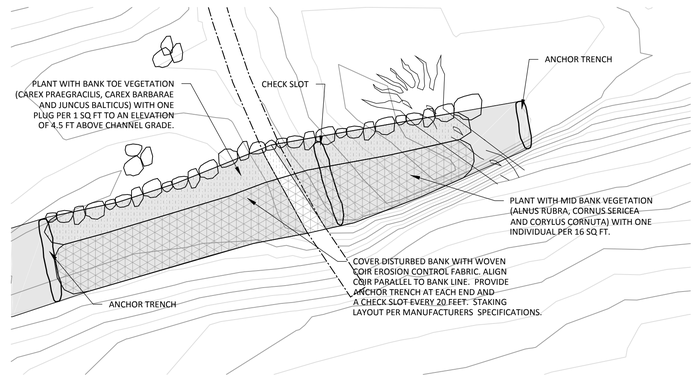
DATE
APRIL 5, 2013

SHEET NO.
4 OF 5



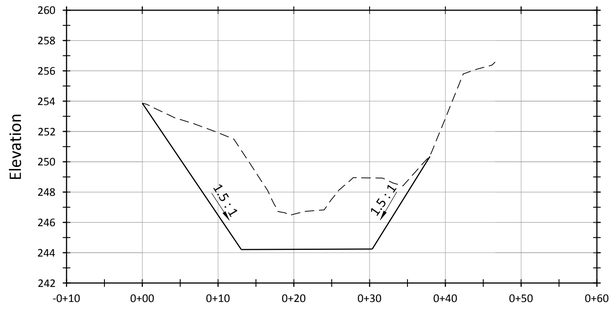
A/4 PROFILE A-A'

HORIZONTAL 1" = 10'
VERTICAL 1" = 2.5'



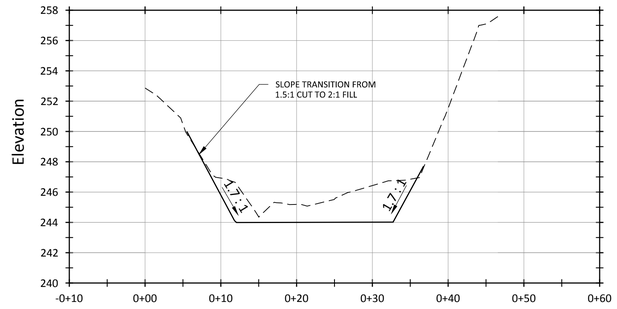
2/4 REVEGETATION AND EROSION CONTROL

NOT TO SCALE



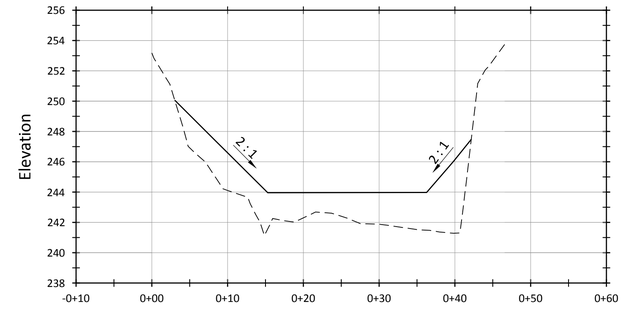
B/4 SECTION B-B'

HORIZONTAL 1" = 10'
VERTICAL 1" = 5'



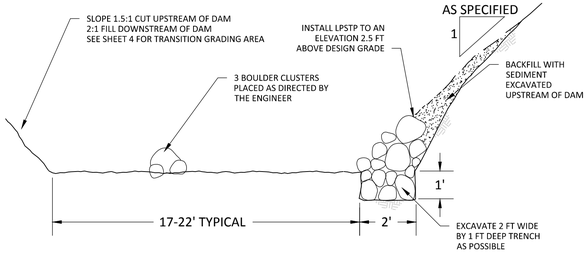
C/4 SECTION C-C'

HORIZONTAL 1" = 10'
VERTICAL 1" = 5'



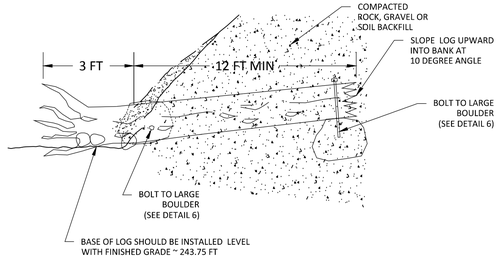
D/4 SECTION D-D'

HORIZONTAL 1" = 10'
VERTICAL 1" = 5'



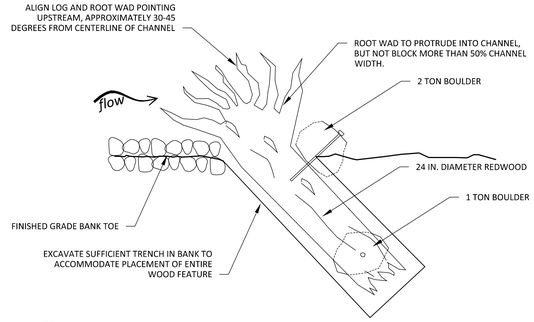
3/4 LONGITUDINAL PEAKED STONE TOE PROTECTION

NOT TO SCALE



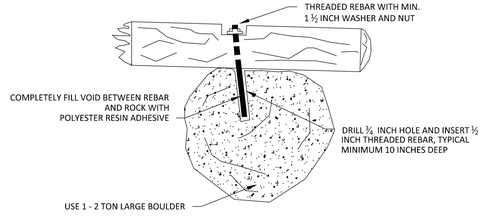
4/4 LARGE WOOD FEATURE

NOT TO SCALE



5/4 LARGE WOOD FEATURE, PLAN VIEW

NOT TO SCALE



6/4 LARGE WOOD BOLTING DETAIL

NOT TO SCALE

DOCUMENT RELEASE
100% PLANS
REVISION NOTES

DESIGNED	CTH/BST
DRAWN	BST
REVIEWED	SLD
APPROVED	CTH

PREPARED BY

cbec eco engineering

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER TREVOR HAMMERSMARK C 68585 Exp 6-30-14 CIVIL STATE OF CALIFORNIA

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

PREPARED FOR
THE RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

CALIFORNIA
SANTA CRUZ

BRANCIFORTE DAM REMOVAL DESIGN PROJECT
SECTIONS AND DETAILS

FILE NAME
5_BDR_XS.DWG

JOB NUMBER
12-1007

DATE
APRIL 5, 2013

SHEET NO.
5 OF 5

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

August 16, 2013

Karen Christensen
Resource Conservation District of Santa Cruz County
820 Bay Avenue, Suite 128
Capitola, CA 95010

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2013-0184-R3
Branciforte Creek Dam Removal

Dear Ms. Christensen:

Enclosed is the final Streambed Alteration Agreement ("Agreement") for the Branciforte Creek Dam Removal ("Project"). Before the Department may issue an Agreement, it must comply with the California Environmental Quality Act ("CEQA"). In this case, the Department, acting as a responsible agency, filed a notice of determination ("NOD") on August 16, 2013 based on information contained in the Negative Declaration the lead agency prepared for the Project.

Under CEQA, filing a NOD starts a 30-day period within which a party may challenge the filing agency's approval of the project. You may begin your project before the 30-day period expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Melissa Farinha, Environmental Scientist, at (707) 944-5579 or melissa.farinha@wildlife.ca.gov.

Sincerely,

Craig J. Weightman
Environmental Program Manager
Bay Delta Region

cc: John Morley
Lieutenant Schindler
Warden Keylock

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
BAY DELTA REGION
7329 SILVERADO TRAIL
NAPA, CALIFORNIA 94558
(707) 944-5500
WWW.WILDLIFE.CA.GOV

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2013-0184-R3
BRANCIFORTE CREEK DAM REMOVAL PROJECT
BRANCIFORTE CREEK, TRIBUTARY TO SAN LORENZO RIVER
SANTA CRUZ COUNTY, CA

KAREN CHRISTENSEN
RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY
820 BAY AVENUE, SUITE 128
CAPITOLA, CA 95010
KCHRISTENSEN@RCDSANTACRUZ.ORG

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and Resource Conservation District of Santa Cruz County (Permittee), as represented by Karen Christensen.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified CDFW on May 15, 2013 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement

PROJECT LOCATION

The project is located on Branciforte Creek, tributary to San Lorenzo River, at 4361 Branciforte Drive, City of Santa Cruz, County of Santa Cruz, State of California; United States Geological Survey 7.5 Minute Quad Map of Laurel, Township 10S, Range 1W, Section 29; Degrees Minutes Seconds: Latitude 37° 02' 16.51" N, Longitude 121° 59' 07.48" W; Assessor's Parcel Numbers 101-041-05 and 101-041-06.

PROJECT DESCRIPTION

The project is limited to the following activities located on Branciforte Creek: removal of a dam; installation of one large woody debris structure; installation of longitudinal peaked stone toe protection (LPSTP); installation of large cobble and boulders; movement of in-stream sediment within the stream channel; and installation of restoration plantings.

The dam is approximately 8 feet tall (visible portion excluding subgrade foundation), 40 feet long, and 1.5 feet wide at its crest, tapering to a wider dimension of 3 or more feet at the base. The dam was constructed in 1931, with the original materials including 10 cubic yards (CY) of gravel, 12.5 CY of sand, 20 CY rock, 240 sacks of concrete, 1,800 pounds of 0.5 inch square reinforcing steel and 6 automobile chassis. The downstream face of the dam contains approximately 1-foot diameter rocks set into the concrete. The initial purpose may have been water supply and recreation; however it is no longer used for these purposes. A steep pass Denil-type aluminum fishway is currently in place (installed sometime after 1931), as well as evidence of an earlier passage structure which the present fishway replaced. There is a 22-inch (in) diameter low level grated outlet positioned above grade, which conveys flows until its capacity is surpassed or it becomes plugged, at which point the dam fills and then spills down the fishway and then subsequently over the dam crest.

Steelhead trout utilize Branciforte Creek to spawn and rear. At present, the dam poses an impediment to both upstream and downstream migration. Passage is possible at some flow rates either through the low level outlet (if not blocked by debris) or the fishway. The barrier is 6-8 feet tall depending on flow and tailwater conditions. Fisheries surveys have observed steelhead upstream of the dam, so it is believed that adult fish can pass upstream during some flow conditions.

The primary objectives of the dam removal project are to: improve upstream and downstream migration/passage of anadromous fish by increasing the range of flow conditions at which passage can occur; restore the downstream transport of sediment and organic matter; mimic the naturally occurring channel morphology; and allow the creek to perform a majority of the work performed in transporting, sorting and redistributing the sediment impounded upstream of the dam. Secondary objectives of the project include: reduce the risk of bank failure in the steep banks found downstream of the dam; and provide a large wood structure to induce scour, providing habitat as well as a location to extract water for fire suppression purposes.

While CDFW and National Marine Fisheries Service (NMFS) fish passage criteria were considered by the Permittee, the dam removal project is not designed explicitly with achieving these prescribed depth and velocity criteria for adult and juvenile anadromous salmonids; rather the Permittee's expectation is that the channel will return to a condition similar to its pre-dam form.

To stabilize the right bank, as well as to provide roughness elements similar to the reference reach, one bankline consisting of LPSTP is included in the project design. Erosion control fabric (woven coir) and two types of vegetation are included in the revegetation design upslope of the LPSTP. The revegetation consists of an herbaceous community consisting of sedges and rushes (*Carex praegracilis, Carex barbarae* and *Juncus balticus*) on the lower bank, as well as a woody riparian community consisting of alder, dogwood and hazelnut (*Alnus rubra, Cornus sericea* and *Corylus cornuta*) higher up the bank. The areas between the LPSTP and the existing steep banks will be back-filled and compacted with sand and gravel, excavated from upstream of the dam, and then covered with erosion control fabric.

The left bank will be cut back to a stable slope, and downstream of the dam, sediment will be placed and compacted. LPSTP, erosion control fabric and plantings will not be installed on this bank. This bank will be allowed to restore naturally. The channel may adjust its width in response to the hydraulic conditions which occur as it reaches its new equilibrium condition. Downstream of the dam, both sides of the channel will be filled. Both the fill and the LPSTP on the right bank will key in the large wood habitat element.

Boulder clusters will be installed to provide mid-channel roughness elements similar to those occurring in the reference reach. A large wood habitat feature will be installed to provide habitat to replace pool features which may be lost due to the dam removal, as well as to provide roughness similar to what is observed in the reference reach. A pool resulting from naturally occurring large wood is present approximately 200 feet upstream of the dam. As the profile of the upstream channel adjusts to the dam removal, it is likely that this pool will not persist in its present form, so this habitat element will partially mitigate for this potential loss of pool habitat.

No trees are to be removed as part of this project. Mixed riparian understory consisting of both native and non-native shrub and forb species will be temporarily impacted. The impact area is approximately 20 linear feet and 1,000 square feet in area. Any disturbed areas will be treated with erosion control blankets and planted with native riparian trees and shrubs. Construction equipment that will be used at this site include: cart, excavator and trucks for spoils removal.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: California Central Coast Distinct Population Segment of steelhead trout, listed as threatened under the federal Endangered Species Act (ESA) and designated as a State Species of Special Concern; breeding birds; aquatic and terrestrial vertebrates and invertebrates; riparian vegetation.

The adverse effects the project could have on the fish or wildlife resources identified above without implementation of the Measures to Protect Fish and Wildlife Resources specified below, include: displacement and/or take of summer-rearing steelhead trout; disruption to bird nest incubation and sub-adult bird rearing; direct take of terrestrial species; disturbance of wildlife from project activity; impediment to migration of aquatic and terrestrial species; permanent modification of the stream bank and channel; temporary deterioration of water quality and aquatic habitat; and temporary impactsto riparian habitat.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that CDFW personnel may enter the project site at any time to verify compliance with the Agreement.

1.5 Access to Property Not Owned by Permittee. This agreement does not grant the Permittee authority to enter, use, or otherwise encroach upon on the property rights of individuals or organizations not party to this Agreement. Permittee shall obtain written authorization from outside parties, in accordance with applicable laws, if access to property not owned by Permittee is necessary.

1.6 Unauthorized Take. The Project area has been identified as an area that is potentially inhabited by State or federally-listed species. Permittee is required to comply with all applicable State and federal laws, including the California Endangered Species Act (CESA) and ESA. Permittee is required to comply with all applicable State and federal laws, including the California Endangered Species Act (CESA) and ESA. This Agreement does not authorize the take of any State or federal endangered or threatened species. Liability for any take or incidental take of such listed species remains the responsibility of Permittee for the duration of the Project. Any unauthorized take of such listed species may result in prosecution and nullification of the Agreement.

1.7 Notification of Project Commencement/Completion. Permittee shall notify CDFW Bay Delta Region within five (5) calendar days prior to initiation and following completion of project activities with written notification or by an electronic notification addressed to Melissa.Farinha@wildlife.ca.gov.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

Construction Measures

2.1 Seasonal Work Period. Project construction activity within the stream and riparian corridor shall take place after June 15 and before October 15. Revegetation activities that exclusively use hand tools are not restricted to a seasonal work period. If Permittee needs more time to complete Project activities, work may be authorized outside of the work period and extended on a week-by-week basis by CDFW representative, Melissa A. Farinha, or if unavailable, through contact with the CDFW Bay Delta Regional Office by mail, phone (707-944-5500) or fax (707-944-5553). Authorization shall be in the form of written communication. If Permittee requests a work period variance, Permittee shall submit such a request in writing to the CDFW Bay Delta Office. The request shall: 1) describe the extent of work already completed; 2) detail the activities that remain to be completed; 3) detail the time required to complete each of the remaining activities; and 4) provide photographs of both the current work completed and the proposed site for continued work. The work period variance shall be issued at the discretion of CDFW. CDFW reserves the right to require additional measures to protect biological resources as a condition for granting the variance. CDFW shall have 10 business days to review the proposed work period variance.

2.2 Work Period in Dry Weather Only. Work within the stream and associated riparian corridor shall be restricted to periods of dry weather. Precipitation forecasts and potential increases of stream flow shall be considered when planning construction activities. Construction activities shall cease, all equipment and materials shall be removed from the channel and all associated erosion control measures shall be in place at least 12 hours prior to the onset of precipitation. No work shall occur during a precipitation event. Construction activities halted due to precipitation may resume when precipitation ceases, the National Weather Service 72-hour weather forecast indicates a 30 percent or less chance of precipitation, and after a dry-out period of 48 hours for rain events. The National Weather Service forecast can be found at: http://www.weather.gov.

2.3 Storm Event Inspection. After any storm event, Permittee shall inspect all sites scheduled to begin or continue construction within the next 72 hours. Corrective action for erosion and sedimentation shall be taken as needed.

2.4 No Equipment in Channel. No equipment shall be operated from within a flowing stream at any time except where required to construct coffer dams.

2.5 No Monofilament Netting. Permittee shall not use erosion control materials containing plastic monofilament netting (erosion control matting) or similar material containing netting within the Project area due to documented evidence of amphibians and reptiles becoming entangled or trapped in such material. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

2.6 No New Project Phase without Erosion Control. No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Erosion control measures shall be inspected frequently to minimize failure and conduct any necessary repairs. All non-structural related and non-biodegradable erosion control measures shall be removed from the project area upon cessation of construction activities.

2.7 Stabilize Exposed Areas. Permittee shall stabilize all exposed/disturbed areas within the project site to the greatest extent possible to reduce erosion potential, both during and following construction. Erosion control measures, such as, silt fences, straw hay bales, gravel or rock-lined ditches, water check bars, and broadcasted straw shall be used where ever silt-laden water has the potential to leave the work site and enter State waters. Erosion control measures shall be monitored during and after each storm event. Modifications, repairs and improvements to erosion control measures shall be made whenever they are needed.

2.8 Cease Project for Elevation of Turbidity Levels. Upon CDFW determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective CDFW approved control devices are installed or abatement procedures are initiated. CDFW may take enforcement action if appropriate turbidity and siltation control measures are not deployed.

2.9 Staging and Storage Areas. Construction equipment, building materials, fuels, lubricants and solvents shall not be stockpiled or stored where they could be washed into State waters or where they will cover aquatic or riparian vegetation.

2.10 Equipment over Drip Pans. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream and riparian areas shall be positioned over drip-pans.

2.11 Check Equipment for Leaks. Any equipment or vehicles driven and/or operated adjacent to the stream and riparian corridor shall be checked and maintained daily to prevent leaks of materials that if introduced to water could be deleterious to aquatic life, wildlife or riparian habitat. Vehicles shall be moved away from the stream prior to refueling and lubrication.

2.12 Hazardous Materials. Any hazardous or toxic materials that could be deleterious to aquatic life that could be washed into State waters or their tributaries shall be contained in water tight containers or removed from the project site.

2.13 Imported Materials. Permittee shall not import, take from or move any rock, gravel, and/or other materials within the streambed or banks except as otherwise addressed in this Agreement.

2.14 Debris and Waste Disposal. Permittee shall not dump any litter or construction debris within the project area. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site. Upon completion of operations and/or onset of wet weather, all construction material and/or debris shall be removed from the Project work site to an area not subject to inundation. All removed vegetation and debris shall be disposed of according to State and local laws and ordinances.

2.15 Spoils. Permittee shall not place spoil where it could enter a stream or other sensitive habitat, such as riparian, or place over vegetation except as specifically noticed to and accepted by CDFW, in writing. Spoil shall be hauled offsite or stockpiled in an upland location where it shall be covered

with plastic sheeting or visquine whenever it is evident that rainy conditions threaten to erode loose soils into sensitive habitats.

2.16 Vegetation Disturbance. No disturbance or removal of vegetation, other than that described in the Project Description and non-native, invasive plant species, such as, but not limited to, Scotch or French broom shall occur as a result of Project activities. Vegetation outside the construction corridor shall not be removed or damaged without prior consultation and approval of CDFW. Vegetation may be disturbed only as specified in this measure.

2.17 Cease Project for Elevation of Turbidity Levels. Upon CDFW or Permittee determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective CDFW approved control devices are installed or abatement procedures are initiated. The CDFW may take enforcement action if appropriate turbidity and siltation control measures are not deployed.

2.18 Coffer Dams. If any project work will be conducted in a flowing stream during bank stabilization or any other project activities, the Permittee shall construct coffer dams upstream and downstream of the construction site and divert all flow from upstream of the upstream dam to downstream of the downstream dam. Permittee shall coordinate coffer dam construction and dewatering with a qualified fisheries biologist to perform fish and amphibian relocation activities. A qualified fisheries biologist or qualified biologist is defined under this Agreement as an individual who shall have a minimum of five years of academic training and professional experience in biological sciences and related resource management activities with a minimum of two years conducting surveys for each species that may be present within the Project area. The qualified fisheries biologist must also be approved by CDFW and National Marine Fisheries Service to handle and relocate salmonids at the Project site. Only the qualified fisheries biologist may handle salmonids and aquatic State Species of Special Concern.

2.19 Coffer Dam Material. Permittee shall construct coffer dams with clean river run gravel or sand bags, and may be sealed with sheet plastic. Upon completion of a project, sand bags and any sheet plastic shall be removed from the stream. Clean river run gravel may be left in the stream channel, provided it does not impede stream flow or fish passage, and conforms to natural channel morphology without significant disturbance to natural substrate.

2.20 Daily Coffer Dam Checks for Stranded Aquatic Life. A biological monitor or qualified biologist shall check daily for stranded aquatic life as the water level in the dewatering area drops. A biological monitor under this

Agreement is an individual experienced with construction level biological monitoring and who is able to recognize species in the Project area and who is familiar with the habits and behavior of those species. Biological monitors shall have academic and professional experience in biological sciences and related resource management activities as it pertains to this Project. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. Captured aquatic life shall be released immediately in the closest body of water adjacent to the work site. This measure does not authorize the take or disturbance of any State or federally listed species.

2.21 Coffer Dam Bypass Flows. When bypassing stream flow around work area, stream flow below the construction site shall be maintained similar to the unimpeded flow at all times.

2.22 Coffer Dams and Work Area Seepage. The work area shall be periodically pumped dry of seepage. Permittee shall place pumps in flat areas, away from the stream channel. Pumps shall be secured by tying off to a tree or staked in place to prevent movement by vibration. Pump intakes shall be covered with 0.125-inch mesh to prevent entrainment of fish or amphibians that failed to be removed. Pump intakes shall be periodically checked for impingement of fish or amphibians that shall be relocated according to the approved measured outlined for each species below.

2.23 Coffer Dams and Flow Diversion around Work Areas. If necessary, flow shall be diverted around the work site, either by pump or by gravity flow, and the suction end of the intake pipe shall be fitted with fish screens meeting CDFW and National Oceanic and Atmospheric Administration (NOAA) criteria to prevent entrainment or impingement of small fish. Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be disposed of in an upland location where it will not drain directly into any stream channel.

Biological Measures

2.24 Special-Status Fish and Wildlife Surveys. Within 48 hours prior to each stage of the Project, a qualified fisheries biologist or qualified biologist (see Measure 2.18) shall survey the project area at the appropriate time of day for presence of special-status fish and wildlife species that may be present. Only the qualified fisheries biologist with the necessary agency permits or approvals may handle salmonids. This Agreement does not authorize the take or disturbance of any species listed under the ESA or CESA. All wildlife species encountered during surveys shall be recorded. CDFW

reserves the right to provide additional provisions to this Agreement designed to protect special-status species.

2.25 On-site Qualified Biologist, Biological Monitor or Construction Monitor with Stop Work Authorization. Permittee shall have a qualified biologist, biological monitor or construction monitor onsite daily during project activity to minimize impacts to plant, fish, and wildlife habitat. A construction monitor under this Agreement is an individual trained by a qualified biologist to identify special-status species which may be in the area, their general behavior, how they may be encountered in the work area, and procedures to follow when they are encountered and approved by CDFW. All biological monitors and construction monitors for the project shall be approved by CDFW prior to commencement of covered activities. Qualified biologists, biological monitors and construction monitors shall be authorized to stop construction if necessary to protect fish and wildlife resources. If there is a threat of harm to any sensitive species, or other wildlife, the qualified biologist, biological monitor or construction monitor shall halt construction and notify Melissa A. Farinha at (707) 944-5579 or electronic communication sent to Melissa.Farinha@wildlife.ca.gov. Consultation with CDFW is required before re-commencing work.

2.26 Obtain Approval for Qualified Biologist, Biological Monitors and Construction Monitors. Within a minimum of seven (7) days prior to initiating wildlife surveys within the Project area, Permittee shall submit the names and resumes of all biologists, biological monitors and construction monitors involved in conducting survey and/or monitoring work to CDFW for review and written approval.

2.27 Special Status Species Inspection Prior to Construction Activities Each Day. The qualified biologist, biological monitor or construction monitor shall inspect the work area and areas adjacent to the work area that will support motorized equipment prior to mobilization into the work site each day. If the monitor determines the work site does not support sensitive species, equipment may be moved onto the site under the observation of the monitor.

2.28 Nesting Bird Survey. If equipment staging, site preparation, grading, excavation or other project-related construction activities are scheduled during the nesting season (February 1 through August 15) of protected raptors and other avian species, a focused survey for active nests of such birds shall be conducted by a qualified biologist within 15 days prior to the beginning of Project-related activities. Surveys shall be conducted in all suitable habitat located at project work sites, in staging, storage and soil stockpile areas, and along transportation routes. The minimum survey radii surrounding the work area shall be the following: i) 250 feet for passerines;

ii) 500 feet for other small raptors such as accipiters; iii) 1,000 feet for larger raptors such as buteos. Surveys shall be conducted at the appropriate times of day, and during appropriate nesting times and shall concentrate on areas of suitable habitat. If a lapse in Project-related activities of 15 days or longer occurs, another focused survey, and if required, consultation with CDFW and U. S. Fish and Wildlife Service will be required before Project activities can be reinitiated. If an active nest is found, Permittee shall consult with CDFW and USFWS regarding appropriate action to comply with the FGC of California and the federal Migratory Bird Treaty Act (MBTA) of 1918. CDFW reserves the right to provide additional provisions to this Agreement designed to protect nesting birds.

2.29 Training Session for Personnel. Prior to any project construction work, the qualified biologist or biological monitor shall provide a training session for all work personnel to identify special-status species which may be in the area, their general behavior, how they may be encountered in the work area, and procedures to follow when they are encountered. Interpretation shall be provided for non-English speaking workers. Any personnel joining the work crew later shall receive the same training before beginning work.

2.30 Disinfect Equipment Prior to Entry Into Watercourses. To prevent spread of invasive aquatics and diseases, equipment to be used in watercourses including, but not limited to, boots, waders, hand tools and nets must be decontaminated with a minimum 5 percent chlorine solution for 2 minutes prior to entry into a watercourse. In addition if a piece of equipment has been exposed or is suspected to have been exposed to areas harboring New Zealand mud snails then that equipment must either be dried out for two weeks, frozen for 48 hours, or placed in 55 degrees Celsius water for 5 minutes.

2.31 Relocation of Fish and Amphibians. Prior to construction, the qualified biologist shall capture and relocate native fish and native amphibian species. Measures shall be taken to avoid harm and mortality resulting from fish and amphibian relocation activities, as follows:

2.31.1 Relocated Fish Records. Relocated fish and amphibians shall be moved to the nearest appropriate site outside of the work area. A record shall be maintained of all relocated fish . The record shall include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the project site, and the number and species of fish captured and relocated. The record shall be provided to CDFW within two weeks of the completion of the work season or project, whichever comes first.

2.31.2 Release Locations Criteria. Prior to capturing fish and amphibians,

the most appropriate release location(s) shall be determined, using the following criteria: water temperature shall be similar as the capture location; there shall be ample habitat for the captured fish; relocation areas must be in proximity to the capture site, contain suitable habitat, not be affected by project activities, and be free of exotic predatory species (i.e. bullfrogs, crayfish) to the best of the qualified biologist's knowledge. In the rare case that amphibian egg masses are found after July 1, the qualified biologist shall make every attempt to wait until the egg masses hatch to transport them. There shall be a low likelihood for the fish to re-enter the work site or become impinged on exclusion net or screen.

2.32 Wet Hands and Nets. Handling of fish and amphibians within the project area shall be minimized. However, when handling is necessary, the qualified fisheries biologist shall always wet hands or nets prior to touching fish and amphibians.

2.33 Proper Holding Technique. The qualified fisheries biologist shall temporarily hold fish and amphibians in cool, shaded, aerated water in a flow-through live car. The qualified fisheries biologist shall protect fish and amphibians from jostling and noise and do not remove fish from this container until time of release.

2.34 Water Temperatures and Water Changes. The qualified fisheries biologist shall measure air and water temperatures periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds 18 °C, fish shall be released and rescue operations ceased.

2.35 No Overcrowding. Overcrowding in containers shall be avoided by having at least two containers and segregating young-of-year (YOY) fish and amphibians from larger age-classes to avoid predation. Larger amphibians, such as Pacific giant salamanders, shall be placed in the container with larger fish. If fish are abundant, the capturing of fish and amphibians shall cease periodically and shall be released at the predetermined locations.

2.36 Timing of Initial Fish Relocation. If feasible, the qualified fisheries biologist shall perform initial fish and amphibians relocation efforts several days prior to the start of construction. This provides the qualified fisheries biologist an opportunity to return to the work area and perform additional electrofishing passes immediately prior to construction.

2.37 Mortality Rate of Fish and Amphibians. If mortality during relocation exceeds five percent, capturing efforts shall be stopped and Permittee shall immediately contact the appropriate agencies.

2.38 Relocate Fish and Amphibians during Cool Temperatures. The qualified fisheries biologist shall conduct relocation activities in the morning when the temperatures are cooler.

2.39 Cease Activities for Salmonids. If a salmonid enters the work area, all work shall stop until the qualified fisheries biologist relocates the animal or it leaves on its own. Only the qualified biologist can handle and relocate salmonids. Any sightings and/or injuries shall be immediately reported to the CDFW per instructions below.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1 Re-vegetation. Permittee shall install vegetation including: *Carex praegracilis, Carex barbarae* and *Juncus balticus* on the lower bank and *Alnus rubra, Cornus sericea* and *Corylus cornuta* higher up the bank. Permittee shall take actions to control growth and spread of invasive species in areas disturbed by the project. Plant installations shall meet the following success criteria: i) a minimum of 80 percent survival of all plantings at the end of five years with a minimum of two consecutive years (two growing seasons) of monitoring after removal of irrigation; ii) at least 60 percent ground cover of native plant species; and iii) less than 10 percent of ground cover consisting of Himalayan blackberry, French broom and other non-native plant species. Only locally native riparian plants shall be used for revegetation of stream banks and riparian areas. Plants used for the revegetation effort shall be harvested from local area plants or from locally grown stock. All initial plantings shall be completed by December 31 of the year project construction ceases. Vegetation monitoring shall occur during all phases of the project and for the five years after revegetation work has been completed. Request for a variance to this monitoring period will be accepted after two growing seasons without supplemental watering, if success criteria have been met. CDFW may verify that success criteria have been met during a field evaluation. . Permittee is responsible for replacement planting, additional watering, weeding, invasive exotic eradication, or any practice to achieve these goals.

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

4.1 Photographic Documentation of Work. Prior to commencement of work, Permittee shall flag a minimum of four (4) vantage points that offer representative views of the project site and work area. Permittee shall photograph the project area from each of the flagged points, (noting the vantage point in relation to the stream in each photo) before, during and after construction. Labeled digital copies of shall be sent to CDFW within 30 days of project construction termination.

4.2 Special Status Wildlife Survey(s). Results from special-status fish and wildlife survey(s) shall be sent to CDFW within 30 days of Project construction termination.

4.3 Capture and Relocation. A report of capture and relocation activities shall be provided to CDFW within 30 days project construction termination. The report shall include: species encountered, capture methods; methods used for handling, stress minimization, equipment cleaning and disinfection; sizes of holding facilities; descriptions of relocation sites; and all instances of mortality and injury.

4.4 Re-vegetation Monitoring Report. A monitoring report on revegetation work shall be provided to CDFW by December 31st of the each year after initiation of planting activities while re-vegetation monitoring is required (Measure 3.1). The report shall include percent survival, percent cover, height of both tree (if included) and shrub species, the number of replacement plantings by species, and an overhead-view map of the planting effort.

4.5 Notification to the California Natural Diversity Database (CNDDB). If any listed, rare, or special status species are detected during project surveys or on or around the project site during project activities, Permittee shall submit CNDDB Field Survey Forms to CDFW in the manner described at the CNDDB website (http://www.dfg.ca.gov/biogeodata/cnddb/) within 30 days of the sightings. Copies of such submittals shall also be submitted to the CDFW regional office as specified below.

CONTACT INFORMATION

Any communication that Permittee or CDFW submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or CDFW specifies by written notice to the other.

To Permittee:

Karen Christensen
Resource Conservation District of Santa Cruz County
820 Bay Avenue, Suite 128
Capitola, CA 95010
(831) 464-2960 ext. 17
kchristensen@rcdsantacruz.org

To CDFW:

California Department of Fish and Wildlife
Bay Delta Region
7329 Silverado Trail
Napa, California 94558
Attn: Lake and Streambed Alteration Program – Melissa A. Farinha
Notification #1600-2013-0184-R3
Fax (707) 944-5553
Melissa.Farinha@wildlife.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). CDFW shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)). .

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.wildlife.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2017, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

A. Technical Memorandum by CBEC Eco-engineering, dated April 5, 2013; *Project 12-1007– Branciforte Dam Removal Design*, authored by Chris Hammersmark as submitted by Karen Christensen on May 16, 2013.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

for

Karen Christensen

8/14/2013

Date

FOR DEPARTMENT OF FISH AND WILDLIFE

Craig J. Weightman

8/19/13

Date

Environmental Program Manager

Prepared by: Melissa A. Farinha
Environmental Scientist

Date Sent: August 13, 2013

FOR DEPARTMENT USE ONLY				
Date Received	Amount Received	Amount Due	Date Complete	Notification No.
5/15/13	$ 840.25 xx	$		1600-2013-0184-3

5/13/13
#00278910
County of Santa Cruz
Auditor-Controller

Farinha
WtSchindler
WdnKeylock

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND WILDLIFE

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Fish & Game
MAY 15 2013
Yountville

Name	Karen Christensen		
Business/Agency	Resource Conservation District of Santa Cruz County		
Street Address	820 Bay Ave., Suite 128		
City, State, Zip	Capitola, CA 95010		
Telephone	(831) 464-2950 x17	Fax	(831) 475-3215
Email	kchristensen@rcdsantacruz.org		

2. CONTACT PERSON (*Complete only if different from applicant*)

Name	John Morley		
Street Address	820 Bay Ave., Suite 136		
City, State, Zip	Capitola, CA 95010		
Telephone	(831) 464-2950 x26	Fax	(831) 475-3215
Email	jmorley@rcdsantacruz.org		

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name	Ben Cahill		
Street Address	4361 Branciforte Drive		
City, State, Zip	Santa Cruz, CA 95061		
Telephone	(831) 423-9167	Fax	NA
Email	NA		

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	Branciforte Creek Dam Removal			
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years*)			
C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (*year*)	Ending (*year*)	Start Date (*month/day*)	End Date (*month/day*)	
2013	2018	September, 1	November, 31	90

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.		
A.	☑ Standard *(Most construction projects, excluding the categories listed below)*	
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*)	*Mine I.D. Number:* _____
C.	☐ Timber Harvesting (*Attachment B*)	THP *Number:* _____
D.	☐ Water Diversion/Extraction/Impoundment (*Attachment C*)	*SWRCB Number:* _____
E.	☐ Routine Maintenance (*Attachment D*)	
F.	☐ CDFW Fisheries Restoration Grant Program (FRGP)	*FRGP Contract Number*_____
G.	☐ Master	
H.	☐ Master Timber Harvesting	

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: The Department may not process this notification until the correct fee has been received.***

	A. Project	B. Project Cost	C. Project Fee
1	Branciforte Creek Dam Removal	99,552.20	840.25
2			
3			
4			
5			
		D. Base Fee *(if applicable)*	
		E. TOTAL FEE ENCLOSED	840.25

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant: _____ Notification Number: _____ Date: _____

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

☑ No ☐ Yes (*Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.*)

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.

(Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway)

The project site is just adjacent to Branciforte Drive roughly 0.5 miles past the intersection of Branciforte and Happy Valley in Santa Cruz, CA.

From the south take CA-1 North and exit Morrissey Blvd. Take a slight left onto Rooney St. which becomes Gilbert Ln. Take a left onto Goss Ave. Turn Right onto BRanciforte Dr./Market St, continue to follow Branciforte Drive and the project will be on your left.

From the north (Bay Area) take CA-17 S towards Santa Cruz. Turn left onto Vine Hill Rd. Stay on Vine Hill which turns slightly right and becomes Branciforte Drive. The project will be on your right.

(see attached location Map)

☑ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	Branciforte Creek
C. What water body is the river, stream, or lake tributary to?	San Lorenzo River
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	Santa Cruz

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Laurel	10.0 S	01.0 W	29	NE

☐ *Continued on additional page(s)*

K. Meridian (*check one*) ☐ Humboldt ☑ Mt. Diablo ☐ San Bernardino

L. Assessor's Parcel Number(s)

101-041-05, 101-041-06...322037.8102203241

☐ *Continued on additional page(s)*

M. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes)*

Latitude/Longitude	*Latitude:* 37°02'16.51" N	*Longitude:* 121°59'07.48" W	
	☑ Degrees/Minutes/Seconds	☐ Decimal Degrees	☐ Decimal Minutes
UTM	*Easting:* 332037.810220	*Northing:* 4096742.059086483	☑ Zone 10 ☐ Zone 11
Datum used for Latitude/Longitude or UTM	☐ NAD 27	☑ NAD 83 or WGS 84	

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☐	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	☐	☑	☐
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	☐	☐	☐
Channel clearing/vegetation management	☐	☐	☐
Culvert	☐	☐	☐
Debris basin	☐	☐	☐
Dam	☐	☑	☐
Diversion structure – weir or pump intake	☐	☐	☐
Filling of wetland, river, stream, or lake	☐	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☐	☑	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☐	☐	☐
Sediment removal – pond, stream, or marina	☐	☐	☐
Storm drain outfall structure	☐	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing : Horizontal Directional Drilling	☐	☐	☐
Jack/bore	☐	☐	☐
Open trench	☐	☐	☐
Other *(specify)*:	☐	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

Branciforte Dam is located on Branciforte Creek near Happy Valley in Santa Cruz County at an elevation of ~240 feet (ft.) (Lat.: 37.0380, Long.: -121.9848). The dam is ~8 ft. tall (visible portion excluding subgrade foundation), 40 ft. long, and 1.5 ft. wide at its crest, tapering to a wider dimension (3+ ft.) at lower elevations. The dam was constructed in 1931, with the original materials estimate including 10 cubic yards (CY) of gravel, 12.5 CY of sand, 20 CY rock, 240 sacks of concrete, 1,800 lbs. of 0.5 inch (in.) square reinforcing steel and 6 automobile chassis. The downstream face of the dam contains ~1 ft. diameter rocks set into the concrete. The initial purpose appears to have been water
supply and recreation; however it is no longer used for these purposes. A steep-pass Denil-type aluminum fish ladder is present (not original), as well as evidence of an earlier passage structure which the present fish ladder replaced. There is a 22 inch (in.) diameter low level grated outlet positioned above grade, which conveys flows until its capacity is surpassed or it becomes plugged, at which point the dam fills and then spills down the fish ladder and then subsequently over the dam crest.

(See attached Project Description continued and project designs)

☑ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

Heavy machinery (excavator and cart) will be used to remove the dam structure, install LWD, install rock to protect toe of slope, and perform grading. Trucks will be used to off-haul materials.

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☑ Yes ☐ No (*Skip to box 11*)
D. Will the proposed project require work in the wetted portion of the channel?	☑ Yes (*Enclose a plan to divert water around work site*) ☐ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

See attached description of impacts.

☑ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No

Vegetation Type	Temporary Impact	Permanent Impact
Mixed riparian understory both native and non-native	Linear feet: 20 Total area: 1000	Linear feet: 0 Total area: 0
	Linear feet: _____ Total area: _____	Linear feet: _____ Total area: _____

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)

☐ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes *(List each species and/or describe the habitat below)* ☐ No ☐ Unknown

Branciforte Creek provides habitat capable of supporting steelhead trout (Oncorhynchus mykiss) and coho salmon (Oncorhynchus kisutch)

☐ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

CNDDB and local fisheries experts

☐ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☐ Yes (*Enclose the biological study*) ☑ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

☑ Yes (*Enclose the hydrological study*) ☐ No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

The site will be dewatered prior to any construction activities to ensure no work is performed in the wetted channel. Sediment already present in the watercourse will be naturally transported downstream during winter storm events, as approved by DFW and NMFS staff, allowing the project site to return to a substrate makeup similar to that present up and downstream of the project. Any disturbed banks will be treated with erosion control blankets and native vegetation plantings.

☐ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

Specific actions to avoid or minimize impacts to steelhead trout and coho salmon are attached.

☑ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

Not applicable

☐ *Continued on additional page(s)*

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A.	Army Corps of Engineers, Regional General Permit	☐ Applied	☑ Issued
B.	Regional Water Quality Control Board, 401 Certification	☐ Applied	☑ Issued
C.	Santa Cruz County Master Permit	☐ Applied	☑ Issued

D. Unknown whether ☐ local, ☐ state, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☑ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?

☑ Yes (*Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each*)

☐ No (*Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared*)

☐ Notice of Exemption	☑ Mitigated Negative Declaration	☐ NEPA document (*type*):
☑ Initial Study	☐ Environmental Impact Report	☐ CESA document (*type*):
☐ Negative Declaration	☐ Notice of Determination *(Enclose)*	☑ ESA document (*type*): Biological Opinions
☐ THP/ NTMP	☐ Mitigation, Monitoring, Reporting Plan	

B. State Clearinghouse Number (*if applicable*)	2004112063		
C. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes D, E, and F*)	☐ No (*Skip to box 14.G*)	
D. CEQA Lead Agency	County of Santa Cruz		
E. Contact Person	Matt Johnston	F. Telephone Number	(831) 454-3201

G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.

This project will be the first in a number of smaller fish passage barrier removals in Branciforte Creek. A concerted effort by the Integrated Watershed Restoration Program Technical Advisory Committee and the Resource Conservation District of Santa Cruz County will continue to seek out funding opportunities in the coming years to complete the goal of removing these structures. Addressing passage barriers in Branciforte Creek is also a priority action in NOAA's 2012 Coho Recovery Plan.

☐ *Continued on additional page(s)*

H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?

☑ Yes (*Enclose proof of payment*) ☐ No (*Briefly explain below the reason a filing fee has not been paid)*

Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.

15. SITE INSPECTION

Check one box only.

☐ In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.

☑ I request the Department to first contact (*insert name*) Kelli Camara at (*insert telephone number*) (831) 464-2950 x15 to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☑ Yes (Please enclose the information via digital media with the completed notification form)

☐ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

Signature of Applicant or Applicant's Authorized Representative

5/2/13
Date

Karen Christensen
Print Name

Santa Cruz Countywide Partners in Restoration Permit Coordination Program
TIER III/ IV
Pre-Construction Notification

Project Code: BrC1
Date: BrC1
Tier: III Ⓘ ***(circle appropriate tier level)***
Explanation of Tier Level: *Project is located in stream reach known to support central California coast (CCC) steelhead, but not CCC coho salmon. Dewatering and fish relocation will be required.*

☒ In Corps Jurisdiction (project involves placement of fill below the Ordinary High Water Mark of a Stream, dewatering of a stream, or potential impacts to wetlands)

☒ RWQCB Certification Applies (assume most projects are subject to RWQCB approval)

☒ Subject to NOAA's National Marine Fisheries' Service Biological Opinion (Work in or near a Coho or steelhead stream)

☒ Subject to USFWS Biological Opinion (potential impacts to federally listed species and their habitat)

☒ Subject to California Department of Fish and Wildlife 1602 Agreement (work in and around a stream, impacts to state listed species)

☒ Subject to County Master Permit (Projects involving grading in excess of 100 cubic yards, work in riparian areas, work in sensitive habitat areas, placement of fill in a floodway, impacts or removal of "Sensitive Trees", work in County Right of Way, and impacts to cultural resources.)

☐ Project Located in the California Coastal Zone

Contact at NRCS or RCD: *Kelli Camara, RCD, (831) 464-2950 x 15*

Project Name: *Branciforte Creek Dam Removal Project*

Project Location:

Address: *4361 Branciforte Drive, Santa Cruz, CA 95065*

Assessor Parcel Number: *101-041-05, 101-041-06*

Description of Location on Property (e.g. Kings Creek channel, a wetland adjacent to Harkins Slough, near shed, etc.): *The project is located in Branciforte Creek, roughly .75 miles north on Branciforte Drive from the intersection of Branciforte Drive and Happy Valley Road in Santa Cruz, CA 95062.*

☒ Verification that landowner consent has been provided to the NRCS and/or RCD for the project site (including properties that must be crossed to implement the project).

Project Description

Estimated Start/End Dates: *Start: September 1st, 2013* *End: November 30th, 2013*
Erosion control will be in place prior to October 31st.
Revegetation efforts will take place between November 1st and November 30th, 2012.

Purpose/Goal of Project: *The goal of this project is to remove a dam structure in Branciforte Creek in order to both remove a partial passage barrier to salmonid migration and restore in-stream conditions at and above the project site. Removing the dam will improve in-stream conditions by allowing deposited sediment on the upstream side of the dam to transport downstream, allowing buried substrates to return to the surface where they can be utilized by spawning salmonids, and open three (3) miles of habitat upstream for spawning and rearing. A large woody debris (LWD) structure will also be constructed to increase cover and pool habitat for rearing salmonids.*

Project Description: *Branciforte Dam is located on Branciforte Creek near Happy Valley in Santa Cruz County at an elevation of ~240 feet (ft.) (Lat.: 37.0380, Long.: -121.9848). The dam is ~8 ft. tall (visible portion excluding subgrade foundation), 40 ft. long, and 1.5 ft. wide at its crest, tapering to a wider dimension (3+ ft.) at lower elevations. The dam was constructed in 1931, with the original materials estimate including 10 cubic yards (CY) of gravel, 12.5 CY of sand, 20 CY rock, 240 sacks of concrete, 1,800 lbs. of 0.5 inch (in.) square reinforcing steel and 6 automobile chassis. The downstream face of the dam contains ~1 ft. diameter rocks set into the concrete. The initial purpose appears to have been water supply and recreation; however it is no longer used for these purposes. A steep-pass Denil-type aluminum fish ladder is present (not original), as well as evidence of an earlier passage structure which the present fish ladder replaced. There is a 22 inch (in.) diameter low level grated outlet positioned above grade, which conveys flows until its capacity is surpassed or it becomes plugged, at which point the dam fills and then spills down the fish ladder and then subsequently over the dam crest.*

The dam structure will be removed from the wetted channel. Portions of the dam that are keyed into the bank and have become integral to bank stability will remain in place to protect roadways and residential access. All concrete and metallic material associated with the dam will be removed and disposed of off-site. An anchored large woody debris structure will be installed in the right bank just downstream of the dam using redwood and boulders. Boulders (1-2 T) will also be used to provide bank armoring on the right bank and be used to create in-stream boulder clusters to encourage scour. As the sediment impounded upstream of the dam is native, non-hazardous material, it will be allowed to naturally transport downstream during high flow events. The banks will be regraded, adjusting to the new bottom elevation once sediment is removed or naturally transported downstream. Using a downstream location as a reference, the banks will be graded to 1.5:1 for approximately 18 ft upstream of the dam. All other banks will be restored to a 2:1 slope. Revegetation of disturbed sites will be achieved through plantings of native rushes and sedges that will help to secure disturbed soils and lower the potential for sedimentation during future storm events.

Table 1. Conservation practices to be used

NRCS Practice Name, Maintenance Activity or Temporary Access/Dewatering Activity	Width (feet)	Length (feet)	Grading Volume * (cubic yards and compaction requirements)	Maximum Cut and Fill Slopes
Dewatering	*17*	*300*	*NA*	*NA*
Temporary Access	*20*	*50*	*NA*	*NA*
Obstruction Removal (500)	*1.5*	*40*	*NA*	*1.5:1 to 2:1*
Stream Habitat Improvement and Management (395) (In-stream configuration and *1 LWD structure*)	*30*	*10*	*75*	*NA*
Critical Area Planting Erosion Control (342)	*10*	*50*	*NA*	*NA*
Riparian Planting (612, 391)	*20*	*20*	*NA*	*NA*

Construction Activities

Description of Construction Activities Anticipated (types of equipment, timing, staging areas or access roads required):

The site will be dewatered using a temporary coffer dam. Access to Branciforte Creek will be achieved through a residential drive off of Shady Brook Court. A temporary access ramp will be constructed to allow heavy machinery to enter the site. An excavator will be used to disassemble the dam and a cart will be used to transport concrete and metal material from the dam to trucks on Shady Brook Court, where they will then be transported off-site and properly disposed of. Once the dam has been removed from the channel, an excavator will install a large woody debris structure using a redwood log with rootwad attached and two 1-2 ton boulders bolted to the log for anchoring. Approximately 130 cubic yards of in-stream sediment deposited behind the dam will be compacted around the structure to provide stability and allow for native plantings around the structure. All other sediment deposited behind the dam will be re-contoured and allowed to flush downstream naturally under high flow events. Any disturbed access roads, staging area, and fill material will be re-vegetated to prevent material from eroding off-site. Rock rip-rap will be placed on the right bank to temporarily protect the toe of the slope. The rock will be spec'd to remain in place unless influenced by anything above a two-year storm event. Work will be conducted after August 1 to avoid disturbance to nesting birds. Earth moving will be completed by October 31 and revegetation will be completed by November 30.

☒ Indication that, prior to the onset of activities that result in the disturbance of habitat or individuals of any listed/special status species, all project workers including NRCS/ RCD staff and growers/landowners and/or their employees/representatives will be given information on the listed species in the project area, a brief overview of the species' natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Estimated number of creek crossings and type of vehicle: *N/A*

☒ Indication that, prior to the onset of activities that result in the disturbance of habitat or individuals of any listed/special status species, all project workers including NRCS/ RCD staff and growers/landowners and/or their employees/representatives will be given information on the listed species in the project area, a brief overview of the species' natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Site Assessment and Potential Project Impacts

Describe the Environmental Setting (surrounding habitat and adjacent land use):
The project reach is located on Branciforte Creek. The dominant plant cover is riparian native and non-native plants including hazelnut (Corylus cornuta), big leaf maple (Acer macrophyllum), bay laurel (Umbellularia californica), redwood (Sequoia sempervirens), snowberry (Symphoricarpos albus), ferns, and English ivy (Hedera helix). Land use in the watershed includes rural residential, agriculture, and open space.

☒ Confirm that CNDDB map has been consulted for potential presence of listed species

Table 2. List of special status species within 5-mile radius of project area

Species:	*California red-legged frog*
Habitat:	*Quiet pools of streams, marshes, and occasionally ponds.*
Source:	*CNDDB (found within a 5 mile radius) not found at project site*
Species:	*Ohlone tiger beetle*
Habitat:	*Found on coastal terraces in remnant patches of native California coastal prairie grasslands with poorly drained clay or sandy clay over Santa Cruz mudstone.*
Source:	*CNDDB (found within a 5 mile radius) not found at project site*
Species:	*Robust spineflower*
Habitat:	*Coastal Strand, Northern Coastal Scrub, Foothill Woodland, Valley Grassland*
Source:	*CNDDB (found within a 5 mile radius) not found at project site*
Species:	*Steelhead trout*

Habitat: *Coastal streams*

Source: *CNDDB (found within a 5 mile radius) and observed in vicinity of the project*

Species: *Coho salmon*

Habitat: *Coastal streams, typically found in slow moving, deep pools*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

Species: *Santa Cruz tarplant*

Habitat: *Coastal Prairie, Valley Grassland*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

Species: *Western pond turtle*

Habitat: *Ponds and creek habitat.*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

Species: *Santa Cruz wallflower*

Habitat: *Coastal Prairie, Valley Grassland*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

Species: *Santa Cruz cypress*

Habitat: *Coastal streams*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

Species: *White-rayed pentachaeta*

Habitat: *Found on rocky, grassy areas*

Source: *CNDDB (found within a 5 mile radius) not found at project site*

☒ Rare, endangered, or threatened species potentially affected? If so, list species here and attach description of measures to minimize and avoid take of listed species: *central California coast (CCC) steelhead trout*

Specific actions to avoid or minimize adverse effects to ***coho salmon and steelhead***

1. *For work proposed in a fish-bearing stream[1], a qualified individual approved by NOAA Fisheries will act as a biological monitor during construction. The biological monitor will monitor construction activities and instream habitat and performance of sediment control devices. The biological monitor shall have the authority to halt work activity and recommend measures for avoiding adverse effects. Work activity shall not recommence until the situation is resolved to the satisfaction of the biological monitor.*

2. *If a streamflow diversion in a fish-bearing stream is necessary, the biological monitor will monitor placement and removal of the streamflow diversion structures. If the biological monitor determines coho or steelhead must be removed from a workspace, or if an unanticipated event occurs that could impact individuals of either of these species, he/she will notify a NOAA Fisheries approved fisheries biologist qualified to capture and transport salmonids.*

3. *A qualified fisheries biologist must capture and relocate listed salmonids prior to construction of the water diversion structures (e.g., cofferdams). The qualified fisheries biologist must note the number of salmonids observed in the affected area, the number and species of salmonids relocated, and the date and time of collection and relocation. The qualified fisheries biologist shall have a minimum of three years experience in the identification and capture of coho and steelhead.*

4. *Notify NMFS one week prior to capture and relocation of salmonids to provide NMFS an opportunity to attend (call Jonathan Ambrose at 707-575-6091 or via email at jonathan.ambrose@noaa.gov).*

5. *Block nets must be placed at the upper and lower extent of the areas where fish will be removed. Block net mesh shall be sized to ensure salmonids upstream or downstream do not enter the areas proposed for dewatering between passes with the electrofisher or seine.*

6. *The following methods must be used if fish are relocated via electrofishing:*

   a) *The backpack electrofisher shall be set as follows when capturing fish:*

	Initial	Maximum
A) Voltage:	100 Volts	300 Volts
B) Duration:	500 µs (microseconds)	5 ms (milliseconds)
C) Frequency:		30 Hertz
		70 Hertz

   b) *A minimum of three passes with the electrofisher shall be utilized to ensure maximum capture probability of steelhead within the area proposed for dewatering.*

   c) *No electrofishing shall occur if water conductivity is greater than 350 microSiemens per centimeter (µS/cm) or when instream water temperatures exceed 18°C. Only direct current (DC) shall be used.*

[1] A "fish-bearing stream" is defined as a stream located within the range of the listed species and/or designated critical habitat (for coho and steelhead). Project areas located above a known permanent barrier to salmonid migration would not be afforded the additional measures outlined below.

d) A minimum of one assistant shall aid the fisheries biologist by netting stunned fish and other aquatic vertebrates.

e) Salmonids will be relocated to pools at least one foot deep. Every effort shall be made to distribute captured fish throughout the flowing portion of the stream (a minimum distance of 100 feet) to avoid overcrowding. Relocation pools shall be identified before the onset of relocation activities.

f) Sculpins (Cottus sp.) and Pacific-giant salamanders (Dicamptodon ensatus) collected and relocated during electrofishing activities should not be relocated so as to concentrate them in one area. Particular emphasis shall be placed on avoiding relocation of sculpins and Pacific-giant salamanders into the steelhead and coho salmon relocation pools. To minimize predation on salmonids, these species should be distributed throughout the wetted portion of the stream.

7. *The following methods, in addition to conditions above, shall be used if fish are removed with seines.*

   a) A minimum of three passes with the seine shall be utilized to ensure maximum capture probability of salmonids within the area.

   b) All captured fish shall be processed and released prior to each subsequent pass with the seine.

   c) The seine mesh shall be adequately sized to ensure fish are not gilled during capture.

8. *If necessary a pump will be used to dewater the work space and will be screened according to NOAA Fisheries' "Juvenile Fish Screening Criteria for Pump Intakes".*

9. *The NOAA Fisheries approved fisheries biologist will capture steelhead and coho stranded in residual wetted areas as a result of the streamflow diversion and/or workspace dewatering and relocate them to a suitable location immediately upstream or downstream of the project area. The biologist shall note the number of steelhead observed, the number relocated, and the date and time of the collection and relocation. One or more of the following NOAA Fisheries approved collection methods shall be used by a qualified fisheries biologist: electrofishing, seine netting, or other collection method approved by NOAA Fisheries.*

10. *If two or more CCC coho salmon, five or more CCC steelhead, or four or more S-CCC steelhead are found dead or injured as a result of relocation activities for any particular project, the project permitee shall contact NMFS biologist Jonathan Ambrose ((707) 575-6091). If Mr. Ambrose cannot be reached, contact the NMFS Santa Rosa Area Office at (707) 575-6050 or (707) 575-6064. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All Federally listed species mortalities must be retained, placed in an appropriately sized whirl-pak or zip-lock bag, labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be retained until specific instructions are provided by NMFS.*

11. *The maximum number of juvenile CCC coho salmon that may be killed or injured in any one year is **one**.*

12. *Although coho salmon are not expected to occur outside of Scott, Waddell, and San Vicente Creeks, any coho salmon collected outside of these watersheds shall be photographed and immediately placed in the best (pool habitat with ample instream cover) available habitat adjacent to the dewatered area. Photographs shall emphasize documenting physical attributes unique to this species including dorsal fins, parr marks, eyes, and anal fin. All photographs shall include references for scale to allow accurate estimation of each individuals length. The fisheries biologist shall inform Mr. Jonathan Ambrose ((707) 575-6091) at the earliest possible opportunity.*

13. *Each project site must be monitored during construction to prevent adverse effects to listed salmonids and/or critical habitat. A biologist or on-site monitor shall evaluate work activities and instream habitat a minimum of three times per week during construction for the purpose of identifying and reconciling any condition that could adversely affect salmonids or their habitat. Project documentation shall be forwarded to NMFS.*

14. *Spill prevention plans must be in place prior to construction at each project site.*

    Oil absorbent and spill containment materials shall be located on site when mechanical equipment is in operation with 100 feet of the proposed watercourse crossings. If a spill occurs, (1) no additional work shall occur in-channel until the mechanical equipment is inspected by the contractor and NRCS, and the leak has been repaired, (2) the spill has been contained, and (3) CDFG and NMFS are contacted and have evaluated the impacts of the spill. Prior to construction, all mechanical equipment shall be thoroughly inspected and evaluated for the potential of fluid leakage. All questionable motor oil, coolant, transmission fluid, and hydraulic fluid hoses, fitting, and seals shall be replaced. The contractor shall document in writing all hoses, fittings, and seals replaced and shall keep this documentation until the completion of operations. All mechanical equipment shall be inspected on a daily basis to ensure there are no motor oil, transmission fluid, hydraulic fluid, or coolant leaks. All leaks shall be repaired in the equipment staging area or other suitable location prior to resumption of construction activity.

    Visqueen shall be placed over sandbags used for construction of cofferdams construction to minimize water seepage into the construction areas. The visqueen shall be firmly anchored to the streambed to minimize water seepage.

15. *The project manager at each site shall be familiar with all minimization and conservation measures and terms and condition prior to construction. The project manager/supervisor for each project shall posses a copy of all conservation and minimization measures described in the project description of the NMFS biological opinion. The project manager/supervisor shall ensure the copy of the conservation and minimization measures is available on site to all workers at each project location. The project manager/supervisor for each project shall posses a copy of the Terms and Conditions from this biological opinion. The project manager/supervisor shall ensure the copy of the terms and conditions is available on site to all workers at each project location.*

16. *In order to monitor the impact to, and to track incidental take of listed salmonids, NRCS and/or RCD shall submit in their (January 31) annual report the following project-specific summaries, stratified at the individual project and ESU level:*

- *A summary detailing fish relocation activities, including the number and species of fish relocated and the number and species injured or killed.*
- *The number and type of Practices implemented within the stream channel.*
- *The length of streambank (feet) protected and stabilized.*
- *The number of culverts replaced or repaired, including the number of miles of restored access to unoccupied salmonid habitat.*
- *The distance (feet) of aquatic and riparian habitat disturbed at each project site.*

This report shall be submitted on an annual basis over the five year life of the Program by January 31 to:

National Marine Fisheries Service
Protected Resources Division
Attn: Devin Best
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

☒ Does the project potentially impact Riparian Vegetation?

☐ Does the project propose removal of non-native trees greater than 6" dbh? *No*

☒ Verify project does not involve removal of native trees 4" dbh or greater, except willows for which there will be no cutting or removal of tress 6 inches or greater dbh.

Is the Project Located in the California Coastal Zone? Yes ☐ No ☒

For Projects in the California Coastal Zone:

☐ Verify that this PCN and project plans have been circulated to the California Coastal Commission, Central Coast District:

Does the project involve disturbance or removal of a "Significant Tree" as defined in the County Code Chapter 16.34?
Yes ☐ No ☒

If answered yes, indicate these trees either as part of the project plan or as a separate map and check one of the following reasons for disturbance or removal of the significant trees (can delete unchecked options prior to submittal to shorten the overall length of the document):

☐ The significant tree is dead or is likely to promote the spread of insects or disease.

☐ The removal is necessary to protect health, safety, and welfare.

☐The removal of a non-native tree is part of a plan approved by the county to restore native vegetation and landscaping to an area.

☐ The removal will involve a risk of adverse environmental impacts such as degrading scenic resources.

☐ The removal is necessary for active or passive solar facilities, and that mitigation of visual impacts will be provided.

☐ The removal is necessary in conjunction with another permit to allow the property owner an economic use of the property consistent with the land use designation of the Local Coastal Program land use plan.

☐ The removal is part of a project involving selective harvesting for the purpose of enhancing the visual qualities of the landscape or for opening up the display of important views from public places.

☐ The removal is necessary for new or existing agricultural purposes consistent with other County policies and that mitigation of visual impacts will be provided.

☒ County cultural resources map has been consulted to determine if the project is located in an area designated as "sensitive" cultural resources area according to the County map

☒ County FEMA map has been consulted to determine if the project is located in a FEMA identified flood hazard area (Zones A, V, or floodway)

The project is located in a FEMA identified flood hazard area A.

Are there any easements or restrictions on the property?

Yes ☐ No ☒

☐ If yes, verify here that they have been reviewed (including coordination with third-party holders), and the project is consistent with them.

Will any part of the project be within 40-ft of a County right-of-way?

Yes ☐ No ☒

☐ If yes, verify that plans have been circulated to the County Department of Public Works

Would the project involve the use of soil amendments within 10 ft. of a water body?

Yes ☐ No ☒

☒ Verify that the project is not taking place on a hazardous material site.

Does this project have the potential to impact a floodway or floodplain?

Yes ☒ No ☐

☒ If yes, check here to verify that the written analysis of a Registered Civil Engineer (RCE) or hydrologist indicating that the project will not decrease floodwater storage, modify floodwater conveyance, increase base flood elevation, or otherwise create an adverse impact either on the site, or upstream or downstream of the site, has been provided to the County.

Revegetation and Restoration of the Site to Preconstruction conditions or Better

When native vegetation will be removed and replaced, provide a visual assessment of dominant native shrubs and trees, approximate species diversity, and approximate coverage:

Table 3. Native species observed in the vicinity of the project site

	Common Name	**Scientific Name**	**Percent Cover**	**Location**
Trees	*Redwood, bay laurel, big leaf maple*	*Sequoia Sempervirens, Umbellularia californica, Acer macrophyllum*	*80%*	*Found in and around the project area*
Shrubs	*Snowberry, hazelnut*	*Symphoricarpos albus, Corylus cornuta*	*5%*	*Found in and around the project area*
Vines	*NA*	*NA*	*NA*	*NA*
Forbs	*NA*	*NA*	*NA*	*NA*
Grasses	*Sedges, rushes, and ferns*	*Carex praegracilis, Carex barbarae, Juncus Balticus, Athyrium sp.*	*10%*	*Found in and around the project area*

Table 4. Non-native species observed in the vicinity of the project site

	Common Name	**Scientific Name**	**Percent Cover**	**Location**
Trees	*NA*	*NA*	*NA*	*NA*
Forbs	*NA*	*NA*	*NA*	*NA*
Vines	*English Ivy*	*Hedera helix*	*75%*	*Found in and around the project area*
Shrubs	*NA*	*NA*	*NA*	*NA*
Succulents	*NA*	*NA*	*NA*	*NA*
Grasses	*NA*	*NA*	*NA*	*NA*

Success Criteria → Describe the criteria that will be used to measure revegetation success for this project and timeframe for monitoring: *Revegetation of the project site will be completed with the goal of habitat enhancement and erosion control. A 60% success rate of all planted species will be measured through annual monitoring as part of the Permit Coordination Program protocol. Eradication of the extensive ivy population is not feasible at this time. The success criteria will be*

monitored for a period of three to five years to ensure successful establishment of native vegetation and to ensure that no new invasive species colonize the project site.

If the identified success criteria are to be monitored for less than five years initially, provide information/rationale for this shorter monitoring period: *NA*

Plant species to be used for revegetation include:

☒ Native species from the approved plant list developed for the Program
☐ Non-native, non-invasive plant species from approved plant list developed for the Program

Table 5 shows a list of plant species that are to be used for revegetation of the project site.

Table 5. Species to be used for revegetation of the project site

	Common Name	**Scientific Name**	**Percent Cover**	**Location**
Trees	*Red alder, American dogwood, hazelnut*	*Alnus rubra, Cornus sericea, Corylus cornuta*	*N/A*	*Mid-bank*
Shrubs	*NA*	*NA*	*NA*	*NA*
Vines	*NA*	*NA*	*NA*	*NA*
Grasses	*Sedges and rushes*	*Carex praegracilis, Carex barbarae, Juncus balticus*	*NA*	*Bank toe*
Forbs	*NA*	*NA*	*NA*	*NA*
Succulents	*NA*	*NA*	*NA*	*NA*

If natives are not to be used, please indicate why: *NA*

If a plant species is to be used that is not included on the approved plant lists, please explain and indicate whether or not this has been approved by a qualified individual: *Cornus sericea and Corylus cornuta are not on the approved plant list, but have been approved for use at the project site due to their abundance nearby the project site.*

Describe any other aspects of the project (i.e. other than revegetation) that will result in disturbance (i.e. channel work, etc.) that will require restoration to pre-construction condition or better: *NA*

Additional Design Requirements

If grading exceeds 2,000 cubic yards, verify that:

☐ Plans have been designed and signed by a Registered Civil Engineer (RCE) in accordance with the standard of the State of California

Does the project require Registered Civil Engineer review/approval per County of Santa Cruz Master Permit requirements?

Yes ☒ No ☐

☒ If yes, check here to verify that an RCE has reviewed, analyzed, and/or designed the project.

For Projects in U.S. Army Corps Jurisdiction:

Reason for Discharge or Fill: Type of Material Being Discharged and Amount of Each Type in Cubic Yards: *Fill material will be discharged in order to reconfigure Braciforte Creek based on the re moval of a dam installed more than 70 years ago. 20 tons of 1-2 ton rock for bank projection, to anchor a LWD structure and create in-stream boulder cluster to create scour for fish refuge. Approximately10 cyd of longitudinal peaked stone toe protection (lpstp) will be installed for toe protection. 73.5 cyd of fill will be placed during the redistribution of sediment that has been impounded in the channel. The LWD structure is 2.5 cyd of fill in the channel.*

	Acres of Wetlands or Other Waters Filled	*Acres of Non-wetland Waters of the U.S. Filled*
Temporary fill	*0.0*	*<0.01*
Permanent fill	*0.0*	*<0.01*

☐ Wetland Delineation Required
☒ Endangered Species Act Compliance – no effect.
☒ New access or dewatering will be required (check box and circle)

For Projects Subject to NOAA's National Marine Fisheries (NMFS) Biological Opinion (Applies to projects involving work in an accessible reach of steelhead and/or coho streams and will involve work in the stream.)

☐ Confirm project site is dry at this time.

☒ Project will require dewatering and stream length to be dewatered is less than 300 ft.

☒ Project is within known limits of anadromy of steelhead and/or coho.

☒ Project is in a stream reach designated in the 2010 NMFS Recovery Plan as containing high intrinsic potential (IP>0.70) for coho.

☐ Project is in a stream reach designated in the 2010 NMFS Recovery Plan as a Core Implementation Area.

☐ Project will require use of rip-rap for bank stabilization

☒ Project focuses on removal of a fish passage barrier

☒ Project plans have been reviewed by biologists and/or engineers from NMFS and/or DFG (prior to submittal of the PCN)

☐ Project site does not have constituents of preferred habitat for steelhead salmon or coho. Explain:

Provide description of existing site conditions and explanation of how proposed activities improve or maintain these conditions for steelhead or move within the natural variability needed to support steelhead:

Currently, a dam structure is in place creating a passage barrier to upstream migration for all stages of the freshwater steelhead life cycle. The structure has also accumulated a large amount of deposited sediment directly upstream which has covered the natural substrate mix, drastically reducing spawning potential. Removal of the dam will allow for improved passage through the site for steelhead to three miles of habitat and will allow the deposited sediment to migrate downstream under high flow conditions. Once the sediment has been flushed from the site, the buried substrate mix will again be available to steelhead for spawning and the downstream corridor will receive fines that have historically been retained by the structure. The installation of a large woody debris structure will also provide steelhead with cover habitat and, in time, a scour pool ideal for juvenile rearing.

5/2/13

Natural Resources Conservation Service — Date

05/02/13

Signature of RCD of Santa Cruz County — Date

Branciforte Creek Dam Removal Project Location Map

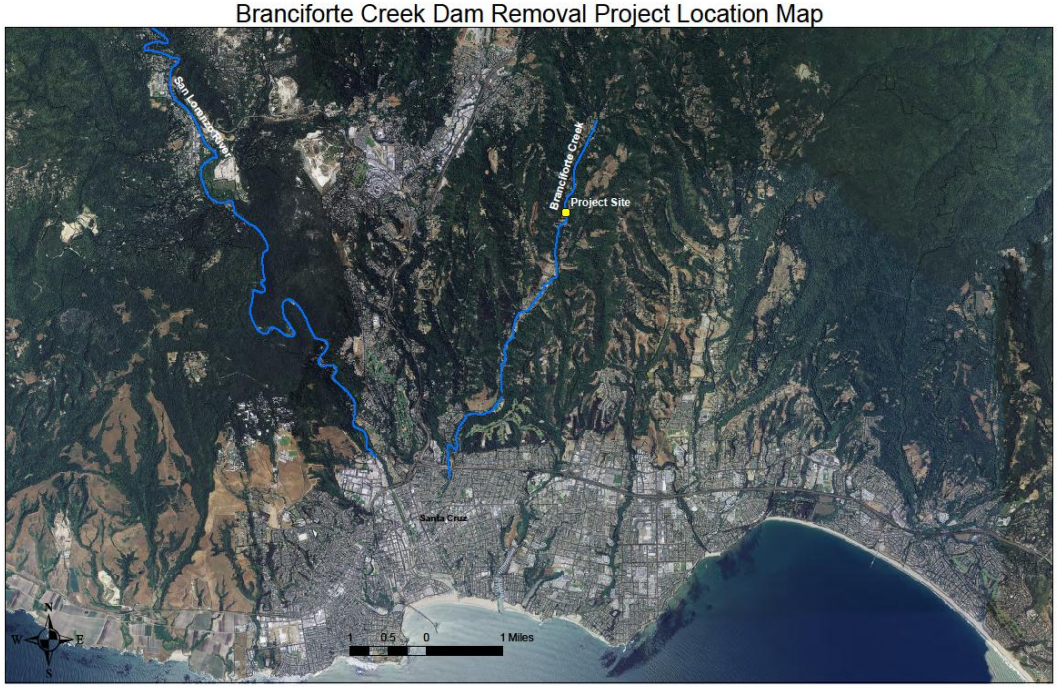


Photo Documentation
Pre-Project (4/6/2012)

View of the dam from downstream.

View of the dam from the left bank.

View of the dam from upstream, standing on the bridge.

Exhibit D. Photo Documentation

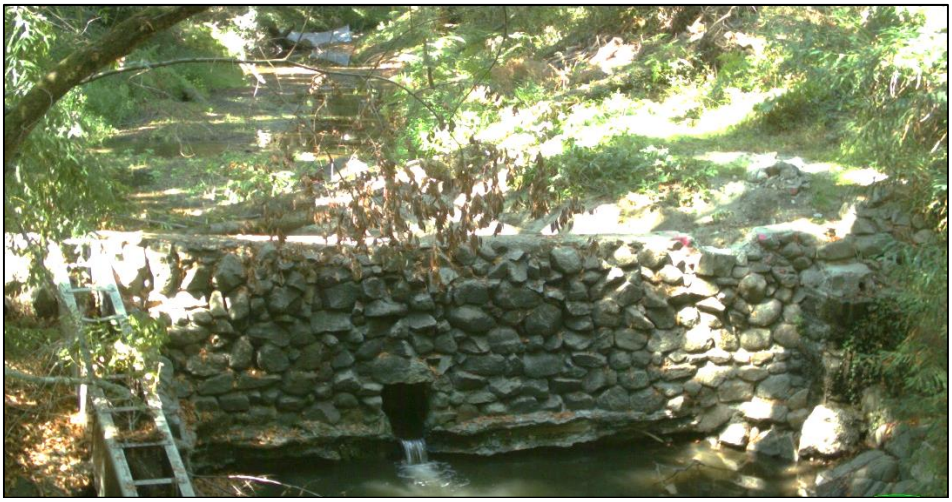


Figure 1. Pre-implementation facing upstream (photo provided by NOAA)

Figure 2. During-implementation facing upstream (photo provided by NOAA)

Figure 3. Post-implementation facing upstream (photo provided by NOAA)

Figure 4. Pre-implementation facing downstream (photo provided by RCD)

Figure 5. During-implementation facing downstream (photo provided by RCD)

Figure 6. During-implementation facing downstream (photo provided by RCD)

Figure 7. During-implementation facing downstream (photo provided by RCD)

Figure 8. During-implementation facing downstream (photo provided by RCD)

Figure 9. Post-implementation facing downstream (photo provided by RCD)