2014 FRGP Proposal Application Form

Section 1: Summary Information

1. Project type:	FP
2. Project title:	Sharber-Peckham Creek Fish Passage Project
3. Applicant Name:	Northwest CA Resource Conservation & Development Council
4. Person Authorized to Sign Grant Agreement:	Patrick Truman, Vice-President NWCARC&DC
5. Contact person:	Mark Lancaster, 5C Program Director
6. Mailing Address: **Check if changed from previous applications** ☐	PO Box 2571
7. City, State, Zip:	Weaverville, CA 96093
8. Telephone #: **Check if changed from previous applications** ☐	(530) 623-3967
9. Fax #:	(530) 623-3979
10. Email address:	mlancaster@5counties.org
11. Organization Type:	NonProfit Agency
12. Certified Nonprofit Organization:	Yes Nonprofit Organization Number: C1948770
13. New Grantee:	No
14. Licensed Professional	Yes ☒ No ☐ If Yes provide: Name: Jerome C. Hauke License Number: C13071 Affiliation: Northwest California Resource Conservation and Development Council Phone Number: (530) 623-4132 Name: Mark Lancaster License Number: RPF 2462 Affiliation: Five Counties Salmonid Conservation Program Phone Number: (530) 623-3967 x111
15. Amount Requested:	$102,757
16. Total Project Cost:	$274,413
17. Salmonid Species Benefited:	**Coho** ☒ **Steelhead** ☒ (Cutthroat ☐ Chinook ☒)

18. Project Objectives:	The project objective is to replace an undersized culvert which has created a migration barrier to anadromous salmonids on Sharber-Peckham Creek. This will restore access to over one mile of suitable spawning, over-wintering and rearing fisheries habitat.
19. Recovery/Restoration Plan:	Recovery Plan for So. OR/No. CA Coast Coho Salmon (NOAA Draft January 2012)
20. Task Number or Reference:	SONCC-LTR.5.1.32.2 Remove barriers, guided by the assessment
21. Time Frame:	6/1/2015 - 3/31/2018
22. Stream:	Sharber-Peckham Creek
23. Tributary to:	Trinity River
24. Watershed System:	Big French Creek - Lower Trinity
25. County(ies):	Trinity
26. Coastal Zone:	No
27. Trinity River Basin:	Yes

Section 2: Location Information

1. Latitude, Longitude (in decimal degrees, Geographic, NAD83):	40.89719400 : -123.56276600 - Coordinates refer to fish passage barrier removal site
2. Location Description:	The project is located near the town of Salyer, Trinity County, California at the intersection of Peckham Creek, a tributary to the Trinity River, and Fountain Ranch Road/Quinby Road (former County Road 455); NE1/4, Section 13, T6N R5E, USGS Quad Salyer (MDBM). The project will occur about 0.2 miles from the mainstem Trinity River on less than 1 acre of stream corridor along approximately 400 feet of stream.
3. Directions:	From the Salyer Post Office, in Salyer, CA drive west on CA-299 (62 feet) and take the first right onto Campbell Ridge Road and continue 0.2 mi, then turn right onto Fountain Ranch Road, which becomes Quinby Road and continue 1.8 mi until you reach the crossing on Sharber-Peckham Creek. There is one gate along Fountain Ranch Road where it turns from a county road to a privately maintained road (Quinby Road) near Sharber Slough. This gate is locked and requires a code. Advance notice /permission from the Riverbend Estates Road Association or landowner within the subdivision is required to access the road.

Section 3: Watershed Information:

All questions in this Section refer to the watershed named in Number 1 below.

1. Watershed name:	Sharber-Peckham Creek
2. Watershed area:	square miles = 5.80
3. Watershed area directly affected by the proposed project:	percent = 0.02
4. Land use statement:	Current land uses within the watershed include limited rural residential development. Approximately 69% of the Sharber Creek watershed is managed by the Six Rivers National Forest. The lower portion of the watershed, where this project is planned, consists of private land parcels and is mainly zoned for rural-residential use. These land uses are expected to remain as such for the next 10 years.
5. Watershed ownership:	% Private:31.00% State:0.00 % Federal:69.00%
6. Length of Anadromous Streams in Watershed:	miles = 1.20
7. Watershed Plan(s):	Natural Resources Management Corporation, 2003, Mainstem Trinity Watershed Analysis, USDA Forest Service-Six Rivers National Forest, Eureka, CA National Marine Fisheries Service, 2012, Public Draft Recovery Plan for Southern Oregon/Northern California Coast Coho Salmon (Oncorhynchus kisutch), National Marine Fisheries Service, Arcata, CA California Department of Fish and Game, 2004, Recovery strategy for California coho salmon, California Fish and Game Commission, Sacramento, CA
8. Background Information	Sharber-Peckham Creek is located in the lower Trinity River, Burnt Ranch HSA (Big French Creek HUC10 and Sharber Creek HUC12) within the SONCC ESU for coho salmon. Land use immediately surrounding the project area is rural residential, with the majority of the upper watershed managed by the Six Rivers National Forest (SRNF). Sharber Creek formerly followed the course shown on the 1979 USGS Salyer CA Quad. Since that time, it has captured another small channel in the south half of Section 12, T6N, R5E, and the majority of its flow follows this course. For the purpose of this document, that creek will be called Sharber-Peckham Creek, while the other channel, located to the west, will be called Sharber Slough. Sharber Creek will describe the watershed as a whole. From aerial photos and topography, it is apparent that the lower section of Sharber Creek, including Sharber Slough and Sharber-Peckham, is an old oxbow of the Trinity River. There is continued debate over the name of these creeks. The watershed is dominated by early to mid-mature vegetation and has an area of 3700 acres with elevations ranging from 400-3600 ft. There is approximately 1.2 mile of winter habitat available to anadromy until

	upstream migration is blocked by a narrow waterfall. The lower portion of the creek, is a spring-fed perennial stream, and supports year-round rearing. Stream gradient is between 2-3% to 3000 ft from the mouth; above this, the channel has a wide floodplain (500 ft). The existing culvert and unsurfaced road has been in place for many years, serving nearly 20 properties, some undeveloped. There are 3 domestic water wells near the project site. Two are immediately downstream of the culvert within the immediate project area serving 5 properties; the other is upstream, outside of the project area. Further upstream, the Salyer Heights water system services about 40 people. During the period 1944-1960, logging and road building occurred within the riparian areas (NRM 2003). Aerial photographs from 1975 show riparian regeneration was underway on private land. However, a western tributary to this creek that passes through uncut Forest Service land showed numerous streambank landslides and channel widening (NRM 2003). The mainstem, which flowed through the cut-over private land, appeared to have a stable channel with an extensive young riparian canopy (NRM 2003). Sharber Creek contains the largest spawning population of coho salmon in the mainstem Trinity watershed analysis area (NRM 2003). In 2001, the Forest Service installed a series of three weirs downstream of the culvert outlet that attempted to deepen the jump pool and lower the jump height to facilitate salmonid passage through the culvert. That project had minimal success. Surveys conducted by SRNF recorded up to 67 redds during surveys conducted between 1996 and 2001. During that period, there were 111 coho and 6 Chinook carcasses counted. Surveys have continued to find coho, steelhead and Chinook.

Section 4: Project Objectives

1. List Task Information:

SONCC-LTR.5.1.32.2

Remove barriers, guided by the assessment

Describe How Project Accomplishes List Task:

The proposed project will result in long-term benefits to SONCC coho salmon in the Sharber-Peckham Creek watershed by improving passage condition, thus increasing the availability of habitat (approximately one mile) accessible for spawning and rearing. Passage condition will be improved by removing the current culvert which is impassable to salmonids at various life history stage and various flows. It will be replaced with an

embedded bottom culvert which will be passable to salmonids and all aquatic species at all life stages and flows.

2. Need for the Project:

The purpose of this project is to replace an undersized culvert which has created a migration barrier to anadromous salmonids on Sharber-Peckham Creek and to improve access to spawning and rearing habitat for these species. The project will remove a migration barrier to Southern Oregon/Northern California Coasts (SONCC) coho salmon (Oncorhynchus kisutch), Upper Klamath-Trinity Rivers Chinook salmon (Oncorhynchus tshawytscha) and Klamath Mountains Province Steelhead trout (Oncorhynchus mykiss). Removal of this barrier would allow use of over one mile of suitable spawning, over-wintering and rearing fisheries habitat.

Sharber-Peckham Creek is designated as both Critical Habitat and Essential Fish Habitat (EFH) for coho. It is a cold, spring-fed, low gradient tributary to the Trinity River, which supports coho salmon, Chinook salmon and steelhead trout which utilize the stream through all life history stages. Upstream spawning access is currently impaired by the culvert's size, angle, absence of culvert baffles and velocity conditions created during fall and winter flows. Its design has likely contributed to the narrowing and downcutting of the channel downstream. During summer months, it is a physical barrier to thermal refugia necessary for juvenile fish. Currently, spawning habitat below the culvert is marginal and has very limited carrying capacity for rearing. Approximately one mile of spawning habitat is available above the culvert. Approximately 800 feet above the culvert, perennial cold springs provide approximately one acre of palustrine wetland rearing habitat to young-of- year (YOY) coho and steelhead trout. Affected private landowners have shown interest and support for this project. This project would allow upstream migration of spawners, presently stopped at the outlet of the culvert, and allow for passage of juveniles seeking cold water refugia, greater food sources and increased habitat availability. Sharber-Peckham is one of the relatively few low gradient tributaries to the Trinity River and is therefore very important for coho.

SONCC coho and KMP steelhead are known to actively use the Sharber-Peckham system consistently. According to Forest Service surveys, YOY juveniles have been observed in Sharber-Peckham Creek in and around the perennial springs at approximately 2,200 feet upstream of the Trinity River. Generally, flows above this have become negligible and habitat is limited to isolated pools after mid-June. Although this stream channel is dry during the summer months, it is capable of supporting significant winter spawning sites. The persistence and development of juvenile coho is supported throughout the season below 2,200 feet by

perennial spring flows. The status of the Lower Trinity River population of SONCC coho is described in Chapter 38 of the Public Draft SONCC Coho Salmon Recovery Plan, January 2012 (Recovery Plan). Sharber-Peckham Creek is specifically noted in the Recovery Plan and is described as likely supporting the highest number of spawning coho salmon among the tributaries in the Lower Trinity River. The Trinity River coho population is dominated by hatchery fish. By increasing access to more suitable habitat within the Sharber-Peckham drainage, this will allow for the possibility of natural production, the reproduction of native non-hatchery fish. The Trinity River is chronically temperature impaired. Thermal refugia provided by tributaries to the river like Sharber-Peckham are critical to overall recovery of listed salmon.

The removal of the migration barrier on the Sharber-Peckham Creek is of high priority and is noted in the Recovery Plan (NOAA Page 12). Restoring this creek is listed as the primary focus of the Lower Trinity River Population in the Recovery Plan (NOAA Page 19). This project will result in approximately 1 mile of stream channel opened for fish passage. A video of coho attempts to pass the barrier on Sharber-Peckham Creek can be viewed on the Five Counties Salmonid Conservation Program's website at http://www.5counties.org/sharber-peckham.htm

3. Limiting Factors to Salmonids Remediated By Proposed Project:	☐ Water quantity	(lack of flow, diversions, runoff)
	☐ Water quality	(temperature, chemistry, turbidity)
	☐ Riparian dysfunction	(lack of shade, excessive nutrients, roughness, elements)
	☐ Excessive sediment yield	(pool and gravel quality)
	☒ Spawning requirements	(gravel, resting areas-pools)
	☒ Rearing requirements	(velocity, lack of shelter, pools)
	☐ Estuary / lagoon issues	(closure during migration periods)
	☒ Fish passage	(emigration and immigration)
	☐ N/A	

4. Limiting Factor Remediation:

Spawning requirements

This project will address spawning requirements by allowing adult fish to move further up into the watershed

where approximately 1 mile of suitable spawning habitat exists.

Rearing requirements

This project will address rearing requirements by allowing juvenile fish to move further up into the watershed where suitable rearing habitat exists and perennial cold springs provide approximately one acre of rearing habitat.

Fish passage

This project will address fish passage by removing a barrier to both adult and juvenile salmonids from Sharber-Peckham Creek and replacing it with a passable structure.

Section 5: Project Description

1. *Detailed Project Description Including All Tasks to Be Performed:*

Detailed project description including all tasks to be performed:

Proposed Activity

The proposed activity of installing a 14'-11" span x 11'-2" rise multi-plate horizontal ellipse culvert on Sharber-Peckham Creek will improve flood conveyance, geomorphic stability and fish passage conditions. This structure would also decrease overall maintenance costs for the current Road Association as well as provide better safety for drivers on the roadway during times of high flow. Most importantly, it will open-up spawning and rearing habitat for coho, steelhead and Chinook. The new crossing will have an increased flow area of over 800% beyond that of the existing culvert and will be designed to pass a 10-year flow of 1,040 cubic feet per second (cfs). More discussion on design justification is included in the Supplementary Documents – Intermediate Plan.

The 5C Program has completed many successful migration barrier removal projects throughout Northwestern California and has the staff and contracted consultants to successfully design and implement this project. The 5C Program staff that will be involved with this project includes the Program Director, Project Coordinator, Field Technician, Account Clerk and Office Manager. Staff time will include involvement with design proposal and review, permitting, bidding/contracting, contract site inspections, construction oversight, erosion control, monitoring, contract management, invoicing, billing and reporting. Staff involvement with the planning, implementation and monitoring phases of the project will require travel between Weaverville and Salyer. Throughout all phases of the project, personal field gear and heavy equipment working in the stream will be properly decontaminated before entering the riparian area. California Department of Fish and Wildlife's field

guidance and decontamination protocols will be followed.

Project Tasks
(Tasks anticipated to be funded by sources other than FRGP are indicated with an asterisk*)

1. Complete draft and final engineering and design*

At the time of this application Intermediate Plans (~65% plans) for this project are complete and are included with the supplemental material. Final design of the project will begin in May 2014. The project is currently at 65% design completion with a detailed plan view, profile of the proposed culvert, long profiles, cross sections and proposed preliminary design complete. A Design Memo which includes hydraulic analysis and design justifications is included in the Supplementary Documents - Intermediate Plan. The finalized design, construction bid drawings and specifications will be subcontracted to a licensed engineer for development. The Project Coordinator and Project Director will facilitate the design process.

2. Permitting*

Permits required for this project that will be applied for by the 5C Program will include Department of Fish and Wildlife 1600/Streambed alteration permit and if funded through FRGP, then the additional permits and review will fall under the FRGP programmatic assessments. The permitting and review process will begin Winter-Spring 2015. Depending upon funding sources and grant partners, NEPA documentation may be required in addition to CEQA documentation and review. Environmental analysis, review and permitting will be overseen by the Project Coordinator and Program Director with the assistance of specialized 5C staff. Permits will be purchased by the 5C Program with grant funds.

3. Project Bid Period & Construction Contract Approval*

Construction will be completed by one to multiple subcontractors, with engineering inspection provided by the licensed engineer hired to finish the design plans. Project construction will be contracted out by 5C Program Staff. Review and preparation of bid documents will be done by the Program Director, Project Coordinator and Account Clerk.

4. Construction

Construction of the Sharber-Peckham Creek multi-plate arch ellipse with an embedded bottom is anticipated to begin mid-summer 2015. Best Management Practices as described in A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds will be applied throughout the construction phase of this project. The full manual is available at www.5counties.org/roadmanual.htm

The project will include:

- Fish removal and exclusion: Prior to removal of fill, existing pipe and installation of the multi-plate arch ellipse, block nets will be placed upstream and downstream of the culvert removal site and seined or electro-fished to remove all aquatic species present, which include coho and steelhead, with possibly some Chinook. The organisms will be relocated at least 100 feet outside of the project area. This work will be performed by Ross Taylor and Associates, a permitted professional fisheries biologist, with the help of the Project Coordinator and the Field Technician.
- Water Management-Water diversion/by-pass: The creek will need to have a by-pass installed, which would consist of routing the flow through PVC pipe and plastic sheeting while maintaining a pump with a diesel or electric generator prior to excavation of the culvert. This will be installed by the contractor with

direction and support from 5C Program Director, Project Coordinator and Field Technician. Use of a pumping and routing system will be used to remove all water from the immediate location of the culvert. A total length of approximately 350 feet will be dewatered. The pump may need to run continuously, 24 hours a day, 7 days a week for up to six weeks (flow dependent). This may require the use of either a diesel pump, or if possible, electricity will be made available at the site for the use of an electric pump. This work will be performed by a licensed electrical/plumbing subcontractor. Water traveling downstream will be routed through temporary piping where it will be released in the lower remaining 400 feet of Sharber-Peckham Creek before its entry into the Trinity River. Measures will be in place to capture any sediment that may route via the diverted water before it re-enters the stream. The water by-pass will accomplish three goals: 1) remove excess water from the immediate construction site; 2) prevent injury to juvenile salmonids; and 3) maintain the cool water refugia at the mouth of Sharber-Peckham Creek for riverine fish.

- Excavation -Removal of existing culvert: The project will require removal of approximately 700 cubic feet of road-bed material from above and below the existing culvert. During culvert replacement, material excavated will be temporarily stored outside the immediate riparian area. Some of this material will be used on top of the proposed elliptical culvert. Excess material shall be removed from site via dump truck and disposal of at a location approved by Trinity County. Use of an excavator to remove the existing culvert will occur within the stream channel approximately 200 feet above and below the existing centerline of the road. The old culvert will be disposed of at an approved site. The current road bed is approximately 16 feet wide. The potential exists for disturbance of approximately 200 feet of riparian vegetation both upstream and downstream of the current culvert location, which may include removal of existing alder trees. An excavator will be used to remove the existing culvert and excavate within the stream channel to a width and depth necessary for placement of the new structure and adjacent compaction of fill materials. Excavation of the channel to achieve the desired grade upstream will extend approximately 150 feet upstream of the inlet of the culvert. Excavation will necessitate removal of approximately 200 square feet of riparian vegetation (majority of vegetation is non-native blackberries) both upstream and downstream of the current culvert location. Removal of all construction materials from the site will occur within 2 weeks following completion of the project. This work will be performed by a licensed subcontractor.
- Construction of Culvert - New structure and simulated streambed: The construction of the 14’-11” span x 11’-2” rise multi-plate ellipse culvert will be constructed with an embedded (approx. 3 feet) simulated streambed bottom. There will also be five rock ribbons installed within the culvert to maintain grade and retain the simulated streambed material within the structure. The design includes additional instream work of grade control structures which will maximize the beneficial effects of culvert replacement and improve both rearing and spawning habitat. Sub-surface grade control rock ribbons will be embedded into the streambed, both upstream and downstream of the new culvert. These ribbons will be set at or below the design channel grade to reduce the potential for upstream headcutting and downstream scouring. Upstream, they will be placed at approximately 5 feet, 75 feet, and 180 feet upstream of the culvert. Downstream, they will be placed at the culvert outlet, and at the site of three existing boulder weirs. These weirs will be converted to sub-surface grade control rock ribbons in order to allow juvenile fish passage. The first rock weir is approximately 45 feet downstream of the culvert outlet. The second rock weir is 40 feet beyond the first, and the third weir is 45 feet beyond the second. An excavator will likely access the first rock weir via the access road on the east side of the creek. From this access road, the excavator will travel approximately 50 feet to the creek, impacting vegetation consisting of invasive Himalayan blackberry, stinging nettle and poison hemlock. The excavator will then likely travel within the creek channel to each of the rock weirs, for a total maximum

distance of 150 feet. This work will be conducted by a licensed subcontractor, with assistance from the Project Coordinator and Field Technician and supervision by the Program Director.

- Roadway and Backfill: Structural backfill and compaction around the new culvert will occur immediately following completion of the culvert and simulated streambed construction. Non-structural backfill and road base will be placed and compacted. The road surface will be restored to pre-construction condition. All road work will be done by a licensed subcontractor with oversight by the Project Coordinator and contracted licensed Engineer.
- Equipment: Some equipment that may be necessary will include large trucks necessary to deliver equipment and supplies, excavator, dump trucks, water truck for dust abatement on the remaining road prism, other heavy equipment required for the delivery of construction materials and preparation and compaction of the road surface, and gas or diesel powered electric generators for all power tools and operation of by-pass pump. Staging areas for all equipment delivery and storage will be kept outside of the riparian area. Fueling and lubricating of all equipment shall be done well outside the riparian area.
- Bank stabilization and erosion control: This will include installation of geotextiles or mulch and aid in the prevention of noxious weed introduction to the disturbed site. Bank stabilization will occur along the downstream bank opposite the wells and along the upstream and downstream side of the fill slope. Methods for bank stabilization will use 1-2 ton RSP. Bank stabilization will be done by a licensed contractor, with the assistance of 5C staff. Upon project completion, the necessary final erosion controls will be installed at the project sites. All disturbed areas will be re-vegetated with native seed/riparian plantings suitable for the project area and/or mulched with certified weed-free mulch. The level of disturbance for this project is anticipated to be minimal, but all applicable BMPs for reducing sediment delivery to the stream (Roads Manual Appendix B, Part 4) will be adhered to throughout construction. All permanent and temporary spoils will be stored in a manner to prevent sediment delivery to any stream/waterway throughout and after project construction. A temporary spoils location and stabilization plan will be prepared by 5C staff for the contractor to use, including incorporation of the Roads Manual spoils storage BMPs (Chapter 5 and Appendix B, Part 4).
- Detour Road - Traffic control: In order to prevent a road closure to area residents, a temporary detour road will be installed approximately 30 feet upstream of the existing culvert. This detour road will be within the dewatered channel and constructed with road fill, road base and will have a temporary CMP in place in the event of a summer thunderstorm. Short-term closures may occur, but with the detour road in place, residents and emergency vehicles will be able to pass. All efforts will be made to maintain an open roadway. This work will be done by subcontractor and overseen by the Project Coordinator.
- Utilities: 5C staff and contractors will ensure that wells and utility lines within the project area are secured, or safely relocated to a new location to prevent interruptions in services to residents. This may require excavation to relocate the lines. If interruptions are foreseen, other accommodations, such as temporary water tanks, or water delivery will be installed or provided. This work will be done by a licensed electrical/plumbing subcontractor and overseen by the Project Coordinator.

5. Monitoring

Implementation and effectiveness monitoring will occur as specified below and according to procedures found in the “California Salmonid Stream Habitat Restoration Manual” in order to ensure the project is carried out as planned and that fish passage is realized. Monitoring activities will be performed by Ross Taylor and Associates and 5C staff, including Program Director, Project Coordinator and Field Technician. All monitoring data associated with the project will be reported to all organizations that fund the project in the form of progress or final reports as specified in the grant agreement, as well as having the final report posted to the Five

Counties Salmonid Conservation Program's (5C) website (www.5counties.org). These data will include, but are not limited to: photographs, long profile survey data and fish presence survey data. The 5C Program and its staff have published multiple reports on migration barrier projects and routinely share data with both public and private organizations.

Implementation Monitoring:
5C staff will monitor the effects of the work in the riparian zone as it occurs. Should any concerns develop that have not been foreseen, appropriate actions, contractual or otherwise, would be taken to avoid deleterious effects to water quality and/or the riparian reserves. Contract administration staff will monitor construction activities daily to ensure that the contract(s) are being implemented properly and that all provisions to safeguard the environment and public safety are being strictly adhered to. This monitoring would begin at project implementation and occur at regular intervals throughout the project. 5C staff will also monitor regularly for any unintentional mortality of juveniles due to failure of exclusion devices. Photo point monitoring will occur pre-project, during construction and post-project for the first two winter seasons.

Physical Monitoring:
Two cross-sections and a longitudinal profile extending from the confluence with the
Trinity River upstream of the project area approximately 400 feet has been established to set baseline for post-project monitoring activities. An existing longitudinal profile is available for this area. Re-evaluation of cross-sections and longitudinal profiles will be surveyed immediately following construction and following the first two winter seasons. This monitoring work will be done by fisheries biologists from the Six Rivers National Forest, 5C Field Technician and Project Coordinator.

Biological Monitoring:
Fish presence surveys will be conducted on Sharber-Peckham Creek following construction to assess success of the project. Post-project, it is likely the stream channel will require at least two to three years of active monitoring to ensure that 1) fish existing pre-project are maintained at least in their pre-project species, life-history stages and numbers, 2) riparian vegetation impacted during the project and replaced is not choked out by competitive species, and 3) channel changes are not causing deleterious upstream effects on existing over wintering and spawning habitat. This monitoring work will be done by fisheries biologists from the Six Rivers National Forest, 5C Field Technician and Project Coordinator.

2. *Time Frame:*

Final Design*	May – December 2014
Permitting*	January – March 2015
Project Bid Period & Construction Contract Approval*	April – June 2015
Pre-project Monitoring	June – August 2015
Construction	August – October 2015
Progress Reports & Final Reports (ongoing throughout project & stipulated by grant contract)	March 2016 – October 2017
Post-project Monitoring*	October 2015 – March 31 2018

*Indicates Tasks anticipated to be funded by sources other than FRGP to start June 2015

3. *Deliverables:*

1) Final design plans
2) Pre and post-project photo monitoring documentation and monitoring reports on post-project surveys
3) Quarterly Progress Reports summarizing work performed during the reporting period
4) Draft Report summarizing the results of the project. This will include a statement of purpose, the scope of the project, final cost breakdowns, and a description of the approach and techniques used during the project
5) Final Report

4. C*DFW Protocols to Be Used in Project Development and Implementation (check applicable box):*

☒ CDFW *California Salmonid Stream Habitat Restoration Manual*

Manual part number: Project Implementation, Project Evaluation and Monitoring, Fish Passage Evaluation at Stream Crossings, Fish Passage Design and Implementation

☐ CDFW Fish Bulleting 180: California Coastal Salmonid Population Monitoring: Strategy, Design, and Methods

5. *Other Protocols:*

As a project under the 5C Program, the fish passage improvement project at Sharber-Peckham Creek will be subject to the applicable best management practices employed by the Five Counties in all implementation aspects of the program. The Best Management Practices (BMPs) for working on a stream crossing, sediment prevention and aquatic species relocation listed in A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds (Roads Manual) will be followed throughout project construction. These specific BMPs are listed in Chapters 4, 5 and Appendix B of the Roads Manual. A full copy of the manual, or specific chapters/appendices, can be downloaded from www.5counties.org/roadmanual.htm.

In addition, the project will comply with requirements of the California Department of Fish and Game as established in the 1602 Streambed Alteration Agreement as well as California Department of Fish and Wildlife's field guidance and decontamination protocols.

6. *Expected Quantitative Results (Project Summary):*

Stream length opened for fish passage by improving stream crossings (miles)	0
Total length of stream made accessible by removing blockages (miles)	0
Overall stream length treated, count one side of stream only (miles)	0
Culverts installed or improved (number)	1
Stream length made accessible by	1

culvert installation/repair (miles)	

Section 6: Qualifications and Experience of Applicant and Professionals:

1. *Applicant's Qualifications and Experience:*

The Five Counties Salmonid Conservation Program (5C) staff has has been recognized by local, state, and federal agencies for its conservation projects and work since the Program's inception in 1997. Although the 5C Program is now part of the Northwest California Resource Conservation and Development Council (NWCARC&DC), there has been no turnover in the Director and Manager positions. Staff members possess a wide range of skills necessary to effectively implement the 5C Program including: fisheries biology, watershed ecology, grant and report writing, project and grant contract management and execution, permitting compliance, various field surveying and restoration techniques, database design and management, fiscal management, land use planning, forestry, and GIS mapping. The 5C and its staff have a long history of obtaining and directly managing over $10 million in completed contracts from various funding sources, with more contracts in progress. Many of the 5C products and work programs are referenced in recovery plans, programmatic permits, and other sources. The Program and its member counties have received the following relevant awards:

• The White House Conference on Cooperative Conservation, 2005.

Awarded for outstanding leadership and personal stewardship in achieving results through cooperative conservation.

• NOAA 2004 Environmental Hero Award.

Awarded to the 5C Program Director (and founder), Mark Lancaster, for his work with the 5C Program. Recipients were told that their "dedicated efforts and outstanding accomplishments greatly benefit the environment and make our nation a better place for all Americans."

• 2003 Governor's Environmental and Economic Leadership Award.

Watershed and Ecosystem Restoration category for laudable efforts of restoring, enhancing, and improving California's watersheds, while promoting sustainable economic progress.

• Clean Water Partners for the 21st Century Award, 2003.

Awarded by US EPA to the 5C Program and individual 5C participants for their watershed restoration efforts.

• Certificate of Special Congressional Recognition, April 2003.

Awarded by US Congress to 5C Program for its conservation efforts in the community.

• Challenge Award, 2002.

Awarded by California State Association of Counties to Siskiyou County for its anadromous fisheries restoration projects.

• Green Award, 2001.

Awarded by Del Norte Solid Waste Management JPA to the Del Norte Community Development Department for its efforts in the Rowdy Creek Stream Enhancement Project.

• 2001 Nathaniel Bingham Award.

Awarded by the Klamath River Basin Fisheries Taskforce to the Siskiyou County Department of Public Works for supporting anadromous fisheries restoration.

• Resolution Honoring its Salmon Habitat Restoration Efforts, 2001.

Awarded by the California Department of Fish and Game to the Trinity County Department of Transportation.

Numerous projects have been implemented including: 63 fish migration barrier removal projects on County Roads and 7 on state, federal or private roads with restoration of over 145 miles of habitat. The 5C staff contributed to, or was entirely responsible for permitting, grant development and/or project monitoring for 40 of the 63 county projects. The 5C Staff members have actively participated in the design and construction of the West Weaver Creek, Solider Creek #1 and #2, Little Browns Creek, Finley Gulch, Conner Creek #1 and #2, and Private Ryan barrier projects. The 5C Program staff has designed, permitted, inspected, supervised construction, and completed post project monitoring for 18 sediment reduction projects. Most of these projects have been based on Direct Inventory Roads Treatment (DIRT) inventories. Other 5C Program achievements include: improvement of County policies and road maintenance practices; attainment and direct administration of over $12,000,000, in various grant and other funding sources; development of methods to streamline permitting procedures; and coordination with watershed groups and regional restoration efforts. The 5C Program's Maintenance Manual has been included under Section 4(d) Limit 10 of the Federal Endangered Species Act for anadromous salmonids and a General Certificate/Waiver has been issued by the North Coast Regional Water Quality Control Board for county maintenance activities conducted under the 5C Program.

The Program has long partnered with experts in numerous relevant fields such as fisheries biology, watershed management, and hydrology in order to accomplish Program goals. This has included consultants Ross Taylor and Associates, Michael Love and Associates, Pacific Watershed Associates, GHD (formerly Winzler and Kelly), SHN Consulting, Sari Sommarstrom & Associates and many others.

2. *Previous Projects Funded By FRGP:*

Under the Northwest CA RC&D Council, the 5C Program staff has most recently administered the following FRGP contracts (listed by #):

- P1010319 (completed): 5C Program
- P0910515 (completed): Ryan Ck, private Fish Passage
- P0910312 (completed): 5C Program
- P0710305 (completed): 5C Program

3. *Professionals Qualifications and Experience:*

Jerome C. Hauke, Civil Engineer # C 13071, BS in Civil Engineering, 1957, University of Wisconsin. Mr. Hauke has over 40 years of experience as a Civil Engineer. He has worked on bridge replacements and design of drainage structures, as well as other transportation and roadway designs while employed as a Project Manager for Caltrans District Four. Mr Hauke or his staff designee will provide site inspections as necessary throughout the construction phase of the project.

Ross Taylor and Associates, 5C consulting fisheries biologist will provide aquatic species relocation and

diversion installation oversight.

Mark Lancaster, Registered Professional Forester #2462 has extensive design and construction oversight experience including direct oversight of the project. Mr. Lancaster has worked on the design and construction of 8 culvert barrier removal and replacement projects in conjunction with Trinity County Department of Transporation. In addition Mr. Lancaster has designed and overseen the construction of road drainage upgrade projects on county roads and private roads in Trinity and Mendocino Counties. He has also designed and supervised numerous timber sales, road construction projects and road decommissioning projects between 1994-2014. He will be overseeing the 5C staff monitoring and supervising the construction site work.

4. *Examples of Similar Work:*

Mark Lancaster has worked on design for the following migration barrier culvert crossing replacement projects:

• West Weaver Creek at Oregon Street (2000)-Mr. Lancaster developed the recommended crossing dimensions for this project as well as completed the 10 year post project and large wood monitoring program.

• Soldier Creek at Evans Bar and Dutch Creek Roads (2005 & 2006)-Mr. Lancaster developed the recommended crossing dimensions and channel gradient for this project.

• Finley Gulch at Roundy Road (2009)-Mr. Lancaster completed the design and supervised the construction of this project on a County road in the Little Browns Creek watershed.

• Conner Creek at Conner Creek Road (2011) and Conner Creek at Red Hill Road (2012)-Mr. Lancaster worked with Wes Scribner, C#80390 in the design, surveying, construction and all other aspects of this project including preparing a Hydrology Report for the USFS NEPA process. The projects were constructed in 2011 and 2012 and were selected as National Waters to Watch for 2012. These projects photos can be viewed at http://www.5counties.org/gallery5.htm

• Ryan Creek Private Fish Passage Project (2013) – Mr. Lancaster completed the design, communicated with landowners, and oversaw management and logistics for implementation of the project at Ryan Creek.

Jerome C. Hauke has worked on multiple projects throughout the Bay Area while employed by Caltrans District Four. As Project Manager for the Dumbarton Bridge Replacement Project, he was responsible for overseeing the design of drainage structures on the east approach through Newark, the two west approaches through Menlo Park and Atherton, the San Mateo-Hayward Bridge Replacement Project, the Alameda tube approach to the proposed Southern Crossing, and the conversion of the SFOBB (Bay Bridge) and approaches to one way traffic on both decks. As a Chief of Maintenance for the nine Bay Area Counties he was responsible for the maintenance of roadway, landscape and drainage structures for State Highways in the Bay Area.

Section 7: Landowners Access, Permits

1. Landowners Granting Access for Project: (Attach provisional access agreement[s])
Ed Fitzgerald - Landowner, Marilee Taylor - Landowner, Michael Christian - Landowner, William Peckham - Landowner

2. Permits:	Army Corps of Engineers Permit (ACOE) California Environmental Quality Act (CEQA) DFG 1600, Lake and Streambed Alteration Agreement (LSA) SWRCB 401 Certification
3. Lead CEQA agency:	CDFW
4. Gallons of Fuel Used to Complete the Project:	Gasoline: 1200 Diesel: 1700
5. Mitigation:	No
6. Listed Species Consultations:	Coho

Section 8: Project Budget

1. *Detailed Project Budget* (Excel spreadsheets can be used)

DETAILED PROJECT BUDGET									
PROJECT NAME: 2014157, Sharber-Peckham Creek Fish Passage Project									
Level of staff / Unit description	**Hours or Units of Amount Requested**	**Hours or Units of Applicant Cost Share**	**Hours or units of Partner Cost Share**	**Hourly Rate or Unit Price ($)**	**Staff Benefits (%)**	**Amount Requested**	**Applicant Amt. of Cost Share**	**Partner Amt. of Cost Share**	**Total Project Cost**
A. PERSONNEL SERVICES									
Level of Staff									
Program Director	100	56		$34.35	0.54	$3,435	$1,924	$0	$5,359
Project Coordinator	264	264		$20.77	0.63	$5,483	$5,483	$0	$10,967
Field Technician	60	60		$18	0.11	$1,080	$1,080	$0	$2,160
Account Clerk	40	20		$18.74	0.11	$750	$375	$0	$1,124
Office Manager	20	10		$21.84	0.64	$437	$218	$0	$655
Subtotal						$11,185	$9,080	$0	$20,265
Staff Benefits						$5,790	$4,793	$0	$10,583
					TOTAL PERSONNEL SERVICES	**$16,975**	**$13,873**	**$0**	**$30,848**
B. SUBCONTRACTOR EXPENSES									
Level of staff / Unit description (indicate units of measure)	**Hrs/units for Amount Requested**	**Hrs/units of Applicant Cost Share**	**Hrs/units of Partner Cost Share**	**Hourly rate / Unit cost ($)**		**Amount Requested**	**Applicant Amt. of Cost Share**	**Partner Amt. of Cost Share**	**Total Project Cost**
Licensed Engineer - Final Design and site inspection (hours)		100		$125		$0	$12,500	$0	$12,500
Fisheries Biologist - Ross Taylor & Assoc. for fish relocation (hours)		36		$72		$0	$2,592	$0	$2,592
Post Construction			220	$45		$0	$0	$9,900	$9,900

Monitoring - USFS Coorinator (hours)								
Post Construction Monitoring - USFS Technician (hours)			140	$18	$0	$0	$2,520	$2,520
Backfill - Structural backfill and compaction around new culvert - includes materials and labor (cubic yards)		2		$600	$0	$1,200	$0	$1,200
Backfill - Non-structural backfillill and compaction around new culvert (cubic yards)	200			$60	$12,000	$0	$0	$12,000
Roadway - Finish with road base (tons)		40		$75	$0	$3,000	$0	$3,000
Bank Stabilization - Installation - excavator (hours)	32			$125	$4,000	$0	$0	$4,000
Bank Stabilization - Installation - labor (hours)	40			$50	$2,000	$0	$0	$2,000
Bank Stabilization - Materials (tons)	270			$50	$13,500	$0	$0	$13,500
Construction of culvert bed and backfill to embed culvert (lump sum)	1			$7,493	$7,493	$0	$0	$7,493
Construction of Culvert - placement of culvert in channel-excavator and backhoe	16			$175	$2,800	$0	$0	$2,800

(hours)								
Construction of Culvert - labor to bolt pieces together (hours)		160		$50	$0	$8,000	$0	$8,000
Simulated Streambed - material (cubic yard)	93			$20	$1,860	$0	$0	$1,860
Simulated Streambed - Installation and jetting of streambed and rock ribbons - labor (hours)	16	120		$50	$800	$6,000	$0	$6,800
Simulated Streambed - Installation equipment - excavator/bobcat (hours)	36			$125	$4,500	$0	$0	$4,500
Construction/Design Contingency (lump sum)		1		$30,000	$0	$30,000	$0	$30,000
Erosion Control - Implemetation and Maintenance during construction(linear foot)		500		$5	$0	$2,500	$0	$2,500
Erosion Control - Installation of post-project - labor (hours)		16		$50	$0	$800	$0	$800
Excavation - remove existing culvert and roadway (cubic yard)		700		$9	$0	$6,300	$0	$6,300
Excavation - Disposal of old culvert - transport and disposal (each)		1		$300	$0	$300	$0	$300

Excavation - Final Spoils Management - front end loader/dump truck/erosion BMPs (cubic yard)	407			$16	$6,512	$0	$0	$6,512
Excavation - upstream channel excavation and installation of rock ribbons - excavator and spoils management (cubic yard)	16	97		$21	$336	$2,037	$0	$2,373
Detour Road - Installation maintenance and removal - materials and labor (lump sum)	1			$7,500	$7,500	$0	$0	$7,500
Utilities Relocation - Relocate utilities within project area - water and phone lines under road; Install temporary power pole/lines, breaker, connections; Install temporary water to residents during construction (lump sum)		1		$12,500	$0	$12,500	$0	$12,500
Water management - Installation of temporary water diversion-labor and equipment (hours)		32		$100	$0	$3,200	$0	$3,200
Water management - Post-	6	10		$85	$510	$850	$0	$1,360

Project removal of water diversion-labor and equipment (hours)								
				TOTAL SUBCONTRACTOR EXPENSES	**$63,811**	**$91,779**	**$12,420**	**$168,010**
C. OPERATING EXPENSES: Other								
Item Description (indicate units of measure)	**Units for Amount Requested**	**Units of Applicant Cost Share**	**Units of Partner Cost Share**	**Unit Cost ($)**	**Amount Requested**	**Applicant Amt. of Cost Share**	**Partner Amt. of Cost Share**	**Total Project Cost**
CDFW 1602 Permit (ea)		1		$1,673	$0	$1,673	$0	$1,673
Stakes, flagging, nails, sandbags (bulk)		1		$100	$0	$100	$0	$100
Water tank - temporary for landowners' water supply (ea)	3			$1,200	$3,600	$0	$0	$3,600
Water diversion supplies - electric pump, power pole, wire 200', hoses, flex pipe, lumber (bulk)	1			$7,500	$7,500	$0	$0	$7,500
Multi-plate arch culvert delivered (ea)		1		$28,000	$0	$28,000	$0	$28,000
Materials for post-project erosion control - includes seed, plants, wattles, backhoe, weed-free mulch (bulk)	1			$2,380	$2,380	$0	$0	$2,380
Mileage (miles)	3,572	3,816		$0.56	$2,000	$2,137	$0	$4,137
				TOTAL OPERATING EXPENSES: Other	$15,480	$31,910	$0	$47,390
D. OPERATING EXPENSES: Electronic and Purchased Equipment								
Item Description (indicate units of measure)	**Units for**	**Units of**	**Units of**	**Unit Cost**	**Amount**	**Applicant**	**Partner**	**Total Project**

	Amount Requested	Applicant Cost Share	Partner Cost Share	($)	Requested	Amt. of Cost Share	Amt. of Cost Share	Cost
TOTAL OPERATING EXPENSES: Electronic and Purchased Equipment					**$0**	**$0**	**$0**	**$0**
E. SUBTOTALS & ADMIN								
Subtotal A + C (Personnel + Operating Expenses: Other)					$32,455	$45,783	$0	$78,238
Requested Administrative Overhead (max. 20%) @ 20.00					$6,491			$6,491
Applicant Administrative Overhead @ 47.34						$21,674		$21,674
Partner Administrative Overhead @ 0.00							$0	$0
Subtotal for Subcontractors					$63,811	$91,779	$12,420	$168,010
Subtotal for Operator Expenses: Electronic and Purchased Equipment					$0	$0	$0	$0
E. GRAND TOTAL					$102,757	**$159,236**	**$12,420**	**$274,413**

2. *Budget Justification:*

The construction budget, including materials, labor and equipment, is based on previous fish passage projects implemented by the 5C Program throughout the five counties, and specifically from Trinity County where possible. The applicant Indirect Charge Rate is included in the budget worksheet at 47.34% in order to calculate the correct dollar value applied for in other grants. The actual rate is approximately 15%, but is applied to all costs within the budget including subcontractor and equipment costs, which are excluded in the online formula. Lump sum costs were included in the budget for particular aspects of the construction project to be subcontracted. Lump sums #1&2 are being requested from FRGP and #3&4 have been requested from other funding sources. Explanations for these lump sums follow: (1) Construction of culvert bed and backfill to embed culvert (lump sum $7493) – this includes 16 hours at $125 (excavator/loader/operator) of preparation, including adding material to bring to grade if necessary, of the already excavated culvert bed; 16 hours at $95 dump truck to bring bedding material, 8 hours at $98 for tractor compactor, 16 hours at $50 for manual compactor, and 12 hours at $95 water truck to wet materials for compaction; contingency of 20% added for unforeseen grading, potential of increase cost in equipment, or need for extra material. (2) Detour road installation maintenance and removal - materials and labor ((lump sum $7500) - : This cost includes materials, equipment and labor for a 150' long detour road around the construction site during construction. Materials will include road fill gathered from old road, temporary culvert delivered at $500 (to be installed in the dewatered portion of the channel in case of summer thunderstorm) and road base at $75 per cubic yard. The equipment may include an excavator/bobcat at rates of $125 per hour and the labor to install, maintain and remove the temporary detour once the new culvert is installed. (3) Utilities Relocation within project area (lump sum $12500) – This work will be done by an electrician and plumber. Water and phone lines under road will have to be temporarily relocated out of the way of equipment during project construction and then reinstalled into the road bed after placement of the culvert. This work will include installation of temporary power pole/lines, breaker, and connections; Temporary plumbing for residential water service will have to be installed to allow water service to be available to residents during construction. (4) Construction/Design Contingency (lump sum $30000) - These funds are to account for any unforeseen expenses incurred during construction.

3. *Administrative Overhead:*

20% overhead is proposed to cover all indirect costs required during the course of the implementation work. This will cover applicant overhead expenses (rent, communications, utilities, general liability insurance), office supplies and services (paper, printing, mailing), worker's compensation insurance, and the cost of using existing survey equipment or field equipment. The indirect rate used for Applicant reflects the actual dollar

amount requested in grant proposals(see Budget Justification).

5. Summary Project Costs

Funding Source	Cash	In-kind (if applicable)	Status S,P,U (secured, pending, unknown)	Source Type	Cost Share Used As Match	Expected Award Date	Total
Fisheries Restoration Grant Program	$102,757						$102,757
California Coastal Conservancy	$83,298	$0	Pending	State	☒	By August 15, 2014	$83,298
National Fish and Wildlife Foundation (NFWF) - Bring Back the Natives	$75,938	$0	Secured	Federal	☐	By August 15, 2014	$75,938
United States Forest Service (USFS)- Six Rivers National Forest	$0	$12,420	Secured	Federal	☐	By August 15, 2014	$12,420
Total	$261,993	$12,420					$274,413

5. *Is Any of the Cost Share Being Used As Match for Other (non-FRGP) Funding for the project?*

California Coastal Conservancy funds are being used as match for both the FRGP and the NFWF grants.

6. *In-kind Detail:*

Source of In-kind contribution	Total volunteer hours	Value of volunteer labor ($)	How Value of Volunteer Labor Determined	Non-volunteer donated labor value ($)	Non-labor contribution description	Non-labor contribution value ($)
California Coastal Conservancy	0.0	$0		$0		$0
National Fish and Wildlife Foundation (NFWF) - Bring Back the Natives	0.0	$0		$0		$0
United States Forest Service (USFS)- Six Rivers National Forest	0.00	$0		$12,420		$0

7. *Estimated Project Cost by Task*

Type of Work	Amount Requested	Cost Share	Total
Fish Screens	**$0**	**$0**	**$0**
Fish Passage	**$102,757**	**$171,656**	**$274,413**
Instream Flow	**$0**	**$0**	**$0**
Instream Habitat	**$0**	**$0**	**$0**
Riparian Habitat	**$0**	**$0**	**$0**
Upland Habitat	**$0**	**$0**	**$0**
Wetland Habitat	**$0**	**$0**	**$0**
Estuarine Habitat	**$0**	**$0**	**$0**
Planning / Assessment / Design	**$0**	**$0**	**$0**
Outreach / Education / Training	**$0**	**$0**	**$0**
Monitoring	**$0**	**$0**	**$0**
Salmon Enhancement / Rearing	**$0**	**$0**	**$0**
Acquisition	**$0**	**$0**	**$0**

Total	$102,757	$171,656	$274,413

Section 9: Supplemental or Specialized Information

Intermediate Plan

PLANS FOR CONSTRUCTION OF

SHARBER–PECKHAM CREEK CROSSING REPLACEMENT

MARCH 2014

65% DESIGN SUBMITTAL

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
TITLE PAGE

SUBMITTAL
MAR 2014

DESIGN
65% DESIGN

DRAWN
DD

PAGE 1

SHARBER–PECKHAM CREEK

LEGEND AND SYMBOLS

LINE AND POINT SYMBOLS

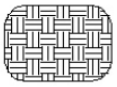
- ROAD EDGE
- DETOUR ROAD EDGE
- ARMORED CRITICAL DIP
- UTILITIES CENTER LINE
- 95 — ELEVATION CONTOUR
- 1+00 — ALIGMENT WITH MARKER
- LIMITS OF DISTRUBANCE
- CONTROL POINT MARKER
- W — WELL INTAKE

ABBREVIATIONS

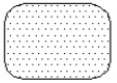
CMP	CORRUGATED METAL PIPE
CP	CONTROL POINT MARKER
EG/NG	EXISTING/NEW GROUND
EL	ELEVATION
(E)/(N)	EXISTING/NEW
FT	FOOT OR FEET
FLOW	FLOW DIRECTION
IN	INCH OR INCHES
MAX/MIN	MAXIMUM/MINIMUM
NTS	NOT TO SCALE
R.D.	RELATIVE DENSITY
RSP	ROCK SLOPE PROTECTION
STA	STATION
TYP	TYPICAL
1.5:1	HORIZONTAL: VERTICAL SLOPE
%	PERCENT

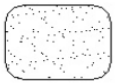
MATERIAL SYMOBLS


ROCK


EARTH


GRADED CHANNEL


ROADWAY AGGREGATE


SAND

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
LEGEND AND SYMBOLS

SUBMITTAL
MAR 2014

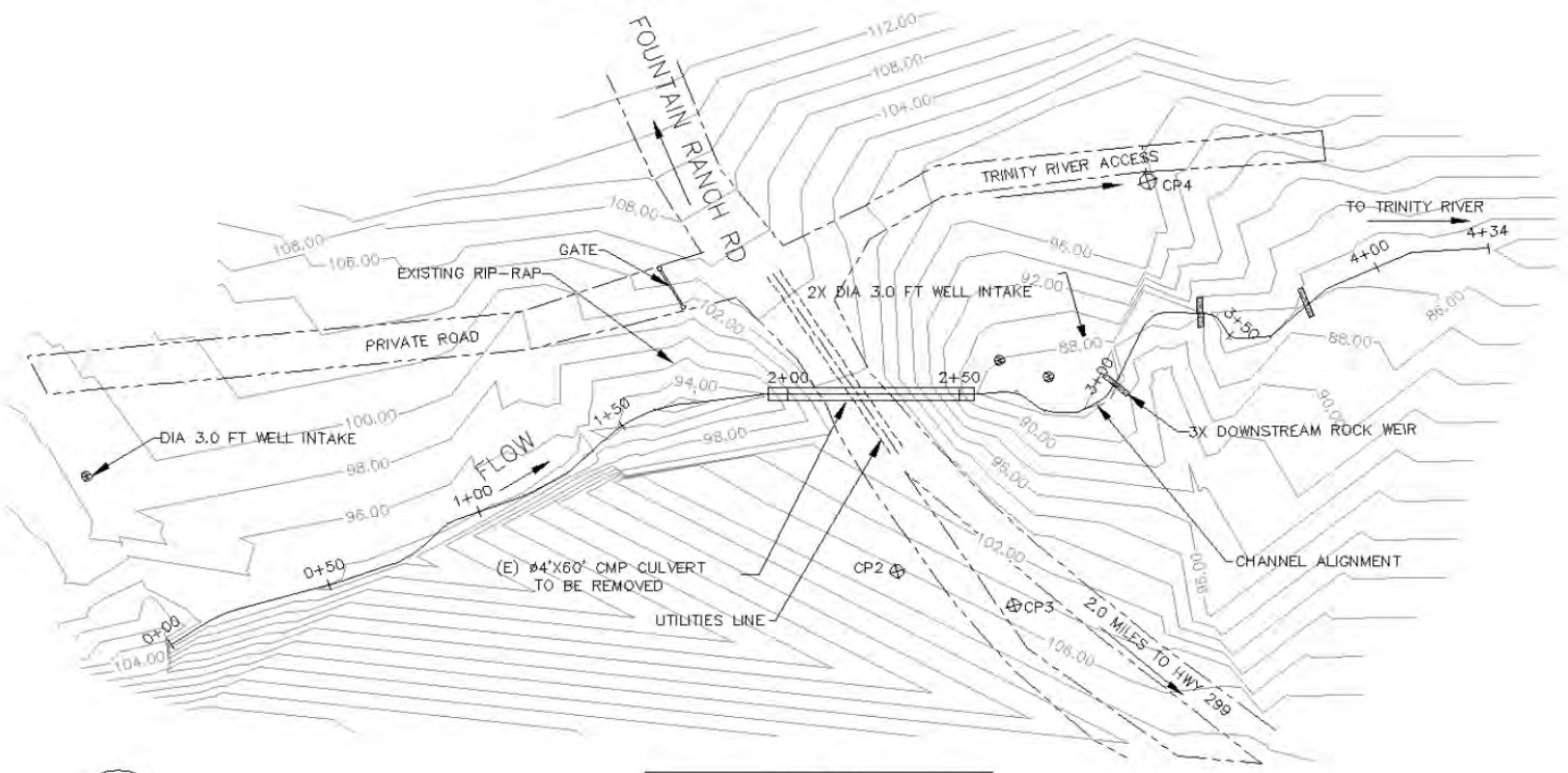
DESIGN
65% DESIGN

DRAWN
DD

PAGE 2

SHARBER–PECKHAM CREEK

EXISTING PLAN VIEW



NORTH

25 FT.

Point Table				
Point #	Elevation	Northing	Easting	Description
1	100.00	1000.00	1000.00	PI-1
2	102.48	1041.07	1000.00	BS
3	105.38	1035.02	965.07	CP
4	96.76	900.87	990.32	CP

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

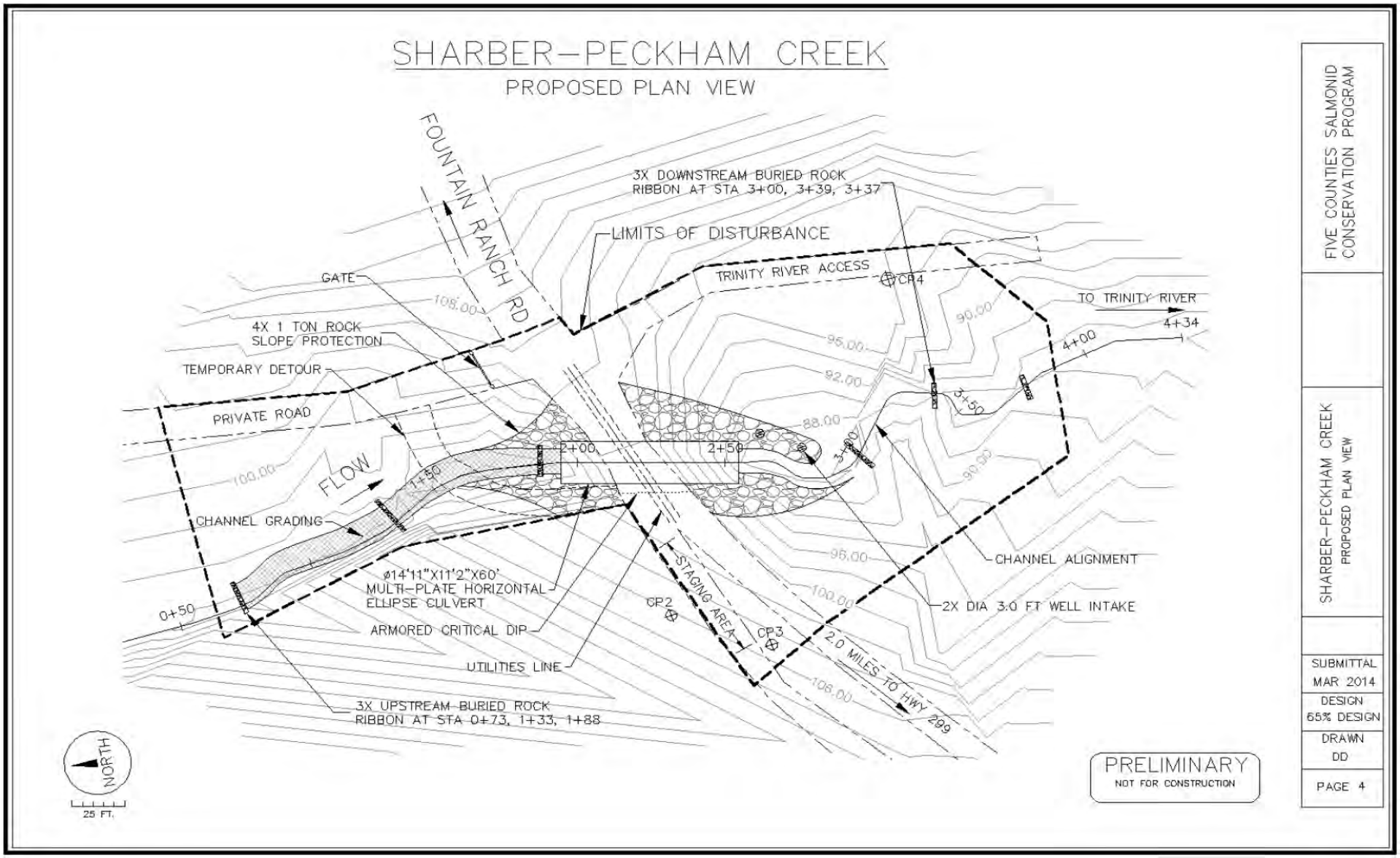
SHARBER–PECKHAM CREEK
EXISTING PLAN VIEW

SUBMITTAL
MAR 2014

DESIGN
65% DESIGN

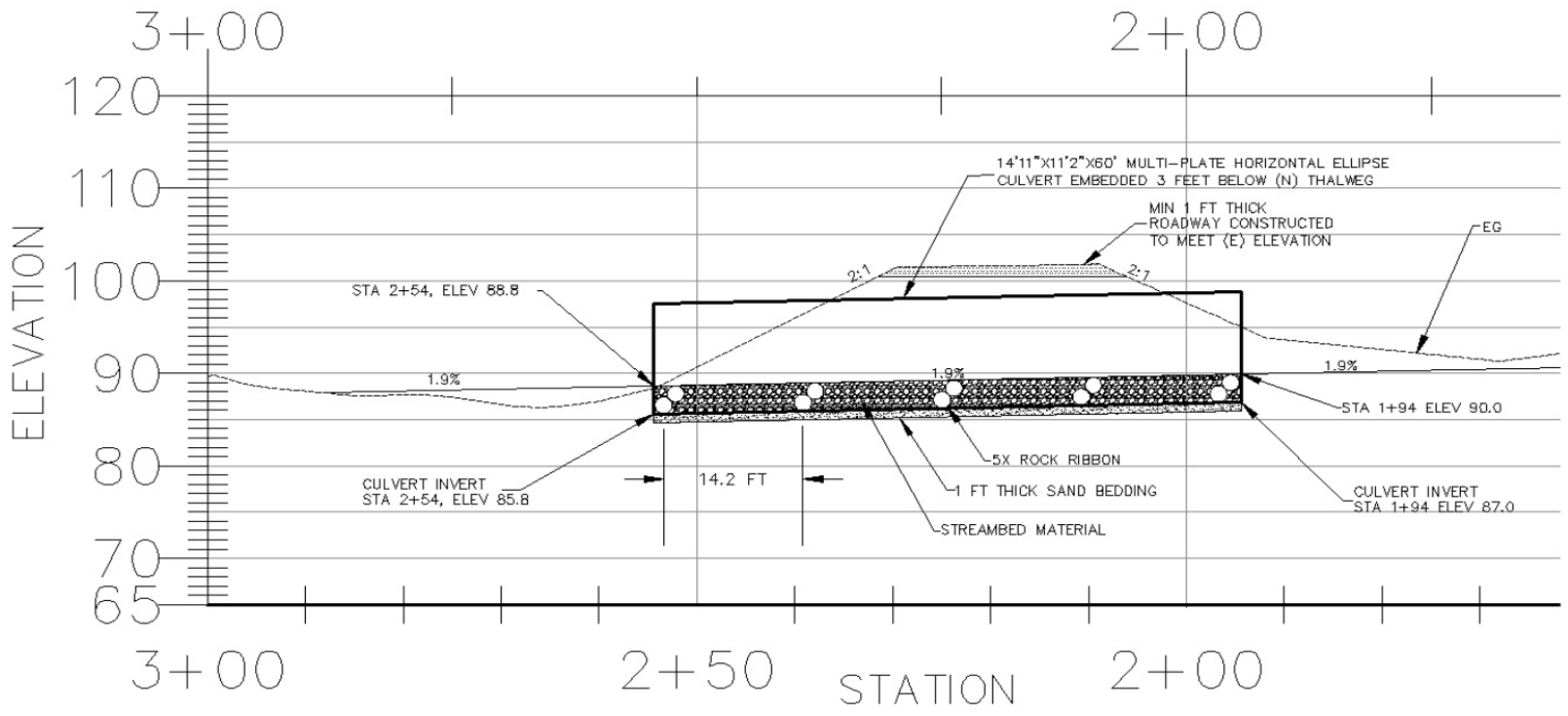
DRAWN
DD

PAGE 3


SHARBER–PECKHAM CREEK
PROPOSED PLAN VIEW
FOUNTAIN RANCH RD
3X DOWNSTREAM BURIED ROCK RIBBON AT STA 3+00, 3+39, 3+37
LIMITS OF DISTURBANCE
GATE
TRINITY RIVER ACCESS
CP4
TO TRINITY RIVER
4+34
4X 1 TON ROCK SLOPE PROTECTION
TEMPORARY DETOUR
PRIVATE ROAD
FLOW
CHANNEL GRADING
2+00
2+50
3+00
3+50
4+00
1+50
0+50
ø14'11"X11'2"X60' MULTI–PLATE HORIZONTAL ELLIPSE CULVERT
ARMORED CRITICAL DIP
UTILITIES LINE
3X UPSTREAM BURIED ROCK RIBBON AT STA 0+73, 1+33, 1+88
CP2
CP3
STAGING AREA
CHANNEL ALIGNMENT
2X DIA 3.0 FT WELL INTAKE
2.0 MILES TO HWY 299
100.00
95.00
92.00
90.00
88.00
NORTH
25 FT.
PRELIMINARY
NOT FOR CONSTRUCTION
FIVE COUNTIES SALMONID CONSERVATION PROGRAM
SHARBER–PECKHAM CREEK
PROPOSED PLAN VIEW
SUBMITTAL
MAR 2014
DESIGN
65% DESIGN
DRAWN
DD
PAGE 4

SHARBER–PECKHAM CREEK

CULVERT PROFILE VIEW



PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
CULVERT PROFILE VIEW

SUBMITTAL
MAR 2014

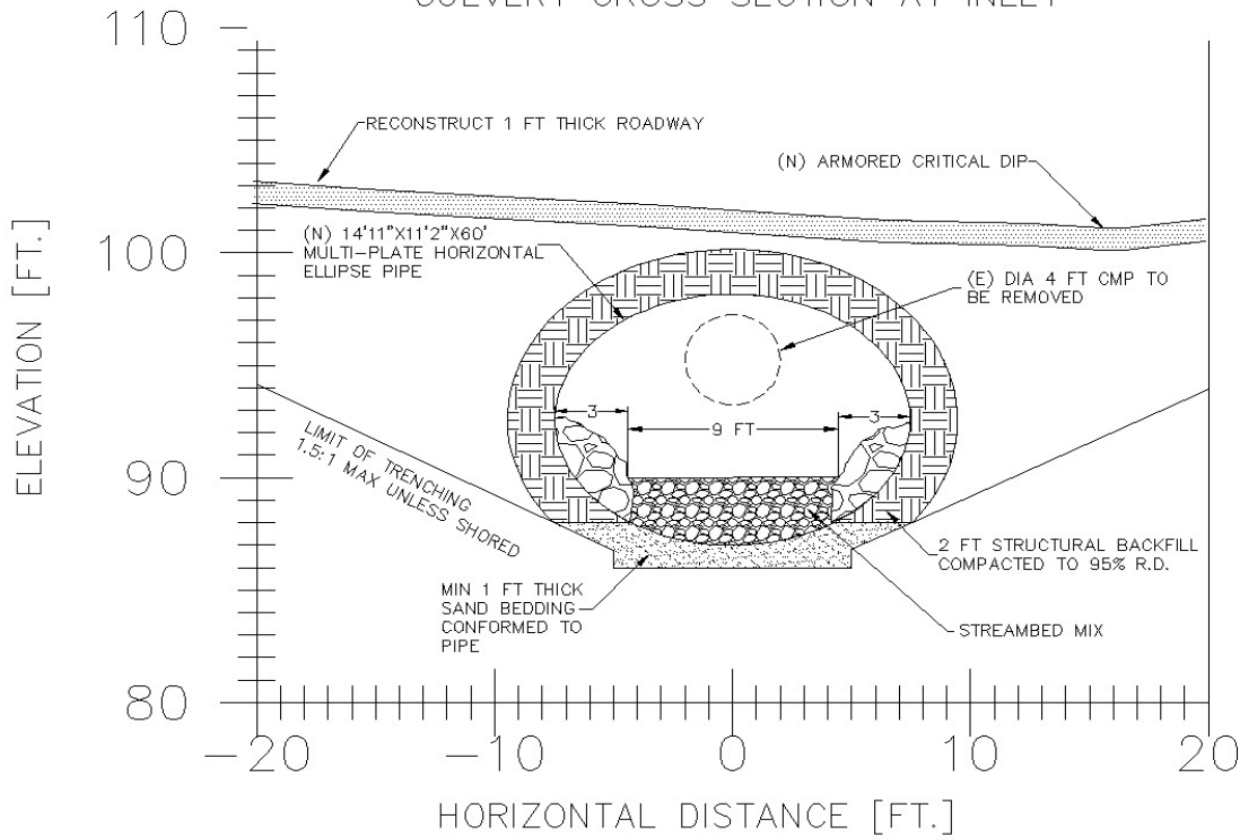
DESIGN
65% DESIGN

DRAWN
DD

PAGE 5

SHARBER–PECKHAM CREEK

CULVERT CROSS SECTION AT INLET



NOTE: CHANNEL AND ROCK BANKLINE WIDTH DIMENSIONS ARE ROUNDED TO ONE SIGNIFICANT FIGURE. DIMENSIONS ARE IN FEET.

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
CULVERT CROSS SECTION AT INLET

SUBMITTAL
MAR 2014

DESIGN
65% DESIGN

DRAWN
DD

PAGE 6

SHARBER–PECKHAM CREEK

ROCK DISTRIBUTION AND PLACEMENT

STREAMBED MATERIAL DISTRIBUTION

D100 = 11.8 IN
D84 = 3.8 IN
D50 = 1.25 IN
D35 = 0.5 IN
D28 = 2 mm

THE STREAMBED MIX WILL CONSIST OF THE STREAMBED MATERIAL DISTRIBUTION WITH LARGER ROCKS FROM THE BANKLINE AND ROCK RIBBON MIX ADDED IN THE CHANNEL AS KEYSTONES.

ROCK BANKLINE MATERIAL DISTRIBUTION

D100 = 36 IN.
D84 = 15 IN.
D50 = 6 IN.
D16 = 0.4 IN.
D8 = 0.08 IN.

ROCK BANKLINES SHOULD BE PLACED IN ACCORDANCE WITH CALTRANS "METHOD A".

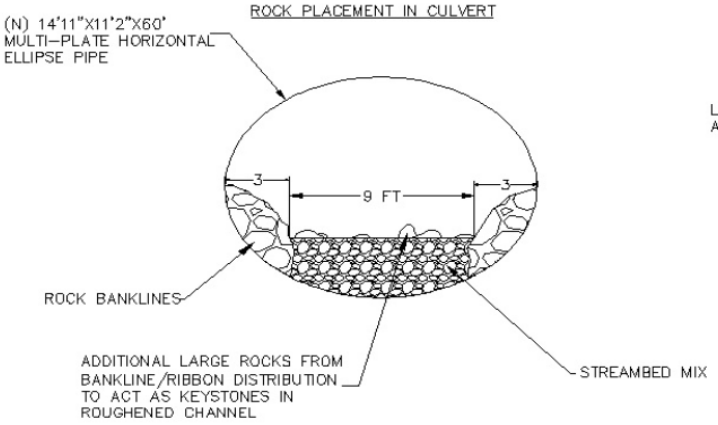
LARGER ROCKS SHOULD BE PLACED FIRST AND BE TAMPERED BY MACHINE. SMALLER ROCKS OF THE BANKLINE MATERIAL DISTRIBUTION WILL BE USED TO FILL IN VOIDS.

ROCK RIBBON MATERIAL DISTRIBUTION

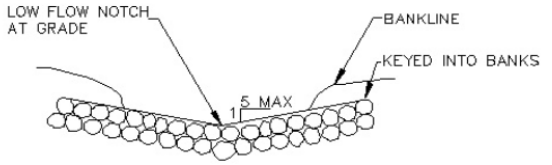
D100 = 27 IN.
D50 = 13 IN.

ROCK RIBBON ROCK SHALL BE MADE UP OF PRIMARILY D100=27 IN. DIA ROCK WITH D50=13 IN. MIN FILILNG VOIDS BETWEEN LARGER ROCK. STREAMBED MATERIAL WILL BE PLACED TO MAKE THE STRUCTURE IMPERMEABLE.

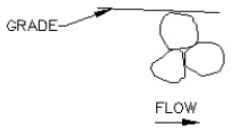
ROCK PLACEMENT IN CULVERT



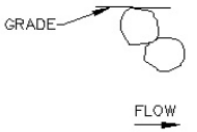
TYPICAL ROCK RIBBON STRUCTURE



2 FOOTER ROCK STRUCTURE



1 FOOTER ROCK STRUCTURE



3 UPSTREAM ROCK RIBBONS ARE TO BE CONSTRUCTED AT STA 0+73, 1+33, AND 1+88. THREE DOWNSTREAM ROCK RIBBONS ARE TO BE CONSTRUCTED AT STA 3+00, 3+39, AND 3+37. FIVE ROCK RIBBONS ARE TO BE CONSTRUCTED IN THE CULVERT AT 14.2 FT INTERVALS.

ROCK RIBBON MAY HAVE A ONE OR TWO FOOTER ROCK STRUCTURE.

GRADE SHALL BE MEASURED AT LOW FLOW NOTCH.

ALL ROCK RIBBONS WILL BE KEYED INTO BANK LINES.

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
ROCK DISTRIBUTION AND PLACEMENT

SUBMITTAL
MAR 2014

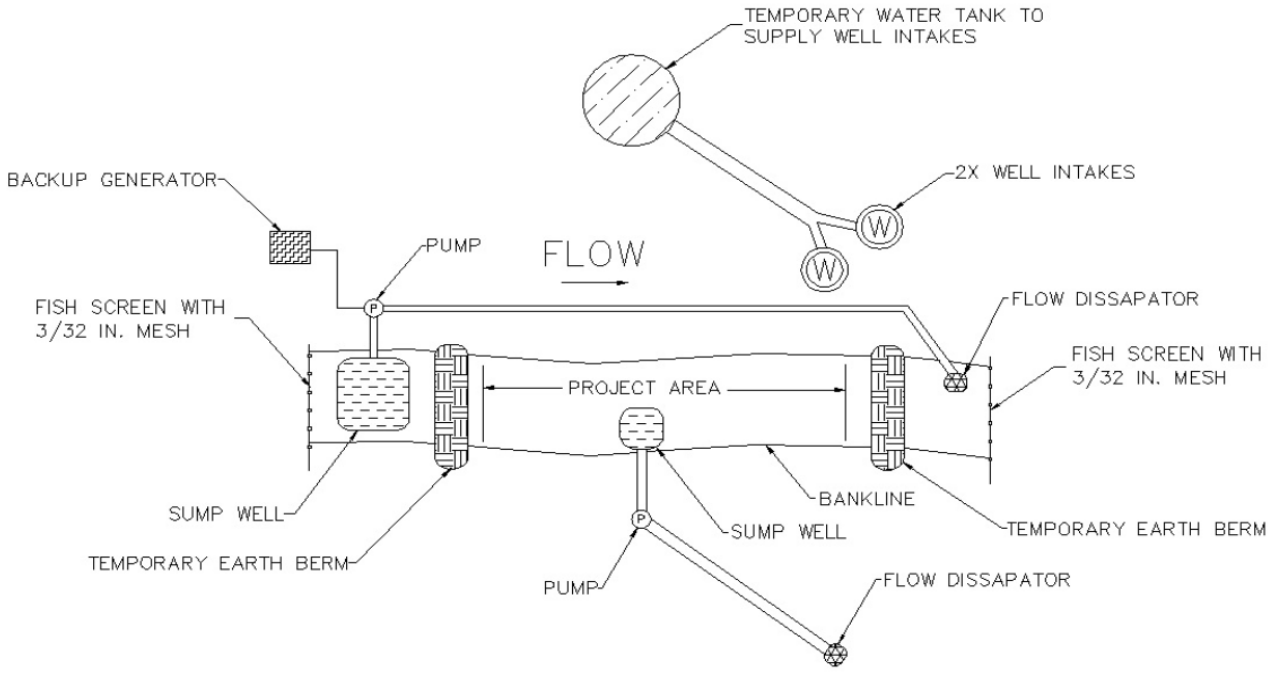
DESIGN
65% DESIGN

DRAWN
DD

PAGE 7

SHARBER–PECKHAM CREEK

WATER MANAGEMENT



NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
WATER MANAGEMENT

SUBMITTAL
MAR 2014

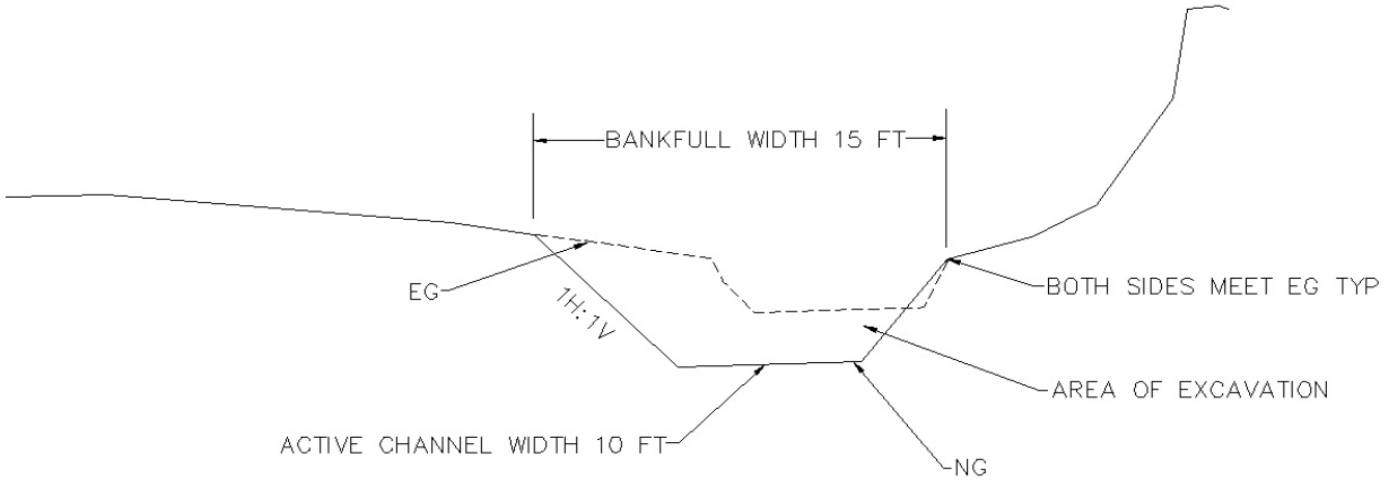
DESIGN
65% DESIGN

DRAWN
DD

PAGE 8

SHARBER–PECKHAM CREEK

TYPICAL CHANNEL MODIFICATION CROSS SECTION



NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

FIVE COUNTIES SALMONID CONSERVATION PROGRAM

SHARBER–PECKHAM CREEK
TYPICAL CHANNEL MODIFICATION CROSS SECTION

SUBMITTAL
MAR 2014

DESIGN
65% DESIGN

DRAWN
DD

PAGE 9

Five Counties Salmonid Conservation Program (5C)
Program of the Northwest California Resource Conservation and Development Council
P.O. Box 2571
Weaverville, CA 96093-2571
(530) 623-3967 Ext. 111 FAX (530) 623-3979
email: mlancaster@5counties.org

Memorandum

Date: March 14, 2014

To: CDFW Fisheries Restoration Grant Program

From: Five Counties Salmonid Conservation Program - Staff

Subject: 65% Design Memorandum for Sharber-Peckham Creek Fish Passage Project, Salyer, Trinity County, California

PURPOSE OF MEMORANDUM

This Technical Memorandum (TM) presents the basis of design for the proposed stream crossing replacement on Sharber-Peckham Creek, a tributary to the Trinity River. This project proposes replacement of an existing 4 foot diameter culvert with a new 14'-11" span x 11'-2" rise multi-plate horizontal ellipse culvert stream crossing designed to improve flood conveyance, geomorphic stability and fish passage conditions. The crossing is designed using a hybrid of the Hydraulic Design and Stream-Simulation Design Methodology. This TM is intended to assist in the review of the proposed design. The 65% design drawings for the project site are presented in **Attachment 1**.

INTRODUCTION

Background

Sharber-Peckham Creek is located in the lower Trinity River within the SONCC ESU for coho salmon, near the town of Salyer, Trinity County California (Figure 1). Land use immediately surrounding the project area is rural-residential, with the majority of the upper watershed managed by the Six Rivers National Forest (SRNF).

Sharber Creek formerly followed the course shown on the 1979 USGS Salyer CA Quad. Since that time, it has captured another small channel in the south half of Section 12, T6N, R5E, and the majority of its flow follows this course. From aerial photos and topography, it is apparent that the lower section of Sharber Creek, including Sharber Slough and Sharber-Peckham Creek, is an old oxbow of the Trinity River. There is continued debate over the name of these creeks. The watershed is dominated by early to mid-mature vegetation and has an area of 3700 acres with elevations ranging from 400-3600 ft. There is approximately 1.2 mile of winter habitat available to anadromy until upstream migration is blocked by a narrow waterfall. The lower portion of the creek, is a spring-fed perennial stream, and supports year-round rearing.

The existing culvert and unsurfaced road has been in place for many years, serving nearly 20 properties, some undeveloped. There are 3 domestic water wells near the project site. Two are immediately downstream of the culvert within the immediate project area serving 5 properties; the other is upstream, outside of the project area. Further upstream, the Salyer Heights water system services about 40 people.

In 2001, the Forest Service installed a series of three weirs downstream of the culvert outlet that attempted to deepen the jump pool and lower the jump height to facilitate salmonid passage through the culvert. That project had minimal success. Surveys conducted by SRNF recorded up to 67 redds during surveys conducted between 1996 and 2001. During that period, there were 111 coho and 6 Chinook carcasses counted. Surveys have continued to find coho, steelhead and Chinook. Sharber-Peckham Creek is considered critical habitat for coho salmon, which are listed under the Federally Endangered Species Act as *Threatened*, and listed as *Endangered* under State law. It is also know to contain the largest spawning population of coho salmon in the lower Trinity River.

Figure 1. Location of the proposed Sharber-Peckham Creek Fish Passage Project near town of Salyer, in Trinity County, California

Project Need

The proposed project will replace an undersized culvert which has created a migration barrier to anadromous salmonids on Sharber-Peckham Creek. This barrier prevents access to upstream spawning and rearing habitat for threatened Southern Oregon/Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*), Upper Klamath-Trinity Rivers Chinook salmon (*Oncorhynchus tshawytscha*) and Klamath Mountains Province Steelhead trout (*Oncorhynchus mykiss*). Removal of this barrier would allow use of approximately 1.2 miles of high quality spawning, over-wintering and summer rearing habitat within this tributary. Currently, anadromous fish can access only the lower 0.2 miles of Sharber-Peckham Creek. The project area is within designated critical habitat and Essential Fish Habitat for SONCC coho salmon.

Southern Oregon/Northern California Coast (SONCC) coho salmon are listed as threatened under both the California and Federal Endangered Species Acts, and range from the Elk River in Oregon to the Mattole River in California. The Klamath River basin (including the Trinity River basin) contains 9 populations of SONCC coho salmon, and Sharber-Peckham Creek is part of the Lower Trinity population unit. Once abundant throughout the Klamath basin, coho salmon have declined significantly over the last 50 years due to numerous factors, including over harvesting, unfavorable ocean conditions and degraded habitat conditions within freshwater systems (e.g., lack of water, increased water temperatures, excess sediment, and lack of access to habitat). Coho salmon are an important part of the greater aquatic ecosystem because they transport vast amounts of marine nutrients upstream to the headwaters of otherwise low productivity water courses, provide food for both wildlife and humans, serve as an indicator of ecosystem health, and play an important role in the life cycle of certain organisms, such as freshwater mussels. Issues still facing coho salmon include obstructed access to their historical habitat, habitat alteration, lack of adequate instream flows, competition from non-native species, seasonal water quality impairment (temperature/turbidity), altered transport of sediment and large woody debris, and lack of low gradient habitat that provides refuge from high water velocities in the mainstem river.

Limiting factors for the Lower Trinity River population include excess amounts of fine sediment, a lack of floodplain connectivity that limits successful spawning and rearing (NMFS 2012), high summer water temperatures, water diversions and migration barriers (CDFG 2004) In particular, lack of high quality tributary habitat for spawning and rearing is in short supply within the Lower Trinity population unit. Most tributary habitat within the lower Trinity River area is in poor condition, with spawning gravels embedded with fine sediment, high summer water temperatures, and a lack of access to low gradient, winter rearing habitat that provides refuge from high water velocities. In contrast, coho salmon critical habitat found within Sharber-Peckham Creek is in good condition, with clean cobble and gravel for spawning, cold water inputs, low gradient, and complex habitat for winter and summer rearing; although, most of this high quality habitat is currently blocked by an impassable migration barrier at the culvert. This project, if funded, will provide access to this high quality habitat, and will help alleviate limiting factors to production of coho salmon within the Lower Trinity population. Sharber-Peckham Creek is one of the relatively few low gradient tributaries to the lower Trinity River and is therefore very important for coho salmon. Since the Lower Trinity population has been selected as a core population for recovery, the low-risk adult abundance target for this population must be met for SONCC coho salmon to be considered recovered (NMFS 2012), which emphasizes the importance of providing access to high quality habitat that will increase population productivity and viability.

Sharber-Peckham Creek is specifically noted in the SONCC Coho Salmon Recovery Plan (NMFS 2012) and is described as likely supporting the highest number of spawning coho salmon among the tributaries in the Lower Trinity River. In addition, the Trinity River is chronically temperature impaired and thermal refugia provided by tributaries to the river like Sharber-Peckham are critical to overall recovery of listed coho salmon. The removal of the migration barrier on Sharber-Peckham Creek is high priority and is listed as the primary focus of the Lower Trinity River Population in the NMFS Recovery Plan (NMFS 2012). A short video of coho and Chinook salmon attempting to pass the culvert barrier on Sharber-

Peckham Creek can be viewed on the Five Counties Salmonid Conservation Program's (5C) website at **http://www.5counties.org/sharber-peckham.htm**

A fish passage assessment indicated that this culvert meets adult passage criteria for coho 29% of the range of migration flows, and 76% of the range of migration flows for steelhead. It is a complete barrier for adult resident trout and juvenile salmonids due to excessive velocities within the culvert across the range of fish passage flows (RTA 2013).

PROJECT ACTIVITIES

Topographic Survey

Five Counties Salmonid Conservation Program staff and Six Rivers National Forest staff conducted a topographic survey of the project area in November of 2013. The survey captured the channel thalweg through the project site, four cross sections, road elevations, culvert orientation, well locations, and elevations along the bank opposite of the Trinity River.

The thalweg profile encompassed approximately 550 feet of channel through the project site and captured all notable grade changes including the three downstream rock weirs. The profile extends 275 feet above the culvert and 225 feet below. The four cross sections obtained extended to opposing valley walls, mapping the entire system floodplain. Elevations were taken along the Trinity River bank to approximate flow heights corresponding to varying observable geotechnical activity.

The well intake locations, depth, and water surface heights were obtained. No other visible utilities were observed, however, it is known that electricity and water lines run under Fountain Ranch Road through the project site. Underground Service Alert should be contacted to examine these utility lines prior to construction.

The survey was used to create a long profile, cross sections, generate a Hec-Ras model, and to provide contours for the project design.

Geotechnical Investigation

A geotechnical investigation is not required because the project will utilize a multi-plate ellipse culvert. The pipe invert will be embedded 3 feet. This depth is well below the low vertical adjustment profile for the approximate 1.9% channel gradient through the project area. The project reach is within the inundation zone of the Q25 peak flow of the Trinity River. Additionally, backwater effects of the Trinity River will significantly reduce scour effects at the crossing. During high flow events, aggradation is more likely than degradation of the site. Exposed bedrock forms a ridge approximately 100 feet to the west of the crossing. No outcropping of bedrock was noted in the channel within 100 feet of the project site.

Construction Timing

The project is in the vicinity of suitable bald eagle nesting habitat and is also within suitable habitat for several California Species of Special Concern, therefore a Limited Operating Period (LOP) prohibiting work between January 1-August 15 will be utilized to prevent noise and other human disturbance related to project activities during the

breeding season. The project work is planned August-October, during low flow and to avoid fisheries concerns.

Given the prescribed LOP and constraints imposed by potential wet weather after October 15, it is anticipated that the time window available for construction will be from August 15 through October 15. Construction at the project site may take up to 6 weeks to complete.

DESIGN FLOWS

Design criteria provided in CDFG (2002) and NMFS (2001) state that replacement culverts shall be sized to convey the 100-year discharge without overtopping the culvert inlet soffit. Computation of a peak design flow for the site, including peak flows for the Trinity River, was necessary to check culvert sizing. Due to site constraints and the backwater effects of the Trinity River, the proposed design will not pass a 100 year event. More explanation follows in this section and in the selection of design. Hydrologic characteristics, watershed area, and peak flows were estimated using the USGS Streamstats site for ungagged watersheds (Figure 2 and Table 1).

Figure 2. USGS California StreamStats for Sharber-Peckham Creek.

Table 1. Regional flood-frequency equations for rural ungaged streams in California, using 2012 updated coefficients.

Peak-Flow Streamflow Statistics			
Statistic		Flow (ft3/sec)	Standard Error
PK2	$1.82 \times DA^{0.904} xPrecip^{0.983}$	474	66
PK10	$14.8 \times DA^{0.880} xPrecip^{0.696}$	1144	60
PK50	$36.3 \times DA^{0.870} xPrecip^{0.589}$	1780	63
PK100	$48.5 \times DA^{0.866} xPrecip^{0.556}$	2064	66

The watershed area used for the culvert design includes the east branch and the upper portion of the west branch of Sharber-Peckham Creek. Both branches of the creek are included in order to model the maximum flow that could pass through the culvert from the upstream watershed. All flow from the upstream watershed (i.e.western and eastern branches of the creek) has the potential to contribute to the eastern branch of Sharber-Peckham Creek at the crossing site due to the low elevation of the drainage divide between the eastern and western branches of the creek upstream of the project site, and the potential for all of the watershed area flow to route down the eastern branch and flow through the crossing. However, in the case of a blockage in the western branch, at least some of the peak flows would make it through and go down the west branch, so our estimates are over conservative.

The crossing design is to function as a streambed simulation project at all fish passage flows, so the low fish passage flows for depth and velocity were not calculated. The 1% exceedence flow (high adult fish passage flow for salmon) was found by normalizing gaged data from other lower Trinity River tributary gaged data at Willow Creek and Supply Creek (Figure 3). The relevant fish passage flows were estimated using a normalized flow duration curve then scaling by watershed area (5.5 square miles, assuming the full watershed area). Table 2 displays the modeled fish passage and flood flows used for the design.

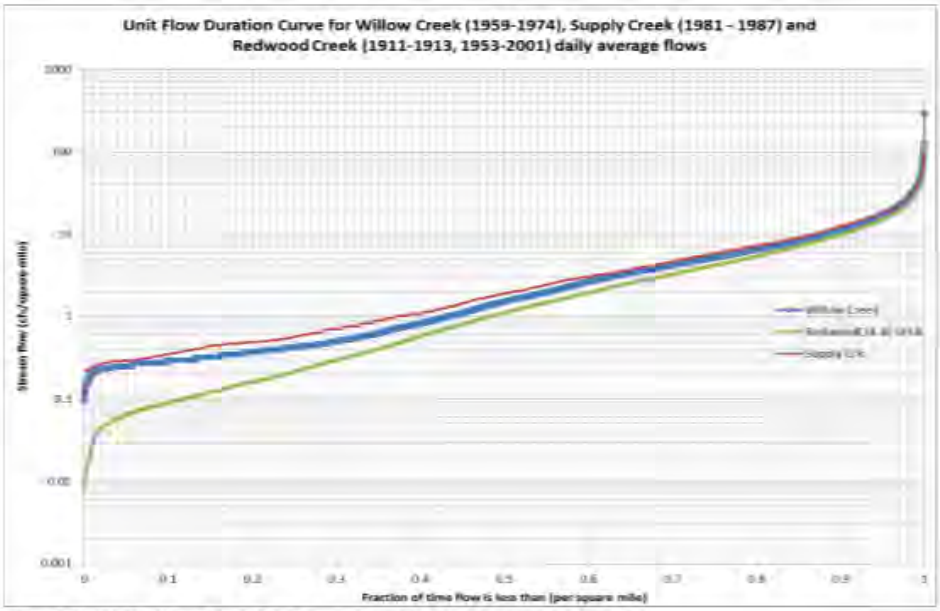


Figure 3. Unit flow duration curve for local gages

Table 2. Modeled Fish Passage and Peak Storm flows

	Trinity	Sharber-Peckham
1% exceedence	12800	215
2 year	15268	448
10 year	33,000	1040
100 year	30062	2150
Lower terrace elevation (85.6 ft)	43186	Assume 2 year
Upper terrace elevation (96.9 ft)	72150	Assume 100 year

Because of the potential for Trinity River backwater effects at the crossing site, the Trinity River at the Sharber-Peckham confluence was included in the hydraulic model. The 2-year, 10-year, 50-year, 100-year flood flows were estimated on the Trinity River for the time period when the Lewiston dam has been in place. These estimates were generated using a LPIII regression and data from USGS gage at Burnt Ranch. Flow releases from Lewiston have increased in the last decade, so these flow estimates could be low. Thus, in order to provide more confidence in our estimation of flood flows from the Trinity River we also used geomorphic characteristics to help verify flood flow water surface elevations. The point bar that exists on the Trinity River at the Sharber-Peckham confluence has two recent terrace deposits with slight vegetation on the lower terrace, and recent but more mature vegetation on the upper terrace. We assumed that these two prominent terrace levels represent the two highest flows on the Trinity River that have occurred in recent years. Judging by the magnitude of the floods and the state of the vegetation on the flood terraces, the two storm peaks most likely responsible for the bar formation were the storms in 2005 and 1997 (Figure 4).

Figure 4. USGS 11527000 TRINITY R NR BURNT RANCH CA Annual Peak flows

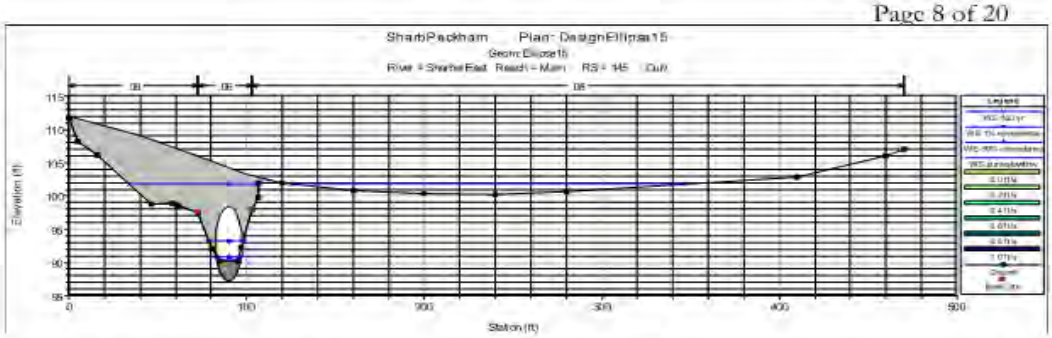


Figure 5. 100 year flow with ellipse on the existing road is 225 feet wide, and maximum of 1.5 feet deep

Observations by a local resident indicate that the Trinity River backed up and over the existing project road crossing in the 1997 flood event and that the flood of 2005 did not backwater from the Trinity River all the way to the culvert, but the culvert was overwhelmed and overtopped from Sharber-Peckham Creek flow. These flood flows were used to help calibrate the model to reproduce the observed flooding in those years.

To summarize, and as shown in Figure 5, the proposed design is an ellipse shaped culvert embedded to create a stream simulation at fish passage flows. The bed material will be sized so not to move under full capacity flows. The embedded culvert will have the capacity to carry a 10-year storm before overtopping the road. An armored swale will be incorporated into the project design to carry the overflow across the road for stormflow greater than the 10 year event. The Trinity River water surface elevation at the 1997 flood inundates the entire downstream project area up to the culvert, but does not flood the roadway.

STREAM SIMULATION DESIGN PROCESS

The crossing replacement for the Sharber-Peckham Creek culvert was designed using the stream simulation methodology (CDFG 2009; USFS 2008). When applying this methodology to culverts, the channel within the crossing is designed to have a similar form and function as an adjacent stable natural channel, thus providing no more of a barrier to movement of aquatic organisms than the adjacent natural channel.

The stream simulation method includes designing the stream channel within the crossing to mimic the channel planform, profile and cross sectional shape of a nearby stable "reference reach." The crossing structure should then be sized to fully-span the bankfull channel width to accommodate stable geomorphic processes within the stream simulation channel. However, existing wells below the Sharber-Peckham culvert restrict the allowable cross sectional adjustment to the approximate active channel width. The proposed embedded culvert will be sized to span the active channel, but the substrate within will be sized to withstand higher velocities at flood flows. Thus, the new culvert capacity will be limited to about the 10-year flood flow with a hardened swale built into the road at the project site to accommodate larger floods, and potential overtopping. Because of the design constraints, the project design approach is a hybrid between stream simulation and roughened channel, where the slope through the roughened channel is kept at the low 1.9% grade but the material is

hardened to withstand the higher velocities of the restricted flood flows through the culvert that is for flood flows above the annual flood.

Reference Reach Characterizations

A suitable reference reach was identified from four cross sections within the channel. Cross section 3 was chosen as the reference reach since it had channel slopes and bed morphologies similar to the proposed project reach. Pebble counts were conducted within each of the cross sections and counts from cross section 3 were used in determining the simulated streambed particle size distribution.

Vertical Adjustment Profile Evaluation and Selection of Design Profile

The project design should accommodate the range of channel bed elevations anticipated over the design life of the new crossing (approximately 50-75 years). This is accomplished through geomorphic interpretation of the channel thalweg profile and field noted channel features controlling channel elevations. Through this process, low and high vertical adjustment profiles (VAP) are plotted.

The low VAP shows an estimate of the lowest expected channel profile. A crossing should be designed to remain functional in the event that the channel bed degrades to the elevation of the low VAP. The high VAP shows the highest expected channel profile and considers the current elevations of the natural riffle crests and steps in the streambed and potential blockages from large wood or sediment aggradation. The stable slope of the channel and design profile falls between the high and low VAP's.

The topographic long profile was surveyed starting approximately 250 feet upstream of the culvert, at a location about 75 feet farther upstream than the upper well. The long profile was extended approximately 200 feet downstream of the culvert. An additional point 550 feet downstream of the culvert was included in the survey at cross section 4. This point was included because it is controlled by bedrock, and because of its proximity to the Trinity River (**Error! Reference source not found.**). The upper well location was used as the upper limit for the allowable vertical adjustment profile (VAP). The design VAP was set parallel to the average thalweg slope intersecting downstream riffle crests and the confluence control point. The target design profile is a 1.9% slope.

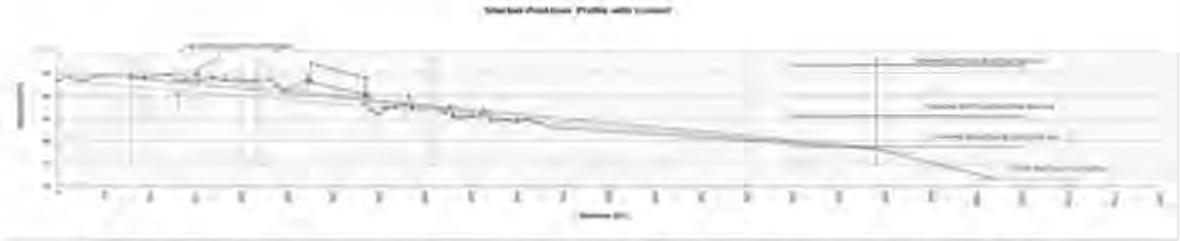


Figure 6. Longitudinal topographic survey showing the vertical adjustment profile (VAP) = 1.9%

Selection of Replacement Structure Size and Type

The width limitation caused by the existing wells requires the maximum horizontal channel width to be about 16 feet at the project crossing. The ellipse culvert has a width of 14'11", slightly less than the estimated bankfull flow. The design vertical adjustment profile is set at the estimated natural slope of the stream, estimated at 1.9%. Figure 7, and Tables 3 and 4, describe reference reach characteristics. Bed material will be placed within the embedded ellipse to 3 feet depth. Rock ribbons, sized to withstand the high storm flow velocities of up to 9.2 fps, will be placed through the culvert at approximately 14 foot intervals. Smaller sized rock will be interlocked horizontally to help stabilize the larger rock. Bed material will fill the spaces between the larger rocks, forming a natural stream path within the culvert. The large rock will protrude from the stream bed material to increase the roughness, and slow velocities through the culvert (see examples in Figures XII-25 and 28 of the Restoration Manual-CDFG 2009). The large rock will be placed to provide a low flow channel as the flow recedes (weirs with a 1:5 side slope, see examples in Figure XII-31 of the Restoration Manual-CDFG 2009). The stream will operate as a the natural stream of Sharber-Peckham Creek at low flows with the natural slope and amount of flow, with the larger rock providing confinement of the low flow channel within the culvert. The rock placed within the culvert as bed material will be a roughened channel in order to maintain the natural 1.9% slope under pressurized flow when the flow exceeds the culvert capacity (Figure 8). Figure 9 shows the estimated water surface elevations of the proposed crossing during flood flows, including backwater from the Trinity River.

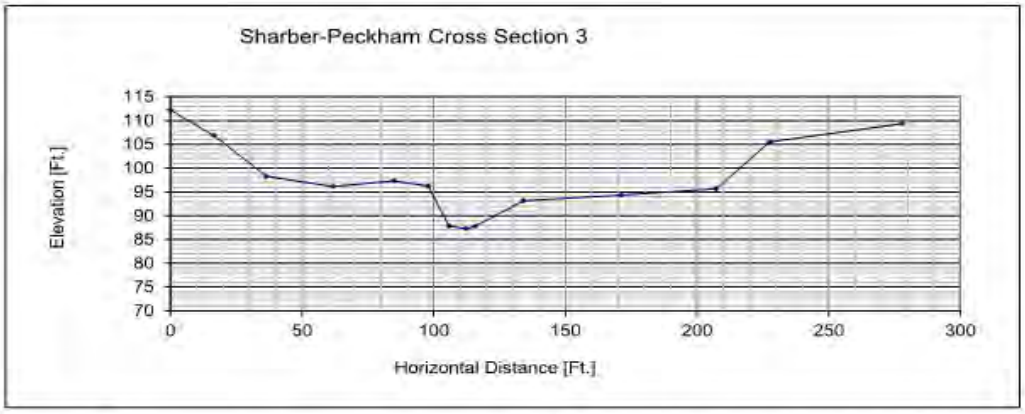


Figure 7. Reference cross section (approximately 28 feet at the 2-year flood and 21.6 feet at 1% exceedence flow.

Table 3. Hydraulic properties of reference reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	125.5	1%	215	89	92.22		92.57	0.017464	4.71	45.62	21.8	0.57
Main	125	1%	215	87.3	90.48		90.84	0.018434	4.81	44.73	21.62	0.59
Main	125.5	2yr	486	89	93.72		94.25	0.017461	5.85	83.03	28.32	0.6
Main	125	2yr	486	87.3	91.99		92.53	0.017838	5.9	82.38	28.22	0.61

Table 4. Characteristics of reference reach

	Typical Water surface width(ft)	Maximum flow depth (ft)	Average velocity from Hec-Ras (fps)
1% exceedence flow	Average 21.5 ft.	3.0	5.0
2-year flood flow	Approximately 27 ft.	4.5	5.6

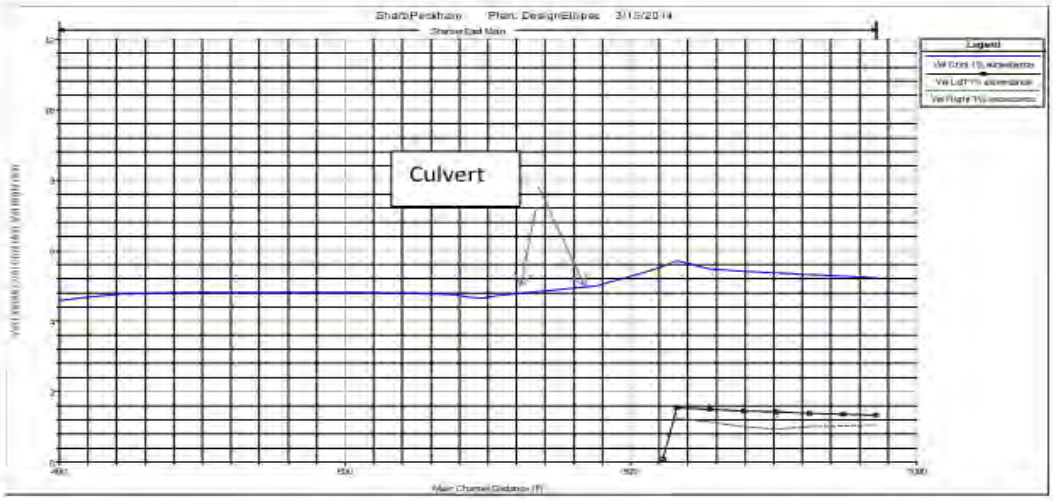


Figure 8. Velocity through culvert at 1% exceedence flow maintained at 5 fps with roughness n=.06 for the bottom 2 feet.

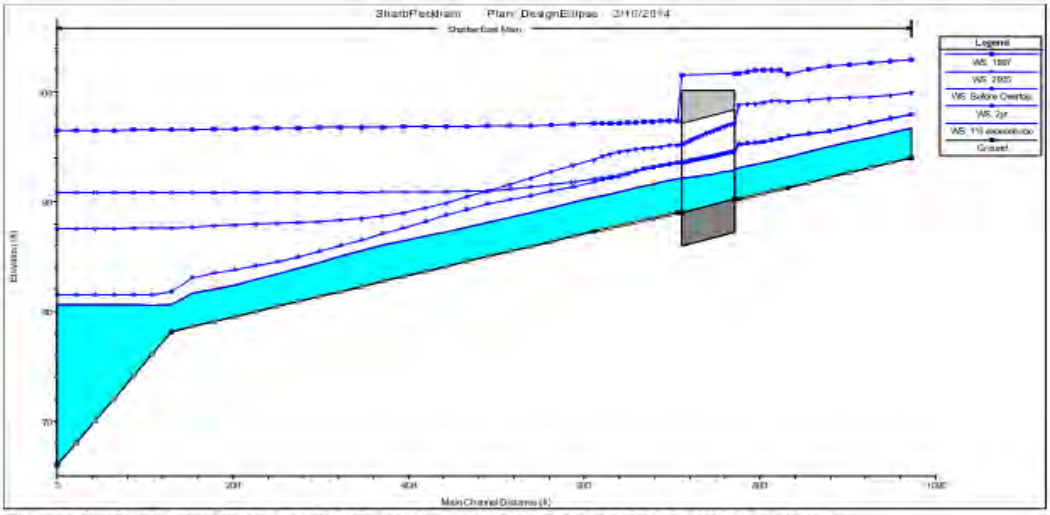


Figure 9. Water Surface profile through proposed embedded ellipse culvert

Hydraulic Evaluation of Design Conditions

The Federal Highway Administration culvert analysis program HY-8 (FHWA 2009) was used to assess culvert capacity and headwater depths for the design culvert. An analysis was prepared for design VAP as displayed in Figure 10, and Tables 5 and 6, below.

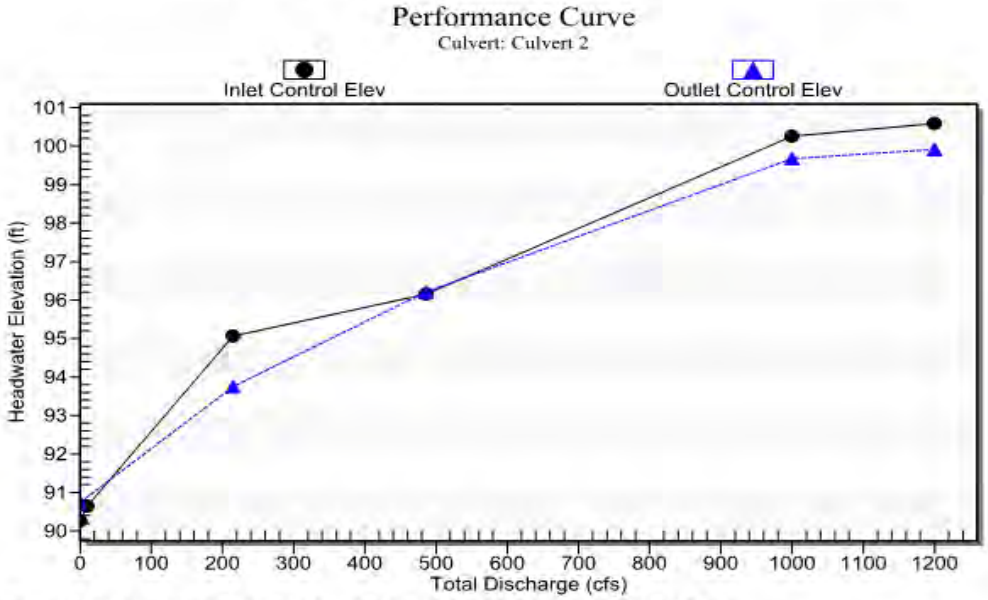


Figure 10. Hydraulic Analysis of Ellipse Culvert using HY8 Model.

Table 5. Crossing Summary Table using HY8 Model

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: SP_Ellipse

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
90.73	survey	0.32	0.32	0.00	1
90.64	50%	10.00	10.00	0.00	1
95.06	1%	215.00	215.00	0.00	1
96.21	2 yea	486.00	486.00	0.00	1
100.26	10 year	1000.00	931.09	68.28	9
100.00	Overtopping	910.18	0.00	1.00	

Table 6. Culvert Summary Table using HY8 Model

HY-8 Analysis Results

Culvert Summary Table - Culvert 2

Culvert Crossing: SP_Ellipse

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
survey	0.32	0.32	90.73	0.01	0.49	3-M1t	0.01	0.01	0.05	0.05	0.50	0.40
50%	10.00	10.00	90.64	0.40	0.0'	1-S2n	0.23	0.26	0.23	0.39	1.86	1.54
1%	215.00	215.00	95.06	4.82~	3.50	3-M2t	2.48	2.00	2.33	2.33	6.66	4.47
2 yea	486.00	486.00	96.21	5.91	5.97	3-M2t	4.19	3.35	3.65	3.65	9.43	5.72
10 year	1000.00	931.09	100.26	10.02~	9.43	3-M2t	7.21	5.05	5.34	5.34	12.49	7.02

DESIGN DEVELOPMENT

Channel Design

Existing Channel Characteristics

As noted earlier, the Sharber-Peckham Creek project crossing is located about 700 feet upstream of the creek's confluence with the Trinity River. Trinity River flows were included in the Hec-Ras model to determine the frequency that the Trinity River may backwater the project area. The backwater effect of the Trinity River limits the amount of vertical channel adjustment that can occur at the project site (see profile in Figure 11).

Figure 11. Longitudinal Profile, Sharber-Peckham Creek project.

Sharber-Peckham Creek has a constant 1.9% slope from the culvert outlet to the bank of the Trinity River. The stream is confined at the downstream end, just before entering the Trinity River, between a 22 foot rock outcropping on the left bank, and a steep hill on the right bank (Figure 12). The active channel at the outlet of Sharber-Peckham Creek is confined to approximately 16 feet in width at this point. Upstream of the outcropping is a wide high flood plain on Sharber-Peckham Creek that becomes inundated at Trinity River flood flows, at floods well below the flows that formed the higher flood terrace elevation that was surveyed on the Trinity River (i.e., estimated 100-year return interval flood flows).

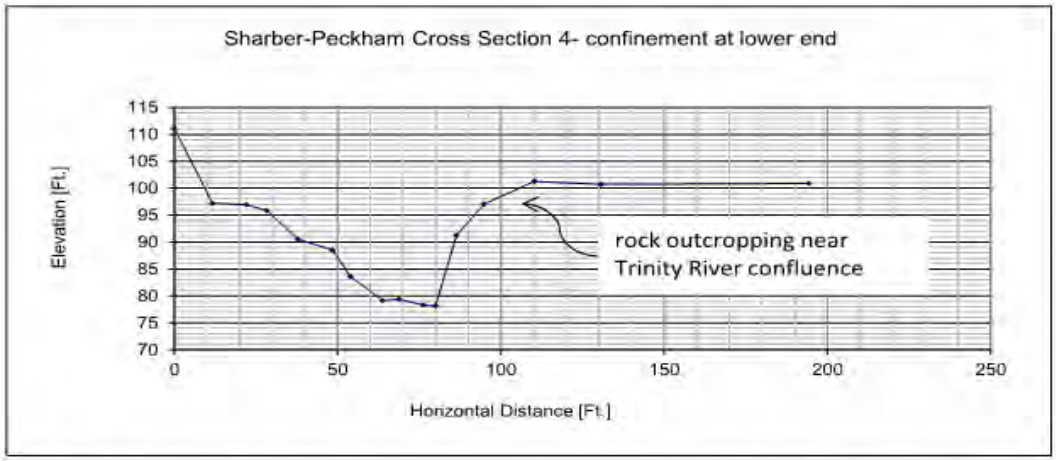


Figure 12. Sharber-Peckham Creek confining cross section at Trinity River confluence approximately 16 feet wide active channel.

The flow inundation from the Trinity River onto the floodplain of Sharber-Peckham Creek provides velocity refuge for coho salmon during flood flows, and the confinement provided by geomorphic features defines the maximum bankfull width of the creek at its downstream end. The estimated flood flows using the conventional methods (LPIII) were based on the Trinity River peak flows at the Burnt Ranch gage. The flows during this period were affected by the flow retention at Lewiston Reservoir which has changed from 90% to 50% over the last decade, so the estimates are biased on the low side. This is verified by the water surface elevations that built the Trinity River flood terraces at the confluence of with Sharber-

Peckham Creek. Based on the flood terrace elevations of the surveyed bar on the Trinity River, the Trinity River backwaters up to the crossing at some flood flows. The high terrace on the Trinity River represents a flood flow elevation that would backup all the way to the project road.

Reference Reach Channel Geometry

The channel below the culvert appears to exist at the assumed natural grade. The reach is incised and controlled in elevation by bedrock and width near the confluence with the Trinity River, preventing a more typical meandering confluence. This downstream reach of Sharber-Peckham Creek is backwatered and swampy during storm flows because of the constriction near the confluence. The reach of Sharber-Peckham Creek that is 100 feet downstream of the culvert (near cross section 3), appears to be stable and at the design grade and so is used as the reference reach. Four cross sections were surveyed, two upstream and two downstream of the culvert.

Stream substrate was evaluated at all cross sections using the Wolman Pebble count protocol (Figure 13). The results of the pebble count show that the upstream cross section has a more well- graded substrate than the downstream cross sections. The upstream reach has a lower flood plain and is less incised than the downstream reach. The downstream reach remains incised from below the existing culvert to the thalweg of the Trinity. The project is limited to a 16 foot width at the crossing (due to the existing location of the downstream wells). The post-project channel is expected to remain incised, and in its existing configuration. Cross section 3 represents the final adjustment channel configuration through the project area and is used as the reference reach.

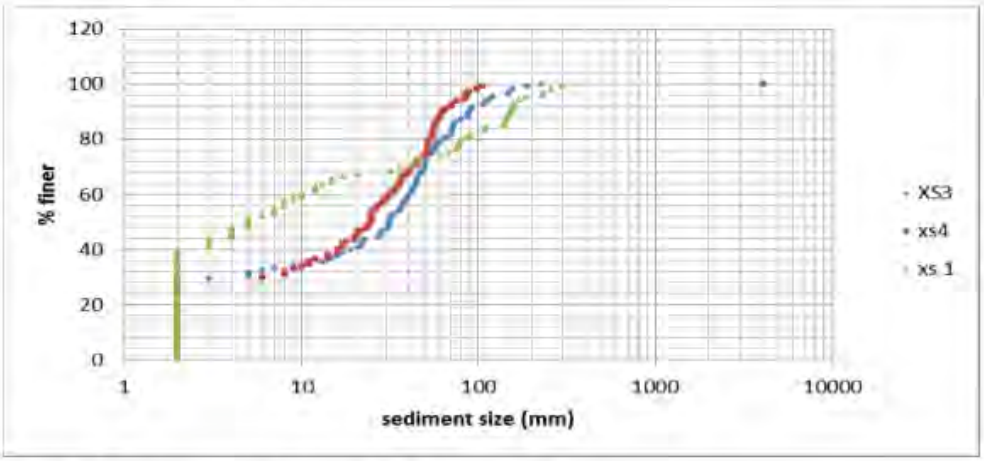


Figure 13. Wolman pebble count at all cross sections.

Channel Cross Section Design

The upstream typical cross section will be modeled after the downstream reference reach. The design will have an average channel width of 10 feet, a bankfull width of 15 feet, and 1H:1V bank slopes. This design will be accomplished by conforming the upstream reach to the 1.9% target grade. An image from Attachment 1 page 9 for typical channel modification cross section is shown below (Figure 14). Within the culvert, rock banklines will be constructed. See Attachment 1 page 6-7 for typical culvert cross section and specifications. The channel and banks that are affected by construction and the detour road will be restored.

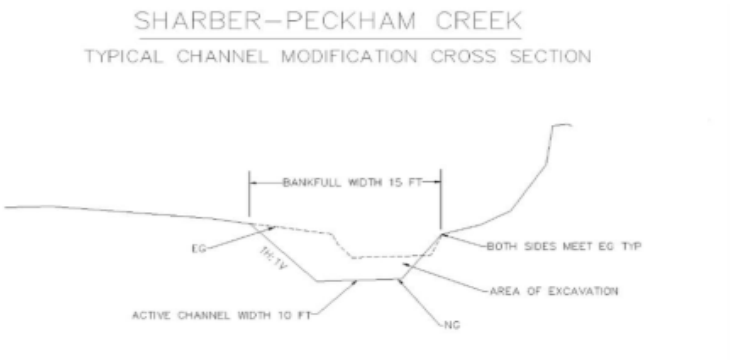


Figure 14. Typical channel modification cross section.

Rock Sizing

Stream Simulation Bed Material

A pebble count from the reference reach was used to determine the makeup of the streambed material mix. Using the calculated distribution, the streambed material mix should have a gradation with a D_{100} of 11.8 inches, a D_{84} of 3.6 inches, a D_{50} of 1.25 inches, a D_{30} of 4mm, and a D_{28} of fines less than 2mm. This streambed mix will supplement the bankline rock and rock ribbons located in the culvert. Additional large rocks from the rock ribbon mix and the streambed mix will be placed as keystones to stabilize the streambed and to increase roughness in the channel. This gradation was specified in the design plans (Attachment 1 page 7).

Rock Banklines

Rock bankline sizes were determined using the Caltrans Stream Bank Rock Slope Protection Design Guidelines (CalTrans 2006). This equation to determine the weight of a D_{50} rock is given:

$$W_{50} = \frac{0.0002\ {V_b}^6 SG}{sin^3(\beta - \alpha)(SG - 1)^3}$$

SG is the specific gravity of the rock in $\frac{lbs}{ft^3}$, V_b is the velocity to which a bank is exposed in

$\frac{ft}{s}$, and β and α are shape factors. This rock sizing is determined to remain relatively stable at a 100-year flow. From the Hec-Ras and HY-8 modeling (see Selection of Replacement Structure Size and Type above), a max channel velocity was found to be 9.2 ft/s, and scaled by 0.67 for flows parallel to the bankline. The W_{50} was determined to be 8.5 lbs. Using this value, the volume of a D_{50} rock was obtained by dividing the weight by its specific gravity and a conversion factor for English units:

$$V_{50} = \frac{W_{50}}{62.4\ SG}$$

Provided the volume, the diameter of a D_{50} rock could be determined by approximating the rock as a sphere. A D_{50} size was found to be 6 inches. Using scaling factors, the distribution was attained that includes a D_{100} of 36 inches and a D_{84} of 15 inches, a D_{50} of 6 inches, a D_{16} of 0.4 inches, and a D_8 of 0.06 inches. This distribution is shown on Attachment 1 page 7.

Rock Ribbons

The three existing downstream rock weirs will be excavated, and the rock will be used to construct the three downstream rock ribbons at grade. Rock sizing for the three upstream rock ribbons and five rock ribbons inside the culvert were determined using the Far West States Lane Method riprap sizing method (NRCS 1996). The equation to find the $D_{75-riprap}$ size is given:

$$D_{75-riprap} = \frac{3.5wDS}{CK}$$

W is the channel width in ft., D is the max depth of flow in ft, S is the channel slope in ft/ft, C is the coefficient for curvature, and K is the side slope coefficient. Values included in the computation are a 15 foot channel top width, 5 foot maximum depth of flow, and a 1.9% channel slope. After a $D_{75-riprap}$ value was obtained, scaling factors yielded the rock ribbon distribution. A D_{50} size of 1.1 feet and a D_{100} size of 2.2 feet were obtained. Rock ribbons will consist of mostly D_{100} sized rocks, with D_{50} rock to fill in the voids. The streambed mix will be used to make the rock ribbon structure impermeable. The rock ribbons in the culvert will be placed 14.2 feet apart as an approximate channel width. See Attachment 1 page 7 for rock ribbon distribution, orientation, and structure.

Replacement Crossing Design

Evaluation and Selection of a Replacement Structure Type

Site Constraints

Landowner well intakes immediately below the culvert are the primary site constraint. Landowners are concerned about the protection of their cisterns, and are not interested in the option of relocating their systems. This constraint forces the alignment of the culvert to

remain the same in order to prevent the culvert from directing flow onto the cisterns during large storm events. To protect the well infrastructure, the culvert width is constrained to remain in the current active channel in order to prevent the creek from adjusting away from the intakes. This constrains the culvert width to 15 feet.

The existing roadway elevation is to be recreated after the culvert replacement. This constrains the maximum allowed culvert height. The height between the top of the road and the target thalweg is approximately 12 feet. Allotting a minimum of 2.5 feet of road fill, this allows a 9.5 foot tall structure plus the height of embedment.

As can be seen in Attachment 1 page 4, the valley wall on the upstream bank right side of the culvert constrains the combined width of the detour road and of the excavation for the culvert. If both the detour road and excavation site cannot be accommodated at the same time, a rail car or other means of transportation will be arranged while the detour road is closed.

Structure Alternatives Considered

Structures of all types were considered in relation to the project goals and site constraints. A 15 foot round multi-plate culvert was a highly considered design. The culvert's increased flow capacity is desirable; however, too many negative aspects of the design prevented it from being implemented. Because the existing roadway elevation will remain, the 15 foot round would need to be embedded approximately 5.5 feet to meet the target thalweg and allow enough roadway over the culvert per the structure's design criteria. This large area of extra excavation and embedded material, coupled with the risk associated with narrowly meeting the minimum standard for road fill, was found to be wasteful and unsafe. These factors were determined to outweigh the benefit of a slightly larger flow area. A 14 foot by 12 foot pipe arch was proposed, but was determined to have a smaller flow area of the options considered, and was deemed a less favorable design.

Structures that include cast-in-place concrete were ruled out due to the large amount of subsurface flow at the project site. Much larger structures and bridges were deemed a poor match to the project due to the small scale and relatively little use of the private road crossing, the structural magnitude required to construct a bridge above the Trinity River floodplain, and economic constraints.

Selected Structure Type

A multi-plate horizontal ellipse culvert was selected as the preferred structure for the crossing. The culvert will be embedded 3 feet below the new channel grade to allow the construction of a roughened channel through the crossing. The multi-plate structure will be delivered to the project site in sections where it will be assembled and installed with the use of excavators. Excavation, shoring, and installation of the culvert are estimated to be accomplished in a 6 week timeframe.

Replacement Structure Sizing and Placement

The crossing replacement must meet the design criteria deemed accomplishable under the project constraints. The culvert should allow successful fish migration through the crossing at all fish passage flows. The crossing should span the active channel width to accommodate stable geomorphic processes. The culvert should convey the 10 year flood interval and the crossing should convey higher flows with a reinforced critical dip and rock slope protection. The crossing should be sufficiently embedded to maintain a streambed despite downcutting

to the low VAP elevation. The culvert should be large enough to accommodate machines to create a simulated streambed. The existing road elevation should be maintained.

A 14'11" by 11'2" by 60' horizontal ellipse culvert meets the project goals and site constraints. Maintaining the existing roadway elevation allows 3 feet of cover over the culvert, exceeding the manufacturer recommended minimum of 2.5 feet. The proposed invert elevation will be embedded 3 feet beneath the design grade so that rock ribbons and a roughened channel can be placed inside culvert. The culvert invert is located approximately 2 feet below the low VAP elevation to ensure that a streambed will remain in the event that the channel downcuts to the low VAP.

The roadway embankments will be constructed with 2:1 side slopes and will be lined with 1-ton RSP. The critical dip to the bank right side of the culvert will be rock armored. These features will help maintain the integrity of the road during large storm events and convey flow over the critical dip.

CONSTRUCTION LOGISTICS

Water Management

A water diversion system will be setup for the approximate 350 feet of channel work to be completed. Dewatering of the project area is expected, and will be pumped to a flat area away from the work area and dissipated. Landowners will be supplied with water while the project site is dewatered. If landowners' house water tanks are inaccessible by a water truck, a water tank will supply the cisterns near the project site. See Attachment 1 page 8 for more detail.

Construction Staging and Access

A full road closure of Fountain Ranch Road across the current culvert is expected at the construction site. In order to provide access for residents and emergency vehicles, a detour road is to be created north of the project site and permit traffic flow. A construction staging area has been designated on the northern road where Fountain Ranch Rd splits around an oak tree. A temporary spoils area will be located near the project site and will be properly stored with best management practices.

REFERENCES

CalTrans. 2006. California Highway Design Manual State of California Department of Transportation.

CDFG. 2002. Culvert criteria for fish passage. Appendix A in California Salmonid Stream Habitat Restoration Manual 3rd edition. California Department of Fish and Game.

CDFG. 2009. Part XII: Fish passage design and implementation. In the California Salmonid Stream Habitat Restoration Manual. California Department of Fish and Game.

CDFG. 2004. Recovery strategy for California coho salmon. Report to the California Fish and Game Commission. Sacramento, CA.

FHWA. 2009. HY-8 Culvert Analysis Program Version 7.2. U.S. Department of Transportation, Federal Highway Administration, Office of Bridge Technology.

NMFS. 2001. Guidelines for salmonid passage at stream crossings. NOAA Fisheries, NMFS SW Region.

NMFS. 2012. Public Draft Recovery Plan for Southern Oregon/Northern California Coast Coho Salmon (Oncorhynchus kisutch). National Marine Fisheries Service. Arcata, CA

NRCS. 1996. National Engineering Field Handbook, Part 650, Chapter 16 - Streambank and Shoreline Protection U.S. Department Of Agriculture, Natural Resources Conservation Service.

RTA. 2013. Sharber-Peckham Creek – Private Road Crossing – Fish Passage Evaluation.

USFS. 2008. *Stream simulation: an ecological approach to stream crossings*. San Dimas, CA, USDA United States Forest Service National Technology and Development Program.

ATTACHMENTS

Attachment 1: 65% Design Plans for Sharber-Peckham Creek Fish Passage Project

Sharber-Peckham Creek – Private Road Crossing

Location: USGS Quad: Salyer. T6N, R5E, Section 13. Lat/Long: 40.8980385N, 123.5611214W (NAD27).

Culvert Type: CMP **Corrugations:** 3" x 1" spiral **Inlet type:** Projecting
Dimensions: diameter = 4.0 ft **Length:** 60.7 ft **Slope:** 4.80% **Modifications:** three downstream boulders weirs to raise outlet pool elevation were installed by the USFW in 2001.
Rust-line Height: 1.6 ft **Outlet configuration:** vertical drop into outlet pool.
Road Prism Fill Estimate: 545 cubic yards. **Overall condition:** Poor – invert is heavily rusted, culvert is slumping/separating at several sections. **Sizing:** Extremely undersized, the inlet is at 100% capacity on a storm-flow with a one-year recurrence interval.

Drainage Area Upstream of Crossing: 5.74 square miles **Average Active Channel Width (ft):** 8.7 ft
Estimated Fish Passage Flows: Adults = 3 - 239 cfs; **Resident Trout =** 2 - 143 cfs; **Juveniles (age-1 and y-o-y) =** 1 - 48 cfs.

Barrier Status: The CDFW first-phase evaluation filter determined that the culvert was **RED** due to the slope being greater than three percent. The FishXing evaluation estimated that the crossing failed to meet CDFW's adult anadromous salmonid passage criteria due to excessive velocities on flows greater than 7 cfs. FishXing estimated a small passage window (29%) for adult coho salmon when a maximum observed burst velocity of 21 ft/sec was used (Bell 1981). For steelhead, FishXing estimated a larger passage window (76%) when a maximum observed burst speed of 26 ft/sec was used (Bell 1981). The crossing failed to meet the passage criteria for resident trout/age-2+ juvenile salmonids and age-0/1+ juvenile salmonids primarily due to the perched outlet.

Additional Stream Crossings: Downstream – none indicated on the USGS topographic map. The crossing is located approximately 900 feet upstream of Sharber-Peckham Creek's confluence with the Trinity River. Upstream – none indicated on the USGS topographic map.

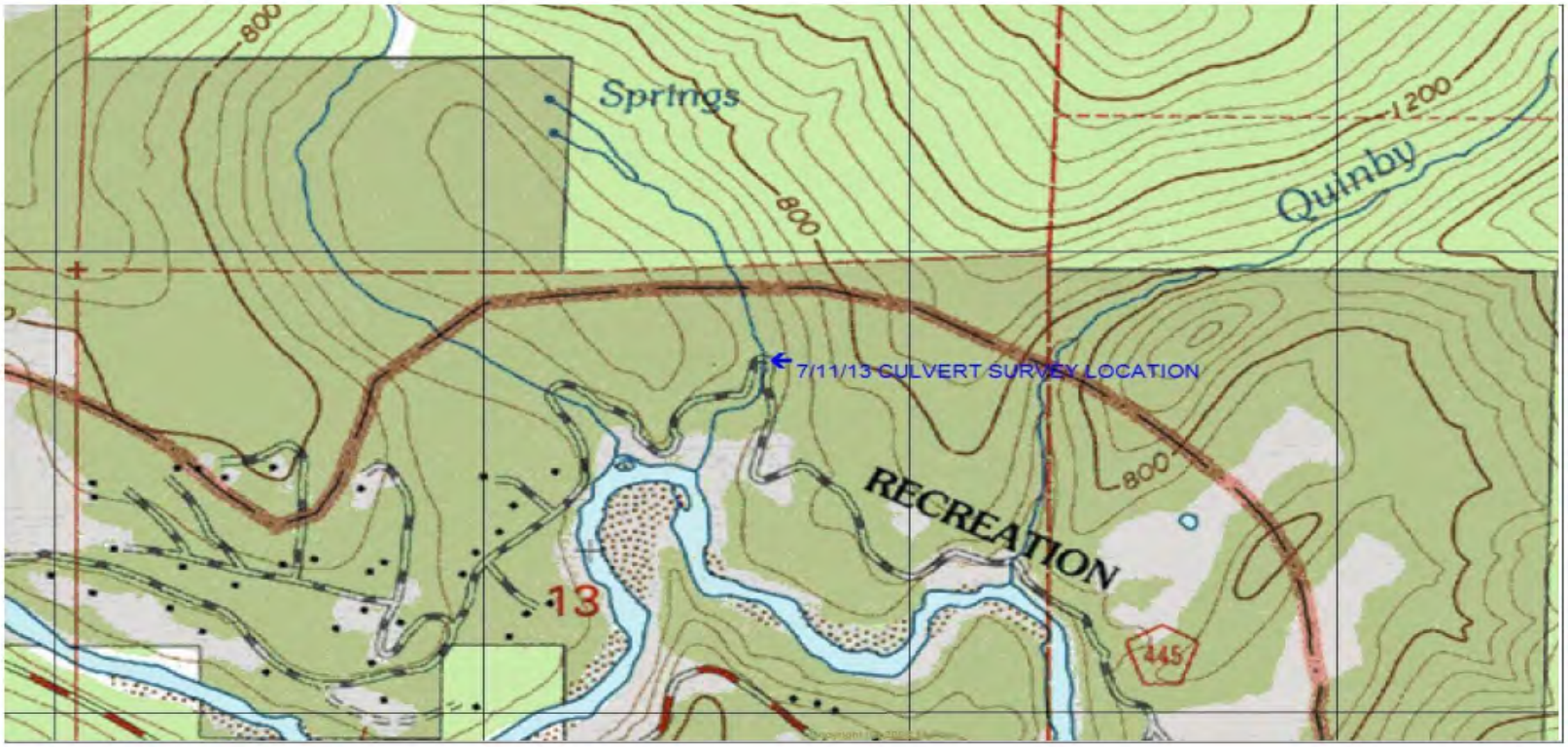
Habitat: Quantity: approximately 4,000 feet of potential salmonid habitat upstream of the assessed crossing. The channel steepens quickly (>10% slope) at a major fork in the channel. Quality: the upstream channel was rated as "good" salmonid habitat by RTA who walked approximately 200 feet of the channel on 7/11/13. The USFS assessed the habitat as good and noted the cool water temperatures due to spring-flow. RTA observed numerous age-0 coho salmon and steelhead downstream and upstream of the private crossing. The channel had a dense riparian canopy and a mix of small pools, runs, and riffles. Sharber Creek was considered an important spawning and rearing creek in NOAA's SONNC Coho Salmon Recovery Plan and treating its migration barriers was listed as a high-priority action (page 38-12 of Volume 2). USFS spawner surveys between 1996 and 2003 documented coho spawning in six of eight winters and an average of 29 redds per spawning season. The USFS assessment noted that over-summering juvenile salmonids were concentrated in the channel reach downstream of the perennial springs on the Sharber-Peckham fork of the Sharber Creek watershed where water temperatures were 11-16°C. On 7/11/13, RTA measured a water temperature in Sharber-Peckham Creek of 13°C at 1:00PM when the shaded air temperature was 27°C.

Preferred Treatment: the best option to provide unimpeded passage of adult and juvenile salmonids is to replace the existing culvert with a properly-sized, fully-embedded arch culvert or a fully-spanning bridge. The replacement design must also protect existing downstream infra-structure, primarily the residential water supply pump and stilling basin located on the left-bank of the outlet pool.

Sharber-Peckham Creek – Private Road Crossing – Outlet Photo

Sharber-Peckham Creek – Private Road Crossing – Inlet Photo

Sharber-Peckham Creek – Private Road Crossing



CDFG Fish Passage Inventory Data Sheet

Stream Crossing Type: ☐ Bridge ☒ Culvert ☐ Ford ☐ Other **Date:** JULY 11, 2013

Surveyors: Scope: TDG Rod: RNT **Culvert #** 1 of 1 (from Left Bank to Right Bank)

Road: PRIVATE / FOUNTAIN RANCH	**Mile Post:**	**Cross Road:** FOUNTAIN RANCH
Stream Name: SHARBER / PECKAM	**Tributary to:** TRINITY R	**Basin:** TRINITY RIVER
USGS Quad: SALYER	**T:** 6N **R:** 5E **Section:** 13	**Lat/Long:** 40.8980385N 123.5611214W NAD27

Fisheries Information

Flow Conditions During Survey: ☒ CONTINUOUS ☐ ISOLATED FLOWS ☐ DRY CHANNEL

Fish Presence Observed During Survey: LOCATION: ☒ UPSTREAM ☒ DOWNSTREAM ☐ NONE OBSERVED

AGE CLASS: ☐ ADULTS ☒ JUVENILES SPECIES: COHO ☐ UNKNOWN STHD U.S.

JUVENILE SIZE CLASSES: ☒ < 3" ☒ 3" – 6" ☐ >6" → SEVERAL IN THIS SIZE CLASS

RELATIVE ABUNDANCE: ☐ SEVERAL (<10) ☐ MODERATE (10-50) ☐ ABUNDANT (50-100) ☒ EXTREMELY ABUNDANT (>100)

Stream Crossing Information

Inlet Type: ☒ projecting ☐ headwall ☐ wingwall ☐ mitered
Alignment (deg): ☒ < 30° ☐ 30°- 45° ☐ >45°
Inlet Apron: ☐ yes ☒ no
Describe:

Outlet Configuration: ☐ At stream grade
☒ Freefall into pool ☐ Cascade over riprap
Outlet Apron: ☐ yes ☒ no
Describe:

Tailwater Control: ☐ pool tailout ☐ full-spanning log or debris jam ☐ log weir ☒ boulder weir
☐ concrete weir ☐ no control point (chnl x-section) Other: 3 D.S. BOULDER WEIRS

Upstream Channel Widths (ft): (1) 9.4 (2) 8.7 (3) 8.8 (4) 8.4 (5) 8.2 **Average width =** 8.7'

Culvert Information

Culvert Type: ☒ Circular ☐ Pipe Arch ☐ Box ☐ Open-Bottom Arch ☐ Other:
Diameter (ft): 4.0 Height or Rise (ft): _____ Width or Span (ft): _____ Length (ft): 60.7'

Material: ☐ SSP ☒ CSP ☐ Aluminum ☐ Plastic ☐ Concrete ☐ Log/wood ☐ Other: _____

Corrugations (*width x depth*): ☐ 2-2/3" x ½" ☒ 3" x 1" ☐ 5" x 1" ☐ 6" x 2" ☐ Other: _____ ☒ Spiral

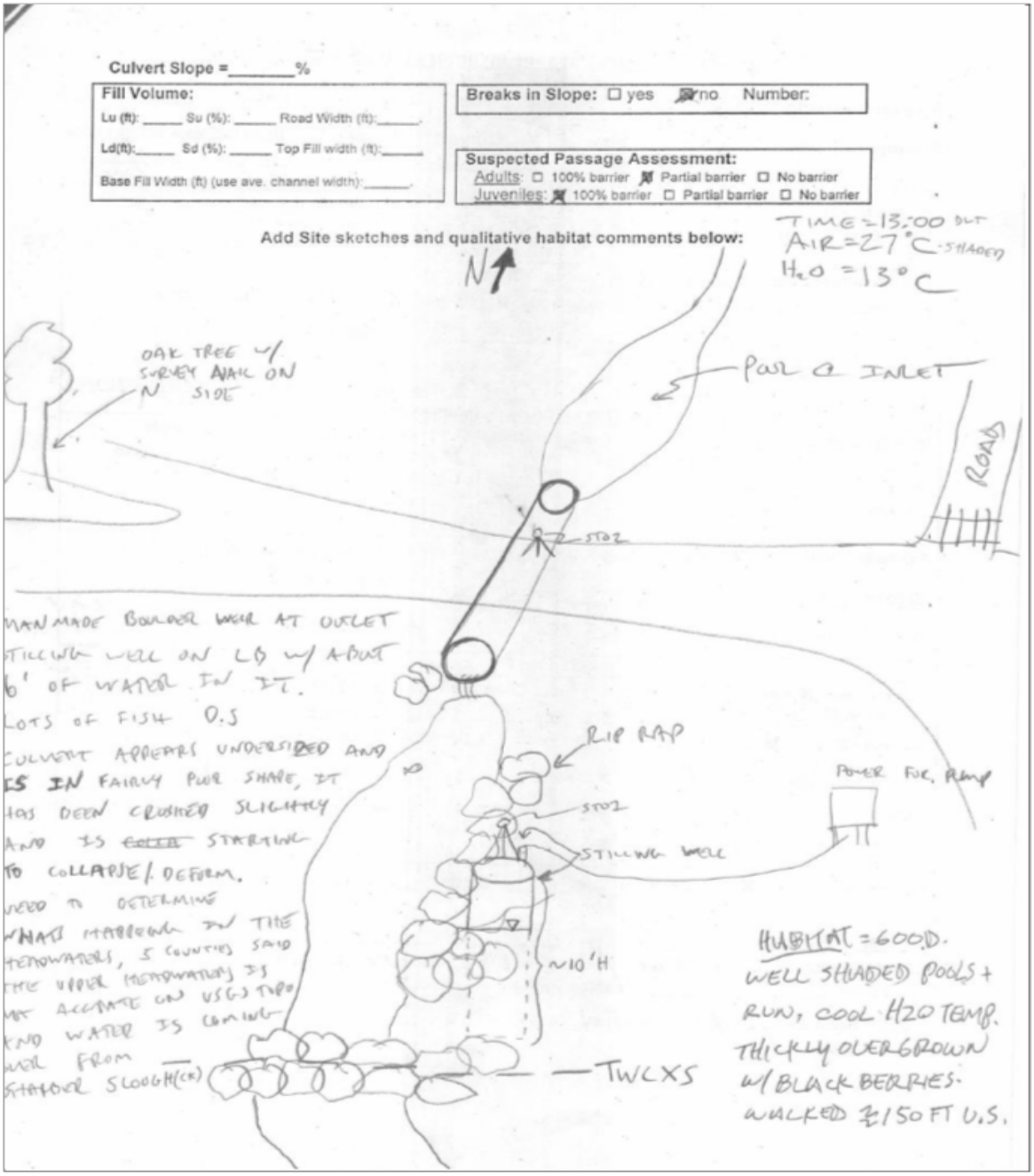
Crossing Condition: ☐ good ☐ fair ☒ poor ☐ extremely poor ☐ Describe condition: SLUMPED, STARTING TO SEPERATE

Rustline Height (ft): 1.3'

Embedded: ☐ yes ☒ no Depth (ft): Inlet: _____ Outlet: _____ Station (ft): start = _____ end = _____
Describe substrate:

Barrel Retrofit (weirs/baffles): ☐ yes ☒ no Type: ☐ Steel ramp baffles ☐ Offset ☐ Corner
☐ Other _____. Describe (number, placement, materials):

Outlet Beam: ☐ YES ☒ NO Notched: ☐ YES ☐ NO


Culvert Slope =_____%
Fill Volume:
Lu (ft): _____ Su (%): _____ Road Width (ft):_____
Ld(ft):_____ Sd (%): _____ Top Fill width (ft):_____
Base Fill Width (ft) (use ave. channel width):_____
Breaks in Slope: ☐ yes ☒ no Number:
Suspected Passage Assessment:
Adults: ☐ 100% barrier ☒ Partial barrier ☐ No barrier
Juveniles: ☒ 100% barrier ☐ Partial barrier ☐ No barrier
Add Site sketches and qualitative habitat comments below:
TIME=13:00 DST
AIR=27°C SHADED
H2O=13°C
N
OAK TREE W/ SURVEY NAIL ON N SIDE
PWL @ INLET
ROAD
STD2
MAN MADE BOULDER WEIR AT OUTLET
STILLING WELL ON LD W/ ABOUT 6' OF WATER IN IT.
LOTS OF FISH 0.5
CULVERT APPEARS UNDERSIZED AND IS IN FAIRLY POR SHAPE, IT HAS BEEN CRUSHED SLIGHTLY AND IS ~~BEGIN~~ STARTING TO COLLAPSE/DEFORM.
NEED TO DETERMINE WHAT MARKERS IN THE HEADWATERS, I COUNTED SAID THE UPPER HEADWATERS IS NOT ACCURATE ON USGS TOPO AND WATER IS COMING FROM STAFFORD SLOUGH(CK)
RIP RAP
STD2
STILLING WELL
POWER FOR PUMP
~10'H
TWLXS
HABITAT = GOOD.
WELL SHADED POOLS + RUN, COOL H2O TEMP. THICKLY OVERGROWN W/ BLACK BERRIES.
WALKED ~150 FT U.S.

Photographs

Sharber-Peckham Fish Passage Project Photos

Photo 1. Looking west on private road toward project location. The large alder to the right is on the right bank of the creek when looking downstream.

Photo 2. Culvert outlet, outfall pool, and well casing (looking upstream) 12/16/13.

Sharber-Peckham Fish Passage Project Photos

Photo 3. First (upper) boulder weir at tail of outfall pool (looking downstream) 12/16/13

Photo 4. First boulder weir (looking upstream) 2/13/14

Sharber-Peckham Fish Passage Project Photos

Photo 5. First boulder weir (looking upstream) 3/13/14

Photo 6. Third (lower) boulder weir (looking upstream) 12/16/13

Sharber-Peckham Fish Passage Project Photos

Photo 7. Just downstream of the first boulder weir (looking downstream) 3/13/14

Sharber-Peckham Fish Passage Project Photos

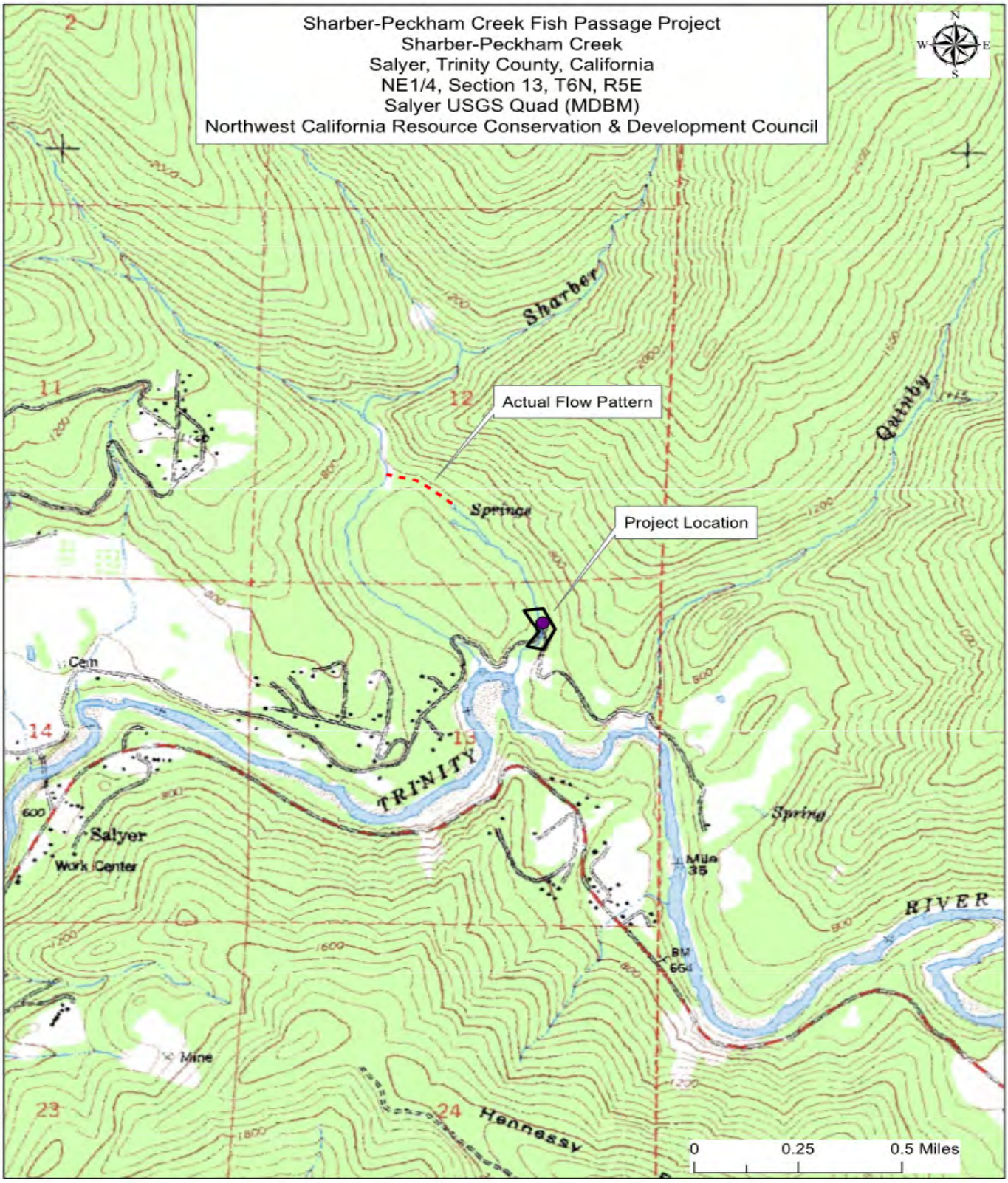
Photo 8. Culvert inlet 12/16/13

Photo 9. Culvert inlet and pool (looking downstream) 12/16/13

Sharber-Peckham Fish Passage Project Photos

Photo 10. ~75 upstream of project extent (looking downstream) 3/13/14

Project Location Topographic Map



Provisional Landowner Access Agreement

Northwest CA Resources Conservation and Development Council (NW CA RC&DC)
P.O. Box 2577
Weaverville, CA

Access/Entry Agreement

Sharber/Peckham Creek Fish Passage Project

I. PURPOSE

The following agreement details requirements of both the landowner and the NW CA RC&DC regarding the Sharber/Peckham Creek Fish Passage Project. Said property is located on Sharber/Peckham Creek, a tributary to the Trinity River, approximately 6.3 miles upstream from the Trinity River.

I, Michael Christian, hereinafter called "Landowner", am aware that a habitat restoration project grant application has been submitted to the California Department of Fish and Wildlife (CDFW) for funding. The project has been explained to me by the NW CA RC&DC. I support the goals of the project. If the project is selected for funding, the Landowner will enter into a ten year landowner agreement that will be project specific.

II. ACCESS PERMISSION

Landowner hereby grants the NW CA RC&DC, CDFW, and NOAA Fisheries representatives permission to enter onto real property owned by the Landowner to perform pre-project evaluation. Access shall be limited to those portions of Landowner's real property where actual restoration work is proposed to be performed and those additional portions of real property that must be traversed to gain access to the work site. The applicant will contact the Landowner at least 72 hours prior to any visit. At no time will CDFW or NOAA Fisheries representatives access the property without the applicant unless expressively given permission by the Landowner.

III. DURATION OF NOTICE

The term of this agreement shall commence upon signing of this Agreement and terminate on December 31, 2023.

IV. LIABILITIES

Reasonable precautions will be exercised by NW CA RC&DC to avoid damage to persons and property. NW CA RC&DC agrees to indemnify and hold harmless the Landowner and agrees to pay for reasonable damages proximately caused by reason of the uses authorized by this agreement, except those caused by the Grantee's negligence or intentional conduct of the Landowner.

Landowner Signature — 3-11-13 Date

370 Arrow Lane, Bayside 95524
Landowner Address — 707 822 5777 Landowner Phone Number

Applicant Signature
NW CA RC&DC/EC Program — 3/11/2013 Date

Provisional Landowner Access Agreement

Northwest CA Resource Conservation and Development Council (NW CA RC&DC)
P.O. Box 2571
Weaverville, CA

Access/Entry Agreement

Sharber/Peckham Creek Fish Passage Project

I. PURPOSE

The following agreement details requirements of both the landowner and the NW CA RC&DC regarding the Sharber/~~Peckham~~ Creek Fish Passage Project. Said property is located on Sharber~~-Peckham~~ Creek, a tributary to the Trinity River, approximately 0.2 miles upstream from the Trinity River.

I, ED FITZGERALD, hereinafter called "Landowner", am aware that a habitat restoration project grant application has been submitted to the California Department of Fish and Wildlife (CDFW) for funding. The project has been explained to me by the NW CA RC&DC. I support the goals of the project. If the project is selected for funding, the Landowner will enter into a ten year landowner agreement that will be project specific.

II. ACCESS PERMISSION

Landowner hereby grants the NW CA RC&DC, CDFW, and NOAA Fisheries representatives permission to enter onto real property owned by the Landowner to perform pre-project evaluation. Access shall be limited to those portions of Landowner's real property where actual restoration work is proposed to be performed and those additional portions of real property that must be traversed to gain access to the work site. The applicant will contact the Landowner at least 72 hours prior to any visit. At no time will CDFW or NOAA Fisheries representatives access the property without the applicant unless expressively given permission by the Landowner.

III. DURATION OF NOTICE

The term of this agreement shall commence upon signing of this Agreement and terminate on December 31, 2023.

IV. LIABILITIES

Reasonable precautions will be exercised by NW CA RC&DC to avoid damage to persons and property. NW CA RC&DC agrees to indemnify and hold harmless the Landowner and agrees to pay for reasonable damages proximately caused by reason of the uses authorized by this agreement, except those caused by the gross negligence or intentional conduct of the Landowner.

Landowner Signature — 3-7-13 Date

2021 Russ St, EKA, CA 95501 Landowner Address — 707-443-3478 Landowner Phone Number

Applicant Signature
NW CA RC&DC/5C Program — 5/6/2013 Date

William & Kristen Peckham
P.O. Box 547
Salyer, CA 95563-0547
Tel: 530-629-3953 Fax: 530-629-2262
E-Mail: peckham@hughes.net

April 17, 2013

Mr. Mark Lancaster
NW CA RC&DC
P.O. Box 2571
Weaverville, CA 96093

Re: Sharber/Peckham Creek Fish Passage

Dear Mark,

I am attaching the signed Provisional Landowner Access Agreement regarding the above. As we discussed on the phone this morning it is important to note that we have concerns pertaining to the water systems which lie adjacent to the proposed culvert improvement project. These wells supply water to numerous residents of this subdivision. I am signing this Agreement with your assurance that the work on the culvert would not disturb these functioning systems.

William D Peckham

William D. Peckham, Jr.

Provisional Landowner Access Agreement

Northwest CA Resource Conservation and Development Council (NW CA RC&DC)
P.O. Box 2571
Weaverville, CA

Access/Entry Agreement

Sharber/Peckham Creek Fish Passage Project

I. PURPOSE

The following agreement details requirements of both the landowner and the NW CA RC&DC regarding the Sharber/Peckham Creek Fish Passage Project. Said property is located on Sharber/Peckham Creek, a tributary to the Trinity River, approximately 0.2 miles upstream from the Trinity River.

I, WILLIAM PECKHAM, hereinafter called "Landowner", am aware that a habitat restoration project grant application has been submitted to the California Department of Fish and Wildlife (CDFW) for funding. The project has been explained to me by the NW CA RC&DC. I support the goals of the project. If the project is selected for funding, the Landowner will enter into a ten year landowner agreement that will be project specific.

II. ACCESS PERMISSION

Landowner hereby grants the NW CA RC&DC, CDFW, and NOAA Fisheries representatives permission to enter onto real property owned by the Landowner to perform pre-project evaluation. Access shall be limited to those portions of Landowner's real property where actual restoration work is proposed to be performed and those additional portions of real property that must be traversed to gain access to the work site. The applicant will contact the Landowner at least 72 hours prior to any visit. At no time will CDFW or NOAA Fisheries representatives access the property without the applicant unless expressively given permission by the Landowner.

III. DURATION OF NOTICE

The term of this agreement shall commence upon signing of this Agreement and terminate on December 31, 2023.

IV. LIABILITIES

Reasonable precautions will be exercised by NW CA RC&DC to avoid damage to persons and property. NW CA RC&DC agrees to indemnify and hold harmless the Landowner and agrees to pay for reasonable damages proximately caused by reason of the uses authorized by this agreement, except those caused by the gross negligence or intentional conduct of the Landowner.

William D Peckham
Landowner Signature

4/17/13
Date

444 Galaxy Drive Salyer, CA 95563
Landowner Address

530-629-3953
Landowner Phone Number

Applicant Signature
NW CA RC&DC/5C Program

Date

Provisional Landowner Access Agreement

Northwest CA Resource Conservation and Development Council (NWCARC&DC)
P.O. Box 2571
Weaverville, CA 96093

Access/Entry Agreement

Sharber-Peckham Creek Fish Passage Project

I. PURPOSE

The following agreement details requirements of both the landowner and the *NWCARC&DC* regarding the *Sharber-Peckham Creek Fish Passage Project*. Said property is located approximately 0.2 miles upstream of the *Trinity River*.

M. Marilee Taylor, hereinafter called "Landowner", am aware that a habitat restoration or monitoring project grant application has been submitted to the California Department of Fish and Wildlife (CDFW) for funding. The project has been explained to me by the *NWCARC&DC*. I support the goals of the project. If the project is selected for funding, the Landowner will enter into a ten year landowner agreement that will be project specific.

II. ACCESS PERMISSION

Landowner hereby grants *NWCARC&DC*, CDFW, and NOAA Fisheries representatives permission to enter onto real property owned by the Landowner to perform pre-project evaluation. Access shall be limited to those portions of Landowner's real property where actual restoration or monitoring work is proposed to be performed and those additional portions of real property that must be traversed to gain access to the work site. The applicant will contact the Landowner at least 72 hours prior to any visit. At no time will CDFW or NOAA Fisheries representatives access the property without the applicant unless expressively given permission by the Landowner.

III. DURATION OF NOTICE

The term of this agreement shall commence upon signing of this Agreement and terminate on *December 31, 2024*.

IV. LIABILITIES

Reasonable precautions will be exercised by *NWCARC&DC* to avoid damage to persons and property. *NWCARC&DC* agrees to indemnify and hold harmless the Landowner and agrees to pay for reasonable damages proximately caused by reason of the uses authorized by this agreement, except those caused by the gross negligence or intentional conduct of the Landowner.

Marilee M Hadley Taylor — 3/2/14
Landowner Signature — Date

P.O. BOX 128
590 QUINBY RD. SALYER, CA 95563 — 530-629-4539
Landowner Address — Landowner Phone Number

Applicant Signature — 3/3/14
Date

Northwest CA Resource Conservation & Development Council
Five Counties Salmonid Conservation Program

Water Right Verification

Water rights are not involved with this project. There will be a temporary flow by-pass installed during removal of the old culvert and replacement of the new culvert. The by-pass will temporarily disrupt surface flow through the construction site and will return all upstream surface flow back into the channel immediately downstream of the project site. The by-pass will be removed immediately following installation and completion of the culvert and simulated streambed.