# Restoration, Acquisition, and Combination Proposal

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| **Project Number** | 16-1215 |
| **Project Name** | Bear Creek Reach 6 Restoration – Ph II Implementation |
| **Sponsor** | Adopt A Stream Foundation |

List all related projects previously funded or reviewed by RCO:

|  |  |  |
| --- | --- | --- |
| Project # or Name | Status | Status of Prior Phase Deliverables and Relationship to Current Proposal? |
| 12-1282 | Choose a status | Initial implementation phase complete – LWD installation and planting located directly upstream from current proposed site. |
| 15-1059 | Choose a status | Design phase of proposed project – In-progress |

If previous project was not funded, describe how the current proposal differs from the original.

***Limit your response to ten pages (single-sided)****.*

*Submit this proposal as a PRISM attachment titled “Project Proposal.”*

1. **Project location.**

The proposed project is located in Lower Bear Creek subarea, Reach 6. This reach is identified in the WRIA 8 Chinook Conservation Plan as a Tier 1-Core Chinook Use. The proposed project is located within the Friendly Village Mobile Home Park in Redmond, WA along 330’ of the mainstem of Bear Creek and contains a total planting area of 1.0 acre.

1. **Brief project summary.**

Adopt A Stream Foundation (AASF) requests funds to implement Phase II of a stream restoration project at the Friendly Village Mobile Home Park in Redmond, Washington. In 2014, AASF completed the first instream restoration project at this property (project #12-1282). Phase II – Project Design is underway (project #15-1059), which will result in, at minimum, preliminary designs for implementation. This project will implement engineered restoration designs resulting from 15-1059, including the addition of stream meanders, large woody debris (LWD) placement, and riparian planting to provide the maximum benefits to Chinook salmon at all life history stages.

1. **Problems statement.**
	1. **Describe the problem including the source and scale.**

The Friendly Village property contains 1,400 linear feet of highly degraded mainstem Bear Creek. Lawn and pavement dominate the riparian zone. Outside the boundaries of previous restoration projects, few native trees and shrubs are found.

Bear Creek Reach 6 has been identified in various plans as having:

• *Decreased floodplain connectivity and decreased off-channel habitat because of channel confinement*. Due to development the channel is somewhat disconnected from its historic flood plain and is constricted by several stream crossings, which results in reduced habitat conditions and flooding in developed portions of the property.

• *Very little large woody debris*. Wood is important because it increases channel complexity, contributes to channel stability, develops pools, traps sediment, and reduces water temperature.

• *Poor native riparian vegetation cover*. Restoring riparian vegetation will improve channel stability, provide sources of large woody debris that can contribute to creation of pools, and reduce peak water temperatures that favor non-native species.

Degraded channel conditions in this reach have significantly reduced fish production when compared to historic levels. According to the 2008 Bear-Evans Watershed Temperature and Dissolved Oxygen TMDL Water Quality Improvement Report, this reach has experienced a 61 – 80% shade deficit due to the loss of a native riparian buffer, with highest 7 day average maximum temperatures exceeding the lethal level for salmonids (Department of Ecology, 2008).

By stabilizing the channel, large wood will reduce erosion in targeted locations, stabilizing the bank. Restoring riparian vegetation will improve channel stability, provide sources of woody debris that can contribute to creation of pools for salmon refuge, and reduce peak water temperatures that favor nonnative species. Project designs will include a large conifer component that will become a future source of LWD.

The project site is currently a mobile home park; historic use of the site is unknown. A major barrier to stream restoration on this property is the landowner due to lack of trust of government and lack of knowledge of stream processes. The Adopt A Stream Foundation has been educating and building a relationship with the landowner over the last several years and has successfully implemented three riparian plantings and placed over 40 pieces of LWD at this property.

BEAR CREEK REACH 6 RESTORATION PROJECT 15-1059

Project History: During 2012 the owner of the Friendly Village retirement community allowed the Adopt A Stream Foundation (AASF) to restore riparian vegetation along 330- feet of Bear Creek and to allow the installation of log fish habitat structures within that portion of the stream. That work was completed in 2014.

Subsequently, AASF approached the landowner about the possibility of expanding the aforementioned fish habitat restoration work on the balance of the stream in the Friendly Village complex. The response was very positive and the owner agreed to allow AASF to “do what it thought best.”

Then, in 2015, AASF prepared a conceptual design for Salmon Recovery Funding Board (SRFB) grant consideration that included installation of a series of log structures that would result in natural channel meanders and a more desirable forest area on both sides of Bear Creek.

Following a site visit by SRFB technical review team and discussions with the WRIA 8 Project Subcommittee, it was recommended by WRIA 8 that AASF should request funds to prepare an engineered design that could “maximize the benefits to Chinook.”

Design funds were awarded in 2015. Chinook Engineering was awarded a contract to incorporate recommendations by the SRFB technical review team and WRIA 8 Project Subcommittee into a detailed design. That design, now considered 30% complete, includes an aggressive approach to log placement and constructing stream meanders.

On August 10, that plan was reviewed by the WRIA 8 technical committee. A variety of comments, and recommendations were provided to the AASF including: “reduce excavated meanders;” “install less wood structure, but make them more engaged;” “…indicate if habitat structures are intended to benefit Chinook fry or smolt or both;” “don’t install wood or change the channel configuration – just plant riparian vegetation;” and don’t fill the old channel with spoils from meander excavations.”

A “marked-up” version of the Chinook Engineering design that reflects some of the WRIA 8 technical team comments has been uploaded into prism. Notations call for a reduction in excavated meanders and log structures with targeted results.

In advance of finalizing the design, a formal revision to preliminary design will be prepared for technical review. Then, after preparing modifications that may result from those discussions, the design will be presented to the landowner for his consideration.

* 1. **List the fish resources present at the site and targeted by your project.**

| Species | Life History Present (egg, juvenile, adult) | Current Population Trend (decline, stable, rising) | Endangered Species Act Coverage (Y/N) |
| --- | --- | --- | --- |
| Chinook | Egg, juvenile, adult | Decline | Y |
| Steelhead | Egg, juvenile, adult | Decline | Y |
| Coho | Egg, juvenile, adult | Decline | N |
| Sockeye | Egg, juvenile, adult | Decline | N |
| Cutthroat | Egg, juvenile, adult | Unknown | N |
| Kokanee | Egg, juvenile, adult | Decline | N |

* 1. Describe the limiting factors, and limiting life stages (by fish species) that your project expects to address.

Eggs (Chinook, Steelhead, Coho, Sockeye, Cutthroat and Kokanee)

* *Increased egg to fry survival:* The Washington Department of Fish and Wildlife indicate Bear Creek Reach 6 as Fall Chinook breeding area, according to their Priority Habitat and Species (PHS) and SalmonScape online mapping databases. Planting and re-grading the streambanks will increase egg to fry survival by reducing fine sediment input, resulting in cleaner spawning gravel and allowing for more oxygenated water to circulate around fish eggs as they incubate in the gravel.
* *Increase in suitable spawning areas:* Restoration will enhance the sorting of gravel by the proposed LWD and reduce fine sediment input, resulting in an increase in clean, well-sorted spawning gravel.

Juvenile (Chinook, Steelhead, Coho, Sockeye Cutthroat and Kokanee)

* *Increased channel complexity:* This project will increase juvenile salmonid production by creating more rearing and refuge areas for young fish. The proposed LWD and meanders will increase channel complexity by creating additional pools, slack water along streambanks, cover habitat and refuge from high velocities. The proposed LWD will accumulate and hold biological matter for processing in the creek, which will feed macro invertebrates, which will become forage for juvenile salmonids.
* *Riparian restoration:* Planting the streambanks will, in addition to reducing fine sediment and improving water quality, result in a reduction in peak summer temperatures. Warm water temperatures can be lethal to salmonids.

Adult (Chinook, Steelhead, Coho, Sockeye Cutthroat and Kokanee)

* *Increase in pool frequency:* Adding LWD will increase pool frequency, which will benefit adult salmonids as they migrate to their natal spawning grounds by providing resting and cool water refuge areas.
* *Increase in suitable spawning areas:* Adding LWD will sort gravel resulting in more suitable spawning areas and less competition.
1. **Project goals and objectives.**
	1. **What are your project’s goals?**

Enhance instream and riparian habitat for Chinook salmon in Bear Creek.

* + 1. **What are your project’s objectives?**

Objective 1: Remove footbridge that confines the stream channel in summer 2017.

Objective 2: Re-grade 330 feet of the left and right streambanks to mimic a natural streambank and to allow for greater interaction of the stream with its floodplain in early summer 2017.

Objective 3. Increase channel complexity by adding meanders and installing log jams as designed in Phase II – Design outcomes, in summer of 2017.

Objective 4: Increase stream shading, filtration of run-off, soil retention and LWD recruitment by converting 1 acre of lawn into a functioning native riparian forest in fall of 2017.

* 1. **What are the assumptions and constraints that could impact whether you achieve your objectives?**

Assumptions:

A primary assumptions is that our current RCO grant will produce preliminary designs by August 12th 2016 with final designs completed on or by December 31st 2016. Final designs will be submit to permitting agencies for review in 2017. Further, proceeding with implementation is contingent on acquiring permits. Utilizing a licensed professional engineer to generate designs will ensure that our project meets minimum requirements for a Hydraulic Permit Approval, Flood hazard Certification and USACE.

A secondary assumption is that we maintain continued support from the Friendly Village landowner. We have secured a signed landowner acknowledgement form for the project, but because implementation would be scheduled in 2017 at the earliest, attitudes or ownership may change. We have established a long-term relationship with the current landowner, and the likelihood of a change is minimal. AASF has heard of no plans for a change of ownership, and thus the likelihood of a transfer of ownership is minimal within the next few years.

Constraints:

This project is located on private property and any work done here must meet the approval of the landowner. This may impose limitations on project designs, as the landowner is very concerned with flooding and any potential to increase flood stage or bank erosion. The landowner may not be confortable with aggressively placed LWD structures including but not limited to mid channel or channel spanning structures. AASF will have to work closely with the consultant and the landowner to develop designs that are both acceptable to the landowner and maximize benefit to salmon.

* Sewer lines and/or other utilities could and/or will limit stream restoration on this property. Project will have to de designed around such obstacles. AASF has obtained a map of sewer lines locations within the project area (see design document “Map of Sewer Lines in Project Area” in PRISM).
* Geology may limit stream restoration options including, but not limited to anchoring techniques. If site geology becomes an issue then alternative anchoring techniques will have to be employed and/or project will have to be designed accordingly to work with site geology.
1. **Project details.**
	1. **Provide a narrative description of your proposed project.**

Specific details regarding the project design will emerge upon completion of the design phase. Engineer preliminary design will be completed by 8/12/2016 to accompany the final application and final designs will be completed by 12/31/2016. AASF intends to engage with the WRIA 8 Technical Committee during the development of designs to solicit feedback and comments. The project will include several components: Adding stream meanders, LWD installation, re-grading the bank, one acre riparian planting and removal of an existing footbridge.

The project will remove an existing footbridge that confines the stream channel. The footing of this bridge creates lateral confinement of the channel, increasing flow velocities and erosion downstream. The bridge also restricts natural channel migration, a primary mechanism for spawning gravel and LWD recruitment, both of which are critical to maintaining channel complexity for salmon habitat.

To improve interaction between the floodplain and Bear Creek, we will re-grade 330’ of the left and right banks, which currently have a near-vertical slope. We will create a more stable 3:1 slope starting from the ordinary high water mark and moving inland. This action meets several project objectives by increasing residence time of waters on the floodplain, reducing fine sediment inputs created by unstable bank slopes, and creating a more stable planting area for riparian restoration.

Following the slope re-grade, we will install LWD to increase channel complexity by creating variation in streambed morphology through scour and accretion. Logs will be clustered in chaotic wood complexes that will create pools and gravel bars, providing refuge for fish and collection zones of biological matter.

Finally, with the help of local volunteers, we will convert one acre of lawn into a functioning native riparian forest. As the riparian canopy matures, it will reduce thermal inputs to the stream by shading the creek, retain fine sediments through soil cover and root complexity, filter runoff before it enters the stream, and act as a source of long-term LWD.

* 1. **Provide a scope of work.**

Project task:

1. Administration
	1. AASF will administer the project. Senior Ecologist Walter Rung will serve as project manager. Tasks include: maintaining project records, submittal of payment requests and project reports, and coordinating project activities.

Task 1 Deliverables:

1. Timely submittal of all progress reports and payment requests.
2. Update PRISM on all BMP implementation activities.
3. BMP implementation
	1. AASF will implement the project. Project implementation will be based on designs produced through Phase II—Design (Grant # 15-1059).
	2. AASF will complete cultural resource review before any ground disturbing activities commence. AASF expects to complete cultural resource review in 2016 using existing funding (not part of the current grant request).

Task 2 Deliverables:

1. Addition of meanders to stream channel
2. Remove and dispose of footbridge.
3. Re-grade streambanks to approximately 3:1 slope.
4. Install LWD per project designs.
5. Install native trees and shrubs on 1 acre of riparian area.

Timeline:

* December 2016 Grant Awarded
* May-June 2017 Order and stage material and equipment and coordinate construction with landowner
* July 1st-September 15th Implement instream construction: remove footbridge, grade streambank, and place and anchor LWD, coir streambanks.
* October 15th – December 2017 Install native plants within project area.
	1. **Explain how you determined your cost estimates.** *Please attach a detailed budget for completing the scope of work. Include anticipated costs for labor, land acquisition, consultant fees and tasks, construction contracts, materials, and other relevant costs.*

Cost estimate is based on AASF experience on similar projects (See attached budget).

* 1. **Describe the design or acquisition alternatives that you considered to achieve your project’s objectives.**

AASF solicited bids for the design phase, and expects to have preliminary designs completed by a licensed professional engineer by 8/12/2016 which, will accompany the current proposals final application. Final project designs will be completed by 12/31/2016. The scope and scale of the project is designed to fit in with several long-term restoration outcomes being considered by the City of Redmond and Habitat Bank LLC. Immediate need for planting along the entire bank at this parcel has been tempered with a consideration of the possibility of future more comprehensive restoration efforts.

* 1. **How have lessons learned from completed projects or monitoring studies informed your project?** *.*

We have the advantage of observing project effectiveness on a site directly upstream of this project, which provides analogous conditions upon which to base our project. We have contracted a licensed professional engineer to produce permit-ready designs appropriate for site conditions and restoration goals.

Adopt A Stream Foundation has refined our stream restoration techniques over the past 30 years. We routinely visit our restoration sites and informally monitor their success. This informal monitoring has lead to a refining of our LWD placement and anchoring techniques and the development of various LWD structures as well as improvements in our riparian restoration techniques.

* 1. **Describe the long-term stewardship and maintenance obligations for the project or acquired land.**

The Friendly Village site has demonstrated commitment to site stewardship and maintenance beginning with our initial restoration project in 2012. Long term stewardship and maintenance obligations are part of all our landowner agreements. By signing the agreement the landowner agrees to monitor and maintain the site for no less then 10 years and to not intentionally compromise, remove or destroy the restoration work on their property. Some specific requirements of the agreement are as follows:

* Native plant maintenance requires watering the plants one to two times per week during the hot summer months. Invasive plant suppression requires the landowner to remove returning blackberry shoots twice per year, typically when the ground is wet.
* The landowner should require no maintenance of anchored log structures. However, if additional scouring of the stream bank occurs, or if a piece of wood becomes loose or dislodged, we request that the landowner contact AASF immediately.
1. **Context within the local recovery plan.**
	1. **Discuss how this project fits within your regional recovery plan and/or local lead entity’s strategy to restore or protect salmonid habitat**

According to the Chinook Salmon Recovery Plan, this project will implement a priority action (floodplain reconnection and riparian restoration), benefit a priority listed species (Chinook), and the project area is located in the Lower Bear Creek Subarea, which is identified as Tier 1 – Core Chinook use in WRIA 8.

Bear Creek Reach 6 is identified in the Chinook Recovery Plan as the fifth highest priority reach in the subarea. The project will directly address several technical priorities for Bear/Cottage Lake Creeks in the WRIA 8 Conservation Strategy including:

* Protecting and restoring riparian vegetation to improve channel stability, provide sources of large woody debris that can contribute to creation of pools, and reduce peak water temperatures that favor non-native species.
* Protecting and restoring floodplain connectivity and increase off-channel habitat by minimizing road crossings, reducing channel confinement, and removing floodplain structures. Protect and increase channel complexity, including large, woody debris, which contribute to channel stability and development of pools, trap sediment, and reduce water temperature.

Specifically, the proposed project will implement portions of project N214 listed in the WRIA 8 Chinook Conservation Plan. The overall technical hypothesis of N214 is to reduce fine sediment inputs, add LWD, restore riparian conditions, and reduce channel confinement. N214 calls out the proposed project area specifically, stating, “Restoration is needed throughout Friendly Village.”

The project will address the following Chinook habitat-limiting factors identified in Chapter 3: WRIA 8 Chinook Recovery Plan:

* Loss of Floodplain Connectivity
* Lack of Riparian Vegetation
* Disrupted Sediment Processes
* Loss of Channel and Shoreline Complexity
	1. **Explain why it is important to do this project now instead of later.**

The timeline of our proposed project aligns with the immediate need for riparian restoration in this high priority reach and the current willingness of the landowner to consider restoration. The Washington Department of Ecology’s Total Maximum Daily Load for Bear Creek identifies this reach as exceeding state water quality standards for thermal pollution. The installation phase of native trees will provide a shaded canopy that will contribute to stream cooling. This reach especially has very little native vegetation to shade and cool the water. This project will add trees and shrubs to 330’ linear feet of Bear Creek converting one acre of lawn in to a native riparian forest. Planting trees does not immediately cool the stream but the sooner trees are planted the sooner they can begin to provide cooling benefits.

This project is also an opportunity to take advantage of landowner willingness to continue restoring the creek. Landowners at this site have historically been resistant to restoration efforts, but have shown an eagerness to work with AASF. Continuing to build a relationship with the landowner and demonstrating stream restoration techniques will create a framework to engage him in a more comprehensive restoration effort in Reach 6.

* 1. **If your project is a part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps is included in this application for funding.** *Attach a map in PRISM that illustrates how this project fits into the overall strategy, if relevant.*

The proposed project will support implementation of a priority habitat restoration action identified in the Lake Washington/Cedar/Sammamish Watershed Chinook Salmon Conservation Plan (N214).

This is Phase II of multiple phase restoration effort on this property. This proposal is to implement designs resulting from Phase II – Design. Phase I was completed last year immediately upstream of the current project location with 42 pieces of LWD installed and 0.35 acres of lawn converted to a native riparian plant community. Our successful completion of this first phase has gained us the trust of the landowner and allowed us to pursue additional stream restoration projects on this property. We are currently working towards our goal of addressing all the restoration needs along the 1400’ of Bear Creek that flows through the property.

The proposed project will complement comprehensive efforts throughout Bear Creek, developed by the City of Redmond and others (WSDOT). This project is incremental in order to continue building a relationship with the landowner. The City of Redmond is very interested in working with this landowner and hopes to build on our relationship.

The entire reach exhibits a high need for habitat restoration. The City of Redmond, King County, WDFW, Habitat Bank LLC and private parties all have the intent to restore streams and wetlands on adjacent parcels. The final shape of those efforts is still being developed. We have been in contact with City of Redmond, WDFW and Habitat Bank LLC to assure that the proposed project will fit into reach wide efforts that are under consideration (see attached letters).

1. **How does your project consider and accommodate the anticipated effects of climate change on salmon recovery?**

The impacts of climate change are a primary impetus for the timing of this project. As summer low flows decrease due to measured reductions in snowpack and groundwater recharge, small streams require more than ever an established riparian canopy to reduce the added effect of thermal pollution on stream temperature. This project aims to connect existing and proposed riparian habitat improvement projects along Bear Creek by the aforementioned organizations and agencies.

1. **Project Proponents and Partners.**
	1. **Describe your experience managing this type of project.**

AASF has 30 years’ experience restoring riparian restoration in Snohomish, King and Island counties. Our restoration team has implemented LWD restoration projects in numerous watersheds through funding with the Department of Ecology, Recreation and Conservation Office (SRFB) and private foundations. Since 2009, our team has managed and installed 31 in-stream design-build restoration projects.

* 1. **List all landowner names.**

Friendly Village of Redmond, Matt Marcus, Marcus Real Estate Services.

* 1. **List project partners and their role and contribution to the project.** *Attach a Partner Contribution Form (Manual 18,* [*Appendix G*](#Appendix_G_Project_Partner_Form)*) from each partner in PRISM. Refer to Manual 18, Section 3 for when this is required.*
1. Chinook Engineering, Designs
2. City of Redmond, Project development
3. WDFW, Project development
	1. **Stakeholder outreach**. *Discuss whether this project has any opposition or barriers to completion, besides funding. Describe your public outreach and feedback you have received. Are there any public safety concerns with the project? How will you address those concerns?*

There are no known barriers or opposition to this project. We have built a good relationship with landowner, residents and Gary the site superintendent.

## Supplemental Questions

### Restoration Project Supplemental Questions

1. **Will you complete, or have you already completed, a preliminary design, final design, and design report (per** [**Appendix D**](#Appendix_D_Design_Deliverables)**) before construction?**

Yes. Final designs will be completed before construction
Choose an answer

1. **Will a licensed professional engineer design your project?**

Yes.
Choose an answer

1. **If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery.**

The current stream banks at the project location are nearly vertical, re-grading the streambank to a more natural 3:1 slope will decrease bank height which is an approved method for increasing streambank stabilization per WDFW Stream Habitat Restoration Guidelines 2012.

All of the required SRFB streambank stabilization criteria have been meet for this project:

* The streambank stabilization is a secondary element of this project. The primary reason the streambanks are being re-graded to a 3:1 slope is to create a stable area to plant and to reduce fine sediment input. The re-grading of the streambanks has a secondary effect of lowering bank height. The proposed streambank stabilization element of this project is just one part of a multi-faceted stream restoration project in which 1.0 acres of lawn is converted to native riparian forest, a stream crossing is removed and LWD is installed to enhance fish habitat.

* Without incorporating streambank stabilization into this project we would not be able to accomplish our goal of planting 1.0 aces of riparian and reducing fine sediment input. Re-grading the streambanks will create a stable planting area in what is currently a vertical bank that is continually sloughing off into the creek.
* Streambank stabilization method in this project have been designed to incorporate habitat features (LWD and seasonally inundated plant communities) and incorporate best practices as described in the WDFW Stream Habitat Restoration Guidelines 2012 and the Integrated Streambank Protection Guidelines 2003.
1. **Describe the steps you will take to minimize the introduction and spread of invasive species during construction and restoration.** *Specifically consider how you will use un-infested materials and clean equipment entering and leaving the project area.*

AASF will follow the protocols listed in Washington Department of Fish and Wildlife Invasive Species Management Protocols, Version 2 (2012). AASF will take measures to minimize introduction and spread of invasive species, such as the European mud snail throughout the course of the project. Example measures include cleaning all waiters after in-stream work and air-drying before waiters are used for other streams. Before entering project area, waiters will be cleaned and examined for non-native seeds and organisms.

# Comments

Use this section to respond to the comments you will receive after your initial site visits, and then again after you submit your final application.

### Response to Site Visit Comments

Please describe how you’ve responded to the review panel’s initial site visit comments. *We recommend that you list each of the review panel’s comments and questions and identify how you have responded. You also may use this space to respond directly to the comments.*

**Date:** 4/12/16 **Project Site Visit?** **[x]  Yes** **[ ]  No Review Panel Member(s):** Powers/Tyler

1. **Recommended improvements to make this a technically sound project according to the SRFB’s criteria.**
	1. Develop existing design grant (SRFB Project # 15-1059) to a minimum 30 percent level. As discussed in the field, design placement for more frequent stream interaction than has been achieved by the upstream restoration work.

The engineered preliminary designs detail aggressive LWD placement with logs placed low in the channel cross section allowing the wood to be interacting with the stream most of the time. Other interactions include the construction of meanders, riffles and floodplain terraces.

* 1. The LWD planned for the site in terms of number and cost seems very low. Please review the design with the engineer and verify LWD costs.

Although final designs have not been completed and final quantities and volumes have not been calculated, AASF believe that the amount requested for construction will be adequate for completion of this project. Cost is based on our experience with project of similar scope and size.

**Comments From 2015 Application (Project 15-1059)**

One of the goals of the project to enhance instream habitat (sort and clean spawning gravel and create rearing pools). The project as designed treats mostly the margins with bank treatment and LWD at the toe. To improve instream spawning and rearing larger structures further out into the main channel would likely be required. This could be achieved by alternating the bank sloping from left to right bank, etc. and create some meander pattern and hydraulic complexity. We understand the potential for this may be limited due to infrastructure or utilities on site. Please identify them relative to the restoration plan.

These concerns have been addressed in the engineered preliminary designs.

Please provide information on current flood levels? Perhaps an aerial photo with waterlines drawn in. The Review Panel would like to better understand the current flooding situation before LWD is added to the channel. Maybe County floodway maps?

Flood elevations, hydraulic modeling and flood hazard are required for the flood hazard certification and will addressed in the final designs with SRH 2-d flow modeling developed by USBOR. An area map delineating the FEMA preliminary floodway and the FEMA preliminary 100-year floodplain has also been uploaded to PRISM.

1. **Missing Pre-application information.**

Preliminary Design = see attachments in PRISM

1. **General Comments:**

While not highlighted in the proposal, one of the added benefits of this project is the proximity to large conservation properties. Immediately downstream is a recently acquired wetland mitigation bank property that has a salmon component . Another conservation property also exists upstream.

The project offers a willing landowner and the opportunity to conduct a wood placement project in relatively close proximity to a residential area. The sponsor has done an excellent job of building landowner trust through small steps in previous projects. This project will capitalize and build upon that trust and project momentum.

**WRIA 8 Project Subcommittee Comments – Bear Creek Reach 6 Restoration, Phase II Construction**

* The Project Subcommittee (Subcommittee) acknowledges the site visit was conducted very early in the design phase, but there were concerns about the concepts and schematics discussed on-site and the proposed approach. The concerns are as follows:
	+ There is a desire to see more aggressive wood placement aimed at enhancing or creating juvenile rearing habitat for Chinook salmon—allowing wood to interact with the low flow channel and within pools. As portrayed in the conceptual plan, wood is tucked in the banks and located along the channel margins on the outside bend of channel meanders, ostensibly serving as bank protection. Given that the landowner has committed significant buffers to the project, and since the area immediately downstream is a mitigation site with no at-risk property, the approach seems overly conservative.

The preliminary designs detail a more aggressive approach to wood placement as well as constructing meanders, riffles and pools. LWD is place low in the stream cross-section to allow nearly year around interactions with the flow. This project is constrained by a sanitary sewer line on the right bank and homes on the left bank, making it necessary to constrain the movement of the channel with LWD structures.

* + It may not be necessary to force channel sinuosity; one approach could be to let the channel respond on its own to the wood placements. Process-based design is encouraged and will help to minimize construction costs.

A processed base design approach is a good idea, however it is inappropriate at this location where major infrastructure exist on either side of the channel and at the downstream end of the project. A sanitary sewer line approximately 8’ deep along the entire right bank of the project and crosses the stream 2’ below the channel bed at the downstream end of the project area. Several homes border the left bank of the project. Designed sinuosity will mazimize the immediate positive impact of the project, and it will help direct future natural channel movement away from existing infrastructure.

* + The need for constructed riffles is unclear. This area is a juvenile rearing area and unlikely to support spawning, so additional justification as to why riffles are desired is necessary.

Currently, this section of Bear Creek is unlikely to support spawning as there is not habitat to support it, however the presence of Chinook salmon that are ready to spawn has been documented in this reach of Bear Creek. Since spawning chinook use this reach it is very likely that once suitable spawning habitat exists it will be utilized.

* + The proposed high flow terrace, if incorporated in the design, should be designed in such a way to provide refuge at the flows expected when juvenile Chinook are out-migrating. Additionally, budget details should be provided pertaining to the export/disposal of material.

High flow terrace dynamics will be addressed during completion of the final design with 2-d flow modeling. Terrace elevation can be adjusted to provide refuge during outmigration.

We anticipate using a cut and fill technique where no soil or fill will need to be exported from the project site.

* + When compared to the riparian planting on the Phase I project, the Subcommittee would like to see more willows, red osier dogwood, and conifers. There is also a desire for more dense plantings (shrink the on-center distance) and an interest in being strategic about what is planted where (e.g., don’t plant rose in an area that will be inundated periodically).

The exact composition of the planting plan will be developed in concert with the landowner, with the engineer, and with careful consideration of microenvironments in order to maximize the plants survival rates, impact on the ecology in and around the stream, and aesthetic value. Each plants utility as, for example, a good shade provider or a efficient bank stabilizer will also be considered. AASF has had success planting trees 9 ft on center and shrubs 4 ft on center, but these dimensions can be adapted to site specific considerations.

* The Subcommittee is aware of the existing sewer line along the right bank and the need to protect this infrastructure. Question: can the sewer line be moved? If not, or if doing so is cost prohibitive and beyond the scope of the current effort, the Subcommittee encourages allowing the maximum channel movement on the right bank that will not put this infrastructure at risk.

The sanitary sewer line cannot be moved; it would be cost prohibitive. The preliminary designs allow for the maximum channel meanders with a reasonable safety margin. Logs will be used to constrain the movement of the channel within what is deemed safe by the designing engineer.

* WRIA 8 will request that RCO condition the grant award to require WRIA 8 Technical Committee approval of both the preliminary design and the final design before the agreement for construction funding is issued. Any feedback provided at the preliminary design review will be expected to be reflected in the subsequent design submitted for the final review.

Preliminary designs will be presented to the WRIA 8 Technical Committee for review. Comments will be incorporated into the final designs, which will also be submitted to the committee. SEE PRISM ATTACHMENT – DESIGN MARKUP

BEAR CREEK REACH 6 RESTORATION PROJECT 15-1059

Project History: During 2012 the owner of the Friendly Village retirement community allowed the Adopt A Stream Foundation (AASF) to restore riparian vegetation along 330- feet of Bear Creek and to allow the installation of log fish habitat structures within that portion of the stream. That work was completed in 2014.

Subsequently, AASF approached the landowner about the possibility of expanding the aforementioned fish habitat restoration work on the balance of the stream in the Friendly Village complex. The response was very positive and the owner agreed to allow AASF to “do what it thought best.”

Then, in 2015, AASF prepared a conceptual design for Salmon Recovery Funding Board (SRFB) grant consideration that included installation of a series of log structures that would result in natural channel meanders and a more desirable forest area on both sides of Bear Creek.

Following a site visit by SRFB technical review team and discussions with the WRIA 8 Project Subcommittee, it was recommended by WRIA 8 that AASF should request funds to prepare an engineered design that could “maximize the benefits to Chinook.”

Design funds were awarded in 2015. Chinook Engineering was awarded a contract to incorporate recommendations by the SRFB technical review team and WRIA 8 Project Subcommittee into a detailed design. That design, now considered 30% complete, includes an aggressive approach to log placement and constructing stream meanders.

On August 10, that plan was reviewed by the WRIA 8 technical committee. A variety of comments, and recommendations were provided to the AASF including: “reduce excavated meanders;” “install less wood structure, but make them more engaged;” “…indicate if habitat structures are intended to benefit Chinook fry or smolt or both;” “don’t install wood or change the channel configuration – just plant riparian vegetation;” and don’t fill the old channel with spoils from meander excavations.”

A “marked-up” version of the Chinook Engineering design that reflects some of the WRIA 8 technical team comments has been uploaded into prism. Notations call for a reduction in excavated meanders and log structures with targeted results.

In advance of finalizing the design, a formal revision to preliminary design will be prepared for technical review. Then, after preparing modifications that may result from those discussions, the design will be presented to the landowner for his consideration.

### Response to Post-Application Comments

Please describe how you’ve responded to the review panel’s post-application comments. *We recommend that you list each of the review panel’s comments and questions and identify how you have responded. You also may use this space to respond directly to the comments.*