BIOLOGICAL ASSESSMENT ADDENDUM FOR THE BEEBE SPRINGS NATURAL AREA DEVELOPMENT PHASE 4A PROJECT

CHELAN, WASHINGTON

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CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
BA	Biological Assessment
BMP	Best Management Practices
CPUD	Chelan Public Utility District No. 1
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FMP	Fishery Management Plan
HUC	Hydrologic Unit Code
OHWM	Ordinary High Water Mark
NMFS	National Marine Fisheries Service (also known as NOAA Fisheries)
PCE	Primary Constituent Elements
RM	River Mile
SPCC	Spill Prevention, Containment, and Countermeasures Plan
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDFW	Washington Department of Fish and Wildlife

EXECUTIVE SUMMARY

In 2003, the Washington Department of Fish and Wildlife (WDFW) acquired 182 acres surrounding the Chelan Fish Hatchery. The acquisition provided the opportunity to preserve low elevation Columbia Basin riparian and shrub-steppe habitat, restore habitats on the portion of the property formerly in orchard, and develop education and interpretive opportunities. The Beebe Springs Natural Area is being created, in several phases, on 120 acres of this property. This property sits north of Beebe Bridge along the western shore of the Columbia River, a reservoir (also known as Rocky Reach Reservoir) on the mainstem of the Columbia River created by Rocky Reach Dam, a hydroelectric dam operated by the Chelan Public Utility District No. 1 (CPUD), Wenatchee, Washington.

U.S. 97 bisects the property, running north and south. To the west of U.S. 97, the property is composed of post-agricultural lands and native shrub-steppe, cliffs, and talus natural areas. Two springs on the west margin of the property erupted into existence during the Ribbon Cliff earthquake of 1872 and later subsided to form the two, Beebe Springs and Beebe Springs Creek. About 1.5 miles to the south is the town of Chelan Falls, and the City of Chelan is approximately 2.5 miles to the west.

The majority of the proposed development area for Phase 4a is bounded on the east by U.S. 97 and on the west by the Highway 150. The project area extends north from the Chelan Fish Hatchery to the north side of Toad Creek, not far from the northern limits of the WDFW-owned property. A disjunct portion of the Phase 4a project area is located near the Columbia River riparian zone under Beebe Bridge. The vicinity of the bridge contains a diverse mix of native and non-native plants, including invasive blackberries. Narrow strips of fringe wetland also border the Columbia River in this area.

This Biological Assessment (BA) Addendum for Phase 4a of the Beebe Springs Natural Area Development is focused on actions relating to native plant restoration, invasive species eradication, creek enhancements, trail construction, and interpretive and educational signage and is a continuation of the implementation of the Beebe Springs Natural Area Master Plan. Additional phases of this habitat enhancement and watchable wildlife project may be completed at a later date when additional funding is obtained.

Phase 1 included the creation of a new spawning/rearing channel (north channel) of Beebe Springs Creek to increase available spawning and rearing habitat for native salmonids. The channel was created to encourage and increase the number of summer/fall-run Chinook salmon, summer-run steelhead (listed as threatened under the Endangered Species Act [ESA]), and coho salmon spawning and rearing in Beebe Springs Creek. This channel was completed in 2006 and approximately two thirds of the creek flow is being directed into this channel, with the remainder directed into the original channel (south channel), which serves as additional salmonid habitat and as an overflow channel. Flows in the two channels of Beebe Springs Creek below U.S. 97 will be monitored and adjusted to optimize access and available spawning and rearing for salmonids.

Phase 2 included the creation of a side channel to the Columbia River, the enhancement of wetlands, restoration of upland and riparian vegetation, improved site access from U.S. 97 and the

parking area, as well as trails with three pedestrian bridges, viewpoints, and interpretive displays. Phase 3 included the creation of a series of new side channels (including a rearing side channel to provide refuge for juvenile salmonids) to the Columbia River, the enhancement and creation of wetlands, planting of upland and riparian vegetation, removal of a dirt road and two culverts on the south channel of Beebe Springs Creek, enhancement of aquatic habitat in Beebe Springs Creek, hand-carry boat launch, and construction of trails with viewpoints.

Phase 4 includes an Americans with Disabilities Act (ADA) compliant pedestrian trail that will lead from the Phase 3 trail loop and run north-south paralleling the Columbia River. Along the trail system, up to three strategically placed viewpoints will allow views of the Columbia River and surroundings. Shrub-steppe and riparian vegetation will be planted to restore the shoreline and uplands. Finally, a 135 foot long culvert that drains surface water from the west side of US 97 will be abandoned, and a new channel will be excavated through the shrub-steppe environment to accommodate the runoff. Phase 4 is planned to be constructed concurrently with Phase 4a.

The key goals of this BA Addendum are to determine the level of effect (if any) of Phase 4a of the project on protected species and critical habitats in the project vicinity and to communicate these findings to the federal agencies. Initial consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) during the first three phases resulted in a list of endangered, threatened, proposed, and candidate species and critical habitats listed under the ESA that are likely to be found in the project vicinity. The species identified were: upper Columbia River spring-run Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*), upper Columbia River Distinct Population Segment (DPS) of steelhead trout (*O. mykiss*), Columbia River bull trout (*Salvelinus confluentus*) DPS, marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), Ute ladies'-tresses (*Spiranthes diluvialis*), gray wolf (*Canis lupus*), showy stickseed (*Hackelia venusta*), and Wenatchee Mountains checker-mallow (*Sidalcea oregana* var. *calva*). Of these, only spring-run Chinook salmon, and steelhead trout have been documented to occur in the Phase 4a proposed action area. The remaining nine species (bull trout, Ute ladies'-tresses, grizzly bear, Canada lynx, marbled murrelet, spotted owl, gray wolf, showy stickseed, and the Wenatchee Mountains checker-mallow) are unlikely to occur in the proposed action area due to a lack of suitable habitat, distance from suitable habitat or documented populations, or lack of migratory corridors to known populations.

Critical habitat has been designated for the upper Columbia River spring-run Chinook salmon ESU, upper Columbia River steelhead trout DPS, Columbia River bull trout DPS, Canada lynx, gray wolf, and Wenatchee Mountains checker-mallow; but only designated critical habitat for Chinook salmon and steelhead trout occur in the proposed Phase 4a action area A list of Essential Fish Habitat (EFH) species protected under the Magnuson-Stevens Act was also obtained and included Chinook salmon and coho salmon (*O. kisutch*).

This BA Addendum is also prepared with the understanding that the proposed Phase 4a activities will all be carried out within the bounds of the protocols established in the July 8, 2008 Biological Opinion (NMFS Tracking No. 2008/03598 and FWS No. 13410-2008-FWS # F 0209) for the Washington State Fish Passage and Habitat Enhancement Programmatic Consultation. . A summary of potential effects to ESA species and EFH is provided in Tables E-1 and E-2.

Table E-1
Phase 4A BA ESA Effects Determination

Species*	ESA Status	Jurisdiction	Effects – Construction	Effects – Long Term	Effects to Critical Habitat
Chinook Salmon *(Oncorhynchus tshawytscha)*	Endangered	NMFS	May affect, not likely to adversely affect	Beneficial-Creation of stream habitat & revegetation of riparian zone	May affect, not likely to adversely affect
Steelhead Trout *(Oncorhynchus mykiss)*	Threatened	NMFS	May affect, not likely to adversely affect	Beneficial- Creation of stream habitat & revegetation of riparian zone	May affect, not likely to adversely affect

Table E-2
Phase 4A EFH Effects Determination-Pacific Salmon

Species	Hydrologic Unit Code (HUC)	Effects Determination
Chinook Salmon (*O. tshawytscha*)	Upper Columbia River-Entiat: HUC 17020010	No adverse effect
Coho Salmon (*O. kisutch*)	Upper Columbia River-Entiat: HUC 17020010	No adverse effect

1.0 INTRODUCTION

This report has been prepared as a supplement to the Biological Assessment (BA) for the Beebe Springs Natural Area Development Phase 3 Project (URS 2010). The BA for Phase 3 was submitted by J.A. Brennan and Associates to the Washington Department of Fish and Wildlife (WDFW) in May 2010 to initiate Endangered Species Act (ESA) consultation for the proposed project. The purpose of this supplement is to update the BA to reflect changes in site development that occurred subsequent to initiation of consultation for Phase 3, and to provide additional information regarding Phase 4a to support the consultation process. For Phase 4, an addendum to the Phase 3 BA was also prepared.

Phase 4a is a continuation of the implementation of the Beebe Springs Natural Area Master Plan, developed by WDFW and J.A. Brennan Associates in 2006. Phases 1, 2, 3 and 4 focused on habitat improvements to Beebe Springs Creek, side channel creation along the Columbia River, and visitor facilities such as a restroom, trail system, parking area, interpretive signage, and art installations. Phase 4a of the Beebe Springs Natural Area Development is focused within an area north of the Chelan Fish Hatchery, and consists primarily of native plant restoration, invasive species eradication, creek enhancements, trail construction, and interpretive and educational signage. In addition, there is a short trail extension proposed beneath Beebe Bridge.

2.0 PROJECT LOCATION

This BA Addendum considers the fifth section in a phased habitat enhancement and watchable wildlife project, and is referred to as Phase 4a. It is referred to as Phase 4a because it is intended to be constructed in conjunction with the activities proposed under the application for Phase 4. The Phase 4a project area discussed in this document is wholly within the Beebe Springs Creek sub-basin and nearshore habitat of Columbia River (see Appendix A, Project Plan and Concept Drawings). The Phase 4a project area is roughly bounded on the east by U.S. 97 and on the west by the Highway 150. The project area extends north from the Chelan Fish Hatchery to the north side of Toad Creek, not far from the northern limits of the WDFW-owned property. On maps this drainage is unnamed, but was dubbed “Toad Creek” by WDFW project staff. A minor portion of the project area occurs on the east side of US 97 where the Beebe Bridge (US 97) crosses the Columbia River. It is on bridge fill well above the ordinary high water mark (OHWM) of the river.

Photographs of the proposed project action area are presented in Appendix B. All major machinery and staging area activities would occur along the roads and on adjacent property. The work window for Beebe Springs Creek flow diversion and inwater work is July1 to August 31. The removal of approximately 50 lineal feet of concrete channel liner and stream habitat improvements along approximately 150 lineal feet of Beebe Springs Creek will be constructed in the dry while isolated by coffer dams and done in accordance with conservation measures and reasonable and prudent measures for incidental take outlined in the July 8, 2008 Biological

Opinion for Washington State Fish Passage and Habitat Enhancement Restoration Programmatic Consultation (NMFS and USFWS 2008) (Appendix C).

3.0 ACTION AREA

The Action Area is "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (Federal Register 1986). In this case, the Action Area is limited to the project area described above and a region extending a half mile in all directions from the perimeter of the project area. All major machinery and staging activities would occur here. The Action Area is illustrated in Figure 1. Noise associated with trail construction, road and culvert removal, landscape restoration and creek restoration is expected to extend no more than 0.5 mile from the construction areas.

4.0 PROJECT DESCRIPTION

4.1 CONSTRUCTION OF TRAILS, CHANNEL RESTORATION, AND LANDSCAPE RESTORATION

Phase 4a of the Beebe Springs Natural Area Development is focused within an area north of the Chelan Fish Hatchery, and consists primarily of native plant restoration, invasive species eradication, creek enhancements, trail construction, and interpretive and educational signage.

The project components include the following:

- Beebe Springs Creek: Restoration and Access Improvements
- Chinook Spring: Restoration and Access Improvements
- Toad Creek: Restoration and Access Improvements
- Trail Construction
- Interpretive and Educational Signage

4.1.1 Beebe Springs Creek: Restoration and Access Improvements

Beebe Springs Creek, which flows from west to east along the northern boundary of the hatchery, is a fairly channelized creek that includes a segment of concrete-lined bottom. Steelhead trout spawn in this creek roughly to a point just below the concrete-lined portion of the channel, where a small pedestrian bridge crosses the creek at the eastern end of the concrete liner.

Figure 1 Beebe Springs Phase 4A Project Area and Action Area

The restoration plan for this segment of Beebe Springs Creek will include removing the concrete liner, excavating portions of the stream bank to install woody debris and rounded rock. The riparian buffer will undergo selective invasive species control and planting of native vegetation. The intent of the restoration is to partially reestablish predevelopment channel morphology, provide better habitat opportunities for spawning steelhead, and provide better cover for wildlife and fish.

A pedestrian bridge currently spans Beebe Spring Creek. However, the grated deck bridge across the creek is light-duty, insufficient for frequent use, and does not provide Americans with Disabilities Act (ADA) access. The project proposal includes removing the bridge and replacing it with a stronger solid-decked bridge.

The restoration and access improvements at Beebe Springs Creek include the following:

- Removal of approximately 50 lineal feet of concrete channel liner
- Channel improvements along approximately 150 lineal feet of Beebe Springs Creek, which includes substrate enhancement, the installation of woody debris, and placement of boulders and cobbles
- Selective clearing of approximately 400 square feet of invasive, non-native vegetation within the stream buffer
- Planting of approximately 3,000 square feet of native riparian vegetation
- Removal of an existing bridge (approximately 60 square feet)
- Installation of a bridge (approximately 63 square feet)

In order to facilitate the work, the majority of the flow in Beebe Springs Creek will be routed through the Chelan Hatchery and discharged below the work area. The small amount of remaining flow will be diverted using sandbags. Therefore, the work will be done outside the flow of the stream. This will reduce the direct input of sediment into the stream and will isolate the work from any fish that may be present in Beebe Springs Creek at the time that the work occurs.

4.1.2 Chinook Spring: Restoration and Access Improvements

Approximately 200 feet northeast of Beebe Springs Creek, a spring-fed drainage, called the Chinook Spring, runs parallel to Beebe Springs Creek. A very small amount of water trickles down the Chinook Spring drainage more or less continuously from part of the Beebe Springs complex. The plant community along Chinook Spring consists primarily of native plant material, which has mostly been installed by WDFW. Wetland F has been identified towards the end of the spring's wetted area (URS 2012), where an old culvert used during a previous agricultural period has failed.

Restoration of the Chinook Spring includes the removal of the culvert and the placement of native plants along the daylighted section. Proposed restoration work will also include the removal of a patch of blackberries and managing the young blackberry sprouts by mowing and utilizing spot spay or cut stem application of a permitted and effective herbicide. A grass seed mix will be planted to aid in erosion control. Invasive species control will occur for two to three growing seasons.

The project includes a proposed pedestrian crossing of Chinook Spring. The crossing will be in the form of a crushed rock surfaced trail with culverts beneath to accommodate water flow.

The restoration and access improvements at Chinook Spring include:

- The full removal of a 4-inch culvert, approximately 30 feet in length
- Creation of approximately 325 square feet of wetland adjacent to Wetland F, where the culvert will be removed
- Selective clearing of 550 square feet of invasive, non-native vegetation within the undelineated portion of Wetland F
- Planting of 325 square feet of native riparian vegetation
- Installation of 250 square feet of crushed rock trail through Wetland F
- Installation of two 8-foot long, 12-inch culverts

The work area for Chinook Spring is approximately 200 feet from Beebe Springs Creek. Since there is no surface water connection, work in Chinook Spring will not affect water quality in Beebe Springs Creek.

4.1.3 Toad Creek: Restoration and Access Improvements

Toad Creek is approximately 600 feet long, runs at a fairly steep gradient down the steep, almost hanging valley, and flows into a low-lying level area where there is an identified wetland, Wetland E (URS 2012). The banks of the creek are covered with invasive species, predominantly Himalayan Blackberry, for nearly the entire length. Restoring the vegetation of the creek would do much to enhance habitat opportunities along this riparian corridor, and significantly enhance the experience of those hiking along the proposed Toad Creek trail.

Site preparation will be conducted to eradicate invasive species within a portion of Toad Creek and its riparian buffer would involve clearing blackberry, grubbing to the extent possible, and managing the young blackberry sprouts by mowing and utilizing spot spray and cut stem application of a permitted and effective herbicide. A grass seed mix will be placed to aid in erosion control. Invasive species control will occur for two to three growing seasons.

The project proposal includes the installation of a solid-decked pedestrian bridge across Toad Creek.

The restoration and access improvements at Toad Creek include:

- Selective clearing of approximately 30,000 square feet of invasive, non-native vegetation within the stream buffer
- Installation of a bridge (approximately 128 square feet)

4.1.4 Trail Construction and Access Improvements

The project includes a proposed hiking trail connecting the Chelan Hatchery with the scenic areas in the vicinity of Toad Creek, and on top of the adjacent bluff. The portion of the trail along the low-lying part of the site is planned to be ADA accessible. It will include stream crossings as previously mentioned. The portion of the trail that accesses the top of the bluff will have a higher degree of hiking difficulty due to steep terrain. The trail will be designed and built to U.S. Forest Service standards.

The trail project also includes a proposed trail spur from the established trail system on the east side of U.S. 97. This trail segment will connect existing trails to an interpretive viewpoint beneath the Beebe Bridge.

At the Chelan Hatchery, access improvements will be implemented that allow visitors the ability to have ADA access from existing parking facilities to the proposed trail system. Improvements include some asphalt paving, striping and directional signage within the existing developed hatchery area.

4.1.5 Interpretive and Educational Signage

The project entails the installation of up to five interpretive or educational signs along the proposed trail system. Post-mounted signs will be located along the proposed trail system at the most beneficial places. Sign content will include information pertaining to wildlife, geology, and human history. This will complement the existing interpretive sign system installed on the opposite side of U.S. 97 during previous phases of the project.

4.2 CONSTRUCTION SCHEDULE

Project construction will begin in July 2012 and be completed by the end of February 2013. Work will begin with the implementation of an Erosion and Sediment Control Plan, consisting of Best Management Practices (BMPs). BMPs will include straw wattles along the OHWM of Beebe Springs Creek, Chinook Spring, and Toad Creek. Site and initial off-channel grading, landscaping, and trail building will occur in the late summer/fall of 2012 using conventional construction equipment.

4.3 CONSTRUCTION METHODS

The proposed project will require the use of standard construction equipment, including excavators, bulldozers, dump trucks, and water trucks (for control of dust). Clearing and grubbing activities and installation of sedimentation control devices may require the use of excavators. In

order to facilitate the work, the majority of the flow in Beebe Springs Creek will be routed through the Chelan Hatchery and discharged below the work area. The small amount of remaining flow will be diverted using sandbags. Therefore, the work will be done outside the flow of the stream. This will reduce the direct input of sediment into the stream and will isolate the work from any fish that may be present in Beebe Springs Creek at the time that the work occurs.

Construction will be phased to reduce the amount of soil exposed at any one time, and the use of temporary straw wattles will minimize off-site migration of soils into adjacent waterways. To control noise, construction equipment will be outfitted with mufflers and all activities will be conducted Monday through Friday during normal working hours (between 7:00 am to 5:00 pm). Exposed soil will be seeded, covered with plastic, or otherwise maintained to minimize erosion. Mowing, non-native invasive species control, cleaning out sediment accumulation, and plant establishment are the only required maintenance activities.

4.4 CONSERVATION MEASURES/BEST MANAGEMENT PRACTICES

The following conservation measures protect and minimize the impact to aquatic species and their habitat:

- **Work Timing Window:** The work window for Beebe Springs Creek flow diversion and in-water work is July1 to August 31. Activities that do not involve instream work can occur any time.

- **Obtain Local Permits:** The project will obtain and comply with the terms and conditions of applicable state and federal permits; Seattle District Office of U.S. Army Corps of Engineers Section 404 permit.

- **Sediment Control:** Erosion and sediment control BMPs will be used to select, implement, maintain, and removal appropriate temporary and permanent erosion and sediment controls during restoration. Contractors will implement and utilize an approved Soil Erosion and Sedimentation Control Plan to prevent accelerated erosion and off-site migration of soil from occurring during construction and restoration efforts. The BMPs include but are not limited to:

- Temporary Erosion Control Practices
    - Straw wattles
    - Stabilized construction entrances
    - Dust Control
    - Spill Prevention
    - Marking Construction Limits and protecting existing vegetation beyond construction limits
- Permanent Erosion and Sediment Control
    - Permanent vegetative plantings and seeding
    - Protective fencing in place until vegetation established
    - Maintenance of vegetation, minor erosion that may occur following high rainfall or snow melt

- **Spill Prevention Control:** Construction contractors will be required to implement and utilize an approved Spill Prevention, Containment, and Countermeasures Plan (SPCC) for spill prevention and containment.

- Spill kits will be readily available
- The contractor and crew will be trained in spill prevention and containment techniques
- Clean and well-maintained equipment and tools will be used

- **Stormwater Pollution Prevention Plan:**

- Contractors will develop and implement an approved Stormwater Pollution Prevention Plan prior to initiating construction activities

- **Preservation of Existing Vegetation:**

- Existing native vegetation will not be disturbed outside of the construction area

- **Visual Monitoring:**

- A construction supervisor will monitor the entire construction process

- **Clean-up:**

- All debris or deleterious material resulting from construction shall be removed from the construction area and disposed of at an authorized site.
- Construction related debris shall not be dumped or allowed to enter the stream channel or floodway

- **Culvert Removal during Phase 4a:**

    - Prescriptions for habitat restoration projects are covered under the July 8, 2008 Biological Opinion for the Washington State Fish Passage and Habitat Enhancement Restoration Programmatic Consultation (NMFS and USFWS 2008). The conservation prescriptions in Appendix C will be followed during the burial or removal of the culvert in the abandoned channel swale.

5.0 EXISTING ENVIRONMENTAL CONDITIONS

5.1 BEEBE SPRINGS CREEK WATERSHED AND THE COLUMBIA RIVER NEARSHORE HABITAT IN PROJECT VICINITY

The Columbia River in the project vicinity is impounded by Rocky Reach Dam to form the Columbia River. The Columbia River extends from river mile (RM) 473.7 at Rocky Reach Dam, upstream to the tailrace of Wells Dam at RM 515.6. The project area is located where Beebe Springs Creek flows into the Columbia River at approximately RM 504.5, about three quarters of the way upstream between Rocky Reach and Wells Dams. The normal water surface elevation of the Columbia River in the project vicinity is 707.5 feet.

The Beebe Springs were formed as a result of the 1872 earthquake that induced the Ribbon Cliffs landslide and formed a geyser at the base of base of the Chelan moraine (Hackenmiller 1995, Kerr

1980), which eventually subsided into two springs and Beebe Springs Creek. A portion of the project area was part of an orchard operation before being obtained by the WDFW. The orchard operation virtually eliminated native upland habitat, and riparian habitat was reduced by conversion to orchard and degraded by introduced non-native plants. Prior to inundation by Rocky Reach Dam, this section of Columbia River shoreline contained a greater variety of habitat features, including sandbars, backwater channels, and a greater variation of water depth and velocities. Today, the shoreline is a homogeneous stretch of shallow water that lacks the complexity to support a diversity of fish and wildlife.

The native vegetation in the project area vicinity is dry shrub-steppe, characterized by drought-tolerant shrubs and grasses. Common shrubs in the uplands on the project site include big sagebrush (*Artemisia tridentata*), common rabbit-brush (*Chrysothamnus nauseosus*), antelope bush (*Purshia tridentata*), and parsnip-flowered buckwheat (*Eriogonum heracleoides*). Common grasses in the uplands include needle-and-thread grass (*Stipa comata*) and cheat grass (*Bromus tectorum*). Wetland and riparian vegetation is described below.

Two streams were observed in the Project Area, Beebe Springs Creek and Toad Creek. A dry sand wash is located in a narrow ravine on the west side of the project site between the two streams. We could not identify a bed or bank for this feature. According to hatchery personnel, flow only occurs in the wash during "flash flood" events. A narrow seepage area (Chinook Spring) with minor surface flow was identified just north of Beebe Springs Creek. URS classified this drainage as a wetland (Wetland F) rather than a stream due to the lack of a well-defined channel and bed. Chinook Spring does not contain fish or fish habitat.

Beebe Springs Creek is a perennial stream fed by springs emerging at the base of volcanic hills between Lake Chelan and the Columbia River. The springs are also utilized by the adjacent fish hatchery. The stream has been highly manipulated through water diversions, weirs, bank hardening and invasive plant species. Much of the riparian buffer has been eliminated due to agricultural activities on the north bank, and the fish hatchery on the south bank. The lower channel abuts the railroad tracks. Common plants in the riparian area include knotweeds (*Polygonum* sp.), stinging nettle (*Urtica dioica*), Himalayan blackberry, climbing nightshade (*Solanum dulcamara*) and introduced elm trees (*Ulmus* sp.). Beebe Springs Creek classifies as a Type F Water according to the water typing criteria (WAC 222-16-030) utilized by Chelan County.

Toad Creek is an intermittent stream which may also be influenced by springs, but its flow is much reduced compared to Beebe Springs Creek, and historically some of the flow in it has been contributed from so-called "apple-wash" water. The upper part of Toad Creek had flowing water at the time of our inspection. The lower part of the creek was dry. Toad Creek flows east towards US 97. The channel was not visible due to almost complete coverage by Himalayan blackberry. Wetland E occurs in the lower part of Toad Creek. Toad Creek does not contain fish and there is no access available to fish from the Columbia River. Toad Creek classifies as a Type Ns Water according to the water typing criteria (WAC 222-16-030) utilized by Chelan County.

6.0 LISTED ESA SPECIES INFORMATION

The ESA Status of West Coast Salmon & Steelhead lists the upper Columbia River spring-run Chinook salmon ESU as endangered and the upper Columbia River steelhead DPS as threatened. Of the species listed in the U.S. Fish and Wildlife Service (USFWS) list of listed and proposed endangered and threatened species and critical habitat, candidate species, and species of concern in Chelan County, Washington, only Ute ladies'-tresses and bull trout have been documented to occur in the project action area. The remaining four species (grizzly bear, Canada lynx, marbled murrelet, and spotted owl) are unlikely to occur in the project action area due to a lack of suitable habitat, distance from suitable habitat, or lack of migratory corridors to known populations. Critical habitat has been designated for the Chinook salmon ESU, steelhead trout DPS, and the bull trout DPS.

7.0 ESA EFFECTS ANALYSIS

7.1 EFFECTS ON NMFS MATRIX INDICATORS

The NMFS and USFWS checklists (Appendix D) for documenting the effects of the proposed project on salmonid habitat indicated that the Beebe Springs Natural Area Development Phase 4a Project will not degrade any of the environmental pathways and indicators for Chinook salmon and steelhead trout.

7.1.1 Effects to ESA species

The following section addresses the direct effects of the project on listed species including the interdependent and interrelated actions, as well as the indirect effects of the project.

7.1.2 Chinook Salmon

Direct Effects. Upper Columbia River spring-run Chinook salmon only utilize the project action area as a migration corridor for upstream movement of adult spawners to spawning tributaries upstream of the project action area and downstream movement of smolts. The residence time of yearling spring-run Chinook salmon smolts in the proposed action area is no more than a few days to a week between late April through May, adult spawners passing the proposed action area from late May through August.

Interdependent/Interrelated Actions. The Beebe Springs Natural Area Development is a multi-phase project. After Phase 4A is completed, additional phases will be completed as additional funding is obtained. Additional phases may include the creation of a new U.S. 97 underpass for pedestrians and Beebe Springs Creek itself, picnic shelter and concessions building, as well as plantings, more interpretive elements and outdoor classrooms for education groups, access trails west of U.S. 97, which also sits on WDFW land. All of the remaining phases have the potential to impact salmonid habitat and would be considered cumulative impacts, but the impacts would have no effect on the use of this portion of the Columbia River as a migration corridor for spring-run Chinook salmon or direct impacts to spring-run Chinook salmon.

The staging areas and accidental spills would be interdependent and interrelated actions. That is the staging areas and accidental spills would not have occurred without the primary action. The primary staging area will be on site at the hatchery parking lot and additional staging areas will also be created on site in the vicinity of construction areas. A spill prevention plan would be in place to minimize the possibility of accidental discharge of fuel or hydraulic fluids to the Beebe Springs channels or the Columbia River. The temporary use of hay bales to control silt, and other BMPs will minimize the potential for off-site migration of soils and road contaminants from entering Beebe Springs Creek or the Columbia River during construction activities.

Indirect effects. The indirect effects of this project involve possible stranding of migrating smolts in Beebe Springs Creek during instream habitat enhancement work, the revegetation of the project site and the maintenance of drainage swales. Maintenance will be conducted on a semi-annual and annual basis. Revegetation and maintenance activities would be short-term and at a very low level of frequency and would not adversely affect spring-run Chinook salmon.

7.1.3 Steelhead

Direct Effects. Rearing juvenile steelhead are likely to be present in the approximately 100-foot reach of Beebe Springs Creek where concrete channel liner removal and stream habitat enhancement will occur. This reach will be partially dewatered during the concrete removal, but enough flow will be passed through the thalweg of the channel so that the juvenile salmonids are not impacted. The removal of the concrete liner and enhancement of stream habitat in the stream reach will be done in accordance with conservation measures and reasonable and prudent measures for incidental take outlined in the July 8, 2008 Biological Opinion for Washington State Fish Passage and Habitat Enhancement Restoration Programmatic Consultation (NMFS and USFWS 2008). The dewatering and fish capture protocol of the 2008 BO will be followed during the concrete liner removal, but there is a potential for a small take of juvenile steelhead during diversion and dewatering of the project area.

Interdependent/Interrelated Actions. The Beebe Springs Natural Area Development is a multi-phase project. After Phase 4A is completed, additional phases will be completed as additional funding is obtained. Additional phases may include the creation of a new U.S. 97 underpass for pedestrians and Beebe Springs Creek itself, picnic shelter and concessions building, as well as plantings, more interpretive elements and outdoor classrooms for education groups, access trails west of U.S. 97, which also sits on WDFW land. All of the remaining phases have the potential to impact steelhead and their habitat and would be cumulative impacts.

The staging areas and accidental spills would be interdependent and interrelated actions. That is, the staging areas and accidental spills would not have occurred without the primary action. The primary staging area will be on site at the parking lot and additional staging areas will also be created on site in the vicinity of construction areas. The parking lot at the Chelan Hatchery may also be used as a temporary staging area during construction of the parking lot. A spill prevention plan would be in place to minimize the possibility of accidental discharge of fuel or hydraulic fluids to the Beebe Springs channels or the Columbia River. The temporary use of hay bales to control silt, and other BMPs will minimize the potential for off-site migration of soils and road contaminants from entering Beebe Springs Creek or the Columbia River during construction activities.

Indirect effects. The indirect effects of this project involve increased turbidity in the upper portion of Beebe Springs Creek during removal of the concrete liner and stream enhancement on Beebe Springs Creek, and the revegetation of the project site. Maintenance will be conducted on a semi-annual and annual basis. Revegetation and maintenance activities would be short-term and at a very low level of frequency and would not adversely affect steelhead trout.

7.1.4 Bull Trout

The species does not occur in the project area and would receive no effects from the project.

7.1.5 Marbled Murrelet

The species does not occur in the project area and would receive no effects from the project.

7.1.6 Northern Spotted Owl

The species does not occur in the project area and would receive no effects from the project.

7.1.7 Canada Lynx

The species does not occur in the project area and would receive no effects from the project.

7.1.8 Ute Ladies'-Tresses

Within the project area vicinity, this species has been found along the banks of Columbia River. The species does not occur in the Phase 4a project area, all of which is above the OHWM of the Columbia River, and would receive no effects from the project.

7.1.9 Grizzly Bear

The species does not occur in the project area and would receive no effects from the project.

7.1.10 Gray Wolf

The species does not occur in the project area and would receive no effects from the project.

7.1.11 Showy Stickseed

The species does not occur in the project area and would receive no effects from the project.

7.1.12 Wenatchee Mountains Checker-mallow

The species does not occur in the project area and would receive no effects from the project.

7.2 EFFECTS TO CRITICAL HABITAT

Critical habitat has not been designated for the grizzly bear, Ute ladies'-tresses, or showy stickseed. Critical habitat has been designated for the bull trout, marbled murrelet, northern

spotted owl, Canada lynx, gray wolf, and Wenatchee Mountains checker-mallow, but no critical habitat for these species is designated in the proposed project action area.

The effects to critical habitat for all listed species has not changed since the submittal of the Phase 3 BA and the Phase 4 BA Addendum (see Appendix D). Specific species determinations for Chinook salmon and steelhead critical habitat are described for Phase 4a work.

7.2.1 Chinook Salmon

The Primary Constituent Elements (PCEs) that were determined to be essential to the conservation of the upper Columbia River Chinook salmon ESU are defined in 50 CFR, Part 226 (70 FR 52630). An assessment of the PCEs was completed in part to identify construction methods that can be changed or altered to lessen the impact on PCEs.

For this project, all of the effects of the action have already been discussed in the ESA effects analysis and would apply to Chinook salmon critical habitat. No adverse effects to critical habitat would occur. Concrete barrier removal and habitat enhancement on Beebe Springs Creek, below and above the barrier, may temporarily disturb Chinook salmon spawning and rearing habitat, but will create a long-term increase in available spawning and rearing habitat. No long-term impacts to Chinook salmon, their prey species, spawning habitat, or rearing habitat will occur from the proposed project. No toxic chemicals or sediments would be released into the environment.

7.2.2 Steelhead Trout

The PCEs that were determined to be essential to the conservation of the upper Columbia River steelhead DPS are defined in 50 CFR, Part 226 (70 FR 52630). An assessment of the PCEs was completed in part to identify construction methods that can be changed or altered to lessen the impact on PCEs.

For this project, all of the effects of the action have already been discussed in the ESA effects analysis and would apply to steelhead critical habitat. In-stream construction on Beebe Springs Creek will occur during between July 1 and August 31, after spawning is finished, but while fry may still be in the gravel. Concrete barrier removal and habitat enhancement on Beebe Springs Creek, below and above the barrier, may temporarily disturb steelhead spawning and rearing habitat, but will create a long-term increase in available spawning and rearing habitat. No long-term impacts to steelhead, their prey species, spawning habitat, or rearing habitat will occur from the proposed project. The project will remove a physical barrier, improve the sediment regime and increase spawning and rearing habitat for steelhead in the long term. The enhancement of stream habitat in the reach below the concrete liner will be done in accordance with conservation measures and reasonable and prudent measures for incidental take outlined in the July 8, 2008 Biological Opinion for Washington State Fish Passage and Habitat Enhancement Restoration Programmatic Consultation (NMFS and USFWS 2008). No toxic chemicals or sediments would be released into the environment.

8.0 EFH ASSESSMENT

The objective of this EFH assessment is to determine whether or not the proposed action(s) "may adversely affect" designated EFH for relevant commercially, federally-managed fisheries species within the proposed Action Area. This report provides a description and assessment of EFH in the project area; a description of the project and its potential impacts on these habitats.

8.1 EFH BACKGROUND

The Sustainable Fisheries Act of 1996 (Public Law 104-297) amended the Magnuson-Stevens Fishery Conservation and Management Act (now called the Magnuson-Stevens Act) to require federal agencies to consult with NMFS on activities that may adversely affect EFH. The EFH guidelines (50 CFR 600.05-600.930) outline the process for federal agencies, NMFS, and the Fishery Management Councils to satisfy the EFH consultation requirement under Section 305(b(2)-(4)) of the Magnuson-Stevens Act. As part of the EFH consultation process, the guidelines require federal action agencies to prepare a written EFH Assessment describing the effects of that action on EFH (50 CFR 600.920(e)(1)). This document has been prepared to satisfy that requirement.

EFH is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C 1802(10)). For the purpose of interpreting this definition of EFH: "waters include aquatic areas (marine waters, intertidal habitats, and freshwater streams) and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity covers a species' full life cycle (50 CFR 600.10); Adverse effect means any impact that reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810). The Magnuson-Stevens Act promotes the protection of these habitats through review, assessment, and mitigation of activities that may adversely affect these habitats. The significance of small-scale projects lies in the cumulative and synergistic effects resulting from a large number of these activities occurring in a single watershed.

The EFH mandate applies to all species managed under a Fishery Management Plan (FMP). In Washington, Oregon, and California, there are three FMPs covering groundfish, coastal pelagic species, and Pacific salmon. Federal agencies must consider the impact of a proposed action on all three types of EFH.

Pacific salmon EFH for the Pacific Coast Salmon FMP includes all streams, lakes, ponds, wetlands, and other water bodies currently and historically utilized by Pacific salmon within Washington, Oregon, Idaho, and California within the U.S. Geological Survey Hydrologic Unit Code (HUC). Excluded are some areas upstream of certain impassable man-made barriers (e.g., dams as identified by the Pacific Fishery Management Council in Appendix A of Amendment 14

to the Pacific Coast Salmon Plan), and longstanding, naturally-impassable barriers (e.g., natural waterfalls in existence for several hundred years). The project action area is located in Upper Columbia River-Entiat: HUC 17020010, which is considered EFH for Chinook and coho salmon.

8.2 ACTION AREA

The proposed project action area is located in U.S. Geological Survey (USGS) hydrologic unit 17020010 (Upper Columbia River-Entiat) and is designated EFH for Chinook and coho salmon (PSMFC 2000).

The project site is in Beebe Springs Creek, which is a tributary of the Columbia River, which provides EFH features and beneficial components to the life history stages of several species of salmonids and other fishes.

8.2.1 EFH for Chinook Salmon

The portion of the Columbia River in the project vicinity is a migration corridor for spring-run Chinook salmon adult spawners returning to the Methow and Okanogan River watersheds above Wells Dam and smolt out-migrants.

8.2.2 EFH for Coho Salmon

The portion of the Columbia River in the project vicinity is a migration corridor for hatchery coho salmon adult spawners returning to the Methow and Okanogan River watersheds above Wells Dam and smolt out-migrants. Beebe Springs Creek is also utilized by stray hatchery coho salmon for spawning and rearing of juvenile off-spring.

8.3 POTENTIAL ADVERSE EFFECTS OF THE PROPOSED PROJECT

The definition of "adverse effect" is "any impact that reduces quality and/or quantity of EFH, including direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810).

For this project, all of the effects of the action have already been discussed in the ESA effects analysis (Section 7.0) and would apply to EFH. All effects of the action are short term and temporary.

8.3.1 Chinook Salmon EFH

The proposed project may result in a minor short-term increase in water turbidity in Beebe Springs Creek during the enhancements in Beebe Springs Creek. Chinook salmon do not utilize this portion of the Columbia River as spawning habitat and the short-term effects of the stream restoration and excavation of the concrete liner and barrier will not prevent the upstream migration of adult Chinook salmon spawners into Beebe Springs Creek or Columbia River. No long-term impacts to Chinook salmon, their prey species, spawning habitat, or rearing habitat will occur from the proposed project. Therefore, the project will have no adverse effect on EFH for Chinook salmon.

8.3.2 Coho Salmon EFH

The proposed project may result in a minor short-term increase in water turbidity in Beebe Springs Creek during stream restoration activities and the excavation of the concrete flume in the upper portion of Beebe Springs Creek. The substrate excavated is primarily composed of sand, gravel and cobble and turbidity should drop to baseline levels shortly after completion of excavation activities. Coho salmon do not utilize the portion of the Columbia River in the project vicinity as rearing or spawning habitat, but adult coho salmon spawners are seen in Beebe Springs Creek. Concrete barrier removal and habitat enhancement on Beebe Springs Creek will be isolated and conducted in the dry. This action may temporarily disturb spawning and rearing habitat downstream of the barrier, but will create a long-term increase in available spawning and rearing habitat. No long-term impacts to coho salmon, their prey species, spawning habitat, or rearing habitat will occur from the proposed project. Spawning and rearing habitat for coho salmon will be improved in the long term. Therefore, the project will have no adverse effect on EFH for coho salmon.

9.0 DETERMINATION OF EFFECT

The NMFS/USFWS matrix (Appendix D) in the original BA submitted in May 2010, in addition to a review of the Phase 4a project design, the BMPs to be implemented during construction, the existing conditions of Beebe Springs Creek, the literature review, and the species information obtained from federal and state agencies were used to establish the following findings of effects for designated critical habitat for Chinook salmon and steelhead. The effects determination for Chinook salmon and steelhead trout has not changed since the submittal of the Phase 3 BA, as noted in Table 9-1 and Appendix D.

Table 9-1
Phase 4A BA ESA Effects Determination

Species*	ESA Status	Jurisdiction	Effects – Construction	Effects – Long Term	Effects to Critical Habitat
Chinook Salmon *(Oncorhynchus tshawytscha)*	Endangered	NMFS	May affect, not likely to adversely affect	Beneficial-Creation of stream habitat & revegetation of riparian zone	May affect, not likely to adversely affect
Steelhead Trout *(Oncorhynchus mykiss)*	Threatened	NMFS	May affect, not likely to adversely affect	Beneficial- Creation of stream habitat & revegetation of riparian zone	May affect, not likely to adversely affect

Table 9-2
Phase 4A EFH Effects Determination-Pacific Salmon

Species	Hydrologic Unit Code (HUC)	Effects Determination
Chinook Salmon (*O. tshawytscha*)	Upper Columbia River-Entiat: HUC 17020010	No adverse effect
Coho Salmon (*O. kisutch*)	Upper Columbia River-Entiat: HUC 17020010	No adverse effect

10.0 LITERATURE CITED

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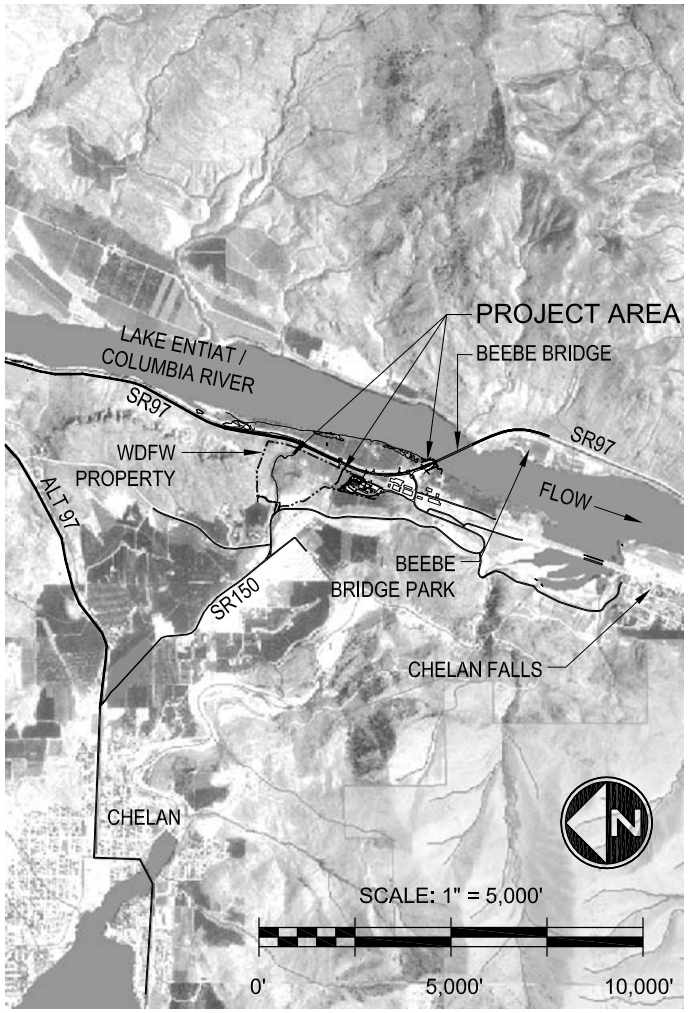
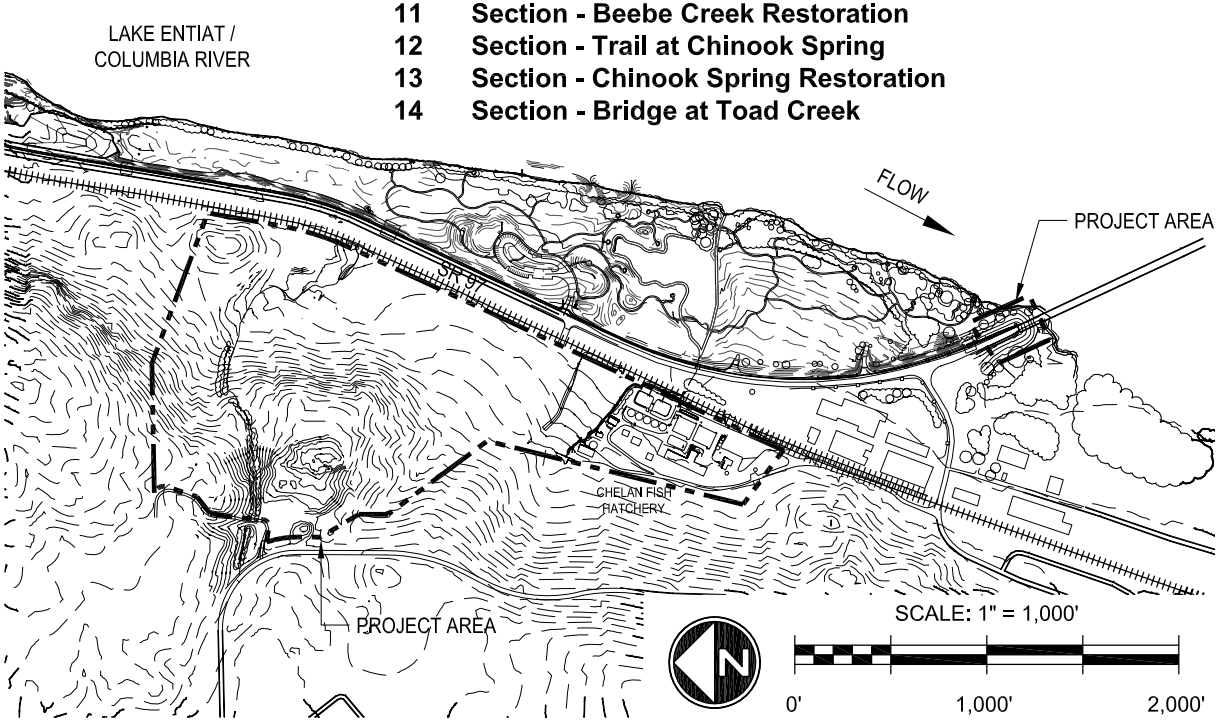
APPENDIX A
PROJECT PLANS AND CONCEPT DRAWINGS

Beebe Springs Natural Area Phase 4A

List of Sheets:





PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

LATITUDE: 47° 49' 14" N
LONGITUDE: 119° 58' 34" W

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 1 **OF 14:** SITE VICINITY MAPS

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IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
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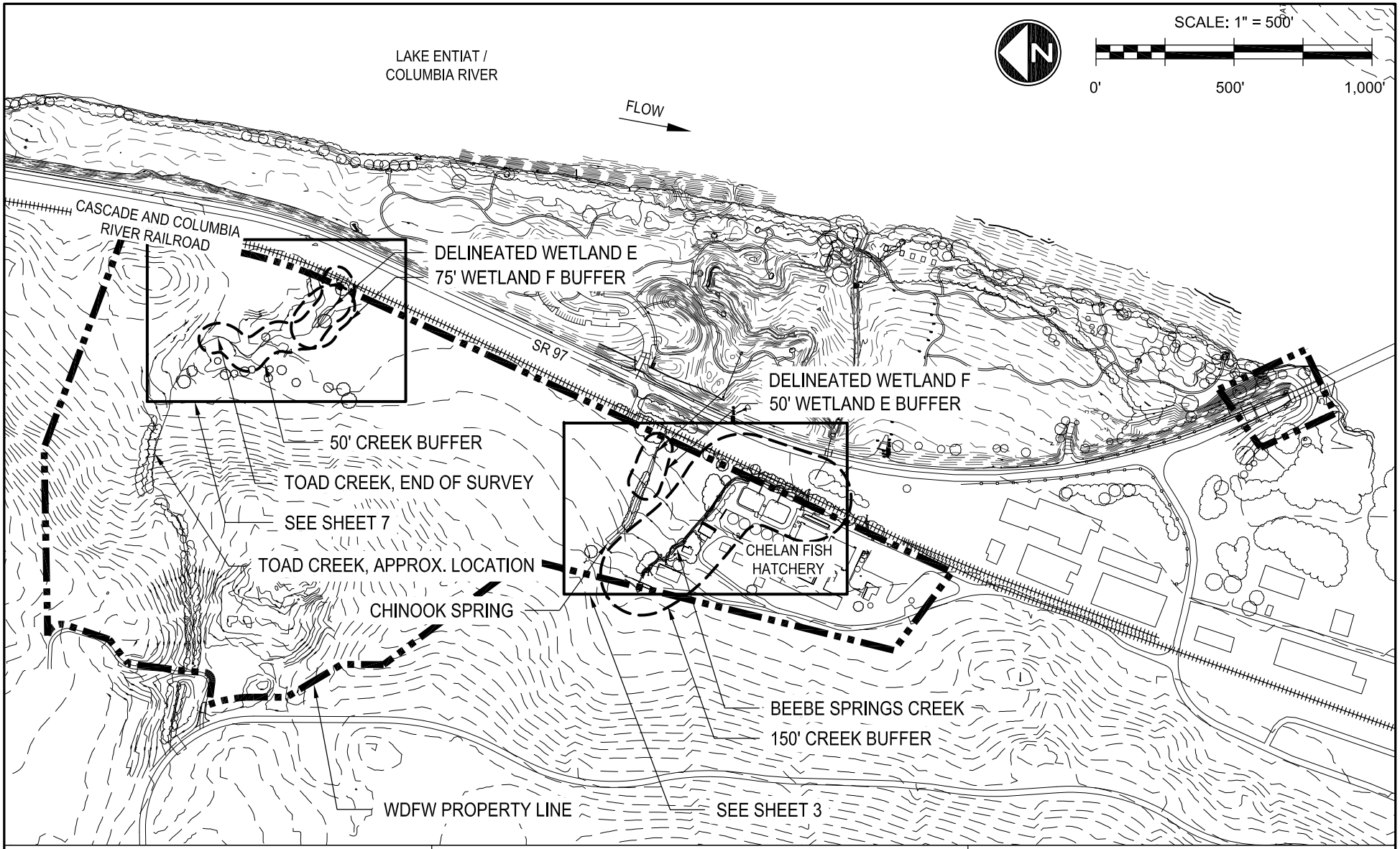
DATE: FEBRUARY 2012
REVISED:

PREPARED BY:
J.A. BRENNAN ASSOCIATES, PLLC



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SHEET 2 **OF 14:** EXISTING CRITICAL AREAS

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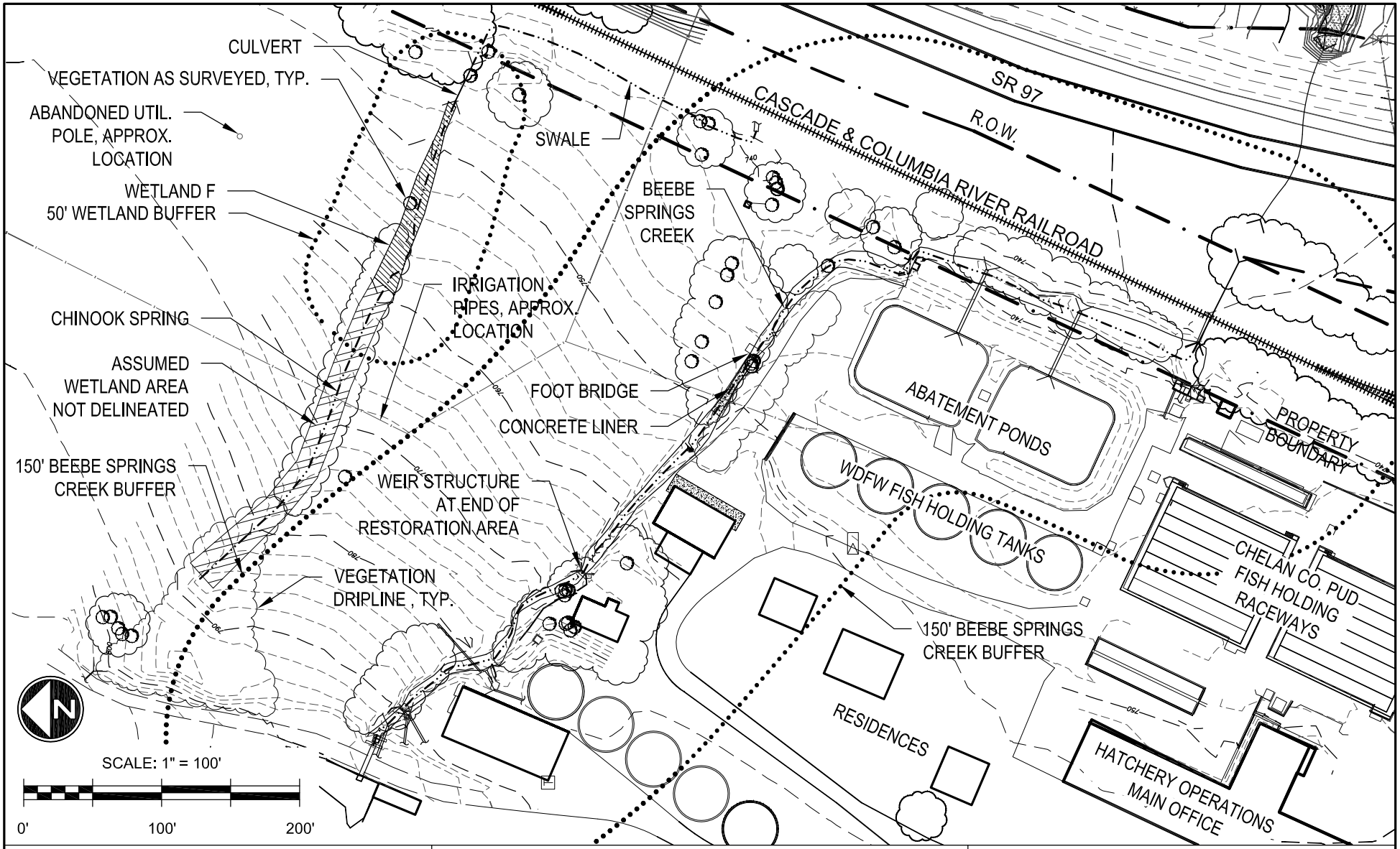

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SHEET 3 **OF 14:** EXISTING CRITICAL AREAS - BEEBE CREEK AND CHINOOK SPRING

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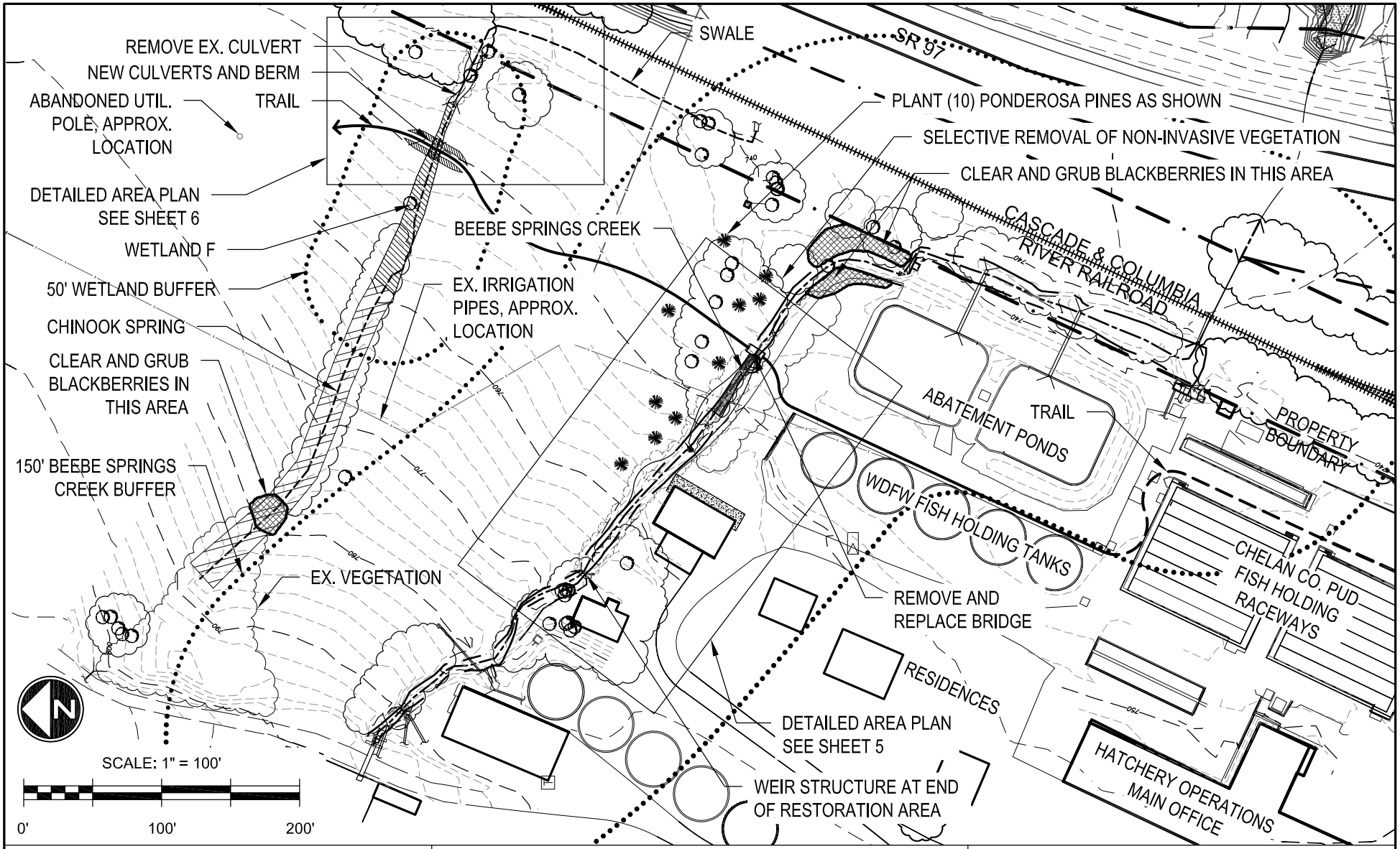

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SHEET 4 **OF 14:** SITE PLAN - BEEBE CREEK AND CHINOOK SPRING

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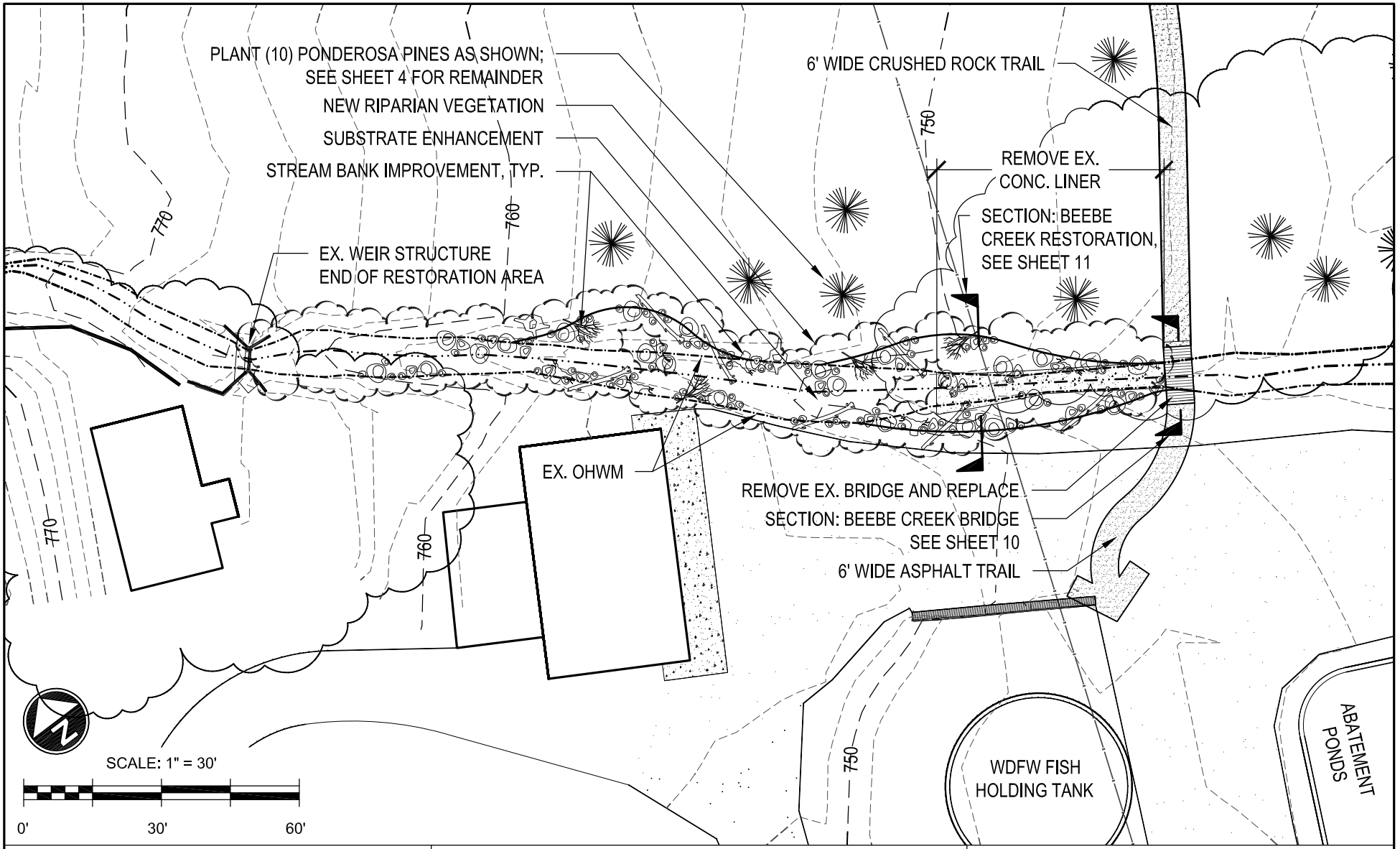

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SHEET 5 **OF 14:** DETAILED AREA PLAN - BEEBE CREEK

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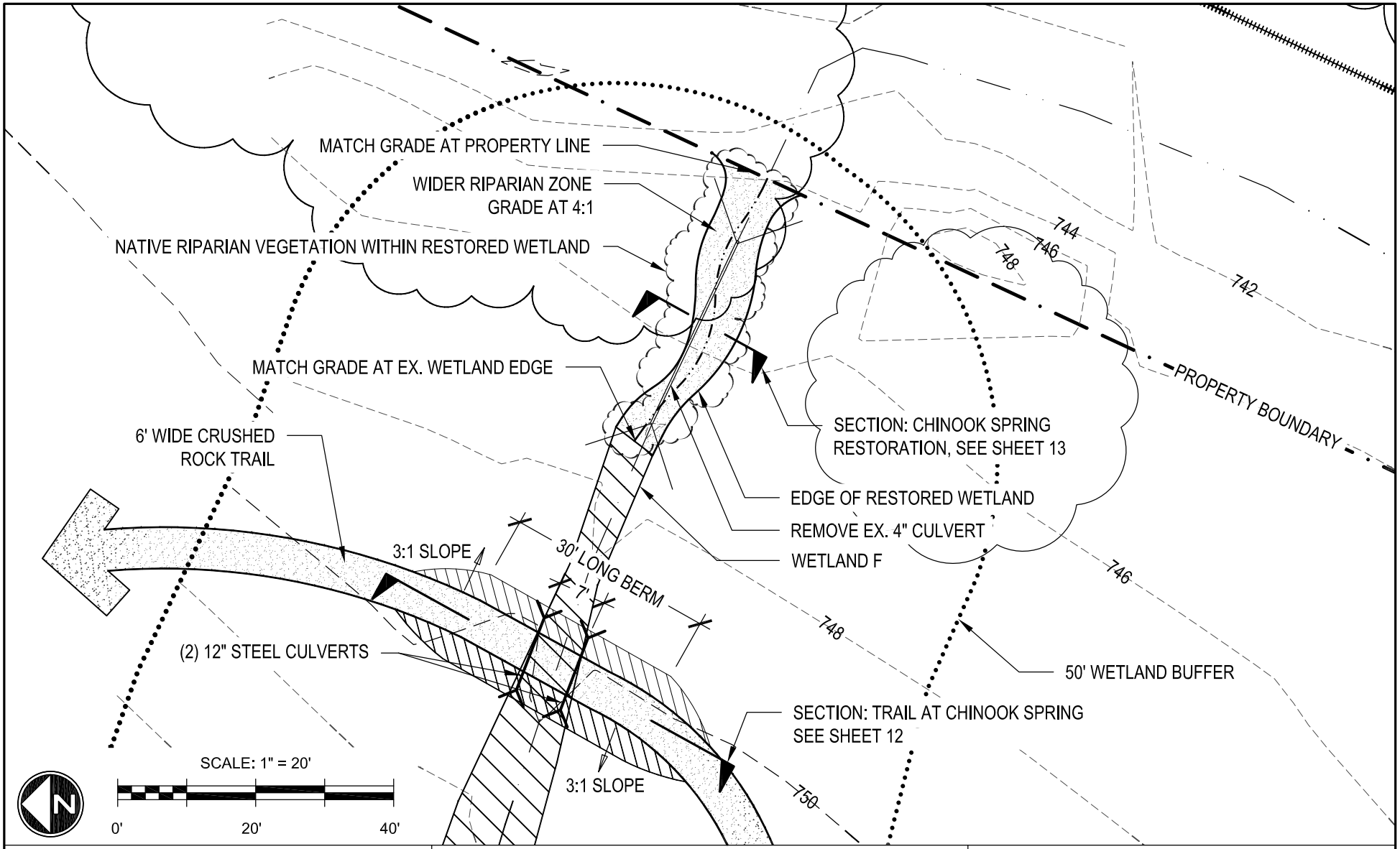

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SHEET 6 **OF 14:** DETAILED AREA PLAN - CHINOOK SPRING

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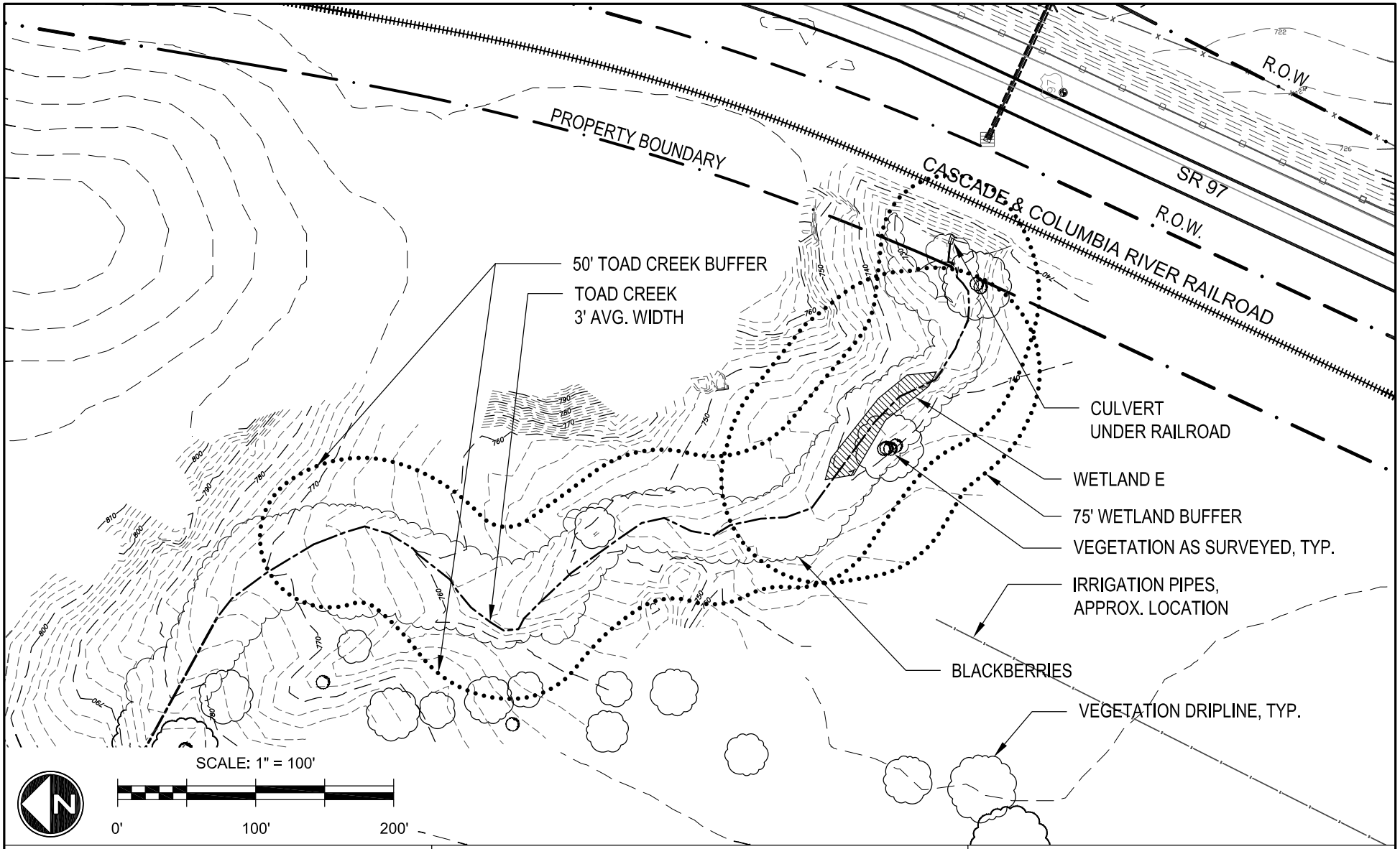

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SHEET 7 **OF 14:** EXISTING CRITICAL AREAS - TOAD CREEK

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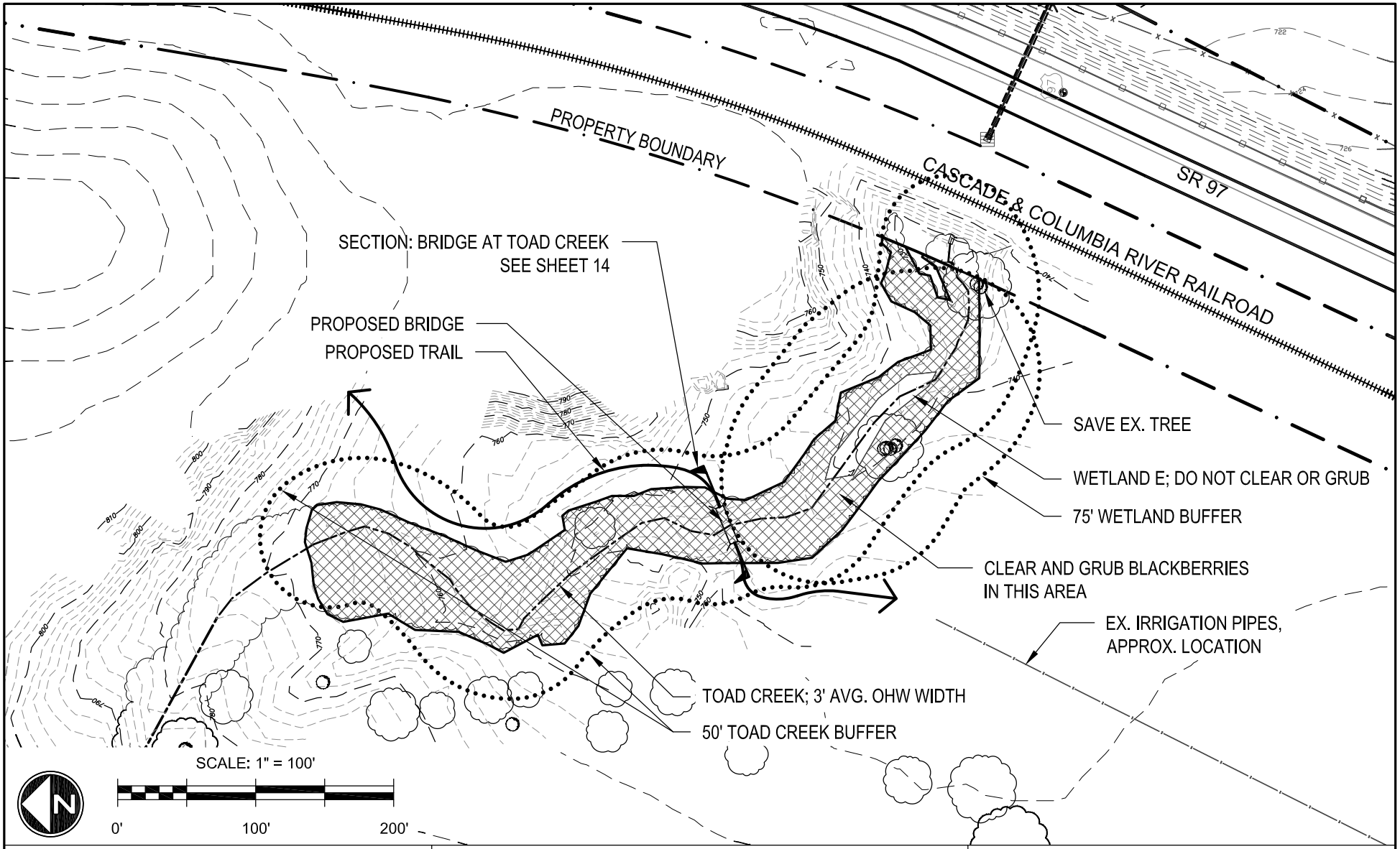

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SHEET 8 **OF 14:** SITE PLAN - TOAD CREEK

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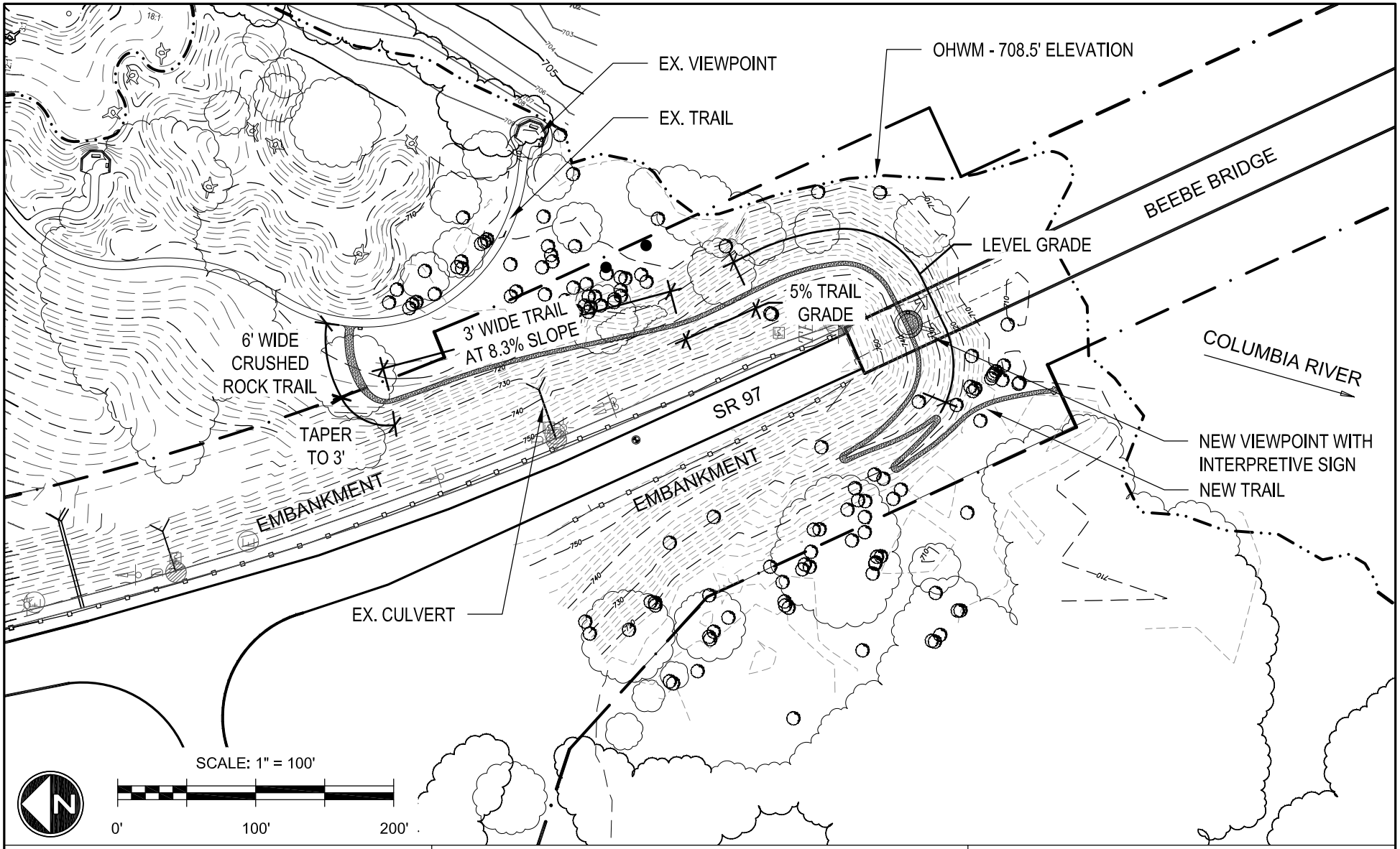

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SHEET 9 **OF 14:** SITE PLAN - BEEBE BRIDGE

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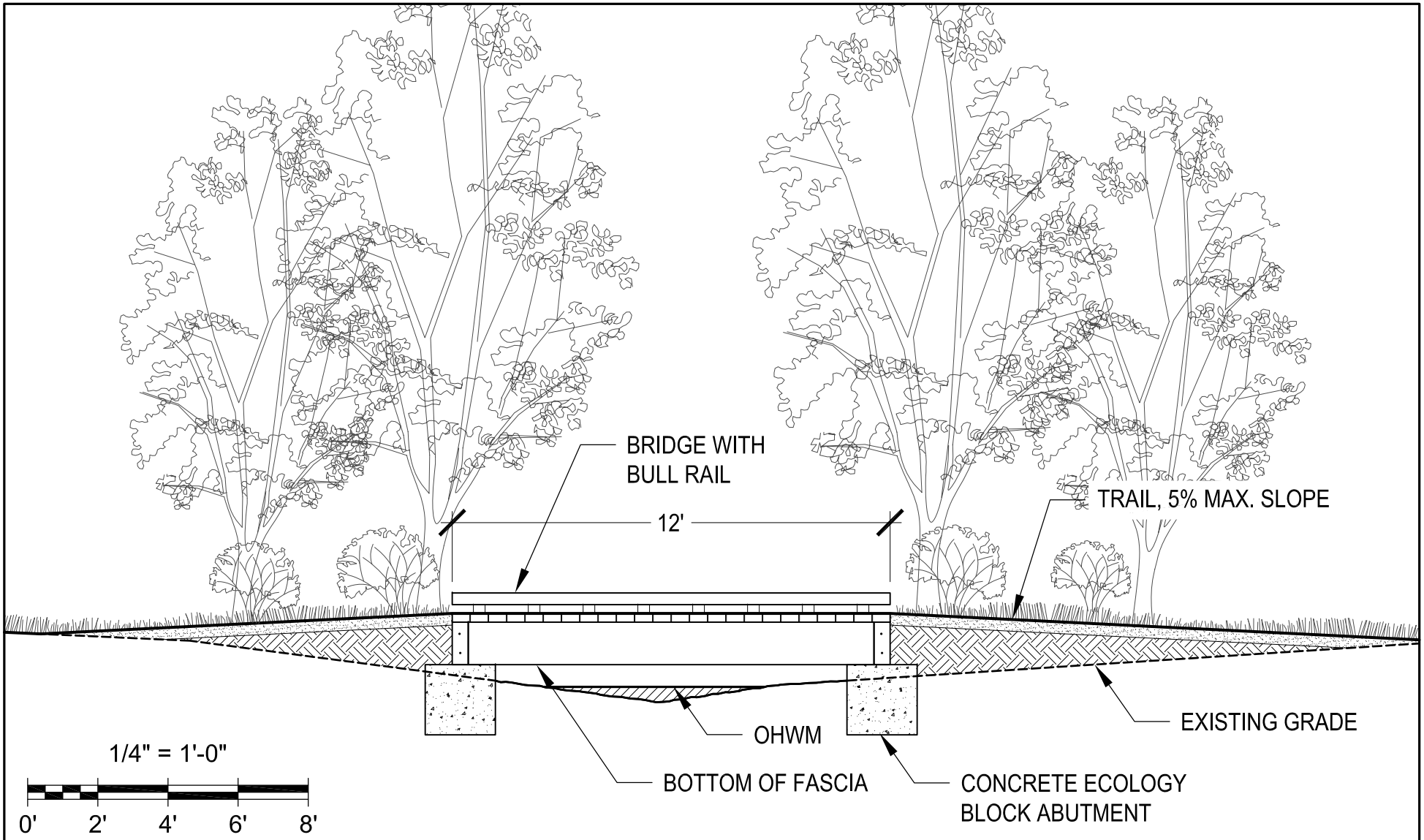
J.A. BRENNAN ASSOCIATES, PLLC



PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

LATITUDE: 47° 49' 14" N
LONGITUDE: 119° 58' 34" W

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

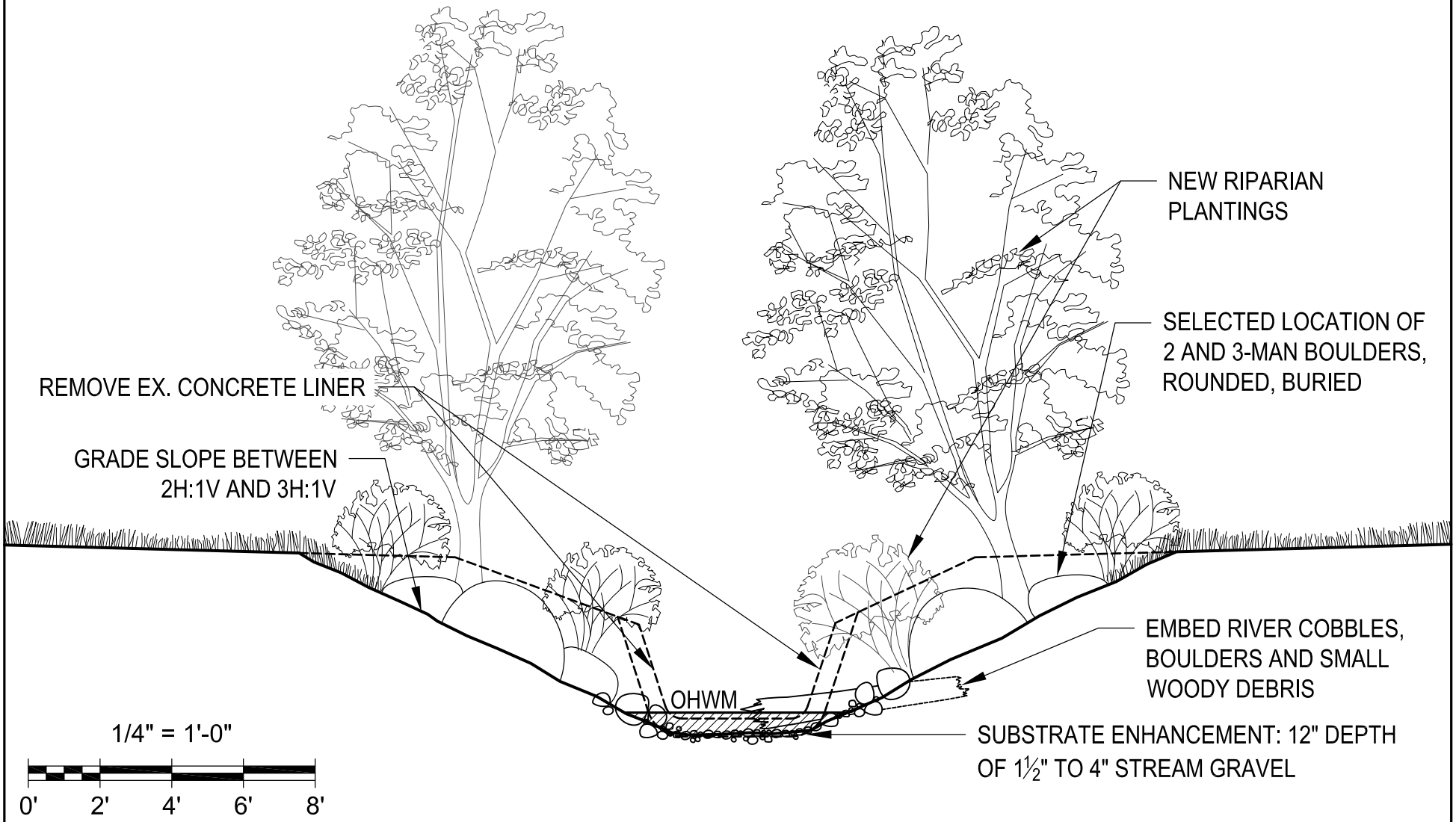
REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 10 **OF 14:** SECTION - BRIDGE AT BEEBE CREEK

PROPOSED: BEEBE SPRINGS NATURAL AREA PHASE 4A
IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
APPL. BY: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
DATE: FEBRUARY 2012
REVISED:

PREPARED BY:
J.A. BRENNAN ASSOCIATES, PLLC



PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

LATITUDE: 47° 49' 14" N
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WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

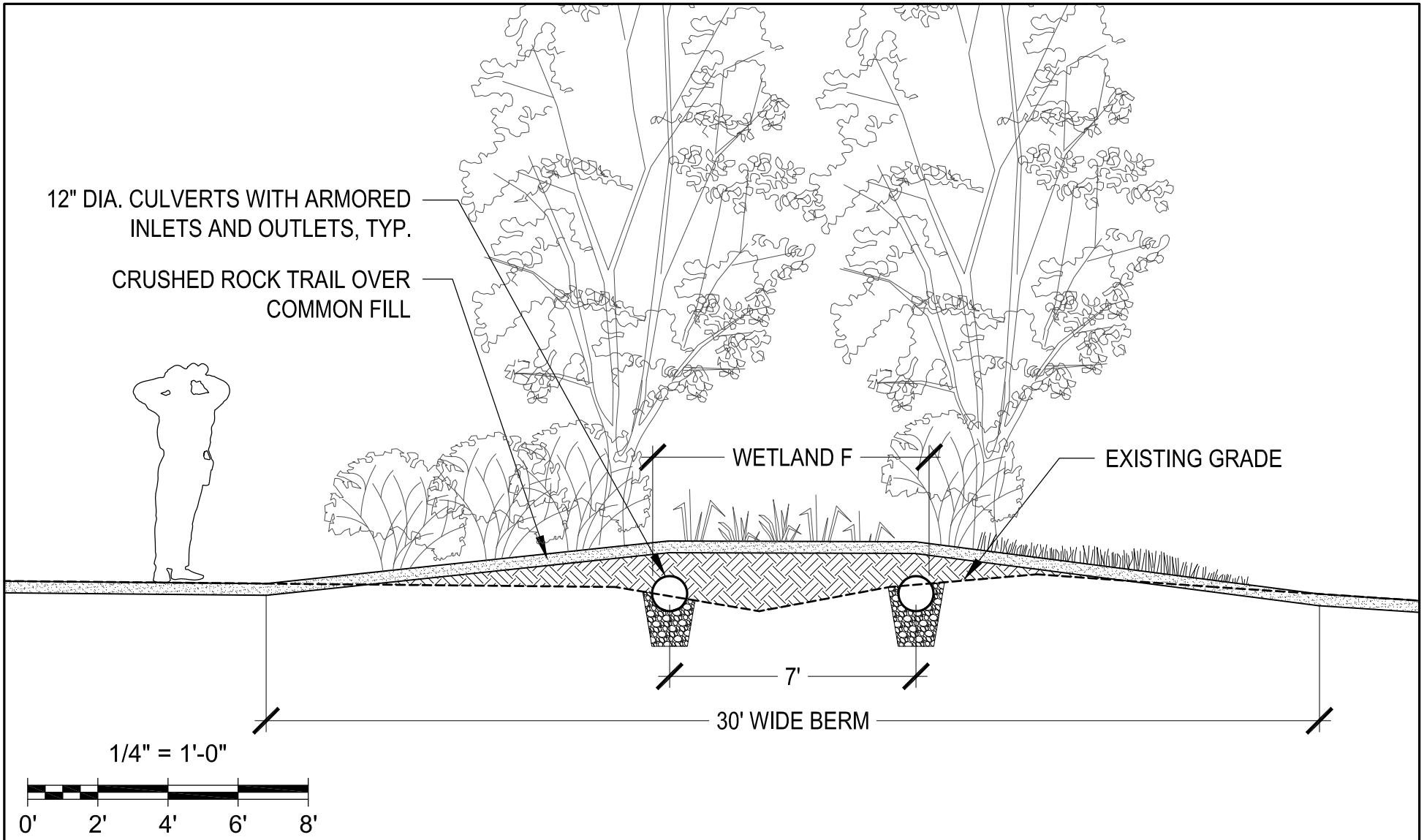
REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 11 **OF 14:** SECTION - BEEBE CREEK RESTORATION

PROPOSED: BEEBE SPRINGS NATURAL AREA PHASE 4A
IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
APPL. BY: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
DATE: FEBRUARY 2012
REVISED:

PREPARED BY:
J.A. BRENNAN ASSOCIATES, PLLC



PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

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WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

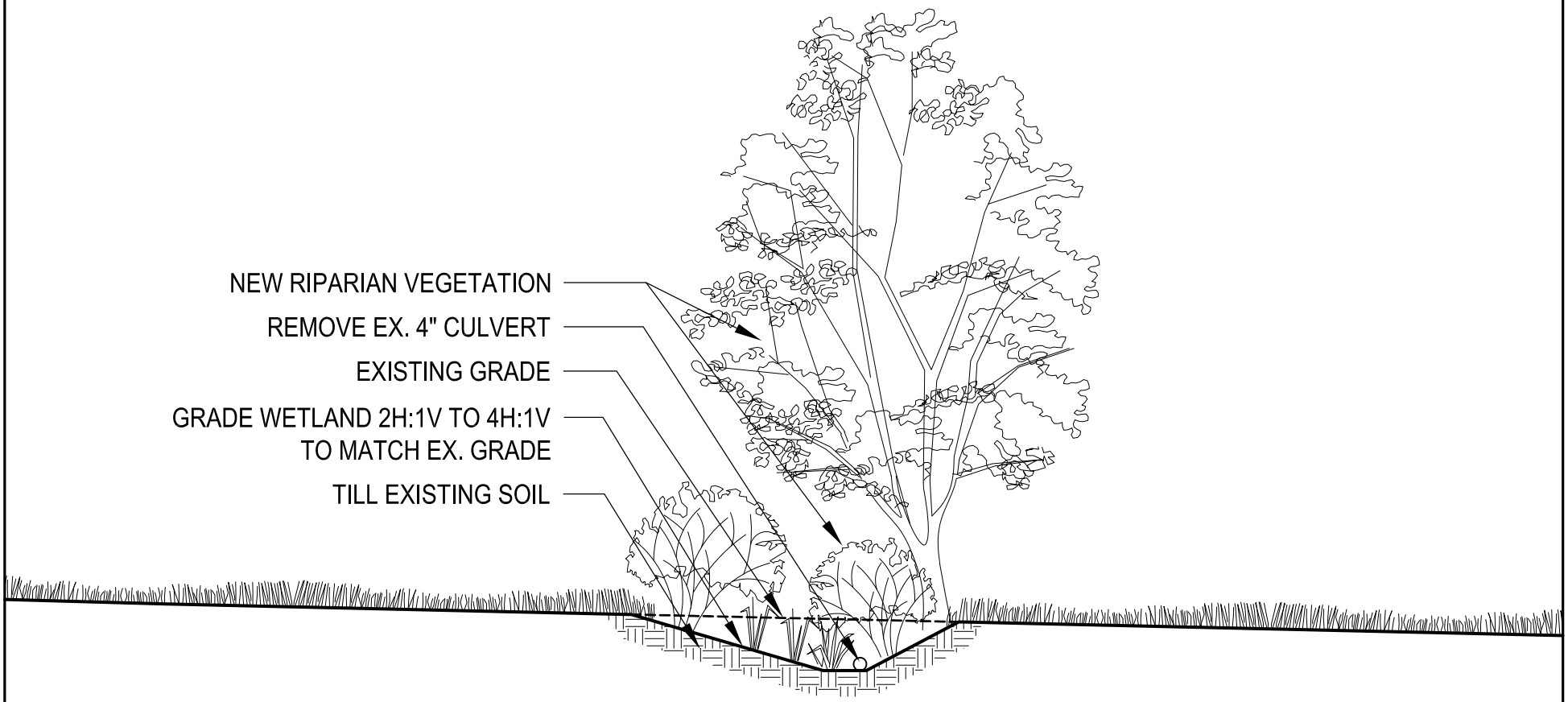
REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 12 **OF 14:** SECTION - TRAIL AT CHINOOK SPRING

PROPOSED: BEEBE SPRINGS NATURAL AREA PHASE 4A
IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
APPL. BY: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
DATE: FEBRUARY 2012
REVISED:

PREPARED BY:
J.A. BRENNAN ASSOCIATES, PLLC



1/4" = 1'-0"

0' 2' 4' 6' 8'

PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

LATITUDE: 47° 49' 14" N
LONGITUDE: 119° 58' 34" W

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 13 **OF 14:** SECTION - CHINOOK SPRING RESTORATION

PROPOSED: BEEBE SPRINGS NATURAL AREA PHASE 4A
IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
APPL. BY: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
DATE: FEBRUARY 2012
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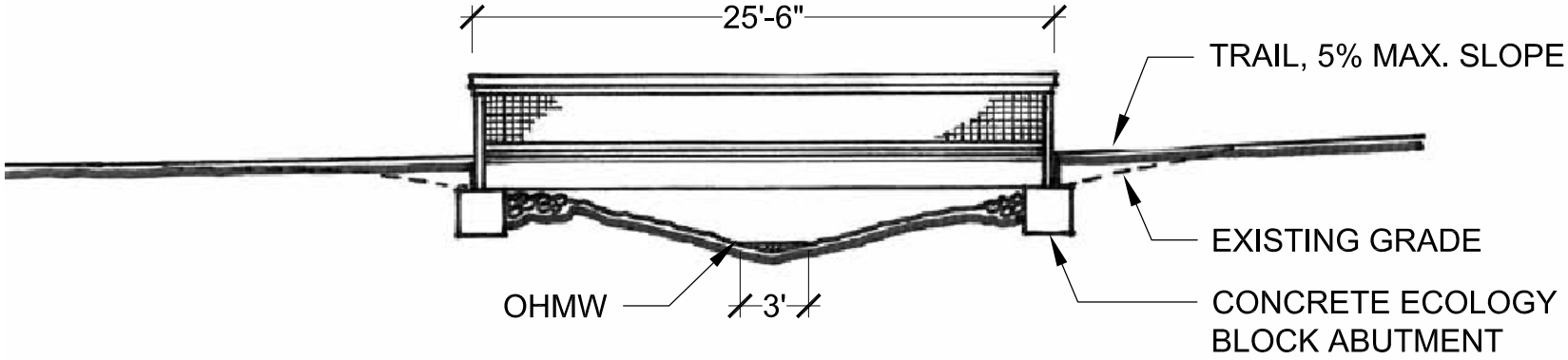

1/8" = 1'-0"

0' 4' 8' 12' 16'

PURPOSE: TO RESTORE RIPARIAN ENVIRONMENTS, IMPROVE HABITAT, AND INSTALL A HIKING TRAIL SYSTEM

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS: WSDOT, Chelan County PUD, COLUMBIA CASCADE RAILROAD

LATITUDE: 47° 49' 14" N
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WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

BEEBE SPRINGS NATURAL AREA PHASE 4A

REFERENCE #:

ADDRESS: SR 97
Chelan, WA 98816

SHEET 14 **OF 14:** SECTION - BRIDGE AT TOAD CREEK

PROPOSED: BEEBE SPRINGS NATURAL AREA PHASE 4A
IN: CHELAN COUNTY
AT: CHELAN FISH HATCHERY
COUNTY OF: CHELAN **STATE:** WA
APPL. BY: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
DATE: FEBRUARY 2012
REVISED:

PREPARED BY:
J.A. BRENNAN ASSOCIATES, PLLC

APPENDIX B
BEEBE SPRINGS PHASE 4a SITE PHOTOGRAPHS

Beebe Springs Creek (upper)

Beebe Springs Creek (middle)

Beebe Springs Creek (lower)

Toad Creek looking downstream (channel not visible)

Toad Creek looking upstream (channel not visible)

Chinook Spring

View looking southeast towards hatchery and Phase 4a site

View of Beebe Springs Creek, looking upstream of existing foot bridge (concrete lined segment)

APPENDIX C
PRESCRIPTIONS THAT APPLY TO BEEBE SPRING CREEK CULVERT REMOVAL, INSTREAM WORK, AND HABITAT ENHANCEMENT

General Prescriptions: These are general prescriptions of the 2008 BO.

General Prescriptions that Apply to all Proposed Restoration Activities:

No in-water activities are permitted in bull trout spawning and rearing areas in eastern Washington.

1. Pre-Construction/Surveying

1 All organic material that has to be cleared for access will remain on site.
2 The removal of riparian vegetation for access will be minimized and estimated in the Specific Project Information Form (SPIF) at the time the COE seeks to conduct the action.
3 The number of temporary access roads will be minimized and roads will be designed to avoid adverse effects like creating excessive erosion.
4 Temporary access-ways across slopes greater than 30 percent will be avoided. If temporary access needs to cross slopes greater than 30 percent it will be indicated in the SPIF.
5 No permanent access-ways will be built. All temporary access-ways will be removed (including gravel surfaces) and planted after project completion.
6 New temporary stream crossings will avoid potential spawning habitat (i.e. pool tailouts) and pools to the maximum extent possible. They will minimize sedimentation impacts by using best management practices like mats and boards to cross a stream. Best management practices will be listed by each applicant in a SPIF. After project completion temporary stream crossing will be abandoned and the stream channel restored where necessary.
7 Boundaries of clearing limits associated with site access and construction will be marked to avoid or minimize disturbance of riparian vegetation, wetlands, and other sensitive sites.
8 A Pollution and Erosion Control Plan, commensurate with the size of the project, must be prepared and carried out to prevent pollution caused by surveying or construction operations.
9 A supply of emergency erosion control materials will be on hand and temporary erosion controls will be installed and maintained in place until site restoration is complete.

2. General

1 Work windows will be applied to avoid and minimize impacts to listed salmonids or forage fish.
2 Electrofishing is not proposed in the vicinity of redds from which fry may not have emerged, or in areas where adult salmonids may be holding prior to spawning.
3 Sandbags may be placed to temporarily keep fish out of work areas. Sandbags will be removed after completion of project.
4 Temporary roads in wet or flooded areas will be abandoned and restored by the end of the in-water work period.
5 Existing roadways or travel paths will be used whenever possible.
6 Any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration.

7 When construction is finished, the construction area will be cleaned up and rehabilitated (replanted and reseeded) as necessary to renew ecosystem processes that form and maintain productive fish habitats.

8 Work below the OHWL or mean lower low tide line will be completed during preferred in-water work windows, when listed salmonids or forage fish are least likely to be present in the action area. Exceptions will be requested in the SPIF.

9 If listed fish are likely to be present, the project sponsor will assess what is less impacting to fish, isolation of the in-water work area or work in the wet, see below "6. Isolation of Work Site".

10 Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and rewatering activities, plan view of all isolation elements, as well as a list of equipment and materials to adequately provide appropriate redundancy of all key plan functions (e.g., an operational, properly sized backup pump and/or generator). This standard material does not need to be submitted with a SPIF. However, it needs to be available to the Services at their request.

11 Any water intakes used for the project, including pumps used to dewater the work isolation area, will have a fish screen installed, operated and maintained according to NMFS' fish screen criteria (NMFS 1997; NMFS 2008).

12 The site will be stabilized during any significant break in work.

13 Project operations will cease under high flow conditions that may inundate the project area, except as necessary to avoid or minimize resource damage.

14 All discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) will be treated to avoid negative water quality and quantity impacts. Removal of fines may be accomplished with bioswales; concrete washout with altered pH, may be infiltrated.

3. Equipment

1 Heavy equipment will be limited to that with the least adverse effects on the environment (e.g., minimally-sized, low ground pressure equipment).

2 When not in use, vehicles and equipment that contain oil, fuel, and/or chemicals will be stored in a staging area located at least 150 feet from the COE' jurisdictional boundary of wetlands and waterbodies. If possible staging is located at least 300 feet away from the COE's jurisdictional boundary of wetlands and waterbodies, and on impervious surfaces to prevent spills from reaching ground water. Where moving equipment daily at least 150 feet of waterbodies would create unacceptable levels of disturbance (multiple stream crossings, multiple passes over sensitive vegetation) a closer staging location with an adequate spill prevention plan may be proposed.

3 When conducting in-water or bank work, hydraulic lines will be filled with vegetable oil for the duration of the project to minimize impacts of potential spills and leaks.

4 Spill prevention & clean-up kits will be on site when heavy equipment is operating within 25 feet of the water.

5 To the extent feasible, work requiring use of heavy equipment will be completed by working from the top of the bank.

6 Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities around the water.

7 Equipment will cross the stream in the wet only under the following conditions:

a) equipment is free of external petroleum-based products, soil and debris has

been removed from the drive mechanisms and undercarriage; and

b) substrate is bedrock or coarse; and

c) in soft bottom streams mats or logs are used to drive across to minimize compaction; and

d) stream crossings will be performed at right angle if possible; and

e) no stream crossings will be performed at spawning sites when spawners are present or eggs or alevins could be in the gravel;

f) and the number of crossings will be minimized

4. Planting and Erosion Control

1 Within seven calendar days of project completion, any disturbed bank and riparian areas shall be protected using native vegetation or other erosion control measures as appropriate. For erosion control, sterile grasses may be used in lieu of native seed mixes.

2 If native riparian vegetation has to be disturbed it will be replanted with native herbaceous and/or woody vegetation after project completion. Planting will be completed between October 1 and April 15 of the year following construction. Plantings will be maintained as necessary for three years to ensure 50 percent herbaceous and/or 70 percent woody cover in year three, whatever is applicable. For all areas greater than 0.5 acres, a final monitoring report will be submitted to the COE in year three. Failure to achieve the 50 percent herbaceous and 70 percent woody cover in year three will require the applicant to submit a plan with follow up measures to achieve standards or reasons to modify standards.

3 Fencing will be installed as necessary to prevent access to revegetated sites by livestock, beavers or unauthorized persons. Beaver fencing will be installed around individual plants where necessary.

5. Water Quality

1 Landward erosion control methods shall be used to prevent silt-laden water from entering waters of the United States. These may include, but are not limited to, straw bales, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas.

2 Wastewater from project activities and water removed from within the work area shall be routed to an area landward of the OHWL in an upland disposal site to allow removal of fine sediment and other contaminants prior to being discharged to the waters of the United States.

3 All waste material such as construction debris, silt, excess dirt, or overburden resulting from this project will generally be deposited above the limits of flood water in an upland disposal site. However, material from pushup dikes may be used to restore microtopography, e.g. filling drainage channels.

4 If high flow or high tide conditions that may cause siltation are encountered during this project, work shall stop until the flow subsides.

5 Measures shall be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into waters of the US.

6 A spill prevention plan will be prepared for every project that utilizes motorized equipment or vehicles. Plan will be available to Service by request.

7 An erosion control plan will be prepared for every project that results in ground disturbance. Plan will be available to Service by request.

6. Isolation of Work Site

To reduce impacts to listed fish and water quality, major habitat restoration projects would be performed in isolation from flowing waters whenever possible. Examples of activities that may be done in the water include placing wood and rock structures that require very little in-water excavation, small scale work in systems with sand or coarser grained substrate and work in rock bottom systems. The choice and rational on whether or not to isolate the worksite needs to be included in the SPIF. The focus needs to be on minimization of impacts on water quality, listed salmonids and forage fish. If worksite isolation and fish capture and removal is the least impacting method, the applicant will follow procedures outlined in Appendix D

When working in the wet some turbidity monitoring may be required, subject to discussions between applicant and the Services. Turbidity monitoring generally is required when working in streams with more than 40 percent fines (silt/clay) in the substrate. Turbidity will be monitored only when turbidity generating work takes place, for example, pulling the culvert in the wet, reintroducing water. The applicant will measure the duration and extent of the turbidity plume (visible turbidity above background) generated. The data will be submitted to the Services.

Measurements of concentration preferably in mg/l are very helpful for the Services. Turbidity measurements are used by the Services to develop procedures to minimize turbidity and estimate take for future projects. If you can provide turbidity measurements in mg/l (NTUs are also less helpful for purposes of comparison with literature values) the Services will greatly appreciate your data.

General Prescriptions that Apply to some of the Proposed Restoration Actions

Bank stabilization, Redirection of Flow, Riparian Invasive Plant Removal and small scale Nutrient Enhancement are frequently associated with restoration actions proposed under this programmatic. For example, riparian enhancements often require some level of bank treatment and invasive plant removal; the installation of LWD often is associated with nutrient enhancement. Neither riparian invasive plant removal nor nutrient enhancement are regulated by the COE. However, if they are part of a project otherwise covered by this programmatic, they should follow the guidelines below:

1. Installation of Bank Stabilization Features:

Description: In many riparian areas anthropogenic activities have led to streambank degradation and accelerated erosion. This usually leads to lack of cover, growth of invasive plants, reduction in pool habitat, and increased fine sediment input and accumulation, which all negatively affect salmonids. Projects that improve riparian habitat conditions for salmonids, such as riparian plantings or side channel construction/reactivation, may utilize the bank stabilization techniques listed below. For a detailed description of each technique refer to Integrated Streambank Protection Guidelines (Cramer et al. 2003).

All restoration/enhancement projects that employ bank stabilization need to have restoration as their primary purpose and need to address the cause of the habitat degradation. Streambank

stabilization cannot be the only proposed component, but rather a conservation measure applied to help a primary action like removal of bank protection and installation of riparian revegetation to succeed.

a. **Bank Protection Engineered Log Jams**: The goal of bank protection ELJs is to protect a section of natural stream bank that may be vulnerable to accelerated erosion resulting from project activities or existing infrastructure that have altered the natural stream flow. Bank protection ELJs can be placed intermittently as a series of flow defectors or as a continuous revetment (Herrera 2006b). Examples in the Pacific Northwest include the Elwha River in Washington and Johnson Creek in Portland, Oregon.
b. **Groins/Spur Dikes:** Groins are large roughness elements that project from the bank into the channel. Different from barbs, groins extend above the high-flow water-surface elevation. Usually they are constructed in a series to provide continuous bankline roughness. Groins must be constructed exclusively from wood with minimal anchor rock. Constructing less permanent (compared to rock) wood groins will ensure that in the long-term the groins do not interfere with natural river dynamics and provide maximal habitat.
c. **Barbs/Vanes/Bendway Weirs:** Barbs, vanes, and bendway weirs are low-elevation structures that project from a bank into the channel. They are angled upstream to redirect flow away from the bank. They increase channel roughness and reduce water velocity near the bank. Barbs have to be constructed from wood with minimal anchor rock. Wooden barbs within the active river channel may be used to allow soft bank treatments such as reshaping and native plantings to mature. Constructing less permanent (compared to rock) wood groins will ensure that in the long-term the groins do not interfere with natural river dynamics and provide maximal habitat.
d. **Rootwad Toes:** Rootwad toes are structural features that prevent erosion at the toe of a streambank. The toe refers to that portion of the steambank that extends from the channel bottom up to the lower limit of vegetation. Rootwad toes can provide the foundation for soft upper-bank treatments such as bank reshaping and soil reinforcement. Rootwad toes provide better fish habitat and have a shorter life span than rock toes.
e. **Bank Reshaping:** Reducing the angle of the bank slope without changing the location of its toe. However, the toe may be reinforced with rootwads or coir logs.
f. **Soil Reinforcement/Soil Pillows:** Soil layers or lifts encapsulated within natural materials. Often the lifts are used to form a series of stepped terraces along the bank which then are planted with woody vegetation.
g. **Coir Logs:** Coir (coconut fiber) logs are long, sausage-shaped bundles of bound-together coir. They are commonly used as a temporary measure to stabilize the bank toe while riparian vegetation grows.

2. In-Channel Nutrient Supplementation

Description: Salmon and anadromous trout runs in most of the rivers in Washington State are significantly reduced compared to historic levels. This has resulted in a reduction of marine-derived nutrients that feeds the food chain including juvenile salmonids. To provide more nutrients up to historic levels the COE proposes to permit nutrient supplementation. Salmon carcasses or carcass analogs will be obtained from non-stream sources, generally hatcheries, to distribute in stream systems that have below-historic numbers of salmon carcasses. Distribution of carcasses will follow WDFW technical guidance (the WDFW protocol and guidelines document describes the application of fertilizer however, that action is not covered by this PBA). Distribution of carcasses will occur within the current anadromous zone of a watershed or within

areas historically accessible to anadromous fish. Carcasses or analogs will be deployed randomly throughout riparian and stream areas by placing individual or several carcasses on the ground, in the water, or wedging into accumulated wood. Work may entail use of trucks and hand crews.

Conservation Measures:

a. WDFW's technical guidance document "Protocols and Guidelines for Distributing Salmonid Carcasses, Salmon Carcass Analogs, and Delayed Release Fertilizers to Enhance Stream Productivity in Washington State(Saldi-Caromile et al. 2004) will be followed.
b. The revised Co-managers Salmonid Disease Control Policy (NWIFC and WDFW July 2006) Section 2.4.5. Carcass Transfer Requirements will be followed.
c. Nutrient enhancement will be covered only, if a recovery document, watershed plan, or best available science identifies nutrient deficiency as one of the limiting factors.
d. Salmon carcass deployment will not be conducted in areas where documented grizzly bear sightings have occurred within the last 4 weeks.

3. Riparian Invasive Plant Removal

Description: Functioning riparian corridors provide many essential benefits to salmonids including shade and recruitment of LWD. In many areas in Washington State riparian corridors have been disrupted by anthropogenic activities and subsequently taken over by nonnative invasive vegetation. To re-establish native vegetation the COE proposes to permit treatment of invasive plant infestations in riparian areas using biological controls, mechanical methods, and chemical herbicides. The following five herbicides are proposed under this action category: Clopyralid, Glyphosate, Imazapyr, Metsulfuron, and Sulfometuron.

Clopyralid is a relatively new and very selective herbicide. It is toxic to some members of only three plant families: the composites (Compositae), the legumes (Fabaceae), and the buckwheats (Polygonaceae). Clopyralid is very effective against knapweeds, hawkweeds, and Canada thistle at applications rates of 0.10 to 0.375 pounds per acre. Clopyralid is a WSSA Group 4 herbicide. Its selectivity makes it an attractive alternate herbicide on sites with non-target species that are sensitive to other herbicides.

Glyphosate is a non-selective, broad-spectrum herbicide that is labeled for a wide variety of uses. It is absorbed by leaves and translocated throughout the plant, and disrupts the photosynthetic process. The herbicide affects a wide variety of plants, including grasses and many broadleaf species, and has the potential to eliminate desirable as well as undesirable vegetation. Glyphosate is a WSSA Group 9 herbicide. Some plant selectivity can be achieved by using a wick applicator to directly apply glyphosate to the target plant, thereby avoiding desirable vegetation.

Imazapyr is used for pre- and post-emergent control of annual and perennial grasses and broadleaf weeds, brush, vines, and many deciduous trees. Imazapyr is absorbed by the leaves and through the root system, disrupting amino acid biosynthesis. Effects may not be seen for two weeks. Complete plant kill may take several weeks. Imazapyr is a WSSA Group 2 herbicide. It can be used in ground broadcast, spot and localized, cut stump, frill and girdle, and tree injection applications at 0.5 to 1.5 lbs active ingredient per acre per year not to exceed 1.5 lbs per acre per year. The imazapyr formulation of Arsenal® herbicide is registered for use in non-crop sites for selective and total weed control.

Metsulfuron methyl is used for the control of brush and certain woody plants, annual and perennial broadleaf weeds, and annual grasses. Metsulfuron methyl is absorbed through the roots and foliage and inhibits cell division in the roots and shoots. Metsulfuron methyl is a WSSA Group 2 herbicide. Application should be made before or during active growth periods at a rate of 0.33 to 2.0 ounces per acre.

Sulfometuron methyl is a non-selective herbicide used primarily to control broadleaf weeds and grasses. Its primary use is for noxious weed control. Sulfometuron methyl is WSSA Group 2 herbicide. Application rates for most plants range from 0.023 to 0.38 ounces per acre.

Treatment of an invasive plant site may include one or more of the following treatment methods: Stem injection; squirt with backpack or hand-held sprayers, squirt bottles, wicking or wiping. Application with sprayers mounted on or towed by trucks is not proposed. A combination of treatments may occur to achieve effective control or eradication of an invasive plant species at many sites. All herbicide applications will comply with label instructions, and may be further restricted as stated below. Treatment methods were selected due to their low potential for adversely affecting aquatic species, while facilitating riparian restoration through invasive plant control. Herbicides were selected due to their low toxicity to aquatic species and application methods were selected for their low potential for contaminating soils, thereby minimizing the risk of herbicides leaching to streams. Methods, tools, and project design criteria are summarized in Table 1, and subsequently discussed in more detail.

Table 1: Summary of Methods, Tools, and Conservation Measures for Invasive Plant Treatment

Methods	Tools	Conservation Measures
Manual & Mechanical Treatment	Various tools listed below	*Manual & Mechanical Treatment*
Hand pulling	Non-motorized tools (weed wrenches, etc)	Hand pulling
Seed clipping	String trimmer or hand-held blade	Transport only daily fuel supply for chainsaws and string trimmers to project site -Do not fuel chainsaws and string trimmers within 100 feet of water
Stabbing	Shovel, hoe, or similar hand tool	
Girdling	Chainsaw, axe, or similar hand-held tool.	
Cutting	String trimmer or hand-held blade	
Solarization	Plastic, geotextile, cardboard, or similar ground cover material	
Herbicide Treatment	Selective application techniques for clopyralid, aquatic labeled glyphosate, imazapyr (aquatic and non-aquatic labeled), metsulfuron methyl, sulfometuron methyl	-Only daily quantities of herbicide transported to project site -Do not apply herbicides if rain is predicted within 24 hours -Emergent treatment restricted to knotweed with aquatic labeled glyphosate -No treatment of submerged aquatic plants -Spill prevention, cleaning, and storage requirements
		-Use only LI 700, Agri-Dex, or an equivalent when adding surfactants to formulations .
Stem injection	Appropriate syringes/injectors	-Knotweed applicators will be familiar with appropriate methods -Knotweed injection will use only aquatic labeled glyphosate (up to 100 percent concentration) -Emergent knotweed stems > 0.75 inches will be injected
Cut-stump and Hack & squirt	Backpack or hand-held sprayers, squirt bottles, and wiping applicators (brush, fabric, etc) Axe, hatchet, machete, drill, chainsaw, or other hand-held tool. Squirt bottles, backpack sprayer, or other hand-held spray bottle. Also tree injector and pellet gun.	-Herbicides to be used are imazapyr, metsulfuron methyl, and glyphosate - Application with aquatic glyphosate and aquatic imazapyr allowed to water's edge, and bankfull level for metsulfuron methyl, non-aquatic imazapyr
Wicking, wiping	Sponge, wick, or similar absorbent material	-Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl -Application with aquatic glyphosate and aquatic imazapyr allowed to water's edge, and to bankfull level for clopyralid, and sulfometuron methyl
Spot spray	Backpack, hand-pumped, or handheld spray bottles	-Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl -Spray of aquatic glyphosate, metsulfuron, and sulfometuron allowed to bankfull level. Hand-held spray application (no backpack spray) of aquatic glyphosate, imazapyr metsulfuron, and sulfometuron allowed

Methods	Tools	Conservation Measures
		within intermittent or ephemeral channels **-**No spray of clopyralid within 15 feet of perennial (flowing water in summer) stream bankfull level.
		-No spray of clopyralid in intermittent/ephemeral streams **-**Hand-held spray application (no backpack spray) of aquatic glyphosate and aquatic imazapyr to 15 feet of waters' edge in perennial channels **-**Drift minimized by 200-800 µm droplet size, and wind speeds consistent with label or local agency requirements, whichever is less
Biological Control	Insects, parasites, or pathogens	**-**State and U.S. Animal & Plant Health Inspections Service approved **-**Agents with direct adverse effects to non-target organisms not used
Site Restoration		
Site preparation	Rakes, shovels, hoes, and similar non-motorized hand tools.	**-**Minimize ground disturbance by clearing only area necessary for effective planting
Planting & seeding	Rakes, shovels, hoes, and similar non-motorized hand tools.	

1. Manual and Mechanical
    a. Hand Pulling – Uprooting is performed either by hand or using hand (non-motorized) tools. Generally appropriate for non-rhizome forming, tap-rooted species or species which produce only from seed. Treatment occurs when plant growth stage and soil conditions allow, and prior to seed-set for annual species. Hand pulling of emergent invasive plants is included.
    b. Seed Clipping – Seed heads are cut, bagged, and removed from the area. The remainder of plant is left intact, but is likely to be treated with another method.
    c. Stabbing – Some invasive plants can be severely weakened or killed by severing or injuring the carbohydrate storage structure at the base of the plant. Depending on species, this structure may be a root corm, storage rhizome, or taproot. Can be accomplished with shovel, hoe, or similar hand tool.
    d. Girdling – A strip of bark is removed around the base of susceptible woody species. The vascular cambium, or inner bark, which translocates carbohydrates between roots and leaves, is removed
    e. Cutting – Removal of the above-ground portion of an invasive plant by cutting with chainsaw, handsaw, pruning shears, or similar hand held device. Also includes mowing or cutting with a string-trimmer type machine, which does not have wheels or contact the ground.
    f. Solar deprevation (ground cover) – Invasive plant infestations may be covered with plastic, geotextile, cardboard, or other ground cover material to kill the plant and roots, or reduce plant vigor prior to treatment with another method.

2. Herbicide Treatments

a. Do not apply herbicides in areas where listed plants may be present. Botanical surveys must be conducted in locations that could support listed plants before any vegetation treatment (including manual and mechanical) is conducted.
b. Stem Injection – Stems of actively growing species are injected with herbicide, usually near the base of the plant.
c. Cut-Stump – Herbicide is applied by spray, squirt, wicking, or wiping to the stump of a plant (usually a shrub or tree) shortly after the shoot or trunk is cut down.
d. Wicking & Wiping – Use a sponge or wick to wipe herbicide onto foliage, stems, or trunk. Use of wicking and wiping method reduces the possibility affecting non-target plants.
e. Spot Application – Herbicide is directly sprayed onto target plants only, and spraying of desirable, non-target vegetation is avoided. Includes backpack and hand-pumped spray or squirt bottles, which can target very small plants or parts of plants (foliage, stems, or trunk).
f. Hack & Squirt – Woody species are cut using a saw or axe, or drilled; herbicide is then immediately applied to the cut with a backpack sprayer, squirt bottle, syringe, or similar equipment.

3. Biological Controls

a. Biological control is the inoculation of an infestation site with insects, parasites, or pathogens that specifically target the invasive plant species of concern. Treatment of invasive plant infestations with biological controls is a gradual process requiring several years to reach full effectiveness. Subsequent treatment with other methods may also occur.
b. Site preparation and competitive planting and seeding
    i. Invasive plant infestation sites treated using one or more of the above stated methods may be revegetated by planting cuttings, seedlings, or seeding.
    ii. Site preparation can involve removal of litter and duff layer suitable to allow proper soil to seed/root contact. This will be accomplished by scuffing or scalping micro-sites (generally less than 1 square meter) with hand tools within the larger planting/seeding site.

Method Specific Prescriptions

1. Manual and Mechanical Methods
   a. Minimize treating invasive plants on streambanks when listed aquatic species are present, or likely to be present.
   b. Use the least ground-disturbing method that results in effective invasive plant treatment.
2. Fuel handling
   a. Transport no more than a one day supply of fuel for chainsaws and string-trimmers into riparian areas.
   b. Fueling of chainsaws and string-trimmers will not occur within 100 feet of surface waters.
3. Herbicides General Criteria
   a. Only daily-use quantities of herbicides will be transported to the project site.
   b. Use only LI 700®, Agri-Dex®, or an equivalent when adding surfactants to formulations.
   c. Do not apply herbicides if precipitation is predicted within 24 hours.
   d. Only herbicide application methods for plants emergent from water are stem injection, wicking or wiping, and hand-held spray bottle application of glyphosate to knotweed. No application to submerged aquatic vegetation with any herbicide is included.
   e. Areas used for mixing herbicides will be placed where an accidental spill will not run into surface waters or result in groundwater contamination. Impervious material will be placed beneath mixing areas in such a manner as to contain any spills associated with mixing refilling.
   f. Equipment cleaning and storage and disposal of rinsates and containers will follow all applicable state and Federal laws.
4. Knotweed stem-injection
   a. Individuals will be familiar with proper glyphosate stem-injection methodology prior to treatment.
   b. Only aquatic glyphosate formulations will be used. The formulation can be used at up to 100 percent concentration for the stem injection method. The formulation will be diluted to 50 percent or less active ingredient when applied directly to fresh stem cuts using wicking or wiping, and up to the percentage allowed by label instructions when applied to foliage using low pressure hand-held spot spray applicators.
   c. Larger emergent knotweed can be treated with glyphosate by stem injection, and smaller emergent knotweed by wicking/wiping and spot spray with hand-held sprayers. Wicking or wiping and hand-held spray bottle application of glyphosate allowed to emergent knotweed plants less than 4 to 5 feet tall, and usually smaller.
   d. Emergent plants with stems over 0.75 inch in diameter will be treated by stem injection.
   e. Most knotweed patches are expected to have overland access. However, some sites may only be reached by water travel, either by wading or inflatable raft (or kayak). The following measures will be used to reduce the risk of a spill during water transport:

i. No more than 2.5 gallons of glyphosate will be transported per person or raft, and typically it will be one gallon or less.
ii. Glyphosate will be carried in 1 gallon or smaller plastic containers. The containers will be wrapped in plastic bags and then sealed in a dry-bag. If transported by water craft, the dry-bag will be secured to the watercraft.

5. Cut-stump and hack & squirt
   a. Herbicides to be used are imazapyr, metsulfuron methyl, and aquatic labeled glyphosate.
   b. Application with aquatic labeled glyphosate and aquatic labeled imazapyr allowed to waters' edge, and to bankfull level for metsulfuron methyl and imazapyr not labeled for aquatic use.
6. Wicking and wiping
   a. Herbicides to be used are clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl.
   b. For perennial streams, wicking and wiping application with aquatic labeled glyphosate and aquatic labeled imazapyr is allowed to waters' edge, and to bankfull level for clopyralid, imazapyr (not aquatic labeled), metsulfuron methyl, and sulfometuron methyl.
   c. For intermittent and ephemeral channels, clopyralid, aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl can be applied to all dry portions of the channel.
7. Spot application
   a. Herbicides to be used are clopyralid, aquatic glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl.
   b. Do not spot spray clopyralid within 15 feet of the bankfull level of perennial streams.
   c. Do not spot spray clopyralid within intermittent or ephemeral channels.
   d. Spot spray using aquatic labeled glyphosate and aquatic labeled imazapyr allowed to within 15 feet of the edge of water with hand-held, hand-pump spray or squirt bottles (no backpack sprayers).
   e. Spot spray using metsulfuron methyl, and sulfometuron methyl allowed to bankfull level of perennial streams with backpack sprayers, hand-pump sprayers, and squirt bottles.
   f. Spot spray of aquatic labeled glyphosate, imazapyr, metsulfuron methyl, and sulfometuron methyl within dry intermittent and ephemeral channels allowed only with hand-held, hand-pumped sprayers and squirt bottles (no backpack sprayers). Excluding backpack spot spray is a conservation measure intended to minimize overspray within channels, and subsequent "first flush" exposures to aquatic resources, while still allowing full efficacy of the treatment.
   g. For foliar backpack spray applications, use only low pressure sprayers producing droplet sizes between 200 and 800 microns to minimize drift.
   h. Backpack spray activities will only occur during conditions with low drift potential, defined as wind velocities greater than two and less than 10 mph, or as stated on herbicide label.
8. Biological Controls
   a. All biological controls used will be U.S. Animal and Plant Health Inspection Service and state approved.
   b. Agents demonstrated to have direct negative effects on non-target organisms will not be released.

9. Site Preparation and Competitive Planting and Seeding
    a. Minimize ground disturbance by clearing only the area necessary for effective planting.
10. Extent of Treatment
    a. Within each sixth field Hydrologic Unit Code (HUC) containing listed aquatic species, no more than 10 percent of the total riparian area, measured as adjacent stream length, will be treated within any one year period. This includes 10 percent of flowing streams, and 10 percent of intermittent streams, measured separately.

Table 2 summarizes conservation measures to minimize effects of herbicide application to water quality.

Table 2: Summary of Conservation Measures to Minimize Effects to Water Quality and Listed Salmonids

	Perennial/flowing channels		**Dry intermittent and ephemeral channels, and ditches**	
	Spot spray	**Hand/select**	**Spot spray**	**Hand/select**
Clopyralid	15 feet from bankfull	bankfull	Bankfull	allowed through channel/ditch
Glyphosate (aquatic)	115 feet from edge of water	edge of water	allowed through channel/ditch	allowed through channel/ditch
Imazapyr	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch
Imazapyr (aquatic)	15 feet from edge of water	edge of water	allowed through channel/ditch	allowed through channel/ditch
Metsulfuron methyl	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch
Sulfometuron methyl	bankfull	bankfull	allowed through channel/ditch	allowed through channel/ditch

General Prescriptions for Herbicide Use

1 When consistent with label instructions, use water when diluting herbicides prior to application.
2 A spill cleanup kit will be available whenever herbicides are used, transported, or stored.
3 A certified/licensed pesticide applicator will oversee all herbicide application projects.
4 In riparian areas, use only surfactants or adjuvants that do not contain any ingredients on EPA's List 1 or 2, where listing indicates a chemical is of toxicological concern, or is potentially toxic with a high priority for testing

Excluded Activities

- Application with sprayers mounted on or towed by trucks is not proposed.
- Treatment of submerged aquatic plants is not proposed.

4. Prescriptions Specific to Bull Trout

BT1. In bull trout local population areas (spawning and early rearing areas), in-water work will only occur during the watershed-specific timing windows identified in Appendix C – WDFW's *Gold and Fish Pamphlet* (WDFW 1999) or more up-to-date, USFWS-approved information. For information on local population areas, refer to the "Key Habitat for Bull Trout Recovery" maps in the *Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout* or to Appendix D: Table 1. BT2. Fish passage structures will not be installed and barriers will not be removed in locations where there are concerns for impacts to bull trout populations from exotic or non-native species.

BT3. In-water work will only occur during the timing windows identified in Appendix C, when the in-water restoration activity occurs in the following water bodies: the Duwamish Waterway, Lake Union and the Ship Canal, Lake Washington, Sammamish Basin, Columbia River Mainstem or in marine nearshore and estuarine areas.

5. Prescriptions Specific to Non-Fish Species

The proposed action includes activity or species-specific (or both) measures and practices relating to effects of restoration actions on several terrestrial plant and animal species managed by the USFWS. These measures were designed to ensure that the underlying restoration activities will have either no affect or will be unlikely to adversely affect those species such that those species need not be addressed in formal consultation. The relevant effect determinations for those species are addressed by letter of concurrence under separate cover. This document lists those species and describes the protective measures and practices in Appendix F, below.

<u>Implementation Process</u>

1 For each project carried-out under this restoration program, the applicant will fill out a SPIF and submit to the COE.
2 The COE will review each project to ensure that the project meets the description and any other criteria of the proposed activity category such that any adverse effects to ESA-listed species and their designated critical habitats are within the range of effects considered in the Opinion.
3 If the COE determines that the proposed action does not quite meet all of the criteria outlined in the action categories, but all adverse effects to ESA-listed species and their designated critical habitats are within the range of effects considered in the Opinion, the COE will inform the Services about the exception in a Memorandum to the Services and provide rationale for how the action meets the intent and results of the of the restoration activity as described for this programmatic consultation. If the Services disagree with the COE determination, the project will need to go through individual consultation.
4 The COE will forward all SPIFs and copies of necessary project plans (*i.e.*, pollution and erosion control, temporary access routes, and stormwater management), to the appropriate NMFS and USFWS field offices for review.
5 The Services will review and approve a SPIF electronically, if warranted, within 30 days.

6. After project completion the applicant will report required sediment monitoring data (extent and duration of plume) to the COE.
7. The COE will prepare an annual monitoring report by evolutionary significant unit (ESU) or Interim Recovery Unit (IRU) for take tracking purposes. The monitoring report will include:
   a. The number of permits that were issued under each of the nine action categories.
   b. Projects/SPIF that were approved with minor deviations.
   c. The sum of all project extents (stream miles effected) by watershed.
   d. The turbidity monitoring data.
   e. A list of problems encountered and solutions.
8. The COE and the Services will conduct an annual coordination meeting to discuss the annual monitoring report and any actions that could improve conservation or make the program more efficient or more accountable.

APPENDIX D
PHASE 3 BA ESA PATHWAYS AND INDICATORS AND EFFECTS DETERMINATION TABLES

Table A-1
NMFS and USFWS Checklist for Documenting the Environmental Baseline of the Beebe Springs Creek Watershed and the Effects of the Beebe Springs Natural Area Development Phase 3 Project on Chinook, Steelhead, and Bull Trout Pathways and Indicators

Pathways	Population and Environmental Baseline			Effects of the Action(s)		
Indicators	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
Subpopulation Characteristics*						
Subpopulation Size		X			X	
Growth and Survival		X			X	
Life History Diversity and Isolation		X			X	
Persistence and Genetic Integrity		X			X	
Water Quality						
Temperature	X				X	
Sediment		X		X (long-term)		
Chemical Contamination-Nutrients	X				X	
Habitat Access						
Physical Barriers		X		X		
Habitat Elements						
Substrate Embeddedness	X				X	
Large Woody Debris	X			X		
Pool Frequency and Quality	X				X	
Large Pools	X				X	
Off-Channel Habitat	X				X	
Refugia	X				X	
Channel Conditions and Dynamics						
Wetted Width/ Max Depth Ratio	X				X	
Streambank Condition	X (long-term)	X (short-term)			X	
Floodplain Connectivity	X				X	
Flow/Hydrology						
Change in Peak/Base Flow	X				X	
Increase in Drainage Network		X			X	
Watershed Conditions						
Road Density and Location			X		X	
Disturbance History		X			X	
Riparian Conservation Areas		X (long-term)	X (short-term)	X		

Pathways	Population and Environmental Baseline			Effects of the Action(s)		
Indicators	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
Species and Habitat*						
Integration of Species and Habitat Conditions		X			X	

* The indicators for these pathways are based on the bull trout populations utilizing Beebe Springs Creek as foraging habitat.

Table A-2
NMFS and USFWS Checklist for Documenting the Environmental Baseline of the Columbia River Nearshore Habitat in the Vicinity of the Beebe Springs Natural Area Development Phase 3 Project on Chinook, Steelhead, and Bull Trout Pathways and Indicators

Pathways	Population and Environmental Baseline			Effects of the Action(s)		
Indicators	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
Subpopulation Characteristics*						
Subpopulation Size		X			X	
Growth and Survival		X			X	
Life History Diversity and Isolation		X			X	
Persistence and Genetic Integrity		X			X	
Water Quality						
Temperature		X			X	
Sediment**	X				X (long-term)	X (temp)
Chemical Contamination-Nutrients	X				X	
Habitat Access						
Physical Barriers		X		X		
Habitat Elements						
Substrate Embeddedness**		X			X	
Large Woody Debris			X	X		
Pool Frequency and Quality**			X		X	
Large Pools**			X		X	
Off-Channel Habitat		X		X		
Refugia		X		X		
Channel Conditions and Dynamics						
Wetted Width/ Max Depth Ratio**			X		X	
Streambank Condition**	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology						
Change in Peak/Base Flow**			X		X	
Increase in Drainage Network **	X				X	
Watershed Conditions						
Road Density and Location			X		X	
Disturbance History		X			X	
Riparian Conservation Areas		X (long-term)	X (short-term)	X		

Pathways	Population and Environmental Baseline			Effects of the Action(s)		
Indicators	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
Species and Habitat*						
Integration of Species and Habitat Conditions		X			X	

* The indicators for these pathways are based on the bull trout populations utilizing the Columbia River as foraging habitat.

** Although some current exists in the project vicinity, the nearshore habitat is composed of former Columbia River floodplain with the original river channel on the other bank.

Table A-3
Phase 3 BA ESA Effects Determination

Species*	ESA Status	Jurisdiction	Effects – Construction	Effects – Long Term	Effects to Critical Habitat
Chinook Salmon *(Oncorhynchus tshawytscha)*	Endangered	NMFS	May affect, not likely to adversely affect	Beneficial-Creation of side channel habitat & revegetation of riparian zone	May affect, not likely to adversely affect
Steelhead Trout *(Oncorhynchus mykiss)*	Threatened	NMFS	May affect, not likely to adversely affect	Beneficial- Creation of side channel habitat & revegetation of riparian zone	May affect, not likely to adversely affect