King County

INSTREAM PROJECT DESIGN CHECKLIST

For Design and Construction of Flood and Erosion Protection Facilities and Habitat Restoration Projects that May Include Large Wood Placement or Natural Wood Recruitment

Project Name: Si View Levee 2019 Repair Project Manager: Stella Torres

River/River Mile/Bank: South Fork Snoqualmie River Right Bank (River miles 3.92 and 4.01) Date: June 14, 2019

Check one or both:

X Project includes placement of large wood elements

X Project may influence the recruitment, mobility and accumulation of natural large wood.

Note: If the project is comprised of emergency work, then fill out and file this form within 30 days of completion of emergency work.

I. Project Background and Preliminary Design (30-40 Percent) Information
(Provide general information at a conceptual level)

1. Describe the overall river management context, strategy and objectives for the river reach. Refer to pertinent plans, policies or documents pertaining to flood hazards, salmon recovery, etc.

   This part of the South Fork Snoqualmie River has containment levees on both banks. River flows are controlled by levees on both banks of the river. The levees were constructed in 1964 with material dredged from the river channel and armored with riprap. The right bank levee is up to 2.62 feet higher than the left bank levee in this reach. The current channel is armored. Gravel is actively being deposited in the lower portions of this reach as the river transitions to a lower gradient. I-90 crosses the river at the upstream end of this segment. Clough Creek flows into the left bank floodplain before flowing into culverts under I-90 at the downstream end of the segment. Narrow bands of forest abut both right and left banks levees. Overbank flooding is significant in the left bank floodplain. The armored channel has limited hydraulic complexity and disconnected the river from its floodplain for small flood events. This has eliminated slow-water refuge for fish and resulted in relatively low ecological functionality. Limited instream cover exists to provide shade and a source of food to the river on growing gravel bars. Clough Creek provides off-channel refuge for fish. Refuge habitat is extremely limited throughout the corridor and therefore highly important. Additionally, the confluence of Clough Creek and the South Fork Snoqualmie River provides the most productive spawning habitat in the corridor. Parts of this segment are forested by a mature mixed conifer forest. Conifer and deciduous forests are separated from the river by the levee system. Fish habitat is generally lacking in the South Fork channel and degraded due to the constrained channel. High-stream velocities, high-water temperature, and lack of floodplain connectivity contribute to degraded ecology.

2. Describe the goals and objectives of the project and its relative importance to the success of DNRP program goals and mandates. Identify funding source(s) and describe any applicable requirements or constraints.

   The goal of the project is to repair the erosion damage by replacing missing face and toe rock on four section of damage totaling approximately 200 feet. The project is funded by the King County Flood Control District. Specific objectives of the project include:

   - *Identify and evaluate alternatives for repair of damaged facility. Evaluation shall include consideration of feasibility (construction, access/easement and permitting), environmental impacts/mitigation, schedule, environmental improvements, cost, and design life.*
   - *Conduct stakeholder coordination and public outreach throughout the project cycle.*
   - *Implement/construct selected alternative in fall 2019.*

3. Describe the existing (and historic, if relevant) site and reach conditions, including structural features, channel form, and the presence of naturally-deposited large wood. Describe known utilization by salmonids and any important or unique biological or ecological attributes.

   The Leveed segment runs through North Bend and is channelized and confined on both banks by continuous levees from river mile 5.2 to river mile 2. Both sides of this segment of the South Fork are urbanized. The City of North Bend's wastewater treatment plant discharges into the river near river mile 2.2. The levees end at the Snoqualmie Valley Regional Trail Bridge. Construction and maintenance of the levees in this segment have adversely impacted riparian functions. The river is cut off from its floodplain and riparian area. Trout stomach content data collected by Thompson, Whitney & Lamb (2011) show a disproportionally small amount of terrestrial invertebrates were found in fish in the lower South Fork compared to fish in the Middle Fork and North Fork. Reduced riparian vegetation density results in less food for trout in this reach. Thompson, Whitney and Lamb (2011) found tributaries in this segment to be poorly connected through long or undersized culverts that are likely partial barriers to fish passage, depending on flow conditions. Furthermore, riparian vegetation has been completely removed in places for commercial purposes such as parking, for vehicular access or converted to lawn in residential areas and the channels frequently contain anthropomorphically litter. Additionally, the levees artificially increase water velocities by creating relatively homogenous and smooth banks. High velocities coupled with loss of habitat complexity reduce the availability of trout spawning, rearing, and holding habitat.

4. Describe what is known about adjacent land uses and the type, frequency, and seasonality of recreational uses in the project area. Are there nearby trail corridors, schools or parks? What is the source(s) of your information?

   According to the King County 2013 River Recreation Study, this reach experiences infrequent use by all categories of recreationists. Approximately nine out of 10 floaters observed in the Snoqualmie River system were observed in the reach of the mainstem between Snoqualmie Falls and Fall City. Fewer than 2 percent of all floaters were observed in all other reaches of the river system, including the reach affected by this project (Synthesis of 2013 River Recreation Study, prepared by Herrera Environmental Consultants for King County, 2014).

5. If the project includes wood placement, describe the conceptual design of large wood elements of the project, including, if known at this stage in the design, the amount, size, location, orientation, elevation, anchoring techniques, and type of interaction with the river and stream at a range of flows.

   The repair does not include any large wood incorporated into the design. The repair will be large rock at the toe and willow stakes and trees planted on the upper bank. There are up to 21 trees currently on the bank that may need to be cut down in order to repair the rock levee. As part of the County's mitigation requirements for obtaining a Hydraulic Project Approval from Washington Department of Fish and Wildlife, the removed trees will be placed into the river (unanchored) with at least 1/3 of their length within the low flow channel. Most of the trees have leaders that are 4-8 inches in diameter at breast height (DBH) with the exception of a few measuring over 12 inches DBH. We do not anticipate cutting all 21 of these trees. The exact location that the wood will be placed cannot be determined until low flow season (i.e. July-September). The wood will be placed approximately parallel to the shoreline to avoid spanning the channel.

6. If the project includes wood placement, what is the intended structural, ecological or hydraulic function of the placed wood? What role does the placed wood have in meeting the project's goals and objectives? Is the project intended to recruit or trap additional large wood that may be floating in the river?

   The wood placement near (but not a part of) the levee repair site is intended to serve an ecological function as fish habitat. State of Washington's Integrated Streambank Protection Guidelines (2003) and WAC 220-660-130 require "No Net Loss" of aquatic habitat functions when conducting bank stabilization projects. Because removal of the existing trees from the levee is effectively removing a future source of large wood input to the aquatic habitat, placing the removed trees into the river and planting new ones for future input satisfy this requirement under the "no net loss" framework.

7. Is the project likely to affect the recruitment, mobility or accumulation of natural large wood, e.g., by encouraging wood deposition on or near the site or promoting bank erosion that may cause tree toppling? Describe expected site evolution and its potential effects on natural wood dynamics.

   Because of the relatively small size of this wood, it is not expected to remain in place at the project site beyond the first major flood.

8. Describe how public safety considerations have been incorporated into the preliminary project design. For placed wood, address each of the considerations:

a. Type, frequency, and seasonality of recreational use: *According to the King County 2013 River Recreation Study, this reach experiences infrequent use by recreationists.*

b. Wood location, positioning, and anchoring techniques: *Wood will not be anchored. It will be placed immediately adjacent to the bank repair approximately parallel to shore with at least 1/3 of its length in the low flow channel. The exact location of the low flow channel potentially changes every year therefore location will be determined on site during construction in late summer.*

c. Maximizing achievement of project goals and objectives while minimizing potential public safety risks: *The repair project goals do not include wood placement. It is a requirement in order to receive necessary environmental permits. The wood that will be placed as permit conditions is not expected to change the background wood loading in the system.*

d. Use of established and recognized engineering, geological, and ecological expertise: *The requirement for placing at least 1/3 of the length of the wood in the low flow channel is an ecological consideration related to providing salmon habitat throughout the year. If the wood was placed high up near the bank it would not be available as habitat to fish except during periods of high flow.*

9. Has the project been reviewed and approved by a Licensed Professional Civil Engineer? Please list other licensed technical staff who have reviewed and provided input on the design (e.g., Licensed Geologist and Licensed Engineering Geologist). Specify the Engineer of Record for the design and any other Licensed Professionals who have sealed their portion of the design plans. Were all reviews and approvals completed?

   Yes. Mark Beggs (Professional Engineer) Darian Kis-Young (Engineer in Training) and Mark Ruebel (Engineer of Record) designed the levee repair and will oversee the wood placement. The project is currently at 30% design. All design reviews and approvals have been completed.

10. Has the project been reviewed and approved by a King County Professional Ecologist (e.g., person with an advanced degree in aquatic and/or biological sciences from an accredited university or equivalent level of experience) if ecological benefits are an intended project objective, to evaluate the consistency of the design with project goals, existing environmental policies and regulations, and expected or known permit conditions? Specify the Reviewing Ecologist for the project. Was this review and approval completed? What is the anticipated schedule for completing project milestones (30-40% design, final design, major construction/earthmoving) and for soliciting public input)?

    Tom Bloxton, Project Ecologist, approved of the levee repair design and placement of the wood. The project is currently at 30% design. The anticipated project construction date is September-October 2019.

Project Manager Date

Supervising Engineer, Project Supervisor or Unit Manager Date