King County

INSTREAM PROJECT CHECKLIST

For Construction and Maintenance of Flood and Erosion Protection Facilities and Habitat Restoration Projects that may include large wood elements

Project Name Jan Road Levee Setback Project (Post-construction update)

Project Manager/Engineer Dan Heckendorf

River/River Mile/Bank Cedar/13.1/Left and Right Date 10/11/2022

I. Project Background and Preliminary Design (30-40 Percent) Information

(Provide general information at a conceptual level)

1. Describe the goals and objectives of the project and its relative importance to the success of DNRP program goals and mandates. (Note: If the project is comprised of emergency work, then fill out and file this form within 30 days of completion of emergency work.)

   The Jan Road Levee Setback Project (project) is an integrated floodplain management action intended to restore floodplain function and habitat while reducing flood risks to people, property, and infrastructure. The project proposes to reconnect approximately 14 acres of historical Cedar River floodplain and significantly improve habitat for endangered Chinook salmon and other species. The flood-related impacts to the adjacent neighborhood and public infrastructure have led to identification of this as a priority flood reduction project for the Cedar River basin in the 1993 and 2006 flood plans, and most recently included in the Cedar River Capital Investment Strategy (CIS), approved by the King County Flood Control District (District) in 2017.

   In addition to the habitat benefits and reduction of flood risks, the project will also provide the required mitigation for impacts associated with the relocation of large wood within the Cedar River in 2017, in accordance with the 2017 Cedar River Wood Relocation Hydraulic Project Approval (HPA). In accordance with the 2017 HPA, the final mitigation plan will be developed and agreed upon through further collaboration between King County, Washington Department of Fish and Wildlife (WDFW), and the Muckleshoot Indian Tribe Fisheries Division (MITFD).

   The goals of the project are:

   (1) Improve natural habitat-forming processes and function, where feasible.
   (2) Establish resilient and sustainable floodplain infrastructure to reduce risks to people, property and public infrastructure.
   (3) Provide required mitigation for the 2017 Cedar River wood relocation efforts.

2. Describe the existing (and historical, if relevant) site and reach conditions, including structural features, channel form, and the presence of naturally deposited large wood.

The Project reach of the Cedar River is an approximately 0.5 mile-long single thread, confined and incising alluvial channel reach. Construction of levees and revetments along the majority of its length have contributed to straightening and confinement of the channel, resulting in increased depths and velocities, elimination of salmon spawning and rearing habitats, and reduction in overall sediment and wood storage potential. Various large wood inventories have shown that the overall wood loading is low when compared to regional metrics for adequate levels of instream wood (King County, 2020).

3. 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?

   Adjacent land uses include undeveloped public space, residential and transportation. The Cedar River Regional Trail boarders the project site and supports active and passive recreation. Water-dependent active recreation includes floating (inner tubing) and fishing.

   The SR 169 highway crossing is the closest boater access, located about 1 mile upstream of the project. According to a 2013 recreational use survey, use within the project reach is limited (less than 5 percent of floaters), consistently predominantly of adults in kayaks and inner tubes. Average use per day at the Cedar Grove Road crossing (about 2 miles downstream) was about one person per day, during the summer recreational period (King County, 2013). Given the trend of decreasing use in the upper reaches of the river, it is anticipated that average use is less than at the Cedar Grove Road crossing.

4. 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.

   Large wood placements are proposed within both the main channel and floodplain. Floodplain wood placements will not induce risks to recreational users, as the majority of flow will remain within the main channel, at recreational use flows.

   Main channel large wood will consist of four engineered log jams (ELJs). All ELJs will include both vertical and horizontal logs. Two of the ELJs ("ELJ 2-1" and "ELJ 2-2", See Drawings) will be of apex jam architecture, having an approximate width and length of 40 and 55 feet, respectively. The top of the structures will be set approximately 2 feet above the estimated 100-year water surface elevation (WSEL). These ELJs will extend into approximately one third of the current mainstem channel width. The other two main channel ELJs ("CSS-1" and "CSS-2") will be of buried channel spanning jam architecture, using a single layer of logs arranged in a complex matrix across the width of the low flow channel, with an approximate length (streamwise direction) of approximately 70 feet and flush with the channel bed. Log members will be excavated into the channel bed with minimal additional excavation to embed the lower portion of rootwads into the channel and minimize gaps between the channel and log bole. The wood used in the ELJs will be chained together and ballasted with rock to withstand flows up to the 100-year flood. Slash and streambed cobble will be used to fill the voids between the channel bottom and log pieces. Additionally,

streambed cobble will be placed upstream of each ELJ to create a smooth transition from the existing channel to near the top of the log (some portion of the wood will extend approximately 1 to 2 feet above the design channel bed).

5. What is the intended 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 woody debris that may be floating in the river?

   Large wood placements are critical in meeting the goal of enhancing aquatic habitat and restoring natural river processes and function. Instream large wood placements are required and encouraged by WDFW and MITFD, to allow opportunities for "in-kind" mitigation, for impacts to main channel aquatic habitat. Instream ELJs are also key for meeting the flood risk reduction goal of the project of reducing flood risks to people, property, and infrastructure.

   Specifically, "ELJ 2-1" and "ELJ 2-2" are intended to constrict the main channel to promote backwatering and bed aggradation upstream, through reduction of velocities, deflection of flows into the right floodplain, formation of scour pools, promotion of stable vegetated island formation, and enhancement of overall connection with the Taylor Creek floodplain. Additionally, "ELJ 2-2" is intended to provide the deep scour pool within the main channel, a particular provision of the 2017 Cedar River Wood Relocation HPA. "CSS-1" and "CSS-2" are intended to increase overall channel roughness, and provide hydraulic controls aimed at holding the channel bed elevation, storing alluvial sediments, and ultimately resisting further channel incision (Montgomery and Abbe, 2006). Additionally, these structures will reduce velocities, locally sort substrate and induce bed aggradation, and provide an overall increase in instream hydraulic complexity. These structures will also induce a localized backwater that will increase upstream water surface elevations (WSEL) and lead to greater frequency of inundation of the floodplain and create refugia for fish during flood flows. Additionally, scour pool formation downstream of the structure and an increase in hyporheic zone exchange will also benefit habitat conditions (Brooks, et al., 2004). Cumulatively, these structures will result in appreciable reductions in erosive forces along the CRT 7 Revetment, providing an overall reduction in flood risks (and future maintenance needs) to this facility and to the critical infrastructure it protects (i.e. Cedar River Regional Trail and SR 169).

   Over time, it is anticipated that the river will migrate into the site and recruit trees from the project area. It is also anticipated that the side channel will evolve to become more sinuous and recruit small trees that will improve floodplain connectivity. Evolution of the river and floodplain over time is likely to increase the potential for retaining large wood within the river reach.

6. Describe how public safety considerations have been incorporated into the project design [see section 1.B.2 of Ordinance 16581] and include a description of how the six (6) key steps provided in Public Rule LUD 12-1, Appendix A. (Rule) Section V.2.A. i)-vi) have been addressed.

   ELJ design boater safety considerations consist of: wood placement at locations with ample site distance/reaction time (greater than 2 minutes) and portage opportunities, minimizing branches on logs (limit snagging potential), minimizing porosity (voids) of the structure, and placement of a deflector log upstream of the rootwads.

Preliminary project designs are informed by standard design practices with input from subject matter experts in fluvial geomorphology, ecology, river hydraulics and civil engineering with hydraulic analysis expertise. Review and approval of preliminary engineering plans and analyses from a Licensed Professional Civil Engineer has been provided. River user groups had the opportunity to review and comment on the structure layout and conceptual design at the 2019 and 2020 large wood public meetings.

7. What is the anticipated schedule for completing project milestones (30-40% design, final design, major construction/earthmoving) and for soliciting public input)?

    - Instream Project comment period ends June, 2021
    - SEPA comment period starts June, 2021
    - SEPA comment period ends June, 2021
    - Complete 60% design June 2021
    - Complete 90% design September 2021
    - Construction and Revegetation June-December 2022
    - Project website: https://www.kingcounty.gov/depts/dnrp/wlr/sections-programs/river-floodplain-section/capital-projects/jan-road-neighborhood-improvements.aspx

Dan M Uchiday

5/24/2021

Project Manager Date

Chris Brummer 5/24/2021

Supervising Engineer, Project Supervisor or Unit Manager Date

II. Project Modifications or Post-Construction Actions

8. Have any answers provided in the above sections at the Preliminary Design and Pre-Construction phases changed in the interim? If so, provide new answers and the rationale for the change.

   Subsurface conditions encountered during construction made for very slow production rates for pile installation, with completion of work per the original design determined to be infeasible, with respect to schedule and budget. In order to maintain the project schedule and budget, a value engineering process was initiated to modify the ELJ structure design in both the side channel and also the main channel. Concurrently, coordination meetings with RFMS maintenance staff and the King County Prosecuting Attorney Office (PAO) to discuss plans for river users detour during construction resulted in a recommendation by both the PAO and RFMS maintenance staff to meet with the King County Sheriff's Office (KSCO) on site to discuss the proposed design and approach for management of river users both during construction and for the life of the project. KSCO representatives communicated strong reservations about the safety of the original design. The PAO made clear that comments from the Sheriff needed to be addressed during the value engineering process for the main channel.

   Various measures for mitigation of the potential increase in hazard, were completed during construction, as part of the value engineering process. The channel spanning widths of mainstem ELJs were reduced, to provide a low flow channel for river users to navigate through the project reach. Loss of the erosion reduction potential provided by these features at the CRT7 revetment was compensated for by the placement of Ballasted Wood Jack (BWJ) units along the revetment to reduce erosion and scour potential along the facility and further mitigate geotechnical slope instability via buttressing of the toe. Directly upstream of the ELJs is a bumper log system intended to guide river users around these ELJs. The bumper log system consists of horizontal (bumper) logs affixed to timber piles via a chain leader, allowing the bumper log to float within the range of typical river use discharges (266 [20% exceedance statistic for July – September, typical innertube use] and 1289 [20% exceedance statistic for February – May, typical kayak use] cubic feet per second), guiding river users around the ELJs and similarly shed transported logs and woody material. Tethered bumper logs are affixed to the BWJs (varied leader length) along the upstream end of the treatment, and along the face of each BWJ spur. Bumper logs are not applied to the downstream portion of the BWJ treatment, given the ample sight distance and limited anticipated channel change over time. Additionally, signage has been placed within the project reach to alert in-river recreationists to constructed large wood hazards, consistent with current design guidelines (Skellenger & Bender Attorneys, 2007) and coordination with the PAO. Future modifications to existing or additional signage will be done in accordance with the process described in the project Public Safety Management Plan (PSMP) (King County, 2022). All public safety risk mitigation measures were reviewed and approved by KSCO and River Safety Council (RSC) representatives prior to implementation.

9. Briefly describe the scope and timing of post-construction monitoring and inspection activities planned for the project as they relate to large wood. If a Public Safety Management Plan or Monitoring Plan has been developed for the project, you may simply reference that document.

A citation for the project PSMP is provided within the references section of this document. Monitoring of ELJ performance related to public safety is described within the PSMP.

10. If post construction monitoring or inspections result in modifications to the project, please describe the action taken and the rationale and consistency with the Public Safety Management Plan, if applicable.

    A citation for the project PSMP is provided within the references section of this document. considerations for adaptive management, based on monitoring of ELJ performance related to public safety, is described within the PSMP.

10/17/2022

Project Manager — Date

Chris Brummer — 10/17/2022

Supervising Engineer, Project Supervisor or Unit Manager — Date

References

Brooks, A.P., and Gehrke, P.C., and Jansen, J.D., and Abbe, T.B. (2004). Experimental reintroduction of woody debris on the Williams River, NSW: geomorphic and ecological responses. River Research and Applications 20(5):pp 513-536.

King County, 2013. Synthesis of 2013 River Recreation Studies, King County River Recreation Study prepared by Herrera Environmental Consultants, Inc.

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