

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 Porter Reach Restoration Project Project Manager Fauna Nopp

River/River Mile/Bank Green River/RM 34/Left Bank Date 03.28.2017

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 Porter Reach Restoration Project is a proposed levee removal and setback project on the Green River (RM 34) near Highway 18 and Soos Creek. The rock face and toe of a 900-foot section of the Porter Levee will be removed, and the top five feet of the levee will be excavated. The upstream part of the existing levee will remain in place to deflect the river away from private property to the south. A 750-foot-long rock revetment and a log deflector will be constructed to protect SE Green Valley Road. Approximately 970 feet of Green Valley Road will be raised to reduce flooding and road closures. Individual logs anchored by boulders will be installed to roughen the left bank along the Road downstream of the new rock revetment. A 1,160-foot-long backwater channel will be created in the floodplain interior. Six logjams will be built in the floodplain along the new side channel and the existing oxbow. Native vegetation will be planted and snags will be installed. Weeds will be controlled. A culvert will be installed on the private property to the south to redirect drainage from the swale on the west side of the project site to the mainstem, upstream of the levee removal area, in order to improve field drainage. The goal of the project is to improve the survival of threatened salmon and trout by allowing the river to naturally erode its banks, form logjams, scour pools, and make side channels. The project will maintain the existing level of protection to private properties, infrastructure, and roadways. The project will comply with King County large wood placement policies and ordinances.

The project is listed as MG-17 in the WRIA 9 Salmon Habitat Plan. The project implements two Tier 1 Conservation Hypotheses (MG-1, MG-3). It is a high priority in the following plans:

- Green/Duwamish River Ecosystem Restoration Study (USACE 2000);
- Middle Green River Restoration Blueprint (King County 2006); and
- Middle Green River Levee Setback Feasibility Study (Bowles et al. 2013).

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

In the early 1900's, the project site was island-braided and contained abundant side channels, logjams, and dense trees and shrubs (Figure 2). Human impacts began in the early 1900's with floodplain clearing and early levee and revetment construction. In the 1960's, habitat conditions were profoundly altered by the construction of Howard Hanson Dam and the channelization of the river by levees, including the Porter Levee. Those actions combined to convert the river to a largely single-threaded form and to isolate much of the former floodplain and off channel habitat. The riparian areas and floodplain were mostly cleared for agricultural production.

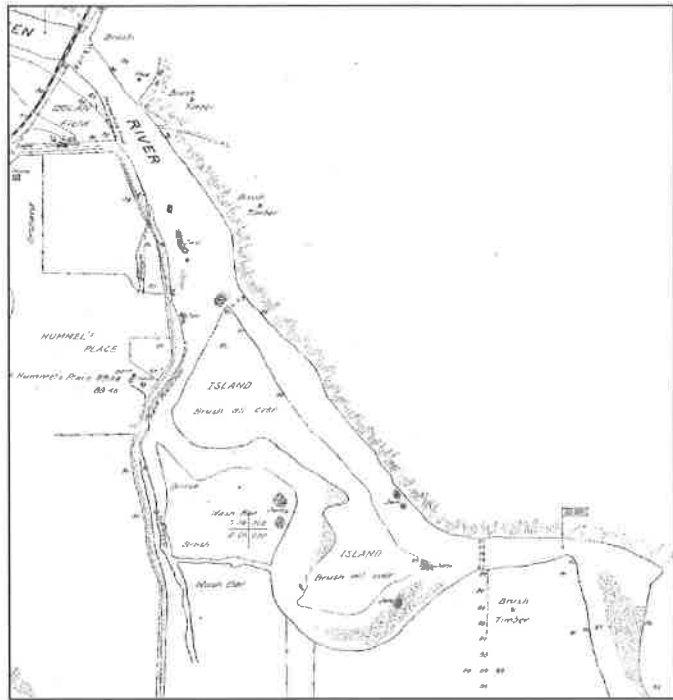


FIGURE 1. PORTER REACH IN APPROXIMATELY 1907.

King County constructed the Porter levee on the site in 1961. The levee is approximately 1,700 feet long. The riverward face of the levee is covered in large angular rock. The levee core is composed of streambed gravels and heavily vegetated with trees and shrubs. The levee was damaged in the 1980's and repaired by the U.S. Army Corps of Engineers (USACE). Floods breached the downstream portion in 1990 and 1996, producing small side channels that persist today. A raised berm of unknown origin, design, or composition runs along the southeastern portion of the project site, next to and parallel with the SE Green Valley Road. No other structures are present on the site.

King County purchased the property on the left (west) bank in 1998 and the right (east) bank in 1999. The project site is managed as 'ecological land' (Porter Levee Natural Area) by the Natural Resource Lands Program (King County Dept. of Natural Resources and Parks). The management goals are to conserve and enhance ecological value and to accommodate passive recreational use.

In 1999, the U.S. Army Corps of Engineers, in partnership with King County, completed a restoration project at Porter levee, under the Section 1135 Program, which allowed for rapid design and construction. The project consisted of breaching the levee in two places to provide fish with access to a 1.7-acre oxbow pond formed by the construction of levee.

The current channel is approximately 100 feet wide and runs in a single thread along the Porter Levee, to the west, and along a densely vegetated bank to the east. The topography of the project site is relatively flat in the valley bottom, with steep slopes of the valley wall to the northeast (Figure 2). Channels and swales are located throughout the project area. The project reach currently contains little instream large wood, except for one logjam on the left bank near the downstream end of the

site. This jam has been stable through floods for a number of years and has accumulated several dozen additional pieces over time, forming an upstream scour pool and a downstream bar.

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?

The project site is adjacent to the SE Green Valley Road (GVR) and private lands west of the right-of-way. To the south is the privately owned Mosby Farm. This farm is in the Upper Green River Agricultural Production District and enrolled in the Farmland Preservation Program. A series of bridges are located on the northern boundaries (i.e., Neely Bridge, a railroad bridge, and Highway 18 bridge). The Green River is used for recreational fishing and boating. Across the river, and south of the site, is the publicly-owned Neely Natural Area. The property to the west—across the road—contains a retail butcher and convenience store. The property to the east is a natural area owned by the public of King County. The northern property contains a boat launch/take-out owned and managed by the Washington Dept. of Fish and Wildlife. There is no trail corridor at the site, and no primary schools are nearby. Green River Community College is 6.7 miles away, by road. The Porter Levee Natural Area is managed by the King County Parks Division, and is in close proximity to other natural areas used for outdoor recreation (i.e., Auburn Narrows and Soos Creek Natural Areas) project sites.

The Green River is also used for instream recreation, but use varies among locations, according to a recreation study completed by King County (King County 2013). The study indicates that relatively few people recreate in the river at the Porter project site, compared to the Whitney Bridge and ‘Beer Can Beach’ sites, which are upstream and downstream (respectively) of the project site. The study found that at the Auburn-Black Diamond Road site (RM 33.4) found that, on an average summer day, three people float past the Porter Levee. Roughly three-quarters of them are adults in tubes without paddles or life vests.

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 element	Amount	Size	Location	Orientation	Elevation	Anchoring techniques	Type of interaction with the river at range of flows
GVR Deflector Jam	1	Extend 60 feet from the bank and approximately 95 feet along the water-ward face. The entire deflector is approximately 8-foot high with the bottom containing a layer of 12 logs 18-24-inch diameter x 25 feet in length.	Placed at the downstream end of the rock revetment to deflect the river away from Green Valley Road into the floodplain.	One row of logs arranged in a rough semi-circle with rootwads facing out into the floodplain.	From streambed to approx. 100-year flood elevation. (elevation 75- to 83-NAVD 88)	Boulders and rip rap ballast	No interaction until channel migrates into them, then interacting with river at all flows
Habitat Jams	6	Buried jams contain nine pieces of wood ranging from 10- to 24-inches in diameter and 30- to 50-foot long. Exposed (not-buried) jams contain 19 pieces	Forested floodplain	Key member(s) with upstream-facing rootwad and racked members against and behind the rootwad oriented perpendicular	Three jams are buried and three are placed at existing grade.	Deformable, but stability enhanced racked logs, native fill ballast, and native tree plantings.	No interaction until channel migrates into them and exposes them, then interacting with river at all flows

		of wood ranging from ten to 24 inches in diameter and 30 to 50 feet long.				to flow, with some angled members on the sides	
Foraging snags	35-50	8-18-inch diameter and at least 15 feet long (10 feet min. aboveground)	Floodplain	Vertical	At existing grade of floodplain	Lower five feet is embedded in the ground	No interaction until overbank flows or channel migrates into them
Nest snags	15	>18-inch diameter and at least 27 feet long (15 feet min. aboveground)	Floodplain	Vertical	At existing grade of floodplain	Lower seven feet is embedded in the ground	No interaction until overbank flows or channel migrates into them
Left Bank Roughening		40 individual logs ranging from 18-24-inches in diameter and 25 feet in length	Left Bank of existing side channel along Green Valley Road.	Variable, but generally oriented with rootwads toward the southeast	Placed at grade between elevation 72 and 78 feet (NAVD 88)	Each log will be chained to a 5 foot average diameter boulder.	Logs will slow velocities in along the west bank of the existing side channel. They will be partially submerged at low flow, but will not fully engage until approximately 8000-10,000 CFS.

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 element	Intended function	Role in meeting project's goals and objectives	Intended to recruit additional wood?
GVR Deflector Jam	To deflect flow away from Green Valley Road towards the project floodplain area and prevent flow from becoming fixed along the setback revetment. Other functions include retaining wood, providing large-scale hydraulic roughness to reduce flow velocities and encourage sediment deposition, create habitat by creating pools, substrate for aquatic insects, and a foundation for riparian vegetation growth.	The GVR deflector jam is intended to push the river away from SE Green Valley Road and to at least temporarily provide instream cover for fish if the river eventually reaches the setback revetment. The deflector is also intended to prevent the channel from entraining (getting stuck) on the rock revetment. This jam should help to force ongoing channel adjustment and promote a meander-cutoff cycle over the long-term, which is good for fish habitat.	Yes
Habitat Jams	To replicate the function of pre-existing, buried logjams when they are eventually contacted by the migrating channel. Once exposed, they are intended to create scour pools, side channels, and backwaters, and to trap wood from upstream.	Habitat jams enhance instream habitat for fish and help to keep the channel migrating laterally, and then cutting off, repeatedly. Over many years, this cycle helps to create a patchwork of diverse habitats.	Yes

Foraging	To increase foraging habitat for cavity-nesting vertebrates, adjacent to nesting habitat within five to ten years of project completion.	Improves wildlife habitat on the site and replaces a missing component of the river floodplain ecosystem, in the form of standing dead trees.	Yes
Nesting snags	To provide nesting habitat for cavity-nesting vertebrates (birds and mammals) within five to ten years of project completion.	Improves wildlife habitat on the site and replaces a missing component of the river floodplain ecosystem, in the form of standing dead trees.	Yes
Left Bank Roughening	To provide bankroughening and flow resistance features on the landward (west) bank of the existing side channel(s) between the mainstem river and GVR to reduce the likelihood that the entire channel will suddenly move into the existing side channel and erode the GVR prism.	Left Bank Roughening will provide a small amount of protection to the GVR embankment but is not designed to protect GVR from migration of the Green River mainstem. If the mainstem channel threatens to contact GVR where left bank roughening is present, additional measures may be necessary to protect GVR.	Yes

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.

Step	Public Safety Considerations	How considerations could be addressed
1	Expected type, frequency and seasonality of recreational use	<ul style="list-style-type: none"> Design based on documented evidence that relatively few people recreate in the project area, but those that do are mostly unskilled, passive floaters without PFDs.
2	Location, Orientation, Elevation, Size, Anchoring methods, Degree of interaction between flowing water and the placed wood during projected flow regimes, including flows commonly experienced in the recreational seasons	<ul style="list-style-type: none"> Habitat logjams have been reduced in number from 10 to six and moved away from the existing mainstem river channel. This improves safety because it allows the river to widen substantially before encountering the logjams through channel migration. A large gravel bar will likely form on the right bank, which will provide users with another portage route past most of the placed wood. Habitat jams located at the up-stream end of the existing levee and adjacent to the main stem of the river have been removed. Snags have been embedded into the floodplain for stability against flood flows, and can move independently if they are toppled or undermined. No interaction with river users in the as-built condition, though as the bank of the river moves over time, they may eventually be captured by the river.
3	Input received through the public outreach process	<ul style="list-style-type: none"> In response to concerns regarding the design of the deflector jam, rootwads are limited to one layer and are ballasted and anchored at the toe of the structure and stuffed with small woody debris (slash). This should maximize habitat value and limit entrapment hazards for boaters if the structure is engaged in the future.
4	Maximize achievement of project goals and objectives while minimizing potential public safety risks. Seek to ensure that the procedures and design options affording the greatest safety for river users are of primary consideration in design concerns. Balance important public purposes as it addresses safety issues.	<ul style="list-style-type: none"> A hazard warning sign will be posted at upstream river access points, and on the left bank upstream from the project site during construction. A portage trail could be made on the right bank to allow people to walk past the logjams.

		<ul style="list-style-type: none"> In the event that extreme hazards develop at the site due to landslides or other natural processes, one option may be the creation of a new take-out at the GVR bridge on the left bank upstream from the project site. This would require the purchase of Parcel 2221059014 and construction of a parking area, river access trail, and haul-out area for watercraft. This action could be coupled with closure of the WDFW boat launch downstream from the project site, to discourage the use of watercraft in the project reach.
5	Design informed by standard design practices.	<ul style="list-style-type: none"> Design informed by standards (Deflector jam designed by licensed engineer with relevant experience. Habitat jams designed by river ecologist and licensed engineering geologist with relevant experience and approved by licensed engineer. Habitat jam design based on naturally-occurring structures and experiences from previous levee setback projects.
6	Review and approval from a Licensed Professional Civil Engineer.	<ul style="list-style-type: none"> Design approved by professional engineer (C. Butchart, P.E.)
7	Review and approval from a professional ecologist.	<ul style="list-style-type: none"> Design approved by professional Ecologist (J. Latterell, Ph.D.)

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

100% completion – April, 2017

Construction – Summer, 2017

Public input – 30% and 100% website postings, public meeting (summer 2016), and annual LW public meetings (summers 2015 and 2016,)

 _____ 3/30/17

Project Manager

Date

 _____ 3/30/17

Supervising Engineer, Project Supervisor or Unit Manager

Date

II. Pre-Construction Information (70% or 100% design with permits) *These questions relate to the designed and permitted project. Information should include input resulting from permit review process, SEPA, boater safety meetings and any other*

8. Have any answers provided in Section I at the Preliminary Design Phase changed in the interim? If so, provide the new answers and the rationale for the change.

The sections above have been revised to reflect the current plans and project schedule. The project team refined the design elements that incorporate large woody debris. Changes were made to improve constructability and performance and minimize construction impacts and 970 feet of Green Valley Road will now be elevated in response to public comments regarding flood hazards and public safety. All changes are reflected on the 100% design plans and summarized below:

GVR Deflector Jam – Length along Green Valley Road increased from approximately 60 feet to approximately 95 feet, total number of logs reduced from 16 to 12. No significant changes were made to the orientation of rootwads, but voids between logs and boulders are now going to be filled with small woody debris (slash). (sheet 14)

Habitat Jams – Locations revised based on new tree survey information and the location of one buried logjam and one exposed habitat jam have been swapped (sheet 27)

Snags – Nesting and foraging snags have been added to the design.

Bank Wood Clusters – Now consist of 40, 25 foot long, 18-24 inch diameter logs with rootwads individually anchored by 40 ~5 foot diameter boulders. Placement is on the west (GVR) side of the existing side channel rather than spanning the side channel.

9. The Rule requires project review and approval by a Licensed Professional Civil Engineer. The Engineer will ensure appropriate application of engineering studies and design standards. Describe the design review and approval process for the project, including review by the licensed professional engineer, as well as reviews by other licensed technical staff such as 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. Was the review and approval completed?

The engineering design was led by Carolyn Butchart P.E. and supported by Todd Hurley L.E.G. Will Mansfield P.E. is the engineer of record, supervised the design and design team and provided final quality control review of the plans and basis of design report (covering all engineering elements including large woody debris structures).

10. The Rule requires project review and approval 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. The Ecologist will 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? Please describe steps undertaken by the Ecologist.

Josh Latterell Ph.D., professional ecologist actively participated in the design process including development of habitat objectives, performance criteria plan elements for the use of large wood throughout the project area (habitat jams and snags), monitoring plans for both the effectiveness and safety of all large wood structures following construction.

11. What regulatory review or permits are required for the project (e.g. HPA, Clearing and Grading permit, COE permits)? List any conditions or requirements included in the permit approvals relevant to placement of large wood in the project.

The project requires the following permits: USACE Section 404 (NWS-2016-598; NWP 27), Section 408 approval, compliance with 401 Water Quality Certification, HPA (2016-4-724+01), King County (KC)_Clearing and Grading Permit (GRDE16-0120), a Shoreline Management Act exemption (SHOR16-0033), KC ROW Use permit, KC Parks Special Use Permit, WADNR Aquatic Use Authorization, SEPA, NPDES Construction Stormwater General Permit, Flood Hazard Certification. , . Final permit conditions have not been received at this time. Known permit conditions relevant to the placement of large wood are as follows:

HPA:

- Retain all natural habitat features on the bed or banks including large woody material and boulders. You may move these natural habitat features during construction but you must place them near the preproject location before leaving the job site. Place large wood or other materials consistent with natural stream processes as shown in the approved plans.
- Install the toe to protect the integrity of bank protection material.
- Bury the base of the structure deep enough to prevent undermining.
- Use fir, cedar, or other coniferous species to construct the log or rootwad fish habitat structures.

NWP 27:

- 13. Proper maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by a district engineer to an NWP authorization.

12. What specific actions or project elements were employed to consider public safety in the final, permit-approved design?

Large wood has been incorporated in specific locations to address specific functional objectives. Large wood placed in the floodplain is intended to mimic naturally recruited log jams and will deform in response to river flows. As a result, the jams should not represent an unnatural hazard in the river system. Anchored structures along the project perimeter have been scaled back to the minimum necessary to meet the project performance objectives, and are located as far as possible from the active channel. In the event that hazards associated with large wood are identified, King County will evaluate conditions and implement the appropriate actions in the site management plan.

13. Describe how the Public Outreach requirements in Rule Section V.3. have been addressed?

The design team met with the public shortly after 30% design and published the 30% plans and large wood checklist in accordance with King County Public Rules. A subsequent public meeting was held between 30% and 60% design and this final checklist and plans have been prepared and published in accordance with the King County public rule.

14. Describe the input received from the public and how, if appropriate, the project team has responded to this input.

Public input regarding large wood was relatively minor. Concerns over the orientation of the logs in the GVR deflector jam were addressed by reducing the number of LWD pieces in the jam and filling voids with slash and ballast rock. Public comments were more focused on flooding and related public safety along Green Valley Road. As a result, the project design was revised to include elevating 970 feet of the existing road. The new roadway will be above the latest FEMA 100year flood water surface elevation and will reduce the risk of flooding and road closures.


15. Describe any additional design modifications or mitigating actions that were or will be taken in response to the public comments.

No additional actions are planned during the design and construction phase. If comments are received following construction, concerns will be investigated and appropriate responses will be implemented in accordance with the site management plan.

16. Will further educational or informational materials be made available to the public to heighten awareness of the project (e.g., public meeting, press release, informational website, or temporary or permanent signage posted in the vicinity of the project)? If so, explain.

In addition to mailings and public meetings that occurred during 30% and 60% design, updated project information was mailed to nearby landowners in December of 2016 (approximately 6 months prior to construction). Two to Three months prior to construction there will be a press release and updated website information to heighten awareness about specific construction timing and traffic routing.

 _____ 3/30/17
Project Manager Date

 _____ 3/30/17
Supervising Engineer, Project Supervisor or Unit Manager Date

III. Post-Construction Actions or Project Modifications

17. Have any answers provided in Sections I and II at the Preliminary design and Pre-Construction phases changed in the interim? If so, provide the new answers and the rationale for the change.
18. In accordance with the requirements of Rule Section V.4., describe post-construction monitoring and inspection activities planned for the project.
19. If post construction monitoring or inspections result in modifications to the project, please describe the action taken and the rationale (See Rule Section V.4.).

Project Manager

Date

Supervising Engineer, Project Supervisor or Unit Manager

Date