



**Flood Development Permit, FLD 16-68
SHX2016-00088**

DATE: July 28, 2016
TO: Jill Komoto, Lummi Natural Resources
FROM: Ben Floyd, River & Flood Engineer *B.F.*
RE: Flood Review for Proposed Porter Creek Reach Phase 1 Restoration Project

We have reviewed the documents submitted for the Porter Creek Reach Phase 1 Restoration Project. The submitted documents include the following:

- Final Stamped Plan Set dated May 31, 2016
- Phase 1 Hydraulic Assessment by Natural Systems Design dated July 19, 2016
- Final Basis of Design Report by Natural Systems Design dated May 18, 2016
- Geomorphic Assessment Update by Natural Systems Design dated March 24, 2016
- Geomorphic and Hydraulic Assessment by Natural Systems Design dated December 6, 2013
- E-mail Correspondences with Jill Komoto of Lummi Natural Resources and Leif Embertson of Natural Systems Design dated June 24, 2016 through July 19, 2016
- US Army Corps of Engineers Nationwide Permit 27, NWS-2016-493

The proposed Phase 1 of the Porter Creek Reach Restoration Project is located on the Middle Fork Nooksack River from River Mile 4.6-4.9, downstream of the Middle Fork Bridge on Mosquito Lake Road within Township 38 North, Range 5 East, Section 13 and 14. Phase 1 proposes constructing 11 engineered log jams (ELJ's) and is located within Flood Zone A with an undetermined base flood elevation on the 2004 Official FEMA Flood Insurance Rate Map Panel 1300.

Whatcom County Code Title 17, Flood Damage Prevention 17.12.030, Section A.3. states that the department shall: "Review all development permits to determine if the proposed development adversely affects the flood-carrying capacity of the area of special flood hazard. For purposes of this chapter, "adversely affects" means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point".

As shown and stated in the hydraulic assessment from Natural Systems Design dated July 19, 2016, the 2D model results indicate that, "At no location evaluated does the average rise exceed 1.0-foot. Local effects from some ELJ's are seen to elevate local water surface levels by as much as 5.5 feet, but this increase is limited to the immediate vicinity of the ELJ's". The maximum increase in the 100-year water surface profile resulting from the proposed Phase 1 project, when the 2D results are averaged across a cross-section, is 1.0 feet. The hydraulic assessment also states that, "No increase in the 100 year WSEL occurs in an area with a residential structure within

the 100 year floodplain nor does the rise cause a residential structure or property that was not within the 100 year floodplain to be inundated during the modeled proposed condition”.

Future phases of the Porter Creek Reach Restoration Project are being planned by the applicant, but at this time have only been developed as concepts that may change considerably as the river responds to previous phases of work. As the applicant evaluates future phases of the project and as designs are developed beyond the conceptual level, the applicant will need to model and assess the cumulative impacts for all phases of the project, considering the response of the river to previous phases, and ensuring that the total rise does not exceed one foot when averaged across a cross-section. Based on guidance provided by FEMA related to 2D modeling for past restoration projects, this project complies with Whatcom County Code 17.12.030, Section A.3.

Endangered Species Act Compliance - This project has received a Nation Wide Permit No. 27 from the Army Corps of Engineers demonstrating compliance with the Endangered Species Act. A copy of this Nation Wide Permit, NWS-2016-493 dated July 28, 2016 has been provided by Lummi Nation.

The hydraulics analysis indicates that the construction of the ELJ's will redirect flows across more of the floodplain, and in some areas direct more flows toward Mosquito Lake Road. While the increases in flows and velocities predicted by the model may not significantly impact the road, future planform changes may result in a greater risk of erosion into the Mosquito Lake Road right-of-way.

Based on our review of the submitted information we have determined that the project complies with the requirements of Title 17, provided that:

- 1.) The project is constructed in accordance with the above-referenced plans and these conditions. Any changes to the scope, hydraulic memo, or plans will require additional review to ensure compliance with Title 17.
- 2.) The existing elevation of the right bank upstream of ELJ 1-2-2 at the flow split into the right channel will not be lowered during construction and the scour hole excavated as part of the construction of ELJ 1-2-2 shall be backfilled to maintain the high ground.
- 3.) Access roads created in the floodplain for construction of the project shall be decommissioned and roughened in a way to prevent a preferential pathway for water to flow.
- 4.) The applicant shall perform annual and post-flood monitoring of the right bank of the active channel in the vicinity of ELJ's 1-2-1, 1-3-10 and 1-3-11 and the location where Mosquito Lake Road was previously relocated to identify changes that may increase the risk to the road right-of-way. Monitoring results will be reported to Whatcom County River & Flood.
- 5.) In the event that lateral migration/erosion threatens the Mosquito Lake Road right-of-way, the applicant will incorporate measures to mitigate the risk to the roadway in future phases of work associated with this project.

Should you have any questions please don't hesitate to give me a call at (360) 778-6288.