ISSAQUAH CREEK FISH HATCHERY DAM REMOVAL (PLN12-00013) FINDINGS ON ENVIRONMENTAL IMPACTS FOR SEPA DETERMINATION

1. Background - The Issaquah Hatchery Dam is a 9-foot high, 70-foot wide concrete structure built in 1936 to divert water to the hatchery. The dam is in poor condition and causes significant delay and mortality for migrating fish. The fish ladder at the Issaquah dam is undersized and too steep (25-percent gradient) for upstream-migrating salmon. In addition to blocking upstream migration, the Issaquah Dam is known to cause direct mortality of salmon, especially when flows are low and salmon often become stranded on the concrete apron below the dam structure. Replacement of the existing dam, with a series of rock weirs, would allow unimpeded fish passage to access over 10 miles of high-quality spawning habitat upstream of the dam. For this reason, the project has been identified as a high priority by federal and state agencies, the Puget Sound Partnership, and more than two dozen cities and counties on the WRIA 8 Salmon Recovery Council. The project is listed in the 2005 WRIA 8 Chinook Salmon Conservation Plan and the WRIA's 3-Year Project Start List, updated in 2011.

2. Existing Vegetation and Habitat Conditions - Riparian vegetation in the project area is comprised primarily of smaller deciduous trees (Red alder, Cottonwood, Vine maple) and non-native invasive species (Himalayan blackberry, Japanese knotweed). The buffer vegetation on the left bank is limited to a narrow band due to the existing access road and development. Buffer vegetation on the right bank is wider, but still somewhat sparse near the dam. Existing vegetation in the stream buffer is generally considered of poor quality for providing buffer functions. The streambanks in the project area have been extensively modified in the past due to road construction, development, channel straightening and dam construction. The existing banks include rip rap and concrete in many places. The stream lacks large wood and other beneficial habitat features, such as well developed pools and overhanging vegetation. Substrates range from fine sediment to sand to large cobble. The altered hydrologic and sediment regimes have created a mosaic of localized and unstable scour and depositional habitats.

3. Alternative Designs Considered - The current proposal is a result of earlier feasibility and alternative design studies led by the City of Issaquah and WDFW, in consultation with the Muckleshoot Indian Tribe, King County, NOAA Fisheries, and other agencies and stakeholders. The feasibility study evaluated several design options ranging from construction of a new fish ladder, juvenile bypass system and water intake structure at the dam; to replacing the dam with a series of fish-passable weirs and a new water intake; to completely removing the dam and relying on groundwater pumping to meet the hatchery's water supply needs. Based on various biological, hatchery management, and economic criteria, it was concluded that replacing the existing dam with several grade control structures (boulder weirs that form a series of elongated step pools) and a new water intake would best meet project goals.

4. Hatchery Water Intake - The Issaquah Hatchery Dam was constructed one-half mile upstream of the hatchery to divert water to the hatchery via a 24-inch, gravity-fed pipeline. One of the main design objectives of the current proposal is to construct a new water intake that provides a reliable water supply to the hatchery. The new water intake would be located approximately 650 feet upstream of the existing water supply weir box on the left (west) channel bank. The new intake structure abutments would provide an 8-foot wide opening at mid-channel, designed to direct and constrict

flow to the channel midline so the desired bed elevation is maintained by scour and coarse sediments are not siphoned into the intake. Adult salmonids would be able to swim upstream through the opening at flows of up to 2,060 cfs, equal to the estimated 10-year recurrence interval flood event. Woody debris and sediment will be able to pass downstream between the abutments. A 42-inch pipeline would be installed from the intake to the existing weir box. The existing 24-inch water pipe to the hatchery would not be replaced, so the amount of water diverted to the hatchery would not change. Therefore, the project is not expected to reduce the quality or quantity of fish habitat in the diversion reach relative to existing conditions.

5. Physical Model Test of Design Structures - The configuration and geometry of the intake abutments, weirs, pools and stream banks were evaluated and refined based on physical model tests for the designed structures. A range of streamflows and sediment loads were simulated using a 1:16-scale physical model. The data indicated that the constructed channel and structures would remain stable over a wide range of flows; that juvenile and adult salmonids would be able to navigate through the weirs and opening between the intake abutments; and that sediment and woody debris would be readily transported downstream under high flow conditions (NHC 2009).

6. Demolition of Existing Dam – The concrete dam, abutments, wing walls, fish ladder, sluiceway, water intake and all other appurtenances to the dam would be demolished and hauled offsite. The contractor would determine if it is feasible to also remove the concrete slab at the toe of the dam. If the slab is too large, it will be left in place and completely covered by the grade control weirs.

7. Boulder Grade Control Weirs - Following removal of the dam, the streambed would be regarded to achieve the desired bed elevation, gradient and profile. Approximately 18,000 cubic yards of bed material would be excavated, about two-thirds would be exported and the remainder reused as fill later in the project. After rough grading the streambed , a rock mattress (75 ft wide, 3 ft thick, 520 ft long) consisting of 6,700 cubic yards of Class IV rock would be constructed. Thirteen equally spaced boulder weirs would be constructed on top of the lower 460 feet of the rock mattress. The boulder weirs are designed with a maximum elevation gain of 0.75 feet (measured at the lowest point of the weir crests); so that all fish species can readily swim upstream. Monitoring of the boulder weirs and large woody debris structures would be conducted during the monitoring period to verify project success.

8. Instream and Riparian Habitat Enhancement – The proposal includes significant instream and riparian habitat enhancements including placement of large woody structures, removal of non-native invasive plant species, and planting of riparian vegetation. Seven large wood structures would be installed in every other pool in the boulder weir reach and another seven in the 650-foot long section of Issaquah Creek downstream of the lower weir. The large wood structures would include single logs and stumps with root wads attached, and combinations of up to 5 logs with and without root wads. The location and orientation of the log structures would increase hydraulic complexity, dissipate streamflow energy, stabilize the streambed and banks, and incorporate organic material. Native riparian plants will be planted in all areas disturbed by construction activity and in other selected areas. The planting plan includes approximately 519 conifer trees, 900 deciduous trees and 1,522 shrubs. The riparian plantings would prevent erosion, stabilize the streambanks, provide shade and overhead cover for the stream, and serve as source of organic material. The City's Critical Area Regulations require a 5-year maintenance/monitoring period to ensure successful establishment of the riparian plantings. The applicant shall provide a 5-year maintenance/monitoring plan, with an as-built plan and specific performance standards, to be approved by the Issaquah Development Services Department prior to finalization of construction permits.

9. Cabin Creek – Cabin Creek is a small tributary that enters Issaquah Creek approximately 135 feet upstream of the existing dam. The lower reach is incised and streambank area has sparse vegetation. The proposal would improve fish passage and stream habitat; removing an existing non-functional sediment trap, replacing an existing 27-foot long impassable metal culvert with a 30-foot long bottomless arch culvert, and constructing rock drop structures in the lower 450 feet of the stream at the confluence with Issaquah Creek.

10. Access Road and Trail – Issaquah Dam is currently accessed via a ½-mile long gravel road that overlies the water pipeline and a City sewer line along the left bank of Issaquah Creek off Wildwood Blvd. Most of the existing road would be retained for access to the sewer line, water supply line, weir box, control building and the lower rock weirs. A short section of the existing road in front of the dam would be converted to a 6-foot wide trail that will connect to an existing trail to the south (upstream). The new water intake structure would be accessed by a 12-foot wide, 250-foot long gravel road that branches off an existing paved road to the south of the Wildwood Apartments. On the right bank of Issaquah Creek, a new 480-foot long temporary construction road would enable access to the creek form Front Street during construction. This temporary road is primarily on City-owned property and would be decommissioned and converted to a 6-foot wide trail after construction. The new access road and trail would add approximately 5,880 SF of new impervious surface area. This would be offset by removing 3,700 SF of the existing gravel road adjacent to the creek in front of the dam and revegetating with native plants, as well as removing 2,000 SF of existing concrete surface associated with the dam.

11. Construction Impacts – The proposal would result in approximately 50,600 SF of temporary stream buffer impacts caused by construction, staging and access. There would be approximately 5,880 SF of permanent stream buffer impacts, resulting from construction of a gravel access road and trail. Riparian vegetation in the impact area is generally considered of poor quality for supporting buffer functions, comprised primarily of smaller deciduous trees (Red alder, Cottonwood, Vine maple) and non-native invasive species (Himalayan blackberry, Japanese knotweed). The construction access and staging has been located to minimize impacts to large, mature trees. Construction of the access road would result in approximately 46 SF of fill of a 950 SF Category IV wetland. Category IV wetlands less than 2,500 SF in size are exempt from buffer and mitigation requirements under the City's CAO. The proposal incorporates mitigation of project impacts, including; approximately 50,600 SF of wetland and stream buffer, 2,200 SF of stream buffer enhancement outside of project disturbance area, 3,700 SF of impervious surface removal converted to riparian vegetation. The project includes other significant instream enhancements to improve ecological functions, as described in sections above.

    The proposal includes detailed Temporary Erosion and Sediment Control (TESC) plans to ensure adequate erosion prevention, sediment retention, perimeter protection, dust control, and dewatering control measures. The plans also address diverting the streamflow in Issaquah Creek and Cabin Creek between May 15 through September 15 around the construction area, and fish removal would follow guidelines included in the Restoration Programmatic (USACE, 2008).

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