APPENDIX D

Tukwila SMP - Net Loss Analysis – Risks to Ecosystem Functions and Proposed Standards to Prevent Net Loss

Ecosystem Function [1]	Risks (actions that would cause a net loss)	Methods in proposed SMP to prevent loss or minimize risk[2]	Opportunities provided for in SMP for restoration of functions
Hydrology – flow regime	None	Not in City's control	N/A
Hydrology – Channel/Flood Plain Interaction	New hard shoreline armoring on over-steepened banks New overwater/in-water structures Loss of wetlands & fish and wildlife habitat areas	Standards controlling new hard armoring (Sect. 9.5, 9.6) Standards controlling extent and design of new over-water structures (Sec 9.12), mitigation required (Sect. 9.12) Sensitive areas provisions in SMP (Sect 10)	Set back levees and other banks to slightly increase flood plain width Mitigation projects to off-set or replace lost functions
Hydrology Groundwater Recharge	No significant risks	N/A	N/A
Sediment Delivery – fluvial transport	No significant risks for coarse sediment transport impairment	N/A- Process controlled and affected at watershed level upriver from Tukwila	N/A
Sediment Delivery – upland fine sediment generation	Land clearing, removal of vegetation along river, landslides from over-steepened banks Inadequate stormwater treatment to remove fine sediment	Standards prohibiting native vegetation removal (Sect 9.10). Standards for land clearing in SMP (Sect. 9.11), including erosion & sediment control for projects Vegetation (native) required (Sect 9.10)[3] Adequate stormwater treatment (Sect. 9.4) and adequate buffer width (Sect. 7)	Incentive built in for re-sloping and re-vegetating banks to provide greater stability at time of redevelopment
Water quality – particulate retention	Land clearing Increased impervious surface in buffer w/o possible retention by vegetation Inadequate stormwater treatment for removal of particulates	Standards prohibiting native vegetation removal (Sect 9.10). Standards for land clearing in SMP (Sect. 9.11), including erosion & sediment control for projects Vegetation (native) required (Sect. 9.10) Adequate stormwater treatment (Sect. 9.4) and adequate buffer width (Sect. 7) Restrictions on what structures can be built in buffer (Sect 8)	Vegetation enhancement at time of re-development as noted above
Water Quality – nutrient cycling	Further reduction of river/floodplain interface through hard armoring on over-steepened banks Removal of trees and native vegetation	Standards prohibiting new hard armoring, unless studies show no alternatives (in that case mitigation would be required) (Sect. 9.5, 9.6) Standards prohibiting native vegetation and tree removal (Sect 9.10).	Restoration projects Laying back banks Installation of native vegetation that overhangs banks
Water Quality - Temperature	Removal of large trees & vegetation that overhangs water (elimination of shading) Increase in impervious surfaces (stormwater temperatures)	Standards that prohibit tree removal with mitigation required (Sect 9.10) Standards controlling structures in buffer & requiring mitigation (Sect. 8, 9.2), prohibiting increase in runoff and requiring LID techniques (Sect 9.4)	Tree planting
Water Quality – contaminants	New impervious surfaces in buffer (i.e., no filtering out of contaminants) Untreated stormwater runoff Overwater structures (such as marinas or boat yards) with transport, use or storage of hazardous materials Use/storage of hazardous materials	Standards controlling structures in buffer & requiring mitigation (Sect. 8, 9.2), prohibiting increase in runoff and requiring LID techniques (Sect 9.4) Standards requiring stormwater treatment and use of low impact development techniques (Sect 9.4) Standards requiring spill prevention and contingency plans, prohibiting development within 100 ft of sensitive area (Sect 9.12) Standards that limit use of treated pilings (Sect 9.12). Prohibition of commercial hazardous waste facilities in shoreline jurisdiction (Sect. 8).	

[1] Ecosystem functions based on Shoreline Inventory and Characterization Report
[2] Analysis of potential environmental impacts, mitigation sequencing, and mitigation (Sect. 9.8 of SMP) apply to all projects in the Shoreline Jurisdiction
[3] Removal of invasive vegetation and replacement with native vegetation is voluntary for development of 4 or fewer single family residences, except where bank stabilization is proposed. City will provide technical guidance to homeowners on removal and planting.

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Ecosystem Function [1]	Risks (actions that would cause a net loss)	Methods in proposed SMP to prevent loss or minimize risk[2]	Opportunities provided for in SMP for restoration of functions
	Excessive use of pesticides Parking in buffer or parking in areas without adequate stormwater treatment (oil drips)	Standards controlling use of pesticides (Sect. 9.10.D), requirement for management plans for areas requiring large turf management adjacent to river (golf course, parks). Use standards for buffers (Sect. 8), stormwater treatment required (Sect. 9.4)	
LWD/Organic inputs	Large tree removal	Standards prohibiting native vegetation removal, tree removal and requirements for planting native vegetation (Sect 9.10). Mitigation requirements that include addition of LWD (Sect. 9.10)	Adding LWD as mitigation and as part of development projects Levee setback with mid-slope bench to allow tree planting
Riparian and in-stream habitat for fish and wildlife (especially for salmonids and bull trout). Freshwater/Saltwater Transition Zone with off-channel habitat	Large tree removal (elimination of shade, source of future large woody debris, perching and nesting locations for birds). Removal of native vegetation overhanging the river (shade, food supply, source of large woody debris) New hard shoreline armoring on over-steepened banks In/overwater structures with impacts on fish passage, shading, habitat disruption Filling of riparian wetland, off-channel habitat	Standards prohibiting native vegetation and tree removal (Sect 9.10). Standards controlling new hard armoring, (Sect. 9.6) Standards for in-water and overwater structures, requirement for special studies to show no net loss, mitigation requirements (Sect. 9.12) Prohibition of wetland filling, protection of Fish and Wildlife Habitat Conservation Areas (Sect. 10)	Restoration projects prioritized in transition zone esp. off-channel and near channel areas Laying back and vegetating river banks with native plants