

- > Ensure 500-Year (or 18,800 cubic feet per second) Plus 3 Feet of Freeboard Flood Control System
- > Minimize Project Costs
- > Limit Site Impacts
- > Minimize Construction Impacts
- > Accommodate Increased Vertical Clearance at the UPRR Underpass
- > Accommodate Trails and Parks
- > Accommodate Salmon Habitat Enhancement

The City provided weightings for each of these parameters as shown in Table 4, which provided a score for each alternative. Based on this analysis, Alternative 1 is recommended to be selected for final design for the following primary reasons:

- > Alternative 1 provides a completely passive flood control system with no gates.
- > The Alternative 1 alignment provides the ability to set back S 259th St from the existing over-steepened slope of the Green River north bank, thus minimizing future unknown risks due to climate change and regulatory mandates.
- > Alternative 1 has the lowest anticipated levee maintenance and life-cycle costs.
- > Alternative 1 provides a continuous trail connection between the section of the Green River Trail on the east and west side of the UPRR tracks.
- > Alternative 1 provides the ability to substantially improve habitat conditions on the north (right) bank within the Project limits.

In comparison with Alternatives 2 and 3,

- > The Alternative 1 levee's toe will need far less stabilization than does the wall of Alternative 2.
- > Alternative 1's use of an earthen levee in place of a wall for the majority of its length maximizes the cost advantages over a floodwall, such as that proposed for Alternative 2.
- > Alternative 1 leaves no private property on the flood-side of the levee, in contrast with Alternative 3, which leaves two private parcels on the flood-side.
- > Alternative 1 has the highest costs, due entirely to the extensive habitat improvements included in this alternative, compared with the limited improvements of Alternative 2 and the minimal habitat improvements in Alternative 3.
- > Only Alternative 1 provides Chinook salmon rearing habitat during key stages of their migration downstream as fry and fingerling.
- > Alternative 1's connecting trail segment provides direct views of the Green River and potentially new habitat features, should habitat improvement funding become available.

1 Executive Summary

This Alternatives Summary Report briefly describes the preliminary engineering process for the Milwaukee II Levee Project (Project), which will be located on the north (right) bank of the Green River in Kent, Washington, along S 259th St between the Union Pacific Railroad (UPRR) tracks to the west and 3rd Ave S to the east. The Milwaukee II Levee is located between the Horseshoe Bend Levee and Foster Park Levee (otherwise known as the Milwaukee I Levee).




The background, objectives, and basic details of the Project are presented as well as the process for formulating the design alternatives. The keys to addressing the Project's objectives and develop responsive alternatives were to define the Project's physical and policy constraints, thoroughly explore opportunities for Project enhancements, and adhere to the design standards and preferences of the City of Kent (City) and the King County Flood Control District (District). In addition, this report was completed in general conformance with the District's guidelines outlined in the "Green River, King County, Washington System-Wide Improvement Framework (SWIF) Interim Report" (February 2016).

After early review of six concepts (see Appendix A), three alternatives were selected for more detailed analysis:

- > Alternative 1 – Levee/Floodwall with No Gates (Figure 9)
- > Alternative 2 – Floodwall Minimizing Property Acquisition (Figure 12)
- > Alternative 3 – Levee/Floodwall with Gate (Figure 15)

Conceptual designs were completed for these three alternatives and are presented along with their key details within this report. Rough order of magnitude (ROM) cost estimates were developed for each alternative. Summaries of these costs are included in the report (see Section 5), and detailed backup is included in Appendix B. In order to provide an objective basis for selecting a preferred alternative, a weighted screening matrix was developed to evaluate each alternative against the Project objectives, constraints, opportunities and design preferences as distilled from the Project Charter between the City and the District dated December 15, 2016. These are expressed as parameters, including the following:

Table 4 Decision Matrix Table

Parameter Sub-Parameters	Weight	Score Metric For Alternative [0: worst, 5: best]		
		1 	2 	3 
Project Costs Minimize Capital Costs Minimize O&M Including Long Term Stabilization Costs Limit Property Acquisition	20%	2	3	4
Site Geometry Limit Changes to Current COK Agreement with UPRR Limit Project Footprint Minimize Changes to Street Alignment Minimize Utility Disturbances	10%	2	3	4
Flood Control System Maximize Passive Nature of System Limit Private Property on Flood-Side of Levee/Wall Ease of Implementation (right-of-way, permits, etc.)	30%	5	2	1
Construction Minimize Traffic Impacts During Construction Limit Disturbances to Existing Businesses during Construction	4%	1	2	2
Accommodate Trails and Parks Minimize Interference with Interurban Trail Crossing of S 259th St Minimize Disturbance to Foster Park Parking Lot Maximize Design for Safety, Accessibility, Functionality, and Aesthetics	20%	5	4	0
Accommodate Salmon Habitat Enhancement Space for Off-Channel Habitat Minimize Sedimentation Log Jams	16%	5	3	1
WEIGHTED TOTAL SCORE	100%	3.94	2.86	1.74

LEGEND:

Flood Control Consideration

Other Consideration

Estimated Project Primary and Secondary Costs




Item		Alternative 1 – Levee/Floodwall with No Gates 	Alternative 2 – Floodwall Minimizing Property Acquisition 	Alternative 3 – Levee/Floodwall with Gate 
CONSTRUCTION AND DESIGN COSTS ¹	Roadway Relocation (including utilities)	\$3,760,000	\$2,860,000	\$0 ²
	Trail	\$760,000	\$670,000	\$0
	Flood Control (floodwall and levees)	\$2,810,000	\$3,110,000	\$5,530,000
	Habitat Improvement (Includes mitigation)	\$7,880,000	\$1,220,000	\$670,000
CONSTRUCTION AND DESIGN TOTAL		\$15.2 million	\$7.9 million	\$6.2 million
REAL ESTATE COSTS	Property Acquisition ³	\$3,100,000	\$2,700,000	\$1,700,000
	Business Damages ⁴	\$300,000	\$2,000,000	\$2,000,000
50-YEAR MAINTENANCE AND LIFE CYCLE COST (DOES NOT INCLUDE INITIAL CONSTRUCTION COST)		\$750,000	\$1,025,000	\$1,640,000
TOTAL		\$19.4 million	\$13.6 million	\$11.5 million

Table Notes:

¹Includes proportional distribution of General, Design Engineering and Construction Management, and Contingency Costs for the alternative.

²All drainage costs have been included in Flood Control for Alternative 3.

³Property acquisition costs are not based on appraised property values.

⁴Business damages costs considered are conceptual estimates only; actual loss of profit and damage costs will be determined later.