

# Chehalis River Flood Water Retention Project Overview of Phase IIB Draft Feasibility Studies

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The Phase IIB Feasibility Study for the potential Chehalis River Flood Water Retention Project updates engineering design and costs, and refines the benefit-cost analysis to help determine whether more detailed study of the projects is warranted in the future. Based on the results of these analyses, it appears that the structure on the Mainstem Chehalis River merits further investigation for flood water storage purposes, while the structure on the South Fork Chehalis River does not.

The Phase IIB analyses are a continuation of previous studies. In Phase I, EES Consulting, Inc. (EESC) reviewed the possible benefits of developing multi-purpose water retention facilities for flood water storage, instream flow augmentation, and hydropower production. Two potentially feasible sites were identified: one on the Mainstem Chehalis River Basin above Pe Ell, and one on the South Fork of the Chehalis River. Phase IIA included a geology and geotechnical study of the potential sites. This study concluded that no major impediments exist to the construction of flood storage structures at either site. Phase IIA also included the development of an environmental scoping document describing future environmental studies related to the potential structures.

The Chehalis River Basin Flood Authority (Authority) then approved moving forward with Phase IIB to refine the engineering estimates developed during Phase I, and to incorporate comments and update the economic information using the methodology followed by the U.S. Army Corps of Engineers (Corps). During the Phase IIB process, the Flood Authority asked what a single purpose flood water retention structure might look like, and whether it might be cost effective. Accordingly, the Phase IIB analysis examines both single purpose (flood only) and multi-purpose (flood, stream augmentation, and hydropower) structures. Costs for these structures are provided in the table below.

**Table ES-1  
Engineering Analysis Results**

	Upper Chehalis		South Fork	
	Flood Reduction	Multi-Purpose	Flood Reduction	Multi-Purpose
Flood Storage, ac-ft	80,000	80,000	20,000	20,000
Flow Augmentation	NA	65,000	NA	13,500
Hydropower Storage, ac-ft	238	288	170	200
Structural Height, ft	\$165,230,000	\$245,060,000	\$93,060,000	\$148,540,000
Construction Cost				

The flood reduction structures are free-flowing and would operate so that natural flows are not affected except during a flood event. The multi-purpose structures store water so that releases in the summer months are greater than natural flows and water would be available for hydropower production.

Phase IIB also included an update on the economic benefits, and calculation of the resulting benefit-cost ratios. This analysis incorporates substantial feedback received following the Phase I report, and is based on the methodologies followed by the Corps. Three benefit-cost ratios were calculated. The first is the National Economic Development (NED) benefit-cost analysis that includes benefits and costs from a national perspective. The Corps selects preferred alternatives (projects) based on NED analyses. An NED analysis is conducted for both single purpose and multi-purpose structures. The second benefit-cost analysis is an Alternative Analysis that adds limited environmental benefits. Although the Corps evaluates environmental benefits, the *Principles and Guidelines* methodology does not monetize environmental effects. Finally, the third set of ratios adds regional benefits and costs. The Corps methodology considers regional benefits and costs; however, selection of the preferred project is generally based on the NED benefit-cost ratios.

Table ES-2 includes the results from the NED analyses only; additional detail about the other analyses is included in the report.

<b>Table ES-2 Benefit-Cost Ratios, 50-Year Period, 2010 Dollars</b>			
	<b>Benefit</b>	<b>Cost</b>	<b>Benefit-Cost Ratio</b>
<b>Flood Reduction Project</b>			
Upper Chehalis	\$235,318,195	\$206,766,205	1.14
South Fork	\$70,425,166	\$105,352,985	0.67
Both Projects	\$274,267,210	\$312,119,190	0.88
<b>Multi-Purpose Project</b>			
Upper Chehalis	\$334,439,952	\$296,479,010	1.13
South Fork	\$90,058,967	\$162,338,251	0.55
Both Projects	\$387,408,239	\$458,817,261	0.84

From these calculations, the Mainstem Chehalis project appears to be cost-effective as a single purpose flood reduction or as a multi-purpose project. Neither the South Fork Chehalis nor the combined project benefit-cost ratios are favorable. Based on these results, further study of the Mainstem Chehalis project only may be merited.

The studies conducted to date are high-level reconnaissance studies. If the Authority decided to proceed with any of the project options, more detailed engineering, geotechnical work, and economic analysis would be required. In addition, expanding the hydraulic modeling to both Thurston and Grays Harbor Counties would be helpful in determining potential benefits in those two counties. In addition, the environmental studies contracted by the Authority have not yet been finalized. These studies will provide important information to be incorporated into the analysis. Project permitting, environmental assessment under SEPA/NEPA, the Endangered Species Act, and other relevant statutes and regulations would also be required in future development phases.