

The Cedar River flows from the Cascade Mountains to Lake Washington. The lower populated reach of the river covers 22 miles from Landsburg to the City of Renton. The dam operated by the City of Seattle, primarily for water supply and power generation, provides incidental flood protection.

**Scope:** Through the corridor planning process, support decision makers in setting flood risk reduction priorities:

- Define flood and erosion hazards in three corridor planning areas
- Focus on critical “worst first” public safety risks in each corridor
- Propose conceptual 6-yr CIP consistent with budget placeholder

**Summary of Risk:**

People and infrastructure in the Cedar River valley face risks of inundation by flood water as well as risks of gradual or rapid channel migration.

Downstream of I-405 (Downtown Renton):

- Levees and floodwalls
- 2,890 people live in 500-year floodplain
- \$423M in taxable retail sales

Upstream of I-405 (Residential):

- 1,060 people in 100-year floodplain
- 770 people in CMZ
- 370 homes isolated by road flooding

Regional Infrastructure:

- 60 training levees and revetments
- 10 locations where river flows against highway (SR-169)
- 11 miles of local roads underwater in 100-year flood



**Proposed Risk Reduction Projects:**

Below is a draft sequenced action plan for implementing risk reduction projects in the Cedar River Corridor. The projects are proposed based on urgency, severity, consequence, responsibility or authority, and funding or partnership opportunities.

The current 2017-2022 adopted King County Flood Control District CIP budget includes:

- \$13.2M for Lower Cedar River Maintenance Dredging Project - 2016
- \$5.4M for Cedar River Corridor Implementation (specific projects TBD)
- \$9.5M for Strategic Acquisitions in support of planned Cedar River CIP projects
- \$1.7M for Acquisitions of high risk and repetitive loss homes
- \$27.7M for countywide corridor plan implementation, some of which could be allocated to Cedar River priorities (specific projects TBD)

PROJECT	PROBLEM	APPROACH	COST ESTIMATES <sup>1</sup>
Efforts Underway			(Funded Projects)
A. Lower Cedar River Maintenance Dredging - 2016	Sediment accumulation near the river mouth reduces flood protection provided by levees and flood walls.	Dredge sediment / mitigate impacts.	TOTAL: \$13.2M
B. Floodplains by Design Grant Acquisitions	First steps in implementing CIPs include feasibility analysis, preliminary design and right-of-way acquisition.	Funding awarded to acquire key parcels in CIP target areas. Grant also provides pass through funding to WLRD for design efforts in Riverbend and preliminary design efforts for Herzman.	FbD: \$2.2M <sup>2</sup> \$1.03M Allocated below \$1.17 Unallocated pending FCD staff discussions
C. State Route 169 Flood Reduction Feasibility Study	During large flood events, local drainage combined with high river stages, causes overtopping of State Route (SR) 169 near the intersection of Cedar Grove Road, forcing closure of SR 169. Numerous residences are also isolated during these conditions.	Conduct feasibility study in coordination with WDOT to evaluate flood risk reduction opportunities, such as elevating SR 169, upgrading the local drainage infrastructure, and/or installation of back flow prevention gates.	TOTAL: \$260K FCD 6-Yr: \$260K <sup>3</sup>
D. Maplewood Neighborhood Improvements	Nearly 40 homes are located within the severe or moderate channel migration zone along the right bank. During 100-yr flood, the river may overtop the bank and flood the neighborhood. The steep slope on the left bank is identified as a potential landslide hazard area.	Conduct site specific landslide risk assessment study; conduct a feasibility study to evaluate opportunities to modify Erickson Levee.	TOTAL: \$110K - \$440K FCD 6-Yr: \$440K  Note: funding allocation has not been made
<div>Proposed Near Term Actions (Years 0 – 6)</div> <div>FCD 6-Year Request: \$22.3M <sup>4</sup> FbD 6-Year secured: \$1.1M <sup>2</sup> FCD Year 7-10 Request: \$5.4M</div> <div>6-Year CIP Placeholder: \$15.9M Total Project Cost: \$21.8M - \$28.8M</div>			
E. Lower Jones Road Neighborhood Improvements	Homes are at high risk from flooding and channel migration. Flooding over SE Jones Road cuts off access to neighborhood. Cedar River Trail Site 1 (CRT1) and Buck’s Curve Revetments are at risk of damage or failure.	Raise in place or setback Jones Road; excavate and stabilize right bank to increase conveyance capacity; reinforce one revetment; remove portion of another revetment; acquire 8 at risk properties (additional partial acquisitions will be required if road is setback).	TOTAL: \$9.2M - \$11.1M FCD 6-Yr: \$10.0M FbD 6-Yr: \$360K <sup>2</sup> FCD Yr 7-10: \$700K
F. Herzman Levee Setback and Trail Stabilization	Herzman Levee directs flows towards the Cedar River Trail Site 2 Revetment (CRT2) that protects the highway (SR-169), trail and utility lines. Both Herzman and CRT2 have had numerous repairs.	Setback levee; excavate side-channel to reduce pressure on CRT2 revetment; reconstruct, reinforce and/or extend CRT2 revetment; acquire up to 5 properties.	TOTAL: \$5.0M - \$5.9M FCD 6-Yr: \$5.0M FbD 6-Yr: \$330K <sup>2</sup> FCD Yr 7-10: \$560K
G. Jan Road Neighborhood Improvements	Neighborhood isolation due to road flooding. 17 homes are at risk from 100-yr flooding and/or channel migration. Jan Road Levee directs flows towards Cedar River Trail Site 7 Revetment (CRT7) that protects highway (SR-169), trail and utility lines.	Suite of solutions include: raise road; remove part of Jan Road levee; construct side channel to reduce pressure on CRT7 revetment; acquire easements; and mitigate remaining at-risk properties through acquisition (8) and home elevation (5). (NOTE: Acquisition and elevations funded in Residential Flood Mitigation Project.)	TOTAL: \$1.6M - \$5.4M FCD 6-Yr: \$900K FbD 6-Yr: \$380K <sup>2</sup> FCD Yr 7-10: \$4.1M

<sup>1</sup> Cost estimates include best available projections regarding right-of-way acquisition, design, construction, 10-year site establishment, 10-year effectiveness monitoring. Corridor Planning cost estimates do not include maintenance and monitoring beyond 10 years.

<sup>2</sup> FbD 6-Yr is a secured state funding source.

<sup>3</sup> Budget allocation approved in 2017 6-year CIP.

<sup>4</sup> Requested to add priority projects which exceed existing placeholder funding

Revised project from Fall 2016 draft proposal

Indicates a project with a nexus to a WRIA 8 habitat restoration opportunity area

H.	1. Lower Cedar River Flood Risk Reduction Feasibility Study	Extreme flood events such as 200 year and 500 year floods would inundate much of downtown Renton, including Boeing plant and Renton Municipal Airport.	Conduct feasibility study to: 1) quantify economic damage potential; 2) determine infrastructure modifications to improve flood resiliency and sediment storage potential; and 3) conduct cost-benefit analysis.	TOTAL: \$500K FCD 6-Yr: \$500K
H.	2. City of Renton Levee Certification Improvements	Sections of the Cedar 205 floodwall and levees do not meet levee certification requirements under the National Flood Insurance Program; land behind these levees and floodwalls will be shown as mapped flood hazard areas without certification and accreditation.	Construct levee and floodwall improvements recommended by Cedar 205 levee re-certification report	TOTAL: \$5M FCD 6-Yr: \$5M
I.	Cedar River Trail Site A Bank Stabilization	Bank erosion on the left bank opposite Riviera Apartments threatens trail stability; could trigger a landslide and increase right bank flood risk.	Repair eroded section of left bank with bioengineered revetment to stabilize toe of bank and to prevent large scale bank failure.	TOTAL: \$540K – \$890K FCD 6-Yr: \$890K
Proposed Medium Term Actions (Years 7 – 10)				(Unfunded Projects) Total Project Cost: \$11.8M - \$22.0M
J.	Strategic Acquisitions to Support Future Projects	Properties & rights-of-way are needed for those flood risk reduction projects not included in the 6-yr CIP, including: Byers Road (11), Rhode-Getchman (8), Rafter Park-Doris Creek (6), and Elliott Bridge (3)	In order to secure project rights-of-way, acquire up to 14 of the 28 “core” properties, 22 of which have homes on them, from willing sellers as needed to construct future CIPs. Additional property needs may be identified in project feasibility and design.	TOTAL: \$1.8M - \$5.2M Existing FbD grant may offset acquisition costs for future projects.
K.	Residential Flood Mitigation	Risk analysis has identified 53 homes as high risk from flooding and channel migration, but which are not mitigated by projects.	Elevate or acquire highest risk and repetitive loss properties from willing sellers. Elevate or purchase approximately 2 homes each year.	TOTAL: \$800K /year (\$3.2M over four years) Existing FbD grant may offset acquisition costs.
L.	Byers Road Neighborhood Improvements – Feasibility Study (Phase I)	Neighborhood is entirely in the floodplain and is inundated during a 20-yr flood. Sole access road floods at low to moderate flood events, requiring emergency evacuation for residents.	Construct emergency egress and conduct a feasibility study of possible solutions to mitigate residual risk, including elevating Cedar Grove Road, elevating other roads in the neighborhood, and modifying Byers Curve Levee. Acquire up to 11 high risk properties (NOTE: Core acquisitions initiated in Strategic Acquisition)	TOTAL: \$780K
M.	Byers Road Neighborhood Improvements – Implementation (Phase II)	Neighborhood is entirely in the floodplain and is inundated during a 20-yr flood. Sole access road floods at low to moderate flood events, requiring emergency evacuation for residents.	Implement recommendations from Byers Road feasibility study.	TOTAL: TBD
N.	Rhode and Getchman Neighborhood Improvements	Left bank levee overtops during 20-yr flood, causing flooding of homes and roads and isolating residents. Flooding of homes and Maxwell Road on the right bank. Many homes located within the severe channel migration area.	Solutions include: Acquire 8 at risk properties; remove levees and construct side-channels to increase conveyance and reduce pressure on downstream facilities; raise Maxwell Road. Completes work underway since 2000. (NOTE: Core acquisitions initiated in Strategic Acquisitions)	TOTAL: \$1.9M - \$8.6M
O.	Rafter’s Park – Doris Creek Neighborhood Improvements	Natural channel changes in two existing side-channels puts more than two dozen homes at high risk from fast deep flows and/or isolation resulting from channel avulsion.	Construct instream woody structures in Doris Creek side channel to prevent avulsion; excavate side-channel to increase conveyance and reduce pressure on downstream facilities; acquire 6 high risk properties. (NOTE: Core acquisitions initiated in Strategic Acquisitions)	TOTAL: \$2.3M
P.	Dorre Don Neighborhood Improvements	Entire neighborhood of more than two dozen homes is vulnerable to flooding, isolation due to road inundation and erosion. In 1990, Dorre Don Upper Levee breached and flooded residents.	Conduct feasibility study to evaluate opportunities to modify right bank levee and revetment system and/or raise Dorre Don Road to reduce the frequency and severity of flooding.	TOTAL: \$350K
Q.	Elliott Bridge Reach Neighborhood Improvements	11 homes are vulnerable to flooding during 100-yr event. An additional 8 homes on the right bank are cut-off by road inundation. Floodplain is encroached on by abandoned bridge approach road and obsolete levees.	Acquire 3 high risk properties in the severe channel migration zone. Raise SE Jones Place to eliminate isolation risks. Reinforce existing right bank revetment. Complete a feasibility study to evaluate residual flood risks and bank erosion in Ron Regis Park. (NOTE: Core acquisitions initiated in Strategic Acquisitions)	TOTAL: \$1.5M
Proposed Long Term Actions (Beyond 10 Years)				(Unfunded Projects) Total Project Cost: \$21.8M - \$35.4M
R.	Arcadia Reach Neighborhood Improvements – Landslide Study (Phase I)	Four homes are vulnerable to flooding in 20-yr flood event and 18 homes are within severe channel migration area. Landslide potential may increase the risk to these homes.	Conduct site specific landslide risk assessment study	TOTAL: \$140K
S.	Arcadia Reach Neighborhood Improvements – Acquisitions (Phase II)	Four homes are vulnerable to flooding in 20-yr flood event and 18 homes are within severe channel migration area. Landslide potential may increase the risk to these homes.	Acquire up to 6 high risk homes from willing sellers.	TOTAL: \$3.2M
T.	Lower Cedar River Maintenance Dredging - Future	Sediment accumulation near the river mouth reduces flood protection provided by levees and flood walls.	Annually monitor bed levels; dredge sediment from river before bed reaches critical elevation. Estimate that action will be needed in 15 years.	TOTAL: \$15.2M
U.	Orchard Grove Neighborhood Improvements	Road isolation, flooding, and channel migration pose risks to more than 27 homes in this dense residential neighborhood on the right bank.	Solutions include: Raise low-lying section of road; construct side channel to convey flows away from right bank residential area; acquire up to 11 high risk homes from willing sellers.	TOTAL: \$1.9M - \$10.4M
V.	SE Bain Road Neighborhood Improvements	Floodwater overtops revetments, surrounding homes and inundating SE Bain Road on the left bank. Many of the homes along the road are also in the severe channel migration zone. Five homes on the right bank are located within the severe channel migration zone. Potential for landslides in Royal Arch Reach could increase flood and channel migration risks.	Suite of solutions include: construct engineered log structures to deflect flow away from left bank towards undeveloped right bank floodplain; raise in-place or extend the left bank revetment; and/or acquire 3 high risk properties and construct right bank side channel. Also conduct a reconnaissance level landslide risk assessment.	TOTAL: \$1.5M - \$6.6M

<sup>1</sup> Cost estimates include best available projections regarding right-of-way acquisition, design, construction, 10-year site establishment, 10-year effectiveness monitoring. Corridor Planning cost estimates do not include maintenance and monitoring beyond 10 years.

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