



REGIONAL  
DISTRICT  
OF NANAIMO

## Update on the Sea Level Rise and Adaptation Program and River Floodplain Maps

### **RECOMMENDATIONS**

1. That the Board direct the completed riverine mapping information be communicated to the public.
2. That the Board direct “Regional District of Nanaimo Floodplain Management Bylaw No. 1469, 2006” be reviewed and updated to incorporate the findings of the riverine flood hazard mapping studies.

### **BACKGROUND**

The *Local Government Act* grants authority for local governments to regulate land use, including natural hazards risk and flooding. In 2019, the Regional District of Nanaimo (RDN) completed a Hazard Risk and Vulnerability Assessment (HRVA)<sup>1</sup>. The HRVA is an all hazards risk assessment to guide decisions on mitigation, preparation, response and recovery from hazards that pose a risk to the region, and is a requirement mandated by the Local Authority Emergency Management Regulation of the *BC Emergency Program Act*. The results revealed flood hazards pose a risk in the region, which are anticipated to worsen as sea levels rise and extreme weather events become more frequent. Acquiring up-to-date information will enable the RDN to better understand flood hazards and reduce the risk to people and property. In response, the RDN launched the Sea Level Rise and Climate Adaptation Program, which collaboratively builds capacity by gathering applicable information, assessing flood risks, identifying mitigation strategies, and broadly communicating findings. The outcomes will be integrated into land use and emergency planning and future infrastructure management, including the RDN’s asset management plans.

Since 2018, the RDN Interdepartmental Working Group (planning, water and wastewater and emergency services professionals) and external consultants have completed a range of coastal and riverine flood hazard studies and mapping products aligned with the provincial guidelines and professional best practices. The coastal flood hazard project (including maps) was published on June 9, 2020<sup>2</sup> and was followed by three projects to update the provincial floodplain maps for the Englishman River, Little Qualicum River and the Nanaimo River. These are the only rivers in the RDN for which the Province prepared floodplain maps. The following is a summary of findings for the Englishman River and the Little Qualicum River riverine projects, and next steps in the project. The Nanaimo River study is under development and is scheduled to be completed in January 2023.

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<sup>1</sup> Regional District of Nanaimo Hazard Risk and Vulnerability Assessment, September 2019 [www.rdn.bc.ca/hazard-vulnerability-risk-analysis](http://www.rdn.bc.ca/hazard-vulnerability-risk-analysis)

<sup>2</sup>RDN Sea Level Rise and Climate Adaptation Webpage with overview report and coastal flood hazard mapping atlas [www.rdn.bc.ca/sea-level-rise-adaptation-program](http://www.rdn.bc.ca/sea-level-rise-adaptation-program)

### ***What is a floodplain map?***

Flood maps generally identify the areas, normally dry, that may be covered by water during actual or potential flood events. Specific flooding risks are identified on structures, people and assets, and the flood hazard, present-day conditions and future conditions are visually communicated.

As required by Section 524 of the *Local Government Act*, local governments must consider relevant floodplain mapping information and hazards when preparing land use bylaws, including the establishment of Flood Construction Levels<sup>3</sup>. A riverine floodplain regulatory map shows the location of the normal channel of a river system, surrounding features or development, flood levels and floodplain limits (the estimated elevation and horizontal extent of the highwater marks of a 200-year flood<sup>4</sup>).

### ***Approach to Riverine Flood Study and Mapping***

In accordance with provincial standards, the 200-year return period flood scenario under future climate change conditions was used to develop the regulatory floodplain maps. To account for uncertainties in the analysis, a freeboard allowance of 0.6 metre was added to the final regulatory floodplain map. The comprehensive scope of the RDN riverine projects includes the following elements:

1. Flood Hydrology to estimate existing and future flood magnitudes and flood hydrograph shapes to be used in the hydraulic model, including regional climate change allowances.
2. Fluvial Geomorphology Assessment using historical aerial photos to define and assess the area surrounding the river channel that could be subject to future erosion processes.
3. Hydraulic Model Development used to produce the regulatory floodplain maps and the flood hazard maps for the risk assessment.
4. Flood Analysis Scenarios and Regulatory Mapping (1:10,000 scale), and
5. High-level Flood Risk Assessment based on ISO 31000 to understand how flooding could affect community infrastructure and properties in the study area.

### ***Community Engagement***

A series of workshops were hosted for each of the riverine projects with representatives from provincial, local government, community-based organizations, business owners and local residents from the study area. The workshops enabled participants to ask questions of subject experts and start a community conversation about flood hazards and future management.

Several key themes were:

- Valuing personal connections to the river systems for recreation, ecological value, and spiritual importance.
- Managing flood impacts to properties with comments varying from fair acceptance of annual flooding and interest in minimizing flood damage on their property to concerns about how flood mitigation works may

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<sup>3</sup> Flood Construction Level is a calculated level of elevation for buildings used to protect people and property from flood impacts.

<sup>4</sup> The provincial Flood Hazard Area Land Use Management Guidelines designated flood based on the 1-in-200-year flood for floodplain mapping in BC. [www2.gov.bc.ca/assets/gov/environment/air-land-water/water/integrated-flood-hazard-mgmt/flood\\_hazard\\_area\\_land\\_use\\_guidelines\\_2017.pdf](http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/integrated-flood-hazard-mgmt/flood_hazard_area_land_use_guidelines_2017.pdf)

impact adjacent and downstream properties, and security of existing services, such as drinking water wells, drains, culverts, private wells and septic.

- Preserving and protecting the natural environment was strongly supported, including support for preserving and leveraging trees as natural assets in flood management, and preserving water quality for domestic use, fish habitat and health.
- Preserving road access and infrastructure for present-day and future conditions, including impacts on existing services, such as drinking water wells, drains, culverts, private wells and septic and impacts caused by log jams.
- Developing in the floodplain raised concerns about potential impacts, including water flow. Further efforts were needed to educate the public and realtors about local flood hazards.

### **Adaptation Program Implementation - Proposed Next Steps**

The Adaptation Program incorporates best practices in risk management established through the federal government’s floodplain mapping framework and the international Sendai Framework. The Program is implemented in four phases, and is currently in Phase 2: Research, which includes completing the Nanaimo River flood hazard mapping project and updating the RDN’s Floodplain Management Bylaw No.1469 (see Table 1 below). At a future meeting, the Board and residents will be presented with a draft amendment bylaw to incorporate the coastal and riverine flood hazard project findings into the existing floodplain bylaw. Proposed changes will include adopting the new mapping information, clarifying terminology, and removing redundancies. In the interim, it is recommended the completed river flood mapping information be publicly communicated on the RDN website.

To support Phase 3, Plan, the RDN submitted a grant application to the federal Canadian Community Building Fund (CCBF) on June 30, 2022. If approved, the RDN will receive an estimated \$529,000 over five years to increase regional flood resiliency by developing an integrated flood management strategy. A key outcome will be assessing the coastal flood risks, identifying mitigation options and establishing a risk-based decision-making framework. Table 1 summarizes the Program phases, key deliverables and milestones.

Table 1: Summary of the Sea Level Rise and Climate Adaptation Program

PHASES	KEY DELIVERABLES	MILESTONES
<b>1. INCEPTION</b>	Backgrounder, Program Plan	Completed 2016
<b>2. RESEARCH (Current Phase)</b>	a. Acquire LiDAR b. Develop coastal flood hazard maps c. Update riverine flood hazard projects* i. Englishman River ii. Little Qualicum River iii. Nanaimo River d. Update of the RDN’s floodplain bylaw *Community engagement initiated through studies	a. Completed 2017 b. Complete 2018 – 2019 c. In progress i. Completed June 2022 ii. Completed May 2022 iii. In progress - due Jan 2023 d. In progress
<b>3. PLAN</b>	Regional Integrated Flood Management Strategy i. coastal flood risk assessment ii. identification of mitigation options/ priorities iii. preliminary adaptation plans iv. on-going community engagement	Pending funding approval CCBF application June 30, 2022

<b>4. IMPLEMENT</b>	Various departmental implementation plans and projects - pending	Pending future decisions
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The riverine mapping information recommended to be communicated to the public, includes the:

- Riverine Study Highlights (Attachment 1)
- Englishman River Flood Mapping Overview Report (Attachment 2)
- Englishman River Regulatory Floodplain Map (Attachment 3)
- Little Qualicum River Flood Mapping Overview Report (Attachment 4)
- Little Qualicum Regulatory Floodplain Map (Attachment 5)

**FINANCIAL IMPLICATIONS**

Updating the floodplain bylaw will incur community engagement costs estimated to not exceed \$6000. This cost is included in the current Long Range Planning Work Plan and budget in the 2022 - 2026 Financial Plan.

Future phases of the project will require a combination of provincial and federal grant funding and RDN budget funds. As noted, provincial and federal grant funding is being actively pursued.

**STRATEGIC PLAN ALIGNMENT**

The Sea Level Rise and Climate Adaption Program and sequential projects align with the Board’s strategic priority to be leaders in climate change adaptation by acquiring the technical information required to better understand flood hazards from climate change and sea level rise. The proposed next steps will increase public awareness and provide a modern approach to reducing the risk of flood events in the region.

Climate Change - Be leaders in climate change adaptation and mitigation, and become net zero by 2032. The Program will also support the Board’s strategic priority on growth management by contributing to the update of asset management plans.

**REVIEWED BY:**

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**ATTACHMENTS**

1. Riverine Study Highlights
2. Englishman River Flood Mapping Overview Report
3. Englishman River Regulatory Floodplain Map
4. Little Qualicum River Flood Mapping Overview Report
5. Little Qualicum Regulatory Floodplain Map