STAFF REPORT TO COMMITTEE

DATE OF REPORT	October 5, 2020
MEETING TYPE & DATE	Regional Services Committee Meeting of October 28, 2020
FROM:	Environmental Services Division Engineering Services Department
SUBJECT:	Cowichan River - Riverbottom Road Area Flood and Erosion Hazard Mapping
FILE:	

PURPOSE/INTRODUCTION

The purpose of this report is to formally introduce the recently completed updated flood and erosion hazard mapping for the Cowichan River – Riverbottom Road Area as the basis for a floodplain management bylaw.

RECOMMENDED RESOLUTION

That staff prepare a floodplain management bylaw based on the Cowichan River - Riverbottom Road Area Flood and Erosion Hazard Mapping Report prepared by Northwest Hydraulics Consultants, dated September 3, 2020.

BACKGROUND

Provincial floodplain mapping in the Riverbottom Road area of the Cowichan River dates to 1997. Erosion hazards in this area were mapped by Hardy BBT in 1989. The Cowichan River is a dynamic system, and the river channel has changed considerably since this mapping was completed. Climate change projections also indicate increased precipitation and more intense rainfall events, lending increased urgency to ensuring that flood and erosion hazard mapping reflects the current level of risk. A major channel change in February of 2020 highlights the potential for sudden and large swings in river position.

Since 2004, flood mapping in BC has been the responsibility of local government; however in the absence of dedicated funding, updates to flood mapping are dependant upon grant or other funding opportunities. The CVRD was able to use funding through the National Disaster Mitigation Program coupled with Disaster Mitigation funding from Emergency Management BC to fund an update to the flood and erosion hazard mapping in the Riverbottom Road area of the Cowichan River. Staff support was funded under the Cowichan Flood Management Function.

ANALYSIS

The CVRD contracted Northwest Hydraulic Consultants (NHC) to conduct updated flood and erosion hazard mapping on an 11 km reach of the Cowichan River from upstream of Stoltz Bluffs down past Sandy Pool Regional Park and the Tzart'lam Reserve. This mapping incorporated 2019 LiDAR from GeoBC, along with bathymetric studies carried out by NHC in February 2020. These data were used to develop a hydraulic model for this reach of the river. Designated flood flows were calculated based on data from upstream and downstream hydrometric stations, the upstream watershed area, and projected increases in precipitation due to climate change.

A significant flood occurred on the Cowichan River on February 1, 2020, estimated at between a 20 and 50 year return period event. While this flood caused substantial damage, particularly in the lower portions of the Cowichan River, it also provided an opportunity to observe the location and extent of high water levels and the accompanying erosion and shifts in channel morphology. The

bathymetric survey took place after the flood event, resulting in up to date mapping which captures a significant avulsion (change in channel position) and other changes to channel morphology.

Several mapping products were produced through this mapping update:

- Designated floodplain maps (1:5,000 scale) for the designated flood of 746 m^3/s (200-year peak instantaneous discharge including 20% increase to account for future climate change). These maps show the flood construction levels (including 0.6 m freeboard) along with the extent of the floodway and flood fringe zones and are intended for regulatory and land-use planning purposes. The floodway zone includes the main channel and portions of the overbank area that experience relatively frequent flooding. Development in the floodway is generally discouraged due to the flood flows in this zone. The flood fringe zone is still subject to inundation but is generally suitable for development subject to flood construction levels or other flood mitigation measures.
- Flood depth map (1:10,000 scale) showing the limits of flooding (without freeboard) for the designated 200-year flood including future climate change based on CVRD climate projections as per current federal and provincial flood mapping standards).
- Erosion hazard / channel migration zone maps (1:5,000 scale) showing areas which are currently susceptible to active channel processes as well as a broader erosion hazard area representing areas which are potentially susceptible to erosion over the 50-year planning horizon.

The maps will provide updated information for future development in and adjacent to flood areas as well as adaptive information to existing property owners. This will also inform current residents that property within the designated area is at risk and would benefit from strategic flood protection. The floodplain and erosion hazard maps should be consulted together to assess overall hazards to the study area. Both mapping products are administrative tools only, and any site-specific engineering or geosciences analysis must be completed by a Qualified Professional given the dynamic nature of the area.

A comparison of the updated floodplain mapping with the 1997 provincial floodplain mapping indicates that flood construction levels have generally increased between 0 and 2 m from previous levels. The 2020 update uses current engineering practices and meets federal and provincial flood mapping guidelines. The resulting increase in flood construction levels is due to two major factors:

- The 1997 mapping used average daily discharge values rather than peak instantaneous discharge and also did not incorporate future climate change.
- The 1997 mapping was calibrated using discharge measurements downstream at Duncan, rather than at Riverbottom Road.

The recommended next steps for managing flood and erosion hazards in the Riverbottom Road area include:

- Ensure the most current flood and erosion hazard maps are available to the public on the CVRD website.
- Use the updated flood and erosion hazard mapping to inform a future flood management bylaw to regulate development.
- Review the floodplain maps at least every 10 years or after any large flood occurrence (similar to or greater than the February 2020 flood).
- Regular monitoring should be carried out to assess how the Cowichan River is reacting to the unusual events in 2020. Monitoring should be conducted annually, during the early part of the summer low flow period. Log jams, sediment accumulation, erosional features, and altered channel patterns should be identified and interpreted to inform the need for channel management. Monitoring conducted using fixed wing aircraft, helicopter or unmanned aerial vehicle would provide a channel scale vantage point of the river system.

- Communicate updated information to land use applications currently in stream.
- Install a flood monitoring station in the area, both to collect long term data in the mid section of the river as well as to inform emergency responses.

FINANCIAL CONSIDERATIONS

None at this time.

COMMUNICATION CONSIDERATIONS

The updated flood and erosion hazard mapping will be published on our website under the Natural Hazards page, but should also be shared on our GIS platform. An internal training session for Land Use Services staff is scheduled for early November. Given the COVID situation, no public meeting and presentations are proposed at this time, however the development of a pre-recorded webinar may be considered.

STRATEGIC/BUSINESS PLAN CONSIDERATIONS

The updated flood and erosion hazard mapping is part of the regional strategic plan goals to: 1. Adapt to a changing climate by conducting climate risk assessments and establishing a climate change adaptation strategy and 2. Supporting sustainable and coordinated growth and development in the region.

GENERAL MANAGER COMMENTS ☐ Not Applicable

Referred to (upon completion):

☐ Communications & Engagement
☐ Community Services *(Cowichan Community Centre, Cowichan Lake Recreation, South Cowichan Recreation, Arts & Culture, Emergency Management, Facilities & Transit)*
☐ Corporate Services *(Finance, Human Resources, Legislative Services, Information Technology, Procurement)*
☐ Engineering Services *(Environmental Services, Recycling & Waste Management, Water Management)*
☒ Land Use Services *(Community Planning, Development Services, Inspection & Enforcement, Economic Development, Parks & Trails)*

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Reviewed for form and content and approved for submission to the Committee:

Resolution:	Financial Considerations:
☒ Manager, Legislative Services	☒ Manager, Finance

ATTACHMENTS:
Attachment A – Cowichan River – Riverbottom Road Area Flood and Erosion Hazard Mapping Final Report
Attachment B – Cowichan River – Riverbottom Road Area Floodplain and Channel Migration Zone Maps