

The Stawamus River drains a heavily-forested glacially-carved watershed that extends from Sky Pilot Mountain to Howe Sound. The river flows through Valleycliffe and Stawamus I.R. No. 24.



Hazard Overview

The primary hazard on Stawamus River is flooding and the possibility of lateral erosion in the higher-elevation areas (e.g. Valleycliffe) and deposition in the lower reaches and estuary.

The Stawamus River is a steep mountain river with typically high rates of wood and sediment transport. Over time, gravel deposited on Mamquam Blind Channel can affect navigation.



Landslide dam-breach debris floods may be possible in the Stawamus River watershed. These events typically have much larger peak discharges and carry much more wood and sediment than a comparable return period 'clear water' flood.

Finally, the Stawamus River estuary is also subject to coastal backwater flooding from Howe Sound.

Areas at Risk

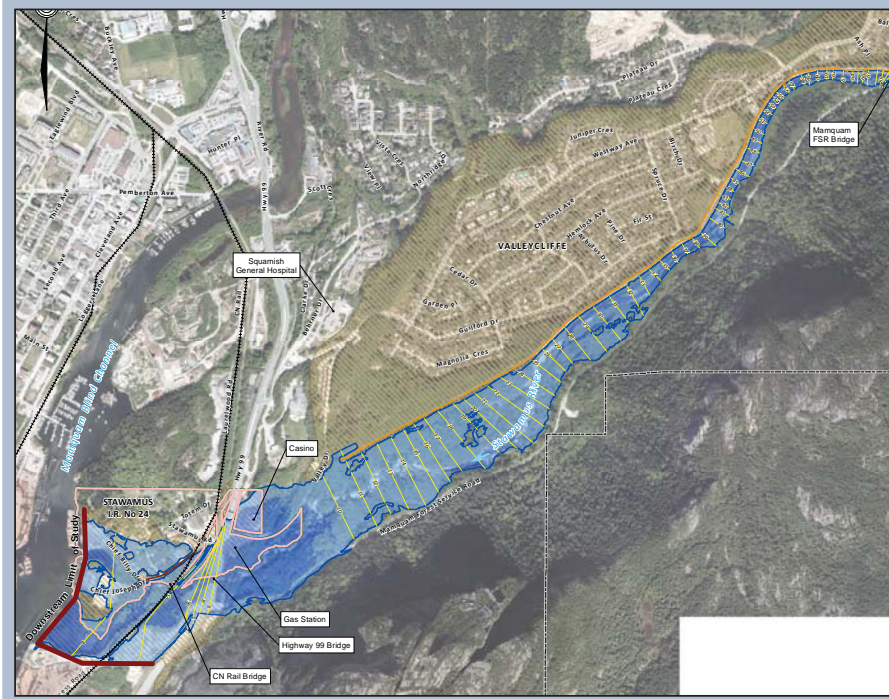
Areas at risk of flooding from Stawamus River include:

- the Valleycliffe neighborhood, including residential and commercial properties as well as Valleycliffe Elementary School,
- low-lying areas surrounding the of Little Stawamus Creek confluence, and
- low-lying areas of Squamish Nation I.R. No. 24.

Key infrastructure includes Highway 99, Valley Drive and the CN Rail mainline and the Mamquam Forest Service Road. The Squamish Nation gas station and Chances Squamish (casino) are located adjacent to the river immediately upstream of the Highway 99 Bridge.

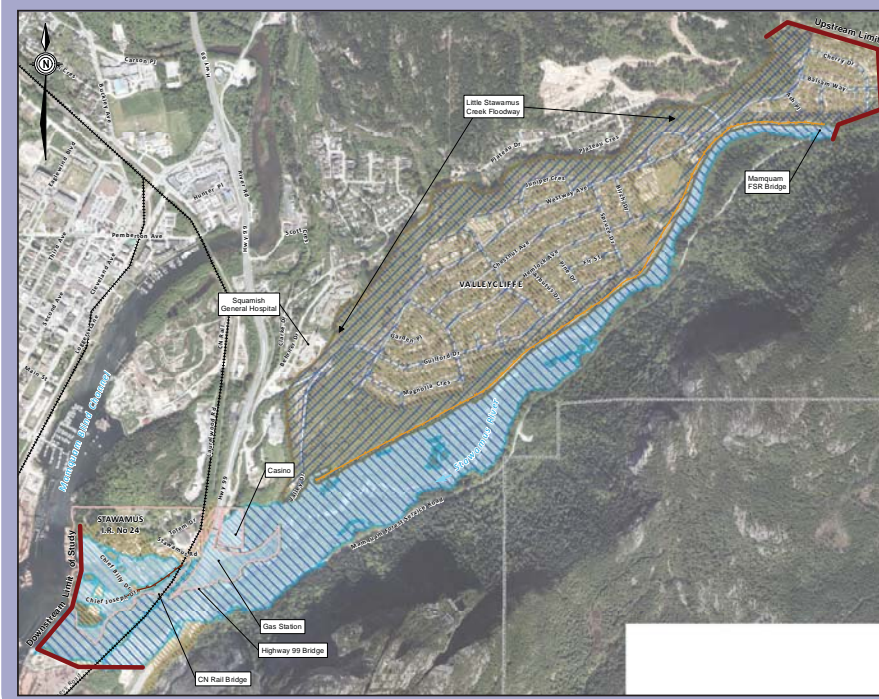
Flood Extents

This map shows the Stawamus River 1:200 year debris flood hazard area. The floodplain consists of the valley corridor generally between the Stawamus River and Little Stawamus Creek. The area at risk extends along the right bank of the Stawamus River from approximately the Mamquam Forest Service Road Bridge to approximately 50 metres upstream of Little Stawamus Creek and about 600 metres upstream from Highway 99.



Land Use Planning - Valleycliffe

The focus for Stawamus River flood risk management is to contain the flood hazard area outside the existing dike. Development under existing zoning should accommodate overland flow by elevating buildings to the FCL and ensuring the street network can serve as secondary floodways in the event of a bridge blockage. These measures are recommended as precautionary and are not expected to be onerous for developers.



Structural Flood Protection Works

- Future studies should consider whether the existing dike crest contains the modelled flood profile along most of its length.
- Upgrades to erosion protection works are recommended.
- Upgrade or extend at the upstream end of the Stawamus River dike could help mitigate debris flood hazards and further reduce the potential for overland flow through Valleycliffe.



Strategy Overview

Protect

is recommended as the primary flood mitigation strategy for the Valleycliffe flood hazard area.

Accept

rather than protect against avulsion and overland flow hazards.

Accommodate

overland flood hazards through floodproofing and internal floodways. Accommodate measures are particularly important in the undiked area between the main Valleycliffe community and Stawamus I.R. No. 24.

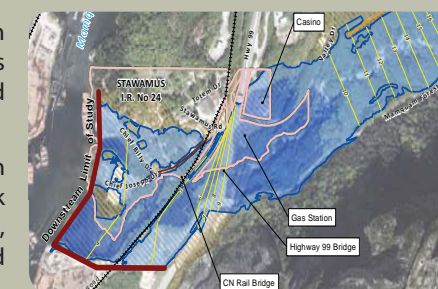
Retreat and **Avoid** strategies are not recommended for the Valleycliffe area, except as related to the protection and preservation of secondary floodways. Valleycliffe is an example of an area that can accommodate growth.

Stawamus I.R. No 24

The Squamish Nation is responsible for identifying and implementing appropriate flood risk mitigation strategies and tools on all reserve lands. The reserve is subject to coastal floods as well as floods and debris floods on the Stawamus River.

In parallel with the District's IFHMP, the Squamish Nation is developing a long-term vision for Stawamus I.R. No. 24 that will integrate development, flood protection and environmental objectives.

The IFHMP project team expects that the final vision will likely incorporate elements of all flood risk mitigation strategies: protect, accommodate, Avoid, and Retreat of specific buildings in the highest hazard areas.



Consequences of Flooding: Valleycliffe

- Flooding of Valley Drive and the Mamquam Forest Service Road could isolate some areas.
- Erosion could threaten the District's backup water intake or damage a water main.
- Dikes confine 1:200 year flow but bridge blockages could cause an avulsion through Valleycliffe.
- An avulsion could damage buildings and create hazards to people.

Consequences of Flooding: I.R. No. 24

- Sediment deposition could limit channel capacity.
- Several buildings (including homes), the heritage Shaker Church, and a community wastewater treatment system are located in the flood hazard area.
- Bridge blockages at Highway 99 and CN Rail are possible and would exacerbate flood hazards.
- Highway 99 and CN Rail could be closed to traffic if water overtops highway or railway.
- Entire Sea to Sky corridor cut off from Metro Vancouver.

Bridges and Access Roads

- Valley Drive east of Highway 99 floods regularly. The District can raise the low point, but it should remain below Highway 99.
- A short length of the Mamquam FSR may also be flooded. The District should work with other stakeholders to raise the road.

- The old concrete bridge abutments remain in place below the new Highway 99 bridge deck (top photo). This constricts the channel and increases the potential for woody debris to be trapped by the bridge.
- The CN Rail bridge opening has limited hydraulic capacity (photo) and could be overtopped during a major flood.

The District should work with partners and stakeholders to identify opportunities to address these issues.

