

NHC Reference P03007525
June 16, 2022

Senate of Canada | Committees Directorate
40 Rue Elgin Street
Ottawa, K1A 0A4

Attention: Ferda Simpson, Committee Clerk
Copy to: Standing Senate Committee on Agriculture and Forestry
Via email: Ferda.Simpson@sen.parl.gc.ca

**Re: Study on British Columbia Flood and Recovery Efforts
9 June 2022 Meeting; Follow-Up Information**

Dear Ms. Simpson:

Thank you for the opportunity to present to the Standing Senate Committee on Agriculture and Forestry on the findings from the 2015 report “Lower Mainland Dike Assessment” prepared for BC Ministry of Forests, Lands and Natural Resource Operations by Northwest Hydraulic Consultants Ltd. (NHC). In response to your request during the meeting, NHC is pleased to provide follow-up information as outlined in this letter.

1 Background Information

Over the past 15 years, several flood management studies have been completed in British Columbia, particularly for the Lower Mainland region. Although prepared at an overview level, future work should build on these previous projects as feasible.

In 2019, NHC prepared a report titled “Lower Fraser River 2D Flood Modelling and Mapping” for Fraser Basin Council. The project developed multi-purpose flood modelling, tools and maps to improve the understanding of flood hazards, risks and management options. The project estimated flood extents, depths and velocities under different flood scenarios with and without dike breaching and evaluated the effectiveness of different flood mitigation options in reducing flood levels. The report is public and available from Fraser Basin Council.

A joint Provincial Government/Fraser Basin Council initiative in 2021 led to “Investigations in Support of Flood Strategy Development in BC” with reporting prepared by various engineering consultants available at: https://www.fraserbasin.bc.ca/BC_Flood_Investigations.html. Of these, the NHC reports “Flood Hazard Information (B-2)” and “Structural Flood Management Approaches (B-5)” contain information specific to diking.

First Nations, particularly in the Lower Mainland, were traditionally provided some of the most flood and erosion prone lands. In some cases, diking was built isolating reserve lands on the river side of the

dikes (Flood and Erosion Damage Mitigation Plan, Zone 2 – Lower Fraser Valley, NHC 2000. Report prepared for First Nations’ Emergency Services Society of BC.) Indigenous knowledge regarding flood hazards has largely been overlooked in the development of flood mitigation.

We are aware of a 2016 discussion paper on “Flood Risk Management”, prepared by Mr. Neil Peters, P. Eng., who was Head of the Provincial Flood Safety Section and Provincial Inspector of Dikes for the BC Ministry of Forests, Lands and Natural Resource Operations from 2002 to 2015. Mr. Peters currently works on a project basis for NHC. Although prepared six years ago, the paper continues to be relevant and highlights challenges within the Provincial Government. You may wish to directly contact Mr. Peters (npeters@nhcweb.com) for a copy.

Whereas these previous studies provide useful information, their mandate was not to outline specific flood mitigation measures. The understanding of flood hazards has been much improved but actual flood risks have not been reduced.

2 Potential Government Action

Flood mitigation spending is most effective if all levels of government work together within a well-defined framework. Given the flood risks faced by Lower Mainland communities, support from the federal government is critical to British Columbia, as well as being essential to reducing federal costs for disaster financial assistance and minimizing impacts of future floods on the national economy. Development of comprehensive strategies, technical studies and plans (as outlined in Section 3) are necessary, but actual implementation of mitigation projects requires long-term senior government commitments and agreements.

In the past, the federal government has played a major role in flood mitigation through specific program agreements with the province. It would be advantageous if the federal government worked with the province to develop a BC specific federal/provincial agreement that could have some similarities to the 1968 to 1995 “Agreement Covering a Plan for Flood Control in the Fraser Valley, British Columbia”. This would involve the establishment of a joint administrative “Advisory Board” and a joint technical “Program Committee” to provide oversight of strategies and technical standards, and to implement prioritized projects within an annual budget.

To reflect current realities, the scope and provisions of such an agreement would need to address the needs of First Nations, habitat impacts, climate change effects, seismic risks to dikes etc. and how best to integrate a range of flood mitigation measures for the Lower Fraser Valley as a whole and within each local government jurisdiction (e.g. floodplain development controls, emergency response and dike upgrades).

In addition to discussing a BC specific federal/provincial agreement, the federal government could encourage the Government of BC to consider some restructuring to establish a single ministry department to lead flood management in BC (and to support a joint federal/provincial board). The new flood management group would include technical specialists, compensated at a private industry salary level. As developing the group may take time, private industry support is likely required in the interim.

3 Future Tasks

As supported by both the federal and provincial governments, we would envision a series of specific future tasks for moving forward:

- Prepare detailed floodplain maps to a consistent standard for the Lower Fraser Valley (Hope to Richmond) and make this information available on-line.
- Develop, implement and test a detailed flood emergency response plan for the Lower Mainland.
- Complete a comprehensive assessment of Lower Mainland Dikes, including field evaluations. Identify the dike fragility in terms of flood and seismic events. Prioritize dike upgrades based on the results, the feasibility of the upgrades and flood risks. Determine appropriate dike freeboard standards. Consider geomorphic channel changes taking place during an extreme flood. Engage all different levels of government, including First Nations.
- Assess structural options other than diking. Apply a multiple criteria analysis involving technical, regulatory, cultural, environmental and financial considerations. Options to be evaluated may include: 1) improving flow conveyance (setting back dikes, increasing the size of bridge openings, introducing floodways, regulating channel sediment deposits); 2) storage reservoirs; 3) flow diversions. Engage all levels of government, including First Nations.
- Consider non-structural flood mitigation options, such as land-use change, flood-proofing, building on fill etc. and implement these through establishment of specific integrated plans for each local government and First Nation.
- Fund and construct prioritized projects through agreements with individual local governments, or joint agreements with two or three local governments and First Nations, where projects cross jurisdictional boundaries.

The outlined actions could be refined in a scoping assessment. It is important to develop a project timeline and establish a monitoring program for measuring progress.

Thank you again for the opportunity to meet with the Senate Committee and to provide this additional information. Please feel free to contact me by email: mmannerstrom@nhcweb.com regarding any questions you may have.



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