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REPORT ON

NORTH ALOUETTE RIVER FLOODING ASSESSMENT - PHASE I MAPLE RIDGE, B.C.

Submitted to:

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EXECUTIVE SUMMARY

The District of Maple Ridge (the District) has initiated a proactive process to assess the nature and extent of flooding in the North Alouette River floodplain. The review of the existing information and consultation with District staff and local residents indicate that the flooding issue is not likely to be alleviated without coordinated intervention.

General Findings

Upland and lowland residential development have progressed at a slow, but steady pace. These changes have caused localized impacts, and a relatively small, but progressive increase in flooding in the floodplain as a whole. The majority of the floodplain itself is encompassed in the Agriculture Land Reserve (ALR), and designated for agricultural use in the OCP. Consequently, land use changes are currently limited. Future upland development has the potential to change the river and tributary flow conditions if not carefully planned. The District is working closely with developers, the Provincial government, and other interest groups to address this issue. In addition to larger-scale development, the cumulative effects of a number of small developments such as dyking or filling on small properties may contribute to flooding problems in the area.

The majority of flooding south of 136th Avenue is caused by the North Alouette River overflowing its banks at locations where the river bank is low. The water then flows across the properties to the northwest, and backs up at 136th Avenue. As a result, 136th Avenue tends to flood before 224th Street.

Based on the work undertaken for this study, flooding along Cattell Brook results from water from the North Alouette overtopping its bank and flowing into Cattell Brook. Flooding also occurs along 224th Street north of 136th Avenue and along 144th Avenue. Flooding in this area is caused by water backing up in the sloughs that cross the Golden Eagle Ranch. When rainfall events are coincident with high tide, water flow in these sloughs has been observed to change direction. The areas outlined above are typically flooded once per year. However, some localized areas are flooded more frequently, in the range of two to four times per year. Flooding can occur throughout the year, although it is more frequent between November and February.

In this study, a number of conceptual potential solutions for improving flood protection in the study area were identified. These potential solutions include structural and non-structural methods to reduce the flood hazard.

The following general recommendations are provided for the District's consideration in developing a strategy to address flooding concerns:

- Account for economic, community, and environmental constraints in the strategy development;
- Engage relevant interest groups, local residents in particular, in strategy development that addresses their needs; and,
- Strive to develop a strategy that addresses long term trends and constraints by addressing systemic issues.

This type of approach should result in a more long-term and cost-effective solution than an ad hoc approach, whereby individual property owners would be encouraged to try to address localized flooding based on their individual needs and resources.

In particular, it is recommended that consideration be given to developing a floodplain management strategy and using a floodplain model as a basis to make decisions about flood protection measures. This model would allow for the determination of areas with high, medium and low impact on flooding on a geographical basis, allowing for a more thorough evaluation of any proposed works.

It is recommended that the District act as a facilitator and advocate on behalf of residents, in particular upstream of the 224th Street Bridge, which was identified in this study as an area of active sediment transport and bank erosion. Possible sources of funding for bank restoration works and channel improvements to facilitate fish habitat would include the Provincial Emergency Program through MELP.

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- A large land assembly (Golden Eagle Ranch) planned for cranberry production; and,
- Blaney Marsh, a large, undeveloped wetland.

3.3 Future Development of the North Alouette River Watershed

The ALR designation prohibits large-scale residential development of the floodplain, as does the OCP and current municipal zoning. However, changes in agricultural usage, such as the conversion of the southern fields on the Golden Eagle Ranch into cranberries or the development of other agricultural industries, could occur. Large-scale residential development is planned in Silver Valley in the headwatersheds of the North Alouette and Alouette River. In addition to large-scale development, the cumulative effects of a number of small-scale changes on individual properties such as dyking or filling could affect the frequency and severity of flooding of the North Alouette River.

Most of the North Alouette floodplain is designated as agricultural use in the OCP (Figure 7). The majority of the study area is in an agricultural zone (A-5) on the current zoning map (Figure 8). Properties located southwest of the intersection of 224th Street and 136th Avenue, and some properties located on the west side of 224th Street south of 136th Avenue are zoned as residential (RS-3).

Under the District of Maple Ridge Bylaw no. 5763-1999, soil deposition permits are required to import fill to properties in the District. This recent Bylaw amends Bylaw 4569-1991, placing further restrictions on importing fill. No soil deposition permits in the study area have been issued since the new Bylaw was enacted. Under the old Bylaw, two soil deposition permits were granted. The locations of the two relevant properties are shown in Figure 9.

The OCP indicates that the upland regions of the North Alouette River Watershed along 232nd Street and Silver Valley Road is primarily designated as single family residential, with small areas for compact housing, neighborhood commercial, and schools and parks. The areas designated for housing vary from 5 to 30 units per net hectare. A conservation corridor is designated along the North Alouette River varying in width from approximately 400 m to 1000 m.

Large wetlands downstream in the District of Pitt Meadows have been partially converted to cranberry production and other agricultural production. These land use changes are likely to continue, and generally require construction of dykes and/or filling.

Build-up of Bank of the North Alouette River

Based on discussions at the May 2nd, 2000 meeting, the North Alouette River reportedly overtops its bank at a few locations where the bank is low and has experienced past bank erosion. The bank could be repaired, raised, and protected from erosion. If such a method were implemented, the bank should be raised to the same level as other reaches in the river to ensure the same level of flood protection. *Regular Debris Removal from the River and Sloughs*

Log jams in the North Alouette River and beaver dams in the sloughs may reduce the capacity of the watercourses to convey flow. Removal of such obstructions would reduce the extent and severity of flooding during frequent flood events. However, large organic debris such as logs provide valuable fisheries habitat and any removal of such debris would likely require approvals under the Federal Fisheries Act and the provincial Water Act.

Dredging

Dredging of the North Alouette River could increase the capacity of the river to carry flow. Hydraulic modelling of this section of the river is recommended to confirm the impact of influence from tides and flows in the Alouette and Pitt Rivers. Before dredging could be contemplated and its effectiveness determined, it should be determined if deposition in the last few decades has caused the river bed to rise. This could be accomplished by re-surveying the cross-sections used in the floodplain mapping study. Dredging would require approval under the Federal Fisheries Act and the provincial Water Act.

Connection of the North Alouette and Alouette Rivers with a Floodgate

The Alouette River and the North Alouette River have different flow regimes due to the differences in size between the watersheds and because the Alouette River is regulated. As a result, it may be possible to direct the flow from one river to the other river when one of the rivers is in flood. This could reduce the flooding on both of the river systems. Before such a system could be implemented, analysis of the historical flows on both rivers would be required to investigate when and under what conditions flow could be diverted. Co-operation with B.C. Hydro would be required as B.C. Hydro controls the release of flow from the dam on Alouette Lake. B.C. Hydro is currently in the process of developing a water use plan for the Alouette River which may result in changes to the operation of the dam. The impacts on fisheries resources by diverting flow would also need to be investigated.