

CORPORATE REPORT

To: Electoral Area Services Committee From: Graham Daneluz, Director of Planning & Development Date: 2021-06-10 File No: 6785-20

Subject: Chilliwack River Valley Public Safety Risk Assessment

RECOMMENDATION

THAT the FVRD Board authorise staff to prepare and issue a Request for Proposals for professional geotechnical engineering and geoscience services for the development of a Public Safety Risk Assessment of slope hazards in the Chilliwack River Valley, Electoral Area E

BACKGROUND

The Chilliwack River Valley in Electoral Area E has complex terrain and hydrology. The escarpment on the north side of the valley rises to about 240 metres to meet the Ryder Lake bench lands. These slopes are often steep. They are characterized by active gullies shaped by erosion, rotational slumps and shallow landslides. The 2016 'bare earth' LiDAR image below shows the gullies nicely.



These slopes, and the stream that drains them, present various hazards to people and property; notably landslides, debris flows and debris floods. These hazards are not particularly well understood and have never been comprehensively assessed.¹

There have been a number of such events over the years. Most recently, several small landslides or slumps occurred in the Chilliwack River Valley (Area E) between January and March of 2021. The map below shows the approximate location of reported events (red triangles). Most of these sites have not been ground-truthed or otherwise validated.

Notable events occurred at Hansom Road and Wingfield Creek. These two events were assessed by Statlu Environmental Consulting on behalf of the Ministry of Forests, Lands, Natural Resource Operations & Rural Development.



Hansom Road Event

According to Statlu Environmental Consultants (SEC), on January 5, 2021 "a rotational slump occurred upslope of 47963 Hansom Road, on Crown land, during a windstorm and wet weather in January, 2021. The ground motion caused by this slump created cracks at 7963 Hansom Road which damaged the driveway and house there, rendering the house uninhabitable. The same event also caused one small landslide on steep ground on the neighbouring property at 48151 Auchenway Road." The map below, prepared by SEC, shows the location of the slide and the rotational slump.

¹ There are many site-specific studies of individual properties, and Thurber Engineering did an overview assessment of slope stability in 1988, but no comprehensive study of the valley has been completed.



SEC concluded that, "instability there is deep-seated and driven by groundwater pressure and occasional very high winds... There is no immediate risk to public safety. No additional landslides are imminent, that is, likely to occur within the next few days, weeks, or months." However, "the house at 47963 Hansom Road is now uninhabitable, and because additional slope movement and cracking is likely to occur here and would probably be prohibitively difficult or very expensive to stabilize."

Wingfield Creek Event

Statlu Environmental Consulting (SEC) documented a large rotational slump that occurred on February 5, 2021, in an area that has been historically instable. Only the toe of the slump failed in the landslide, and the remainder of it settled, creating a series of scarps and terraces upslope of the landslide scar. In addition, there are indicators of slope movement over a larger area, extending about 30 m west, 50 m east, and 200 m upslope of the rotational slump scarps."

SEC provided the map below which shows the location of the slide (purple) and the larger area of the slump (red line).



SEC concluded that, "additional landslides are likely to occur here. Small landslides, similar in size and extent to the recent failure, will occur every decade or two. Larger landslides of up to about 50,000 m³ might occur with an average annual frequency of one event every few hundred years. If a large landslide were to occur, it would likely not reach or deposit on any structures or buildings, but it could reach and/or cross Wingfield Creek. It could block or divert Wingfield Creek, causing localized flooding, sedimentation, and/or washouts."

DISCUSSION

As a result of the landslides that occurred in the Chilliwack River Valley in January and February, 2021, Emergency Management BC (EMBC) is prepared to cover the costs of a Public Safety Risk Assessment. The assessment would include the following:

- Completion of a Landslide Risk Assessment including the evaluation of landslide kinematics (type and extent of movement) that would indicate the potential types and size of landslides that might occur.
- Hazard and risk mapping
- A detailed landslide runout analysis and modeling to provide better quantification of risk to valley residents.
- Lidar data
- Assessment of recent slide activity to understand the potential for future occurrences.
- Presentation to stakeholders
- Identification of potential mitigation options (not detailed costs or design works)

EMBC would require that FVRD undertake a Request for Proposal (RFP) process to select a consulting firm with expertise in geotechnical engineering, specializing in the field of landslide geohazards, to complete these analyses in order to quantify the concerns raised by the recent landslide activity. Local MFLNROD staff will review the RFP prior to it being released and provide assistance if required. MFLNROD and EMBC would review the consulting firm proposal selected by the FVRD to ensure that it meets the intent of the Public Safety Risk Assessment.

EA Directors should also be aware that the Public Safety Risk Assessment will likely provide information about slope and stream hazards that have the effect of limiting development in some locations within the Chilliwack River Valley. Furthermore, it may trigger the need to amend the Official Community Plan and other bylaws to implement the findings of the assessment.

COST

The Public Safety Risk Assessment is a major study. I anticipate that the consulting cost for the Public Safety Risk Assessment will exceed \$300,000. Costs for consulting would be covered by EMBC.

FVRD would be responsible for the costs associated with staff resources to:

- Prepare an RFP, review proposals and engage a consultant;
- Supervise the consultant and administer the contract for consulting services;
- Coordinate with provincial agencies and other through the course of the work; and,
- Present the findings of the Public Safety Risk Assessment to the community and stakeholders and make the report available to the public and others.

Costs to FVRD are largely commitments of staff time, but some modest expenditures will be required; for example, mail-outs and community meetings to communicate the results of the assessment. These direct expenses, probably in the order of \$3000, can be covered by the EA Planning budget.

Implementation of the Public Safety Risk Assessment - which is not fully considered in this report – will likely involve amendments to the Official Community Plan and other bylaws. These efforts will need to be considered separately by the FVRD Board once the results of the assessment are known and in conjunction with work plans and budgets for future years.

This work was unanticipated and, as such, is not included in the 2021 work plan.

CONCLUSION

As a result of recent slope movements in the Chilliwack River Valley, Emergency Management BC is prepared to fund a Public Safety Risk Assessment for a portion of the Chilliwack River Valley. The assessment would be a major study – similar in scope to the Chilliwack River flood and erosion study done in the early 1990's by Hay & Co – that will probably cost in excess of \$300,000. It will fill an

important gap in our understanding of landslide and stream-related risks in the Chilliwack River Valley which have never been comprehensively studied. The study will benefit from LiDAR mapping that **uses 'laser-scanning' from aircraft to produce highly accurate terrain mapping to identify slope** features. The result will be comprehensive and reliable assessment of risks to the public about slope-related hazards in the Chilliwack River Valley.

EMBC would provide 100% of the funding for consultant costs. FVRD would be responsible for costs associated with tendering, contract administration, and public/stakeholder engagement. Furthermore, EA Directors should anticipate that new information about landslide risks will need to be implemented through future OCP amendments and other bylaw changes. These changes may result in additional restrictions on development in some parts of the community.

I recommend that FVRD Board authorise staff to prepare and issue a Request for Proposals for professional geotechnical engineering and geoscience services for the development of a Public Safety Risk Assessment of slope hazards in the Chilliwack River Valley, Electoral Area E.

We would not proceed with contracting for professional services for the work until the full costs of the work are known and EMBC has provided the funds.

COMMENTS BY:

Kelly Lownsbrough, Chief Financial Officer/ Director of Finance: Reviewed and supported.

Jennifer Kinneman, Chief Administrative Officer: Reviewed and supported.