





Landslide Risk Assessment

2026 Update

Prepared by BGC Engineering Inc. for:

DISTRICT OF NORTH VANCOUVER

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District of North Vancouver
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Attention: Fiona Dercole, Senior Project Manager, Public Safety

Landslide Risk Assessment – 2026 Update

Please find the Landslide Risk Assessment Update report attached. We appreciate the opportunity to collaborate with you on this challenging and interesting project.

Should you have any questions, please do not hesitate to contact the undersigned.

Yours sincerely,

BGC Engineering Inc.
per:



Lauren Hutchinson, M.Sc., P.Eng.
Senior Geotechnical Engineer

SUMMARY

The District of North Vancouver (the District, DNV) is characterized by forested terrain with steep river valleys, escarpment slopes, and mountains subject to a range of natural hazards including landslide, steep creek, flood, coastal, and wildfire hazards. Following the landslide along the Berkley Escarpment on January 19, 2005, the DNV initiated proactive risk management of natural hazards across the District. Between 2005 and 2010, BGC Engineering Inc. (BGC) was retained to complete quantitative risk assessments (QRA) along priority escarpment slopes and known debris-flow hazard areas.

This report presents an update to the life-loss risk assessment from landslides on escarpment slopes in the District. The update is completed at a district-wide scale and integrates updated topographic information, advances in risk assessment methodologies, and reflects mitigation works completed since 2010. It is intended to provide the DNV with an updated understanding of life-loss risk associated with landslides as a basis for ongoing, proactive landslide risk management. It does not account for economic damages that can result from landslide hazards within the District.

In the District, the types of landslides with the greatest potential to cause loss of life involve rapid to extremely rapid earth flows (referred to as flow slides), debris flows, and rockfall (BGC, January 4, 2010). There have been seven, known flow slides originating from escarpment slopes in the District since 1972 and additional shallow debris slides, including debris slides associated with water main ruptures. Two of the historical landslides (1979, 2005) caused structural damage to houses located at the bottom of the escarpment. In this report, BGC updated life-loss risk estimates for flow slides originating on the following escarpments:

- Berkley
- Pemberton Heights
- Westlynn
- Riverside West
- Mosquito Creek
- West Hastings
- Capilano River East.

The assessment was informed by a review of changed slope conditions based on fieldwork at representative sites and district-wide lidar change detection between 2013 and 2022. BGC also updated the risk assessment methodology developed following the January 2005 Berkley Escarpment landslide. Some landslide hazards involve different geological conditions, failure mechanisms, or urban development scenarios than were present along the Berkley Escarpment. Estimates of life-loss risk for properties affected by such hazards, for example in Deep Cove/Cove Cliff, Mount Fromme East, and for alluvial fan areas affected by steep creek hazards were provided by BGC (November 12, 2010; May 31, 2017) and have not been updated as part of this assessment. Moreover, BGC has not updated risk for steep slopes outside those escarpments listed above.

Observed changes in the District over the period of 2013 to 2022 from the lidar change detection results are associated with a combination of local, urban changes where buildings or specific properties have been modified and construction/modification of roads. There is also evidence of landslide (e.g., Seymour River rock slide), creek activity, and construction of steep creek mitigations works. Limited evidence of slope movement on escarpment slopes was observed which is consistent with the historical record of having only three landslides recorded between 2005 and 2024 and is an indication of the efficacy of slope mitigation works implemented since 2005. Lidar change detection results are available in Cambio (cambio.bgcengineering.ca/DNV/vNext).

BGC identified two properties that exceed the DNV's risk tolerance threshold for existing development (1:10,000 annual Probability of Death of an Individual (PDI)):

- 2050 Rivergrove Place
- 2064 Rivergrove Place

Life-loss risk at these properties is elevated due to the proximity to the slope, slope height and angle, and the presence of a deteriorating retaining wall at an upslope property (2454 Hayseed Close). BGC also identified properties downslope of 2360 Carman Place (1788, 1802 Riverside Drive) which are near the risk tolerance threshold and within the range of uncertainty of the analysis. BGC recommends that the DNV work with the property owners at these locations to inform them of the risk levels and to develop risk management approaches. At 2454 Hayseed Close, BGC recommends that the retaining wall is replaced with an appropriately designed structure reviewed by a Qualified Professional to ensure the design will achieve the required level of risk reduction and appropriate factor of safety. At the time of writing, BGC understands that work is underway to replace the retaining wall.

Overall, apart from the properties downslope of 2454 Hayseed Close and 2360 Carman Place, life-loss risk estimates are lower than previous district-wide assessments due to the:

- Mitigation works completed across the District since 2005
- Extended historical record with limited additional slides that support a reduced estimate of District-wide landslide frequency
- Updated consequence estimation method that accounts for decreasing landslide impact pressure with distance from the escarpment base and the shielding effect of upslope buildings.

Eighty-five percent of properties (127 of 149 properties) at the base of the escarpment have lower risk than previously estimated. Of these, 41 properties decreased from 'tolerable' to 'broadly acceptable' risk. For the properties at the base of the escarpment where estimated risk is higher than previously assessed, the risk estimates are within the same risk level. All 124 properties at the crest of escarpment slopes that BGC assessed were 'broadly acceptable'. Risk estimates at individual properties are summarized in tables within this report, shown in the Cambio webmap, and provided to the DNV as a geospatial package.

BGC also interpreted risk levels for properties within the DNV Slope Hazard DPA but outside of previously assessed escarpments. The interpreted risk levels provide a screening tool to identify

any properties that may exceed the DNV's risk tolerance criteria for existing development and may warrant further assessment. BGC estimated interpreted risk levels for 183 properties at the base of slopes and an additional 355 properties at the crest of slopes within the DPA. Of these, BGC did not identify any properties with an interpreted risk level that exceeds DNV's risk tolerance criteria for existing development.

As part of the DNV's proactive approach to natural hazard risk management, BGC recommends the DNV continue to provide updated information and education to the public on how to reduce landslide risk when living near steep slopes and develop regular inspection programs related to management of stormwater, fill and yard waste, retaining walls, and slope conditions. As part of field work completed in this study, BGC observed sites where lawn cuttings, garden debris, and saturated fill have been placed at the escarpment crest. Placement of these materials should be avoided as it may contribute to slope instability through slope oversteepening and by introducing materials with lower strength than native soils. BGC also observed one retaining wall whose condition had deteriorated since the last inspection in 2005. Similar deterioration may be present at other sites across the District, in particular for timber/log crib structures, that were not observed as part of this assessment. BGC recommends the DNV consider developing an inspection/asset management program for retaining walls, if such a program is not already operational.

In addition to the above, BGC recommends the DNV plan to update the district-wide landslide risk assessment at regular future intervals, for example at 10-year intervals, to create a mechanism to reinspect slopes and retaining walls and update the associated landslide risk estimates, as required.

Finally, at the request of the DNV, BGC prepared a guidance memo for developers, property owners, and Qualified Professionals completing slope hazard assessments, provided in Appendix E. BGC recommends that following internal review, the DNV make this document, or relevant content from it, available to the DNV building permit department and post publicly for reference.

TABLE OF REVISIONS

Date	Revision	Remarks
March 7, 2025	A	Draft issue for review by DNV
February 20, 2026	0	Final issue integrating DNV comments
June 15, 2026	1	Final issue with edits to Appendix E

CREDITS AND ACKNOWLEDGEMENTS

This analysis and report were developed through the contributions of many individuals (Table CA-1).

Table CA-1 Project study team. Professional designations are for practice in British Columbia.

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BGC's study team comprises individuals from BGC's offices in:

- **Vancouver, British Columbia** – situated on the unceded traditional territories of the xʷməθkʷəy̓əm (Musqueam Indian Band), Sḵwx̱wú7mesh (Squamish Nation), and səlilwətaɬ (Tsleil-Waututh Nation).
- **Calgary, Alberta** – located on the traditional territories of the people of the Treaty 7 region in Southern Alberta. This includes the Blackfoot Confederacy, made up of the Siksika, Piikani, and Kainai First Nations; the Stoney Nakoda comprised of the Chiniki, Bearspaw, and Wesley First Nations; and the Tsuut'ina First Nation. Calgary is also homeland to Métis Nation of Alberta, Region 3.

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[1] References in these Limitations to the "document" include the document to which these Limitations are attached, any content contained in this document, and any content referenced in this document but located in one of BGC's proprietary software applications (e.g., Cambio).

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1.0 INTRODUCTION

1.1 Background

The District of North Vancouver (the District, DNV[2]) is characterized by forested terrain with steep river valleys, escarpment slopes, and mountains, bounded to the south and east the Vancouver harbour and Indian Arm (Drawing 01). The District is subject to a range of natural hazards including landslide, steep creek, flood, coastal, and wildfire hazards.

Following the landslide along the Berkley Escarpment on January 19, 2005, the DNV initiated proactive risk management of natural hazards across the District. Since 2005, BGC Engineering Inc. (BGC) has been retained to complete quantitative risk assessments (QRA) along priority escarpment slopes and known debris-flow hazard areas:

- Berkley Escarpment
- Pemberton Heights Escarpment
- Westlynn Escarpment
- Deep Cove/Cove Cliff
- Riverside West
- Mosquito Creek
- Capilano River East
- Mount Fromme East
- Debris-flow fans along Indian Arm.

BGC (November 12, 2010) provided an overview of the landslide risk management process and summarized all available QRAs completed within the District between the 2005 Berkley Landslide and 2009. For each of the escarpments, maps and tabular summaries of life safety risk to individuals in buildings, expressed as annual Probability of Death of an Individual (PDI) were presented. The landslide risk assessments informed DNV's current slope Development Permit Area (DPA) and Natural Hazards Risk Tolerance Criteria (DNV, November 10, 2009).

Following the 2010 assessment, BGC assessed an additional escarpment slope, Virginia Crescent due to concerns from a property owner regarding ground deformation observations on the slope (BGC, April 6, 2016).

In the years since BGC's landslide risk summary document (BGC, November 12, 2010) and the formal adoption of risk tolerance policy (DNV, November 10, 2009), there have been advances in scientific knowledge, future climate change projections, changes in land use, and lessons learned from the application of existing DNV policy and procedures. For these reasons, DNV is seeking an update to the landslide risk assessment. The DNV requested that BGC update the landslide risk assessment across the District to reflect these advances.

[2] In this document, DNV is used to refer to the administrative authority and the District is used to refer to the geographic area.

1.2 Scope of Work

This report contributes to the DNV's proactive approach to natural hazard risk management. It is intended to provide the DNV with an updated understanding of life-loss risk associated with landslides originating from escarpment slopes as a basis for landslide risk management. It does not account for economic damages that can result from landslide hazards within the District.

The objectives of the assessment, as outlined in BGC's proposed workplan (BGC, July 12, 2023), are to:

1. Identify landslide hazard areas with the potential to pose life-loss risk, including those previously identified in the Landslide Risk Assessment Summary (BGC, November 12, 2010) and Debris Geohazard Risk and Risk Control Assessment (BGC, May 31, 2017).
2. Update existing landslide risk estimates, including climate-change impacts to landslide risk, where applicable.
3. Communicate study findings to DNV staff and affected property owners.

BGC understands that the DNV intends to utilize the results of this assessment to:

- Consider locations where additional investigation or mitigation may be required to manage slope hazards.
- Prioritize future landslide risk-reduction efforts, including installation of sewer drainage systems.
- Clarify technical requirements for Qualified Professional (QP) slope hazard assessments completed in support of proposed development in the Slope Hazard DPA.

BGC further understands that the DNV is considering reviewing the existing Natural Hazards Risk Tolerance Criteria (DNV, November 10, 2009) to integrate learnings from implementation over the past 15 years. The risk tolerance criteria update is outside of the scope of the present assessment; however, the results of this assessment may inform any associated policy updates.

Work was carried out under Purchase Order 99163-OS-125 and dated July 19, 2023.

1.3 Related Documents and Studies

As part of the present assessment, BGC reviewed previous studies of slope hazards and risks across the District, summarized in Appendix A. These studies do not include services BGC provided for Geotech-on-Demand hazard assessments, except where risk was assessed, or mitigation works were completed that changed the assessed risk.

2.0 BACKGROUND

2.1 Landslide Risk Management

Geohazard risk management encompasses risk identification, risk estimation, risk evaluation, risk control implementation, and monitoring. Effective geohazard risk management balances all these components to understand risks and identify practical solutions given site characteristics and community needs. As part of risk identification and estimation, landslide risk can be estimated and communicated for individual and societal (group) risk:

- Individual risk: the probability that the person who spends the greatest proportion of time at specific location (referred to as “individual most at risk”) is killed by a hazard. It is expressed as the annual probability of death of an individual (PDI).
- Societal (group) risk: the number of people that could be killed by a hazard, considering all who could be exposed.

Landslides and other natural hazards in the District are managed through a comprehensive Natural Hazards Management Program. Landslide risk management strategies include engineered (structural) measures as well as land use planning, policy, and communication approaches that address components of risk. Following the January 2005 Berkley Landslide, the DNV has worked with property owners to identify and remove excess fill from the crests of slopes, complete drainage improvements, and implement additional mitigative works.

Land use planning and permitting processes in the community integrate risk tolerance criteria for subdivisions, development approvals, and building permits within DPAs (Table 2-1, DNV, November 10, 2009).

Table 2-1 DNV risk tolerance criteria (DNV, November 10, 2009).

Type of Application	Risk of Loss of Life (per annum)		Factor of Safety (static)	
	1:10,000 + ALARP(1)	1:100,000	FOS > 1.3	FOS > 1.5
Building permit (<25% increase to gross floor area)	X		X	
Building permit (>25% increase to gross floor area and/or retaining walls >1.2 m)		X		X
Re-zoning		X		X
Sub-division		X		X
New development		X		X

Note:

1. As Low As Reasonably Practicable (ALARP) is used to indicate that risks should be reduced to the point where the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained

The DNV Slope Hazard DPA applies to properties that are within 20 metres of the top or bottom of a steep slope. A steep slope is defined as a slope with an angle greater than 20 degrees (36%) and greater than 10 metres in height (DNV Document: 5756356). In practice, BGC understands that the DNV has been using a horizontal distance of 20 m from the bottom of a steep slope, and a horizontal distance of 10 m from the top of the slope. Consistent with DNV risk tolerance criteria, landslide risk can be categorized as broadly acceptable, tolerable, or unacceptable (Table 2-2).

Table 2-2 Risk tolerance categories.

Category	Description	Risk of Loss of Life (per annum)
Broadly Acceptable	Incremental risks from a hazard are within the range that society accepts and do not require mitigation.	<1:100,000
Tolerable	Risk is not negligible, but can be tolerated for benefit, given that effort is taken to reduce risk and is kept under review.	1:10,000 to 1:100,000
Unacceptable	Generally considered unacceptable by society and require mitigation.	>1:10,000

2.2 Previous Landslide Risk Assessments

Landslide hazards and risks in the District have been studied extensively from approximately 1980 (following the 1979 landslides on the Berkley Escarpment) to present. BGC's district-wide Landslide Risk Summary (BGC, November 12, 2010) provides the most up-to-date and comprehensive summary of landslide risk across eight escarpments and reflects the risk reduction achieved from mitigations implemented between 2006 and 2010. In total, BGC (November 12, 2010) estimated life-loss risk at 546 properties. Of these:

- One (1) property was identified as having unacceptable risk (2871-2873 Capilano Road) which was noted to be undergoing mitigation design by others at the time of the report. At this site, a tie-back retaining wall was designed by Davies Geotechnical Inc. (Davies, July 12, 2010) to meet the DNV factor of safety criteria (Table 2-1). Independent, third-party review was completed by Horizon Engineering Inc. (Horizon, October 15, 2010) and BGC understands that the permitted retaining wall was constructed in 2012 (personal communication, F. Dercole, February 6, 2026).
- 110 properties were identified as having tolerable risk (annual risk between 1:100,000 and 1:10,000 PDI).
- 435 properties were identified as having broadly acceptable risk (annual risk less than 1:100,000 PDI).

Full details on the risk assessment background, methodology, and limitations are provided in BGC's previous risk assessment reports (BGC, January 13, 2006; May 11, 2006; January 15, 2007; November 29, 2007; November 27, 2008; April 30, 2009a, 2009b, 2009c, 2009d; 2009e; June 17, 2009; January 4, 2010) and summarized by Porter et al. (2007). A list of additional past studies reviewed is available in Appendix A.

3.0 LANDSLIDE RISK ASSESSMENT UPDATE

3.1 Introduction

In the District, the types of landslides with the greatest potential to cause loss of life involve rapid to extremely rapid earth flows (referred to as flow slides) originating from escarpment slopes, debris flows, and rockfall (BGC, January 4, 2010). In this assessment, BGC updated life-loss risk estimates for landslides originating on escarpment slopes across the District and within the DNV Slope Hazard DPA. This update builds on previous assessments completed by BGC (Section 2.2) and integrates:

- Refined landslide hazard understanding based on extended historic record of landslides from 2005 to 2024, District-wide lidar change detection, and additional landslide path mapping using lidar.
- Updated risk assessment methods, including consequence estimation techniques aligned with recent research and best practices, field verification at select properties at the Berkley and West Hastings escarpments, and numerical modelling at select properties where additional analysis was required to support landslide risk estimation.
- Screening-level review of life-loss risk for properties in the DNV Slope Hazard DPA not previously assessed.

3.2 Surficial Geology

Escarpment slopes are steep, natural slopes that separate two relatively level land surfaces. In the District, these slopes range from several meters to approximately 85 m high with slopes angles ranging from approximately 25 to 45°. The surficial geology of escarpment slopes in the District is typically characterized by till and fill and colluvium derived from glaciomarine sediments overlying Capilano glaciomarine sediments, Vashon Drift lodgement till, Coquitlam Drift, and Quadra Sand (Figure 3-1). The fill and colluvium, both derived from glaciomarine sediments, typically consist of a matrix of fine sand with sand- to cobble-size fragments of very stiff silt and increasing coarse sand and fine gravel with depth. The thickness of fill is highly variable, ranging from 1 to 4 m, based on observations at the crest of the Berkley Escarpment prior to remediation works completed following the 2005 Berkley Landslide (Porter et al., October 2007). Capilano glaciomarine sediments are typically laminated sands, silts, and clays with lower permeability than overlying fill leading to the potential for perched water tables during periods of heavy rainfall. Vashon Drift lodgement till is extremely dense, relatively strong, and impermeable compared to overlying sediments (Porter et al., October 2007). Valley sides characteristically have outwash terrace deposits and colluvial deposits from historical landslides (Bednarski, 2014).

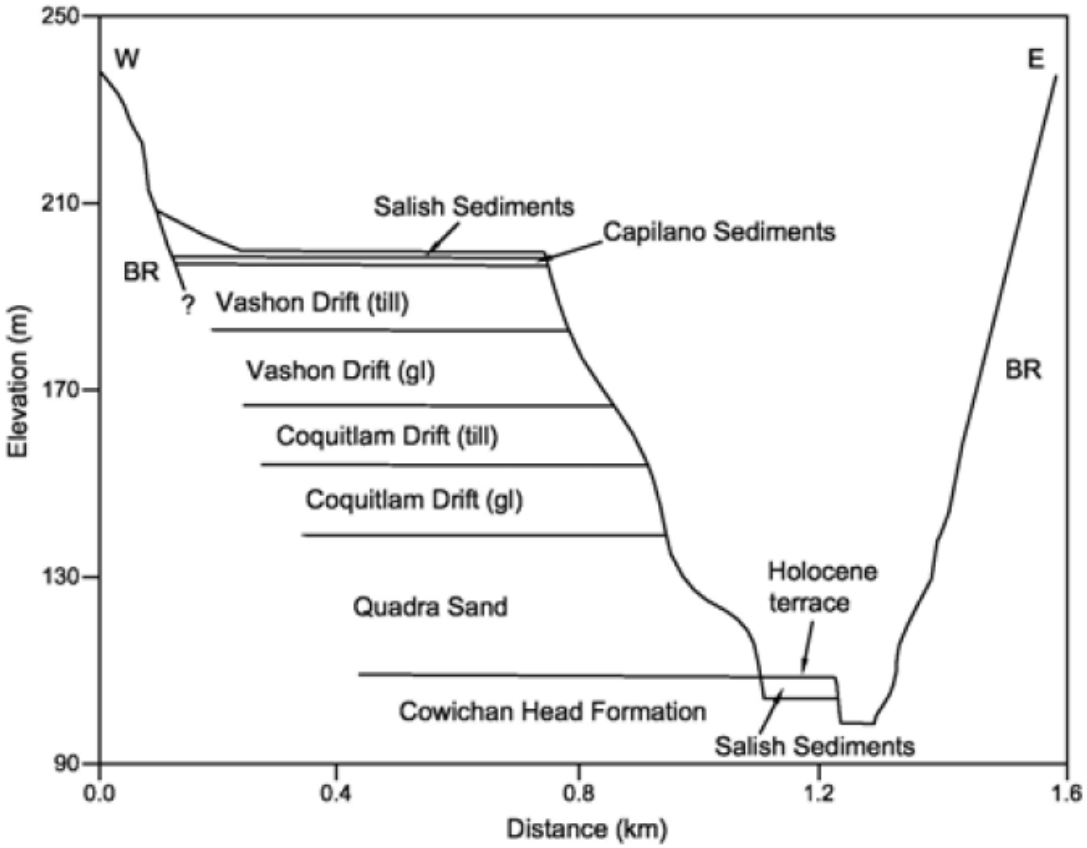


Figure 3-1 Typical stratigraphy of Pleistocene sediments in the vicinity of the Berkley Escarpment and DNV escarpment slopes (Porter et al, October 2007)

3.3 Lidar Change Detection

Lidar data covering the District is available from 2013, 2016, 2018, and 2022. BGC completed lidar change detection between lidar collected May 1, 2022 and April 23, 2013 to evaluate changed slope conditions on the escarpment slopes assessed. Details on the lidar change detection methodology are presented in Appendix B. Lidar change detection results are available in Cambio (cambio.bgcengineering.ca/DNV/vNext).

BGC interprets the observed changes in the lidar between 2013 and 2022 as largely attributable to local urban development, infrastructure modifications, river channel adjustments, and the December 2014 Seymour Rock Slide. There is limited evidence of slope movement on the escarpment slopes. BGC is not aware of any post-2022 landslides originating from the escarpment slopes.

3.4 Historical Landslide Inventory

BGC integrated historical records, airphotos, lidar data, and lidar change detection results to update the inventory of historical landslides in the District. In total, nine historical landslides have been recorded across the District escarpment slopes (Table 3-1). Six landslides were recorded between 1972 and 2005 originating from the Berkley Escarpment in the Berkley-

Riverside area (BGC, January 13, 2006). The recorded landslides originated in fill material and were triggered by surface water runoff water or seepage within the slope following heavy rainfall, travelling downslope as flow slides. Two of the historical landslides (1979, 2005) caused structural damage to houses located at the bottom of the Escarpment. Fortunately, in 1979, the occupants of the damaged home were able to escape; however, in the 2005 landslide, one serious injury and one fatality occurred (BGC, January 13, 2006).

Three additional landslides have occurred since the 2005 Berkley Landslide, two of which (2006, 2011) resulted from water main ruptures[3] that caused small debris slides leading to inundation and debris deposition downslope. Additional historical debris slides (shallow slides of granular material) were noted on the Westlynn Escarpment over the period of 1952 to 1979 in aerial photographs (BGC, January 4, 2010) but are not listed in Table 3-1 due to their small size. The inventory does not include rockfall or debris-flow hazards nor those events for which the date could not be verified.

The historical flow slides had an average width of approximately 20 m, originated from slope angles between 35 and 46°, and terminated at runout angles ranging from 19 to 25° measured from the crest of the slope (BGC, January 13, 2006). The runout angle is the angle from horizontal of a line connecting the landslide release point to the furthest point of runout. It describes the kinetic energy of a landslide, with smaller angles indicating higher mobility and further runout from the base of the slope (Figure 3-2).

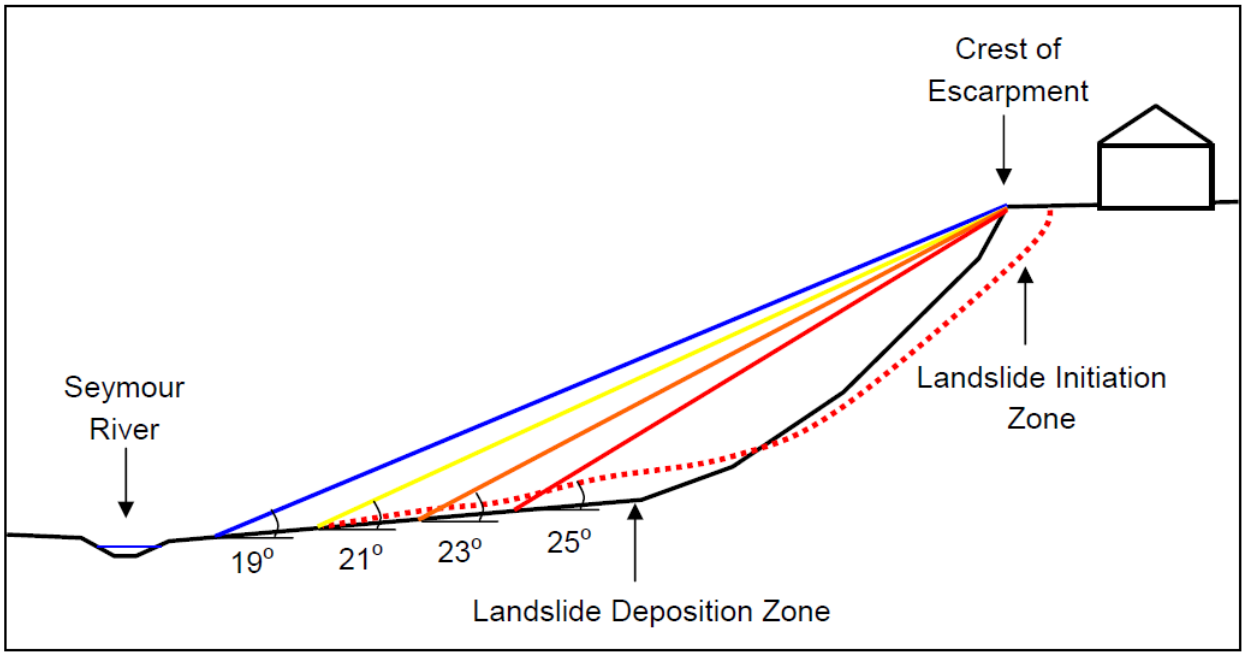


Figure 3-2 Schematic illustration of landslide runout angles (BGC, January 13, 2006).

[3] The DNV's watermain replacement program considers the need to prioritize watermain replacement in areas susceptible to landslides.

Table 3-1 Summary of previous landslides. Modified after BGC (January 13, 2006).

Date of Occurrence	Address Near Initiation Zone	Site Observations	Consequences
December 25, 1972 *"Tate Slide"*	1425 Lennox	• Originated in fill • 35 to 46° slopes • Fill replaced, settled and cracked during December 1979 storm • Runoff from 3 properties directed towards slope • Pool not cracked but drains down the slope • Approx width at crest = 15 m • Approx runout angle = 23 – 25°	• 1425 Lennox: damaged sundeck • No houses were present below the slope – no damages or injuries down slope
December 17, 1979 "*Dawson-Chu Slide*"	2379 Carman	• Originated in fill • 42° slopes • Seepage evident 20 ft below crest • Fewer conifers than adjacent slopes • Pool drained down the slope • Approx width at crest = 20 m • Approx runout angle = 22 – 24°	• 2379 Carman: Pool and back yard lost • Impacted houses downslope: 3 ○ 1730 Riverside: destroyed ○ 1710, 1718 Riverside: damaged, car destroyed • Occupants at downslope houses: ○ 1730 Riverside: 2 ○ 1710, 1718 Riverside: unknown • 1730 Riverside sheared in half, one occupant in undamaged side, other escaped through basement window. No injuries.
December 17, 1979 "*Patrick Slide*"	2360 Carman	• Originated in fill • 37 to 45° slopes • Young deciduous trees and brambles at crest of slope • Roof and foundation drains extended over bank • Seepage 15 feet below scarp along surface of dense silts • Approx width at crest = 18 m • Approx runout angle = 24 – 26°	• 2360 Carman: Backyard lost, no other damages • Impacted houses downslope: 0 ○ 1788, 1802 Riverside: no record of damages • No damages or injuries down slope
December 17, 1979 *"Tree Top – Chapman Slide"*	2205 Berkley	• Originated in fill • 36 to 40° slopes • Driveway runoff directed to storm sewer • Approx width at crest = 25 m • Approx runout angle = 23 – 25°	• 2205 Berkley: Backyard lost, no other damages • No houses were present below the slope – no damages or injuries down slope • No damages or injuries down slope
January 14, 1999	2391 Berkley	• Originated in fill • 40 to 45° slopes • Seepage evident at base of fill • Approx width at crest = 20 m	• 2391 Berkley: Portion of back yard lost • No houses were present below the slope – no damages or injuries down slope • Walking trail temporarily closed

Date of Occurrence	Address Near Initiation Zone	Site Observations	Consequences
		• Approx runout angle = 30° (stopped by right bank of Canyon Creek)	
January 19, 2005 "*Berkley Slide*"	2175 Berkley	• Appears to have originated in thick fill and colluvium • Adjacent slopes >35° • Runoff from 3 properties and portion of Berkley Road directed towards slope • Fishpond present, not cracked • Approx slide width = 25 m • Approx runout angle = 21 – 23°	• 2175 Berkley: Retaining wall and back yard lost, failed to within 1.1 m of house • Impacted houses downslope: 2 ○ 2440 Chapman: destroyed ○ 2290 Chapman: damaged, car destroyed • Occupants at downslope houses: 7 ○ 2440 Chapman: 2 (1 serious injury; 1 fatality) ○ 2290 Chapman: 5 (3 of 5 sustained minor injuries)
April 9, 2006(2)	2240, 2248 Greylynn	• Water main near Viewlynn and Lauralynn Drive ruptured. Water inundated slope causing erosion and small debris slide. • 30° to 35° slopes	• Water and debris deposited on Carmaria Court and properties downslope and east of initiation zones. • No injuries downslope
December 3, 2007(3)	1287 Seymour Boulevard	• Significant rain-on-snow event caused a flow slide 25 m north of 1287 Seymour Boulevard. • Triggered by uncontrolled discharge of water immediately above the landslide headscarp, along the power line access road. • 30° to 40° slopes • Approx runout angle = 26° • Estimated volume = 250 m^3	• No injuries • No significant property damage • Some sediment laden water flowed onto the driveway at 1287 Seymour Boulevard.
September 21, 2011(2)	2590, 2602 Lauralynn	• Water main along Lauralynn Drive broke triggering two debris slides that coalesced downslope. • 25° to 35° slopes • Approx runout angle = 19° (majority of debris stopped upslope)	• Water and fine-grained debris flowed on driveway of 2416 and entered the basement of 2412 Carmaria Court. 50 m^3 deposited on Carmaria Court. • No structural damage or injuries.

Notes:

1. Slide names for Dawson-Chu, Patrick, and Tree Top-Chapman slides are after Cook (May 18, 2002). The letter identified an additional slump at 1305 and 1345 Lennox Street in December 1972, and slide in the 1000 and 1100 blocks of Riverside Drive in 1978 following excavation at the toe of the escarpment along with three other slides without dates. These slides are excluded from the inventory as they have different mechanisms and/or BGC could not verify the dates.
2. Details based on BGC (May 22, 2013).
3. Details based on BGC (December 6, 2007).

3.5 Risk Assessment Methods

3.5.1 General Framework

BGC assessed life-loss risk to building occupants at existing structures at the crest and base of escarpment slopes within the DNV Slope Hazard DPA. Landslide risk was estimated using the following equation:

$$RISK = P_{slide} \, x \, P_{S:H} \, x \, P_{T:S} \, x \, V \, x \, E$$

Where:

- P_{slide} is the annual likelihood of a landslide
- $P_{S:H}$ is the conditional probability that a landslide reaches the location of individual(s) exposed to the hazard (i.e., spatial probability of impact)
- $P_{T:S}$ is the conditional probability a person occupies the location at the time of the landslide (i.e., temporal probability)
- V is the conditional probability of fatality if impacted (i.e., vulnerability)
- E is the number of people exposed to the landslide.

BGC estimated landslide likelihood (P_{slide}) as described in 3.5.2 and estimated consequences for properties at the base (Section 3.5.3) and crest of the escarpment (Section 3.5.4), where consequences are expressed as the expected number of fatalities (N):

$$N = P_{S:H} \, x \, P_{T:S} \, x \, V \, x \, E$$

3.5.2 Landslide Likelihood (P_{slide})

BGC used the historical landslide frequency and size to calibrate an estimate of average landslide likelihood for each assessed property. Seven flow slides are known to have occurred on escarpment slopes between 1972 and 2024 (Table 3-1). The average width of these slides approximately aligns with the width of a backyard at the crest of an escarpment slope. Over the 52-year period from 1972 to 2024, an average likelihood of a single slide ($P_{slide\ (avg)}$) of 0.001 applied across all assessed properties predicts approximately 7 flow slides across the District, aligning with the historical record.

To estimate property-specific landslide likelihood ($P_{slide(site)}$), BGC used an algorithm developed in past assessments that accounts for the factors that tend to make a slope more prone to landslides and evidence of past slope deformation:

$$P_{slide(site)} = [slope\ score] * [loose\ soil\ score] * [water\ score] * [deformation\ score] * [P_{slide(avg)}]$$

Where the slope, loose soil, water, and deformation scores were assigned as in Table 3-2.

Table 3-2 Landslide likelihood algorithm (after Porter et al., 2007)

Slope Score	Loose Soil Score	Water Score	Deformation Score
< 35° = 0.8 35 - 40° = 1.0 >40° = 1.25	Approved mechanical stabilization at and below crest = 0.35 <1 m deep at crest and <2 m deep below crest = 0.35 <2 m deep at and below crest = 0.5 >2 m deep at or below crest = 1.0 >2 m deep at and below crest = 2	All adjacent properties connected to storm sewer and street storm sewer properly managed = 0.35. Connected to storm sewer = 0.5, else: Runoff from backyard = 0.5 … half roof =0.75 … full roof = 1.0 … driveway = 1.5 …street = 2	None observed = 0.5 Deformation at or below crest = 1.0 Deformation at and below crest = 2

Prior to the availability of lidar data, previous assessments mapped landslide runout zones using runout angles of 25° to 19° from the escarpment crest. In this assessment, BGC mapped individual representative landslide paths using 2022 lidar. These mapped landslide paths account for local topographic controls on landslide runout, and in some instances, differ from previous runout zones.

If BGC mapped more than one independent slide path from the same initiation zone at a single property, BGC divided the $P_{slide\,(site)}$ by the number of slide paths. For example, if $P_{slide\,(site)}$ is 0.0002 at a property with two independent slide paths, BGC assigned 0.0001 to each of the slide paths. The likelihood estimates leverage previously collected observations, where available, field observations collected in this assessment at select sites (Section 3.5.5, Appendix C), and integrate mitigation works completed since 2005. Likelihood estimates at each assessed property are provided in Appendix D.

3.5.3 Properties at the Base of Escarpments

Landslide intensity changes along the runout path as does the degree of building damage and life-loss risk. In the 2005 Berkley Landslide, the upper house closer to the escarpment slope (2440 Chapman Way) was completely destroyed and had 1 fatality and 1 serious injury, while the lower house (2290 Chapman Way) was partially damaged and had no fatalities (Figure 3-3). While other factors may have partially contributed to these outcomes (e.g., building orientation, construction type, and human behaviour), the buildings were impacted by markedly different landslide depths and assumed velocities.



Figure 3-3 Building damages from the 2005 Berkley Landslide. a) Completely damaged house at 2440 Chapman which had 1 fatality and 1 serious injury (source: Ian Smith/Vancouver Sun). b) Partially damaged house at 2290 Chapman Way with 0 fatalities and 5 survivors (source: BGC). C) Overview of the landslide path (source: Ian Lindsay/Vancouver Sun).

In this update, life-loss risk to people in buildings is based on the following factors:

- Landslide runout and building location relative to the escarpment, with properties further from the base of the escarpment less likely to be exposed to high landslide intensity.
- Landslide intensity, quantified by dynamic impact pressure, with higher intensity resulting in higher degrees of building damage and fatality rates.
- Height of the escarpment, with higher slopes leading to higher peak landslide impact pressures.
- Vulnerability of occupants in buildings impacted by landslides based on historical dataset
- Presence of upslope buildings providing some shielding from landslide impacts.

3.5.3.1 Landslide Runout

BGC assessed landslide mobility scenarios with runout angles of 25°, 23°, 21°, and 19° utilizing individual landslide paths mapped from the 2022 lidar. This mapping does not replace more detailed, site-specific assessments of landslides as part of the DNV permitting process.

Historical landslide runouts in the DNV (Table 3-3) and expert judgement informed estimates of the conditional probability of a landslide reaching a certain runout angle (Table 3-4).

Table 3-3 Historical DNV landslide runout angles.

Upper-Bound Landslide Runout Angle (°)	Count[1,2]	Historical Frequency
>25	1 (1287 Seymour Boulevard)	0.17 (1/6)
>23 to ≤25	1 (2360 Carman)	0.17 (1/6)
>21 to ≤23	3 (1425 Lennox, 2379 Carman, 2205 Berkley)	0.5 (3/6)
>19 to ≤21	1 (2175 Berkley)	0.17 (1/6)
≤19	0	0

Notes:
1. Addresses near initiation zone provided from Table 3-1.
2. Runout angle from 2391 Berkley landslide not included because runout truncated by right bank of Canyon Creek.
3. Runout angle from 2240, 2248 Greylynn and 2590, 2602 Lauralynn landslides not included due to low sediment volumes and high water contents due to watermain rupture trigger.

Table 3-4 Assumed conditional probability of landslide mobility scenarios (probability of landslide reaching certain runout angle).

Landslide Runout Angle (°)	Conditional Probability
25	0.3
23	0.5
21	0.18
19	0.02

3.5.3.2 Landslide Intensity

BGC used a landslide's average dynamic impact pressure (kPa) as an intensity measure for this assessment because the available life-loss vulnerability relationship is a function of impact pressure (described near the end of this section). Impact pressure is an effective intensity measure because it accounts for a landslide's depth, velocity, and density. For the purposes of this district-wide risk assessment update, BGC assumed that a landslide reaches some peak impact pressure at the toe of the escarpment, beyond which impact pressures decrease as the landslide spreads out and slows down until termination at the runout angle (Figure 3-4). For simplicity, BGC assumed this decay in landslide impact pressure from the toe of the escarpment to the landslide terminus is linear.

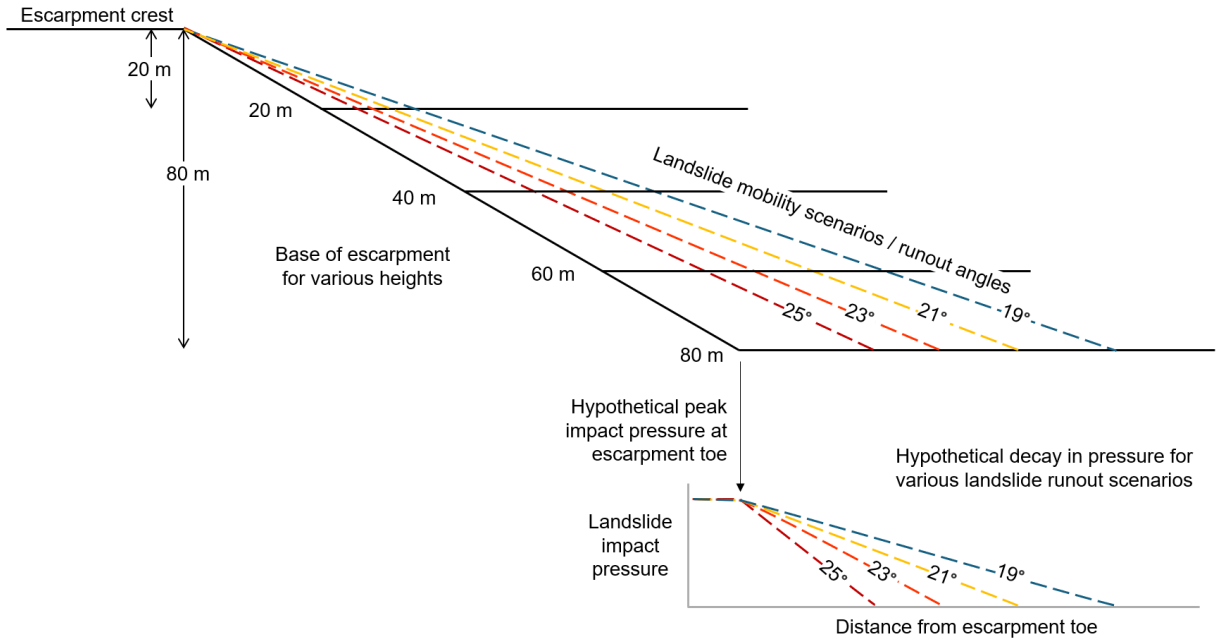


Figure 3-4 Schematic showing escarpment heights, landslide runout angles, and hypothetical landslide impact pressure decay forming the basis of the consequence estimation update.

3.5.3.3 Peak Impact Pressure

There are many factors that influence a landslide's peak impact pressure, such as the slope angle, landslide fluidity, volume, channelization, and obstacles along the landslide path. For the purposes of the District-wide risk assessment update, BGC estimates that landslides from higher escarpment heights result in higher peak impact pressures due to the increased distance for the landslide to accelerate and volume gained through entrainment. Escarpment height is also a convenient indicator to measure across the study area. BGC binned the escarpment height into four height classes from 10 to 80 m spanning the range present across the District.

Peak impact pressures were estimated by simulating landslides with the numerical model DAN3D (McDougall & Hungr, 2004) calibrated to the 2005 Berkley Landslide for different escarpment heights and release volumes (Table 3-5). Assuming initial volumes of 100 m^3 to 600 m^3 and an entrainment depth of up to 1.5 m along the slide path, the final simulated landslide volumes in DAN3D ranged from 200 m^3 to 5,000 m^3, spanning a range typical for recorded DNV landslides.

Table 3-5 Peak landslide impact pressures at the toe of the escarpment and total volumes estimated with numerical model DAN3D.

Escarpment Height (m)	Estimated Peak Landslide Impact Pressure at the Toe of the Escarpment (kPa)[1,2,3]	Estimated Total Landslide Volume (m^3)
10-20	50	200 - 1,000
20-40	100	500 - 3,000
40-60	200	1,000 - 5,000
60-80	250	1,000 - 5,000

Notes:

1. Peak impact pressure (P) calculated using equation $P = 0.5dg\rho + \alpha\rho v^2$ (Zanchetta et al., 2004), where d is depth (m), g is acceleration due to gravity (m/s^2), is ρ is density (assumed 2,000 kg/m^3), v is velocity (m/s), and α is dynamic impact coefficient (assumed 1.5).
2. Landslide depths and velocities at the toe of escarpment estimated with DAN3D assuming a Voellmy rheology calibrated to the 2005 Berkley Landslide based on survey data and field observations (best-fit friction parameter of 0.27 and turbulence parameter of 200 m/s^2), 1.5 m entrainment along the slide path, and various landslide release heights (20 m, 40 m, 60 m, 70 m) and initial volumes (100 m^3, 300 m^3, 600 m^3).
3. Calculated peak impact pressures varied approximately +/- 50 to 100 kPa. A best estimate value was assumed from the calculated range.

3.5.3.4 Vulnerability (V)

BGC used a vulnerability function to convert impact pressures to a probability of fatality at locations along the landslide path. The vulnerability function was developed by Natural Resources Canada and BGC from a dataset of 378 buildings and 282 people inside buildings impacted by rapid landslides and applies to typical North American wood-frame buildings (LeSueur et al., 2026).

Combining the landslide runout (Table 3-4), estimated impact pressures from different escarpment heights (Table 3-5), and assuming a linear decay of impact pressure with distance from the slope, BGC calculated an average vulnerability (expected value) at zoned runout locations from the escarpment crest (Figure 3-5). The curves in Figure 3-5 represent the vulnerability (V) x spatial probability of impact ($P_{(S:H)}$) terms in the risk equation (Section 2.1). Buildings at the base of the escarpment were assigned the values in Figure 3-5 based on mapped runout angles, landslide path mapping, and escarpment heights measured from 2022 lidar.

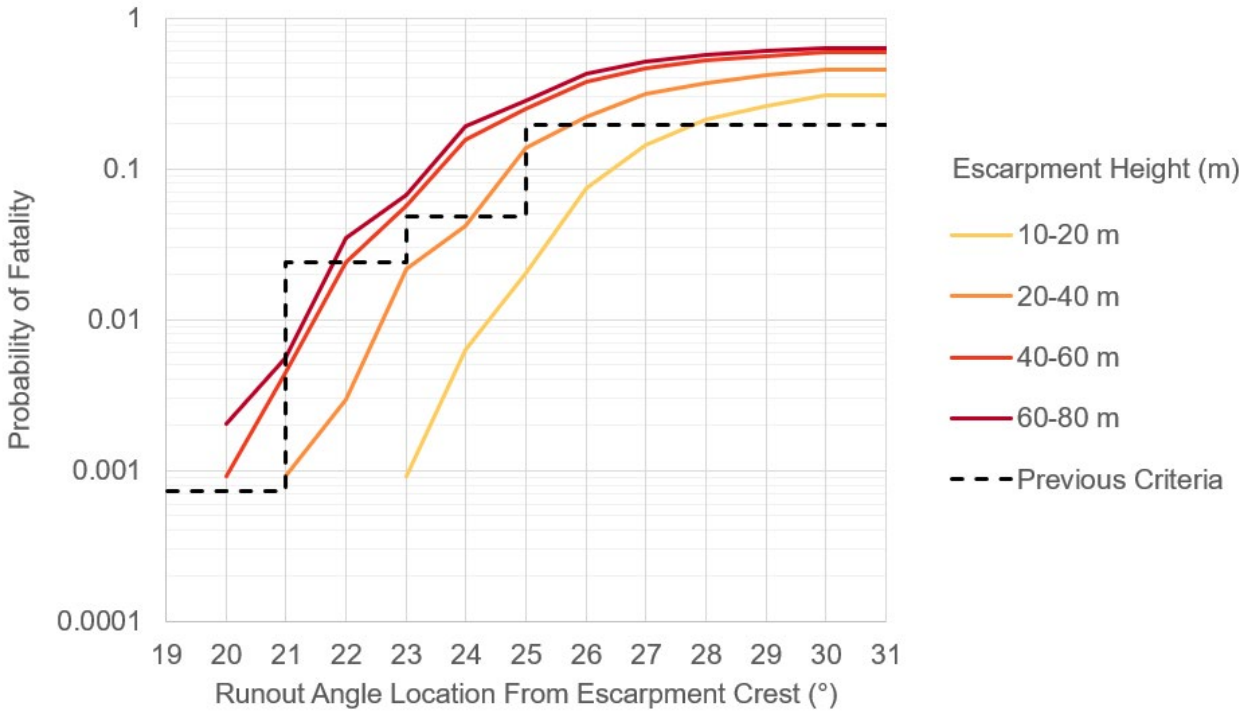


Figure 3-5 Probability of fatality for an individual in a wood frame building at the base of the escarpment given a landslide occurs from various escarpment heights. Values represent the vulnerability (V) x spatial probability of impact ($P_{(S:H)}$) term in the risk equation (Section 3.5.1).

3.5.3.5 Presence of Upslope Buildings

When there are multiple buildings along a landslide path, buildings directly upslope of others can provide shielding and energy dissipation if the landslide is not of sufficient intensity to destroy the building immediately upslope. In Figure 3-6, this concept is illustrated where a landslide would need to cause extensive damage of the first building at the base of the slope (Building B) to reach the next building (Building C).

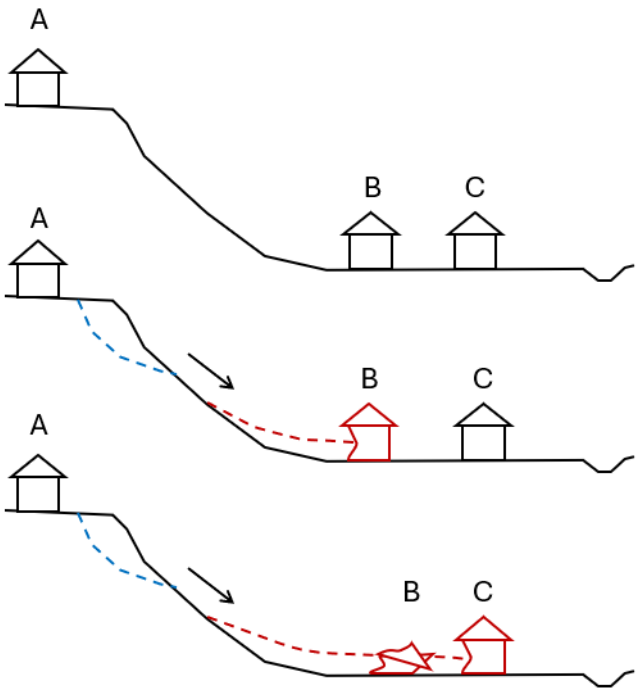


Figure 3-6 Schematic of the shielding effect of upslope buildings. Top section shows a slope prior to a landslide occurring. Middle section shows a landslide that damages house B but does not reach house C. Bottom section shows a landslide that damages house B and reaches house C leading to damage.

In the absence of established methods to reduce impact pressures, BGC used the upslope building vulnerability as a proxy for the expected impact pressures and associated building damage. In Natural Resources Canada and BGC's landslide impact database, impact pressures >50 kPa correspond to damage states where part of the building could be collapsed, offset, or swept away. An impact pressure of 50 kPa corresponds to a life-loss vulnerability of 0.3 in the vulnerability model. Based on this this, BGC used the following logic to account for building shielding at the downslope property:

- If the upslope building vulnerability (V) ≥ 0.3, reduce the escarpment height class in Figure 3-5 by one-level.
- If the upslope building vulnerability (V) < 0.3, reduce the escarpment height class in Figure 3-5 to 10-20 m.

For example, if a building is located at a runout angle of 25° below a 40 to 60 m high escarpment and there is a building immediately upslope at a runout angle of 30°, the upslope building probability of fatality would be 0.6 (>0.3) and the downslope property probability of fatality would be reduced from 0.25 to 0.14.

3.5.3.6 Summary of Risk Parameters for Properties at the Base of Escarpment

Risk parameters used for properties at the base of escarpments are summarized in Table 3-6.

Table 3-6 Risk parameters for properties at the base of escarpments.

Risk Parameters	Value	Rationale
Probability of landslide $(P_{slide(site)})$	0.00004 - 0.0013 (1)	$P_{slide(avg)}$: 0.001 Adjusted for site-specific characteristics using landslide likelihood algorithm (Table 3-2).
Probability of fatality (Spatial probability of impact * vulnerability) $(P_{S:H}\ x\ V)$	0 - 0.64	Expected value for escarpment height and runout angle (Figure 3-5).
Temporal probability $(P_{T:S})$	Individual risk: 0.67	Assuming individual most at risk spends on average 16 hours per day in their home.
	Group risk: 0.5	Assuming occupants are present 12 hours per day on average.
Element value (E)	Individual risk: 1	Based on a single individual who spends the highest proportion of time at home (individual most at risk).
	Group risk: 4	Assuming four people occupy each home on average.

Note:

1. This range represents the calculated range in $P_{slide(site)}$ while the maximum theoretical range is 0.05 to 10 times $P_{slide(avg)}$.

3.5.4 Properties at the Crest of Escarpment

For properties at the crest of the escarpment, BGC estimated the spatial probability of impact for people occupying backyards at the time of a landslide as the ratio of ground lost to the distance from the escarpment crest to the house (Table 3-7). The temporal probability, vulnerability, and element value were defined as in Table 3-8.

Table 3-7 Spatial probability of impact to occupants of backyards at crest of escarpment (BGC, January 13, 2006).

Distance from House to Crest of Escarpment	Spatial Probability of Impact ($P_{S:H}$)
< 3 m	0.99
3 - 6°m	0.67
6 – 9 m	0.40
9 – 12 m	0.29
> 12 m	0.20

Table 3-8 Risk parameters for properties at crest of escarpment (after BGC, November 27, 2008).

Parameter	Value	Rationale
Temporal probability $(P_{T:S})$	Individual risk: 0.01	Individuals most at risk spend 15 minutes per day in their backyard on rainy days in the winter when landslides are most likely to occur.
	Group risk: 0.007	Assuming occupants are in their backyards for 10 minutes per day on average during rainy, winter days.
Vulnerability (V)	0.5	No historical data available to calibrate. Assumes a 50% chance of escaping from the slide headscarp area as the landslide starts to move.
Element value (E)	Individual risk: 1	Individual risk is based on a single individual who spends the highest proportion of time in the backyard.
	Group risk: 4	Assuming four people occupy each home on average.

3.5.5 Field Verification and Numerical Modelling at Select Properties

BGC identified properties for field assessment where the updated risk estimate was near the threshold or exceeded DNV's risk tolerance criteria along with a selection of additional representative properties to verify the desktop-level risk estimates. Field work was completed on December 5, 2024 by Lauren Hutchinson and Sophia Zubrycky. Field photos and observations are provided in Appendix C. BGC visited the following properties:

- Berkley Escarpment
  - 2360 Carman Place
  - 1788 Riverside Drive
  - 1802 Riverside Drive
  - 2430 Chapman Way
  - 2141 Berkley Avenue
  - 2125 Berkley Avenue
  - 2448 Hayseed Close
  - 2462 Hayseed Close
  - 2454 Hayseed Close
  - Layton/Hayseed Gully
  - 1855 Layton Drive
  - 2050 Rivergrove Place
  - 2064 Rivergrove Place
  - Berkley slide headscarp area (no development)
- West Hasting Escarpment
  - 1582 Merlynn Crescent
  - 1588 Merlynn Crescent
  - 2180 Carmaria Court.

Following the desktop-level risk estimates and field inspections, BGC completed numerical modelling of flow slides originating from two properties (2360 Carman Place, 2454 Hayseed

Close) at the Berkley escarpment crest to assess risk to downslope properties. These properties were selected for numerical modelling as the desktop risk estimate exceeded DNV's risk tolerance criteria and BGC's field assessment identified conditions consistent with the potential for future landslides, specifically:

- 2360 Carman Place. The north side of the property is the location of one of the 1979 landslides (Table 3-1). The south side of the property has not experienced a known failure. On the south side, there is minor observed slumping (<0.1 m deep). Hand auger logs completed by BGC in 2005 suggest that the depth of fill at this location is approximately 1 m thick. Should this portion of the crest fail, material would channelize downslope in the natural gully and be directed towards 1788 Riverside Drive, which has inhabited area and ground-level windows within the gully area (Appendix C).
- 2454 Hayseed Close. At 2454 Hayseed Close, a log crib retaining structure at the crest of the slope is showing signs of deformation and degradation of the logs since it was last inspected by BGC in October 2005. The log crib structure is approximately 3 m tall and comprises two, 1.5 m tall steps. There is limited evidence of differential deformation at the downstream face; however, at the corner joints the log structure is separating indicating downslope movement and evidence of damage and rotting of the logs was observed (Appendix C).

For each property, BGC simulated landslides with the numerical model DAN3D (McDougall & Hungr, 2004) using the 2022 lidar and calibrated to the 2005 Berkley Landslide (Voellmy rheology with best fit friction parameters of 0.27 and turbulence parameter of 200 m/s^2). Table 3-9 summarizes details of the properties assessed with numerical modelling.

Table 3-9 Properties assessed with numerical modelling.

	2360 Carman Place	2454 Hayseed Close
Downslope Properties	1788, 1802 Riverside	2050, 2064 Rivergrove
Initial Volume[1, 2] (m^3)	100	170
Entrainment Depth (m)	0.5	0.5
Final Volume [2] (m^3)	800	1,000
Estimated Peak Impact Pressure at Buildings Downslope[3] (kPa)	65-70	100-125

Notes:

1. Initial volumes and entrainment depth along slide path based on field observations collected in December 2024. At 2360 Carman, the initial volume is based on an approximately 11 m wide headscarp that extends 5 m into the slope with a depth of 1.5 m. At 2454, the initial volume is based on an 8 m wide headscarp that extends 5 m into the slope with a thickness of 3 m to reflect the size of material retained by the log crib structure. The reported volumes integrate variation in the natural topography and were based on slip surfaces integrated to the 2022 lidar.
2. Initial and final volumes rounded to nearest 10 m3.
3. Peak impact pressure (P) calculated using equation $P = 0.5dg\rho + \alpha\rho v^2$ (Zanchetta et al., 2004), where d is depth (m), g is acceleration due to gravity (m/s2), is ρ is density (assumed 2,000 kg/m3), v is velocity (m/s), and α is dynamic impact coefficient (assumed 1.5).

Informed by the numerical model results, BGC estimated life-loss vulnerability using a model relating impact pressures from rapid flow-type landslides to life-loss probability for typical North American wood-frame buildings (LeSueur et al., 2026). BGC integrated the estimated

vulnerability from the vulnerability model to the risk estimates for the properties listed in Table 3-9 in place of spatial impact and vulnerability estimates from the District-wide approach (Section 3.5.3).

3.5.6 Influence of Climate Change

The influence of climate change on slope hazards in the District is governed by changes in landslide-triggering storms and the slope conditions at the time of these storms. Climate projections for the District for the period of 2071 to 2100 in response to CMIP6 SSP5/8.5 emissions scenario suggest that precipitation will increase in winter, spring, and fall months (total annual increase of 7% relative to the period of 1961-1990) with reduction in precipitation falling as snow across these same months (total annual decrease of 87% relative to 1961-1990) (Wang et al., 2016; Mahony et al. 2022).

While the frequency, intensity, and total rainfall associated with storm events is expected to increase over the century due to climate change, the direct impact on escarpment landslides where mitigation measures have been implemented (e.g., fill removal, slope shaping, surface water drainage management) is uncertain. For this reason, BGC has not modified the landslide hazard and risk assessment to account for climate-driven changes. Notably, recommendations for landslide risk management on escarpments in a changing climate do not differ from those provided under current conditions (Section 4.1).

3.5.7 Limitations

BGC's risk assessment is based on 2022 lidar topography, BGC's current understanding of landslide hazards in the District, the current layout of buildings within the Slope Hazard DPA, assumptions on typical building occupancy, and exposed population. Any changes to the escarpment topography, drainage, or the location(s) and occupancy of buildings may change the risk. Any person(s) outside of a building, such as in a car or on foot, can be at risk of injury or fatality during a landslide due to the depth, speed, or force of the slide. BGC has not assessed economic risk as part of this scope

This assessment was completed at a District-wide scale and does not replace site-specific assessments required as part of the DNV permitting process. As part of this scope, BGC revisited only a selection of sites and the risk estimates presented may not be representative at sites where the local conditions have changed significantly since the last field inspection.

The assessment is subject to uncertainties and limitations of the lidar change detection (Appendix B), numerical modelling, and vulnerability model utilized that may warrant updates as methods advance and additional data becomes available.

While BGC did not adjust the landslide hazard and risk assessment to account for climate change, future updates to the risk assessment may integrate modification in response to current or future projected changes in climate, if deemed appropriate to estimate landslide risk and inform landslide risk management.

3.6 Risk Assessment Results

BGC assessed life-loss risk at 149 properties at the base of DNV escarpments and 124 properties at the crest of escarpment slopes. Of these, BGC identified two properties that exceed the DNV's risk tolerance threshold for existing development (1:10,000 PDI):

- 2050 Rivergrove Place
- 2064 Rivergrove Place.

BGC acknowledges that these two properties are near the threshold annual PDI for existing development. There is significant uncertainty in the probability of a future landslide given the condition of the retaining wall at 2454 Hayseed Close as well as the depth of erodible material along the slide path given the limited field information available. It is possible that the depth of erodible material may significantly exceed that modelled in which case the risk estimates above may be an underestimate. Given the proximity of the properties to the slope, the slope geometry, and the presence of the deteriorating retaining wall, BGC deems the 'unacceptable' risk level to be appropriate for these properties.

The two properties downslope of 2360 Carman Place (1788, 1802 Riverside Drive) are similarly near the threshold and within the range of uncertainty in the analysis. These properties are included in the 'tolerable' risk level; however, BGC notes that given the uncertainty in the analysis, we cannot conclusively rule out that the risk to these properties may exceed DNV's risk tolerance criteria for existing development. The information available on DNV's GeoWeb suggests that 1788 Riverside Drive was constructed in 1973, six years prior to the 1979 slide at this location. BGC did not encounter any records of damage to the property associated with that landslide. Given this, and provided the construction date is accurate, it may be possible that small slides originating from the location are sufficiently small to deposit within the natural gully without damaging the downslope properties. It is also possible that larger landslides than that modelled may result in higher impact pressures and damage to properties with increased life-loss risk.

Apart from the properties downslope of 2454 Hayseed Close and 2360 Carman Place, the updated risk estimates resulted in lower estimates of life-loss risk than previous assessments due to the:

- Mitigation works completed across the District since 2005
- Extended historical record to calibrate a reduced District-wide landslide frequency
- Updated consequence estimation method that accounts for the decay in landslide impact pressure with distance from the escarpment base and the shielding effect of upslope buildings.

BGC estimated that risk to properties at the base of the escarpment was less than previously assessed for 85% of properties (127 of 149 properties). Of these, 41 properties decreased from 'tolerable' to 'broadly acceptable' risk. For the properties where estimated risk is higher than previously assessed, the risk estimates are within the same risk level. All risk estimates presented are based on the maximum risk from any individual landslide path.

A summary of estimated risk levels for properties at the base of escarpment slopes is provided in Table 3-10. For properties within the 21° runout extents that were not directly intersected by a mapped landslide path, BGC assigned a risk level of 'broadly acceptable' to acknowledge the property is within a landslide hazard area. All 124 properties at the crest of escarpment slopes that BGC assessed were 'broadly acceptable'.

In addition, BGC estimated interpreted risk levels for properties within the DNV Slope Hazard DPA but outside of previously assessed escarpments as a screening tool to identify any properties that may exceed the DNV's risk tolerance criteria for existing development and warrant further assessment. BGC estimated interpreted risk levels for 183 properties at the base of slopes within the Slope Hazard DPA and an additional 355 properties at the crest of slopes within the DPA. Of these, BGC did not identify any properties with an interpreted risk level that exceeds DNV's risk tolerance criteria for existing development. Interpreted risk levels are solely based on a desktop-level screening without site-specific information and are not intended to replace site-specific assessment at individual properties to identify site characteristics that may indicate slope instability (e.g., retaining walls in deteriorating condition).

Table 3-10 Estimated number of properties at the base of escarpment slopes in each risk level.

Escarpment	Estimated Risk Level for Properties at Base of Escarpment		
	Broadly Acceptable	Tolerable	Unacceptable
Berkley	48	26	2
Mosquito Creek	6	1	0
WestLynn	9	1	0
Pemberton	10	2	0
Riverside West	13	24	0
West Hastings	7	0	0
Total across Escarpments (1)	**93**	**54**	**2**

Note:

1. Total across escarpments refers to the sum of the number of properties in each risk level for all the escarpments assessed (Berkley, Mosquito Creek, WestLynn, Pemberton, Riverside West, and West Hastings).

Appendix D includes summary tables of the risk parameters and estimates:

- Table D-1 is a summary of field observations that form the basis for the landslide likelihood ($P_{slide\,(site)}$) values
- Table D-2 is summary of calculated ($P_{slide\,(site)}$) for each property.
- Table D-3 is a summary of estimated life-loss risk for each property at the base of escarpment slopes along each mapped landslide path.

- Table D-4 is a summary of estimated life-loss risk for each property at the crest of escarpment slopes.
- Tables D-5 and D-6 summarize the maximum estimated life-loss risk to each property at the base of escarpment slopes for previous assessments and this 2025 update.
- In addition to the tabular summaries, estimated risk level (broadly acceptable, tolerable, unacceptable) are presented in Cambio and have been provided as a spatial data package to the DNV.

In addition to this report, BGC has provided the DNV with the digital deliverables outlined in Table 3-11 which are also available in Cambio.

Table 3-11 Digital deliverables provided to DNV.

File	Description	Intended Use
Runout Extent (21°)	Runout angle to 21° from escarpment crest.	Inform Slope Hazard DPA extents.
Representative Mapped Landslide Paths	Individual landslide paths mapped from the escarpment crests. Intended to be representative of landslide paths from source area but not encompass all potential landslide paths.	Used to inform the present risk assessment update. Illustrate representative landslide paths for slides originating from the escarpment crests.
2026 Risk Estimates	Estimated individual risk level at property.	Communicate risk level to inform future risk management decision making and build public awareness.
Study Area Boundaries	Escarpment slopes included in study.	Delineate areas included in present assessment

4.0 RECOMMENDATIONS

4.1 General Recommendations

Managing landslide risk on escarpment slopes necessitates appropriate management of stormwater, fill and yard waste, and retaining walls. BGC recommends that the DNV encourage property owners to adopt appropriate practices as follows:

- Stormwater management.
  - Ensure properties along the crest of escarpments have access to the stormwater system, where practical, and to connect their drainage downpipes to it.
  - If connecting to the stormwater system is not practical, utilize alternative stormwater management systems approved by the Municipal Engineer that direct stormwater away from slopes.
  - Maintain stormwater drainage system to ensure it functions effectively.
- Fill and yard waste management.
  - BGC observed several properties on escarpment slopes where lawn cuttings, garden debris, and saturated fill have been placed at the escarpment crest (Appendix C). Property owners should remove these materials and further placement of garden waste along the escarpment should be discouraged.
- Retaining wall management.
  - Modification to existing or construction of new retaining walls should be reviewed by a Qualified Professional to ensure the designs will achieve the required level of risk reduction or appropriate factor of safety levels. Final ‘as built’ drawings and a completion report should be received from contractors and provided to the DNV to be recorded in the DNV natural hazard database.

In addition, as part of the DNV’s proactive approach to natural hazard risk management, BGC recommends the DNV:

- Slope monitoring.
  - Conduct ongoing visual monitoring of the slopes to ensure that drainage systems remain functional, yard waste is appropriately managed, retaining walls are well maintained, and to prevent new surface erosion or landslide hazards from developing and going undetected.
  - Supplement visual monitoring with periodic lidar data collection (on the order of multiple years between acquisitions) and lidar change detection. Lidar change detection may be completed when new lidar becomes publicly available to reduce total cost to DNV.
  - Consider usage or development of a digital inspection platform for monitoring and inspection of natural areas and assets to facilitate easy reference to past conditions (as compared with static reports), flag changed conditions, and inform future risk management actions.
- Risk assessment updates.
  - Update risk estimates at individual properties when slope or building conditions have changed sufficiently to warrant an update to the risk level.

    - Update the district-wide landslide risk assessment approximately every 10 years to account for additional changes in climate predictions and methods of landslide risk assessment over time, and to provide a regular opportunity to review slopes for changed conditions.
- Public education.
    - Continue to provide information and education to the public on how to reduce landslide risk when living near steep slopes.

4.2 Properties Exceeding DNV's Tolerance Criteria

Life-loss risk to properties downslope of 2454 Hayseed Close exceeds DNV's risk tolerance criteria for existing development due to the condition of the deteriorating retaining wall. BGC recommends the property owners at 2454 Hayseed Close develop an appropriate design and replace the deteriorating retaining wall in their backyard. BGC also recommends that the property owners at 2050 and 2064 Rivergrove Place are informed of the risk level at their properties. As an interim activity, the DNV may also consider engaging a Qualified Professional to complete a structural review work of the retaining wall. Finally, BGC recommends regular review of the slope in the vicinity of 2454 Hayseed Close given the steep slope (~35°) and proximity of buildings to the base of the escarpment. At the time of writing, BGC understands that work is underway to replace the retaining wall.

BGC also identified that properties downslope of 2360 Carman Place are near the risk tolerance threshold for existing development and within the range of uncertainty in the analysis. BGC recommends that the DNV keep these properties under review and complete regular site inspections to identify any changed slope conditions that may warrant reassessment of the risk. BGC also recommends that the DNV inform the property owners at 1788 Riverside Drive of the risk level at their property and of actions that can be taken by individual property owners to reduce their vulnerability, for example moving the location of bedrooms to downslope areas outside of the natural gully.

4.3 Guidance for Slope Hazard Assessments

The risk assessment update presented herein was completed at a district-wide scale for the purposes of informing risk management actions by the DNV. Building permit applications for individual properties or assemblies of properties in Slope Hazard DPAs warrant additional site-specific review to evaluate if the proposed development aligns with the DNV's risk tolerance criteria and the land can be safely used for the use intended. At the request of the DNV, BGC prepared guidance for developers, property owners, and Qualified Professionals completing slope hazard assessments, and as a resource for the DNV. The guidance is provided as a memorandum in Appendix E.

5.0 CLOSURE

We trust the above satisfies your requirements. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC Engineering Inc.
per:



Lauren Hutchinson, M.Sc., P.Eng.
Senior Geotechnical Engineer

Reviewed by:

Kris Holm, M.Sc., P.Geo
Principal Geoscientist

EGBC Permit to Practice, BGC Engineering Inc. 1000944

LCH/KH/mjp/mm

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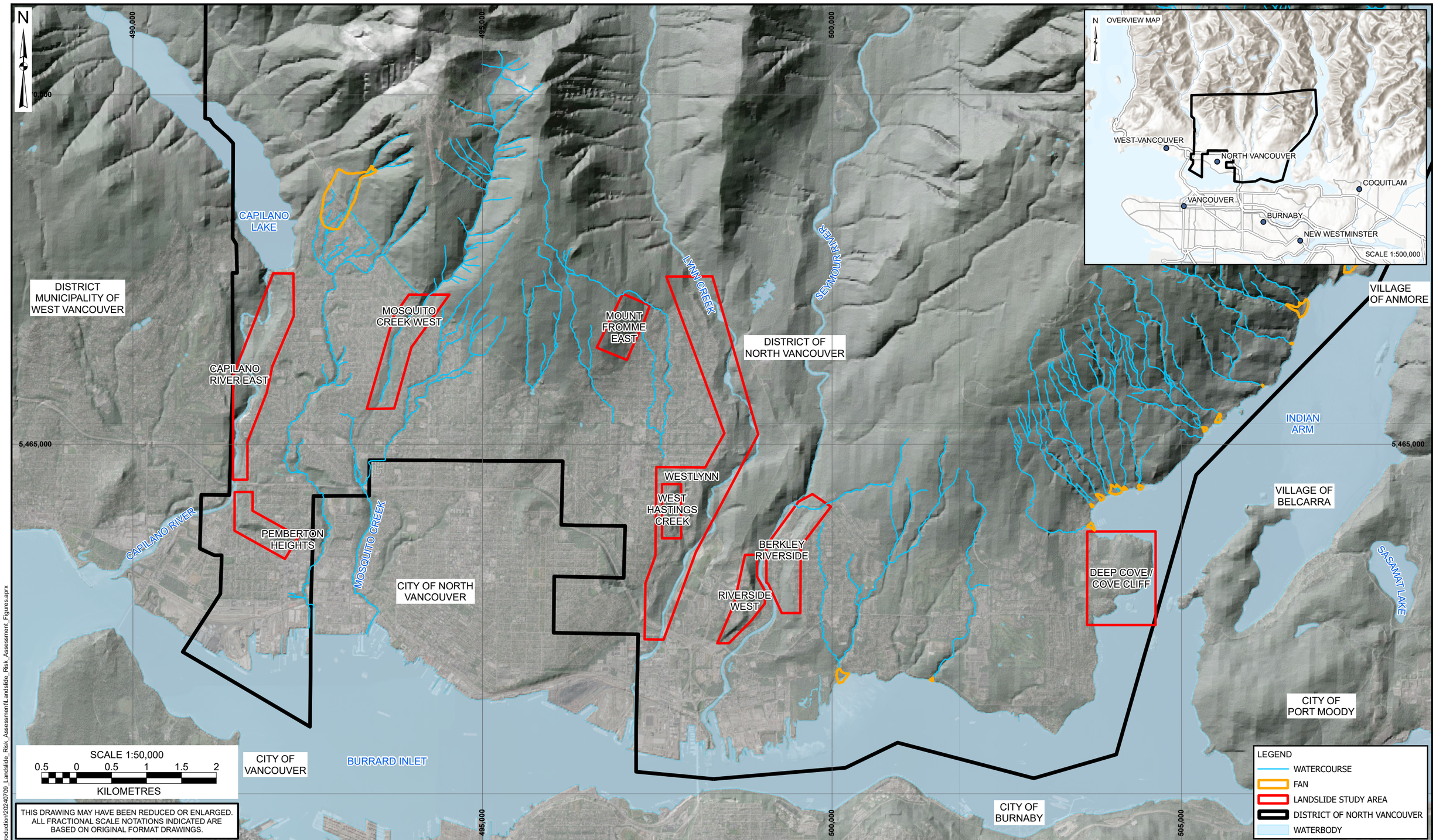
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DRAWINGS



NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "LANDSLIDE RISK ASSESSMENT - 2026 UPDATE", AND DATED JUNE 2026.
3. BASE TOPOGRAPHIC DATA IS BASED ON LIDAR FROM FROM THE DISTRICT OF NORTH VANCOUVER, DATED 2022-07-20. ALL SURROUNDING TOPOGRAPHIC DATA IS BASED ON THE CANADIAN DIGITAL ELEVATION MODEL (CDEM) DATA, FROM THE GOVERNMENT OF CANADA, DATED 2011.
4. LANDSLIDE STUDY AREAS FROM RISK ASSESSMENTS COMPLETED BY BGC FOR THE DNV BETWEEN 2006 AND 2013 (SEE DETAILS IN REPORT). WATERCOURSE AND FAN DELINEATIONS BASED ON BGC (MAY 31, 2017).
5. PROJECTION IS NAD 1983 UTM ZONE 10N. VERTICAL DATUM IS CGVD2013.
6. BGC PREPARED THIS DRAWING FOR THE EXCLUSIVE USE OF BGC'S CLIENT IDENTIFIED ON THIS DRAWING. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING MUST NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE SPECIFIC PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES, INJURY, OR LOSS ARISING FROM ANY UNAUTHORIZED USE OR MODIFICATION OF THIS DRAWING. THIRD PARTIES USE OR RELY UPON THIS DRAWING AT THEIR OWN RISK.

SCALE:	1:50,000
DATE:	JUN 2026
DRAWN:	CM
REVIEW:	SZ
APPROVED:	LCH

CLIENT: NORTH VANCOUVER DISTRICT

BGC

PROJECT: **LANDSLIDE RISK ASSESSMENT - 2026 UPDATE**

TITLE: **OVERVIEW MAP**

PROJECT No.: **0404103**

DWG No: **01**

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APPENDIX A
PREVIOUS ASSESSMENTS

A-1 RECORD OF PREVIOUS ASSESSMENTS

Table A-1 BGC's past landslide risk assessment projects for the DNV.

Report Year	Report Title	Risk Assessment Method	Risk Assessed	
			Individual	Group
2021	Lynn Canyon Ecology Centre and Lynn Canyon Café: Preliminary Slope Assessment	Berkley (qualitative)	✓	
2018	Slope Assessment 520, 528 and 532 Alpine Court	Berkley (qualitative)	✓	
2017	1576 and 1582 Merlynn Crecent Landslide Risk Reassessment	Berkley	✓	
2016	4176 Virginia Crescent Slope Geotechnical Review	Limit Equilibrium	✓	
2013	West Hastings QRA	Berkley (amended)	✓	
2012	2307 Berkley Avenue - Landslide Risk Assessment Update	Berkley	✓	
2010	Landslide Risk Summary Report	Past methods	✓	✓
2010-2009	Landslide Risk Assessment for Select Escarpment Slopes	Berkley, Limit Equilibrium, Rockfall	✓	✓
2009	Riverside West Preliminary Landslide Hazard Assessment and Risk Analysis	Berkley (qualitative)	✓	
2009	Deep Cove – Cove Cliff Preliminary Landslide Hazard Assessment and Risk Analysis	Berkley adapted (qualitative)	✓	
2009	Mount Fromme East Preliminary Landslide Hazard Assessment and Risk Analysis	Berkley (qualitative)	✓	
2009	Mosquito Creek Escarpment Preliminary Landslide Hazard Assessment and Risk Analysis	Berkley (qualitative)	✓	
2009	Capilano River East Escarpment Preliminary Landslide Hazard Assessment and Risk Analysis	Berkley (qualitative)	✓	
2008	1264 and 1282 Arborlynn Drive Landside Risk Assessment	Berkley	✓	
2008	Westlynn and Pemberton Heights Landslide Risk Assessment	Berkley (amended)	✓	
2007	Dec 3/07 Flow Slide near 1287 Seymour Boulevard	Field observations		
2007	Berkley Landslide Risk Management Updated Landslide Risk Assessment Following Stage 1 Mitigation	Berkley	✓	
2006	Berkley Landslide Risk Management Phase 2 Assessment of Risk Control Options	Berkley	✓	✓
2006	Berkley Landslide Risk Management Phase 1 Risk Assessment	Berkley	✓	✓

Notes:

1. Individual risk evaluates the annual probability of death to the person most at risk (PDI) to the hazard.
2. Group risk evaluates the probability of a fatality per year among people exposed to the hazard.
3. This list does not include services provided by BGC as part of the Geotech-on-Demand program except where risk was assessed or mitigation works were completed that changed the risk.

APPENDIX B
ALS CHANGE DETECTION METHODOLOGY

B-1 DATA AND METHODOLOGY

The District of North Vancouver provided BGC with airborne lidar scans (ALS) collected by MetroVancouver 2013, 2018, and 2022 and by GeoBC in 2016. BGC used the 2013 and 2022 ALS from MetroVancouver to perform the change detection analysis.

The bare-earth lidar datasets were analyzed for topographical change using a custom software developed by BGC. The process of assessing three-dimensional (3D) surface change with ALS data involves four main steps:

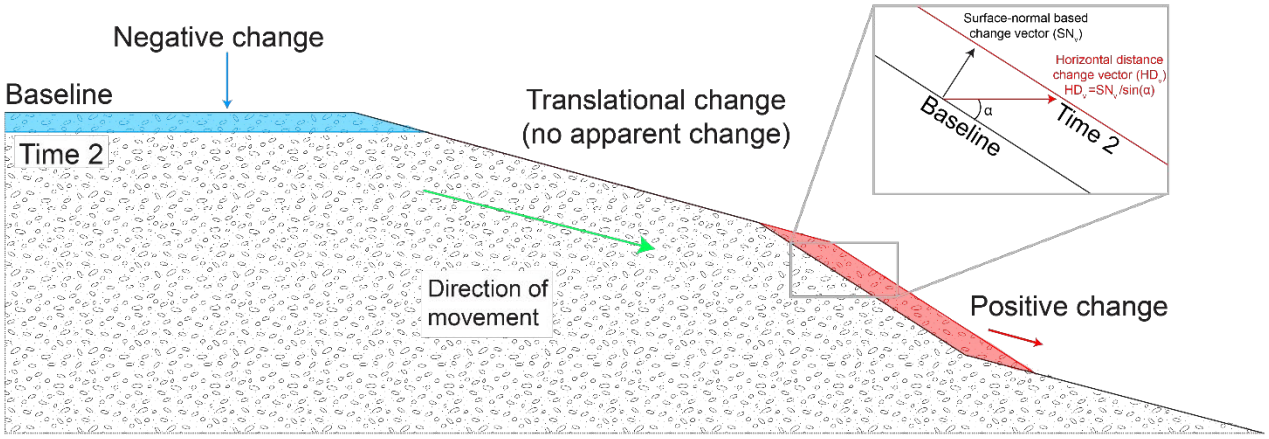
4. Align the 'active' (more recent) lidar dataset to the baseline (earlier) dataset. This is conducted by adjusting the spatial position of the active dataset to minimize the difference relative to the baseline dataset. During the alignment, areas of known or suspected changes are ignored to improve the accuracy of the alignment and improve the limit of detectable change. The initial step of re-aligning the ALS data reduces georeferencing errors resulting from poor GPS or ground control at the time of data collection. This process maximizes the ability to detect real change between datasets.
5. Calculate the limit of detectable change ($LoD_{95\%}$). The $LoD_{95\%}$ is defined as the 2.5% and 97.5% cumulative alignment interval of the model differences between the non-changing regions of the active and baseline ALS datasets. The alignment error between datasets is a function of the alignment, data precision, resolution, and the presence of non-changing sections of the datasets to control the alignment. Model differences within the $LoD_{95\%}$ may represent noise, error, or real change, if changes are too small to identify. The $LoD_{95\%}$ reported in the change detection images is rounded to the nearest 0.05 m. In cases where the $LoD_{95\%}$ is rounded down, the results shown may include small amounts of noise and/or alignment error which is considered in the interpretation of the results. The alignment error distribution may not be perfectly centered on zero due to a number of factors including vegetation, land use, and/or soil moisture. For this reason, the limit of detection may be skewed towards either positive or negative model differences for each comparison.
6. Conduct a 3D surface-normal based change measurement for each point in the 'active' dataset.
7. Interpret the results of the change detection as real change, spurious change, or error.

B-2 INTERPRETATION AND LIMITATIONS

The results of the change detection analysis are presented as colour-contoured images illustrating the surface-normal based change calculated between the baseline and active datasets. Positive model differences can be interpreted as material accumulation or bulging, and negative model differences can be interpreted as a loss of material (material removal, erosion or slumping). Zones of positive model difference are coloured yellow to red; zones of negative model difference are coloured light to dark blue. If the calculated change between the two datasets is less than the $LoD_{95\%}$, the area is coloured grey. Schematic B-1 illustrates the relative loss and accumulation of material through a simplified active landslide mass.

There are several limitations with lidar change detection. One limitation is the inability to detect translational movement where the ground and slip surfaces are parallel; in this instance, the ground surface appears unchanged between the two datasets (Schematic B-1). Because the ALS data represents the surface topography at each date, the analysis reflects surface changes only and cannot necessarily be extrapolated to interpret slide movements at depth.

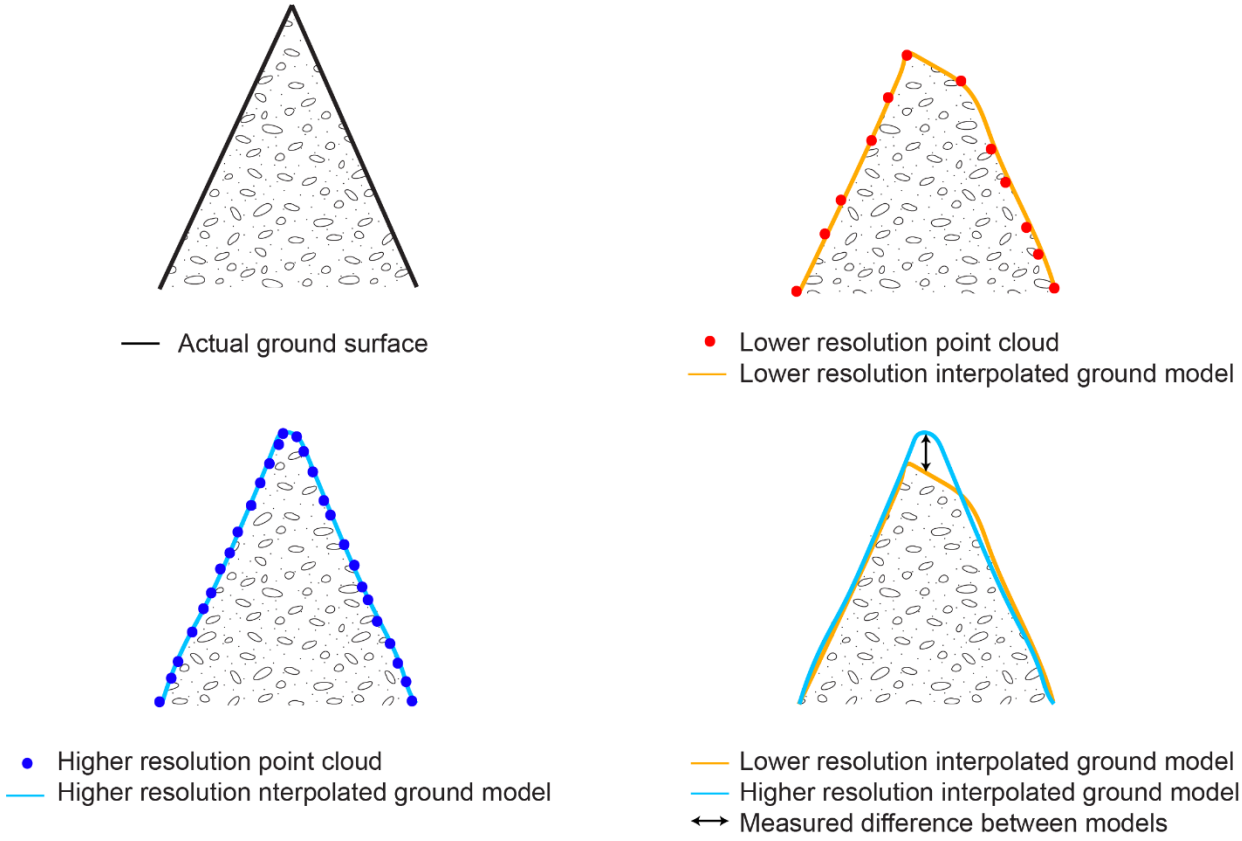
Positive changes reflected in ALS change detection analysis represent the amount of change that occurred along the shortest distance vector between the two datasets, and not necessarily the maximum magnitude of the deformation (Schematic B-1, inset). For example, a landslide with a slope angle of 35° showing a measured surface-normal based distance vector of 0.5 m in the zone of positive topographic change would imply an equivalent true horizontal change of 0.90 m. This limits our ability to detect deformation on landslides using lidar change detection analysis.



Schematic B-1 Simplified schematic diagram of translational landslide showing positive change in the direction of movement. The amount of change along the shortest distance vector can be used to calculate the true horizontal change.

Change detection results are limited by the temporal and spatial resolution of the datasets and the relative accuracy of the lidar points between each dataset (also referred to as data precision, or local accuracy). In this project BGC analyzed changes between 2013 and 2022 lidar datasets. Slope deformations that occurred before 2013 or after the 2022 dataset was collected are not detected in this analysis.

The assessment of topographical change between ALS datasets of different point density can result in spurious change. For example, in regions of steep topography, ridges and valleys are not well defined in the lower resolution ALS datasets but are mapped in the higher resolution datasets. The difference in data resolution, and resultant interpretation of the topology between datasets, is mapped as ‘change’ by the algorithms used. This situation is illustrated in Schematic B-2. Given the consistent data resolution across all datasets used for this study, the impact of data resolution on the results is minimal.



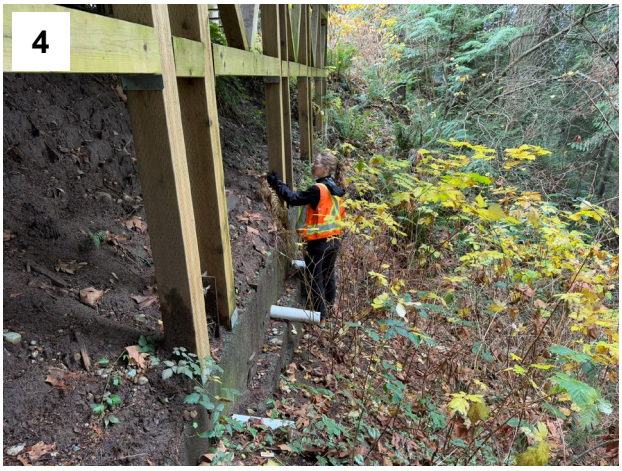
Schematic B-2 Schematic diagram of spurious changes caused by variable resolution of the datasets, not actual topographical change.

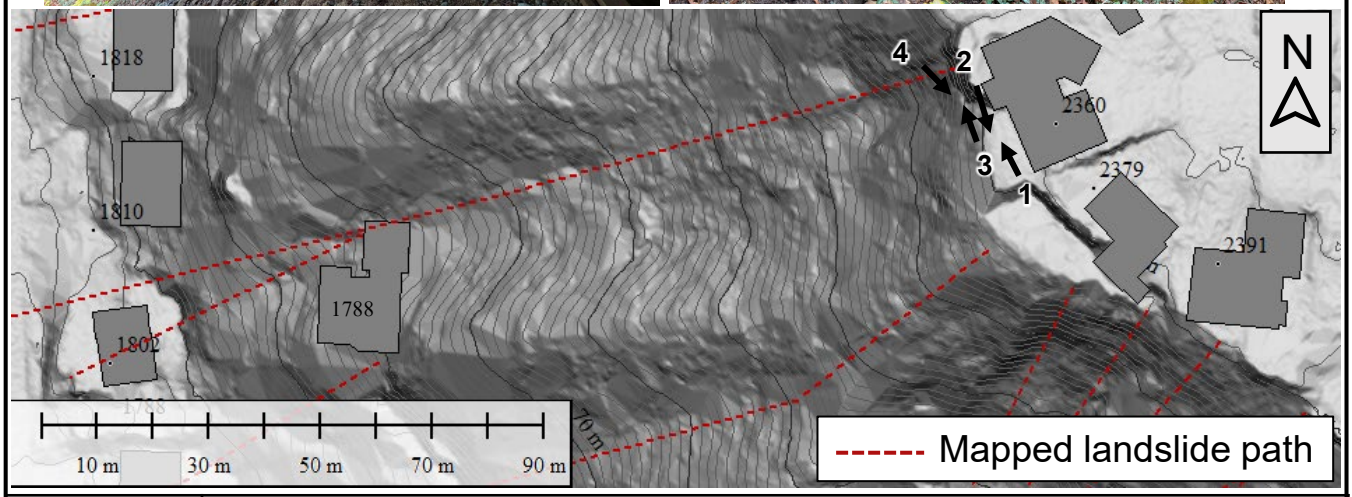
APPENDIX C
FIELD PHOTOS











Observations	• Backyard sloping gently towards slope. Area of minor slumping (<1 m^2, <0.1 m deep depression) at crest (Photo 2), south of historical 1979 headscarp. • Mostly straight trees with some pistol butted alders. 1979 slide path vegetated with young alders. • Concrete retaining wall with drainpipes supporting wooden deck at 1979 headscarp location (Photo 3,4). Appears to be in good condition at time of inspection.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2360 Carman		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-1

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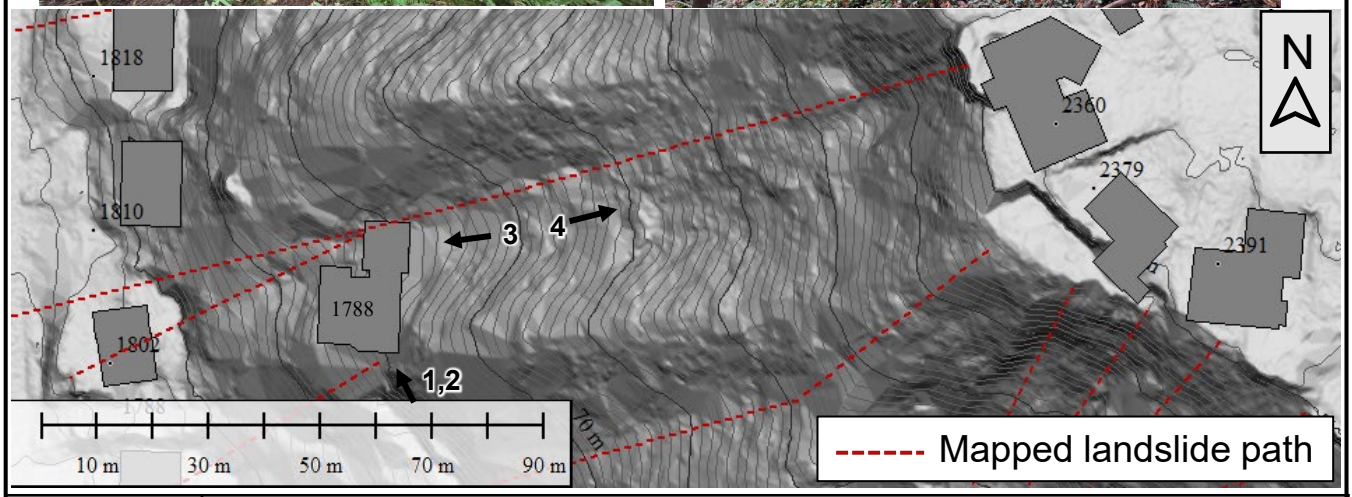
BGC ENGINEERING INC.











Observations	• Cracks observed parallel to slope in driveway. Existing retaining wall at driveway in robust condition. • Building in natural gully that includes the 1979 slide path. Large conifers observed in gully. • Northeast corner of building exposed to landslides from 2360 Carman (Photo 3). Southern portion of building footprint protected by ridgeline.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

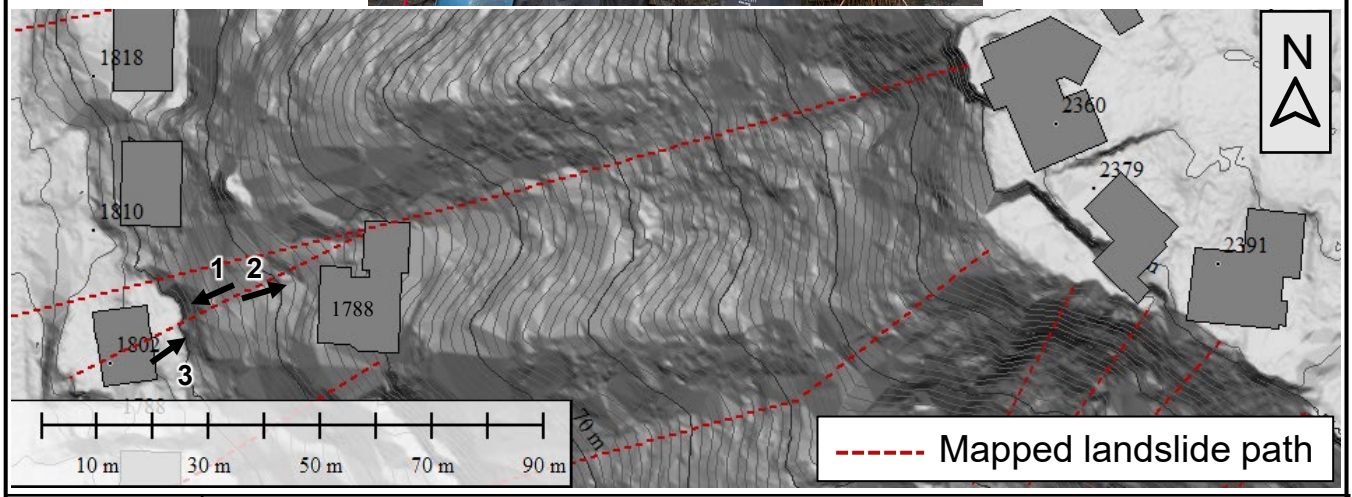
PREPARED BY: LCH	FIGURE TITLE: 1788 Riverside		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-2

0 5 10 mm in ANSI A sized paper









Observations	• Property downslope of 1788 Riverside. Gentler slope upslope of retaining wall. • Landowner reported having a test pit completed in upslope area and indicated dense material was observed approximately 18 inches below ground (BGC does not have access to log to confirm). • Landowner reported than stone retaining wall seeps in heavy rain.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

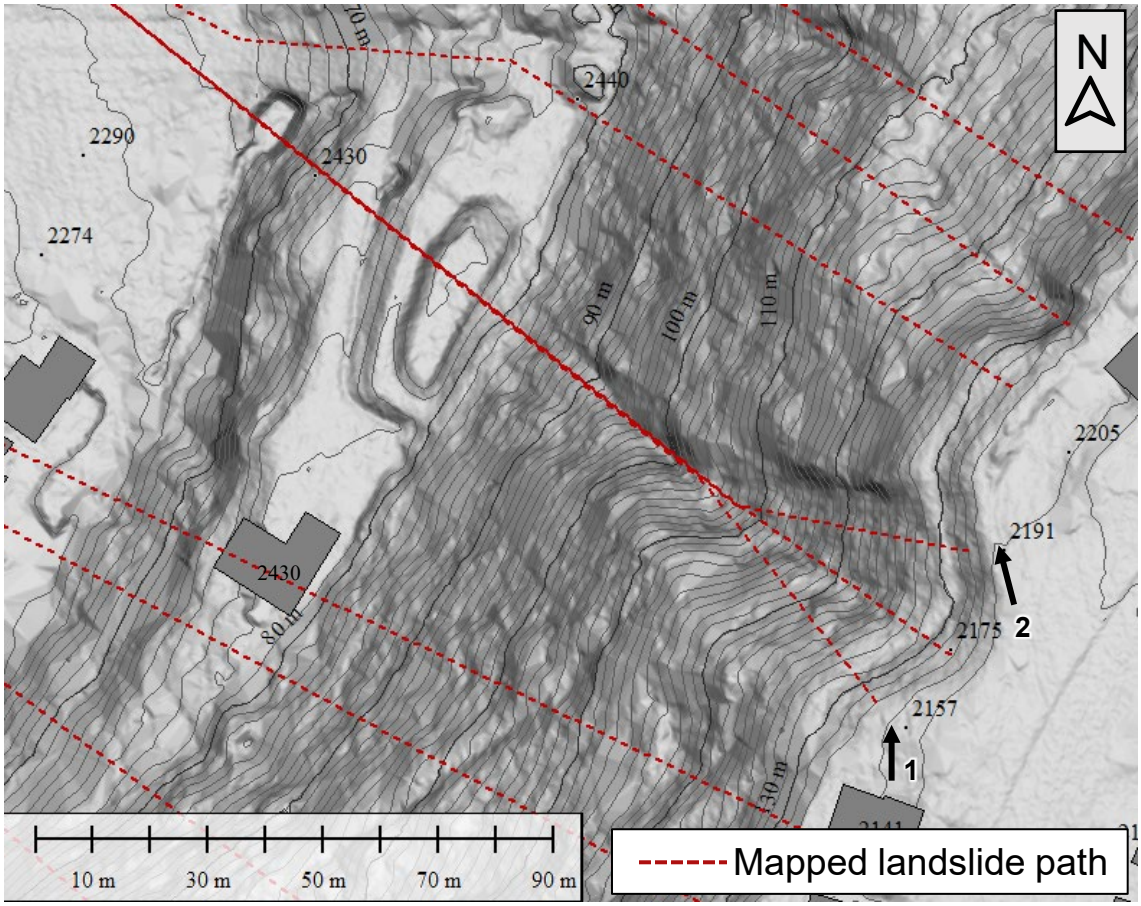
PREPARED BY: LCH	FIGURE TITLE: 1802 Riverside		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-3

0 5 10 mm in ANSI A sized paper

BGC ENGINEERING INC.







Observations	• 2005 Berkley landslide scarp re-vegetated with alders. • Minor depression observed behind crest at north side of scarp (Photo 2). No signs of recent movement observed here at the time of inspection.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: Berkley Slide Headscarp Area		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-4

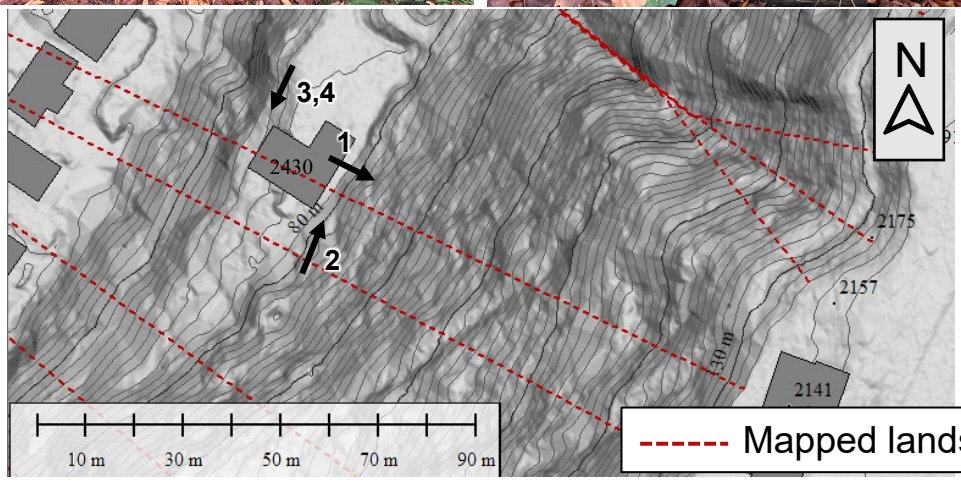
0 5 10 mm in ANSI A sized paper











Observations	• Windows near ground level at the rear of the house (Photo 2). • 0.4 m tall timber crib retaining wall located 2.5 m from the rear of the house and above 13 m tall slope (Photos 3, 4). Retaining wall is bowing downslope slightly. Building downslope of retaining wall is outside of 19° runout angle.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2430 Chapman Way		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-5

0 5 10 mm in ANSI A sized paper

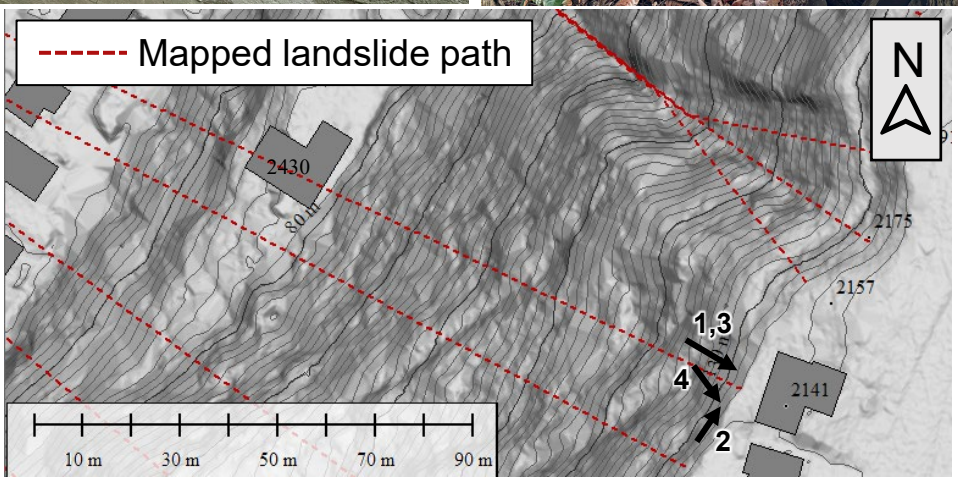
BGC ENGINEERING INC.











Observations	• Retaining wall in good overall condition at time of inspection (Photo 2). Some evidence of minor tilting and bowing. • Large conifers on slope are straight. • Vertical crack observed in building foundation (Photo 3). • Loose exposed soil at south side of property, south of retaining wall (Photo 4).

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2141 Berkley		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-6

0 5 10 mm in ANSI A sized paper

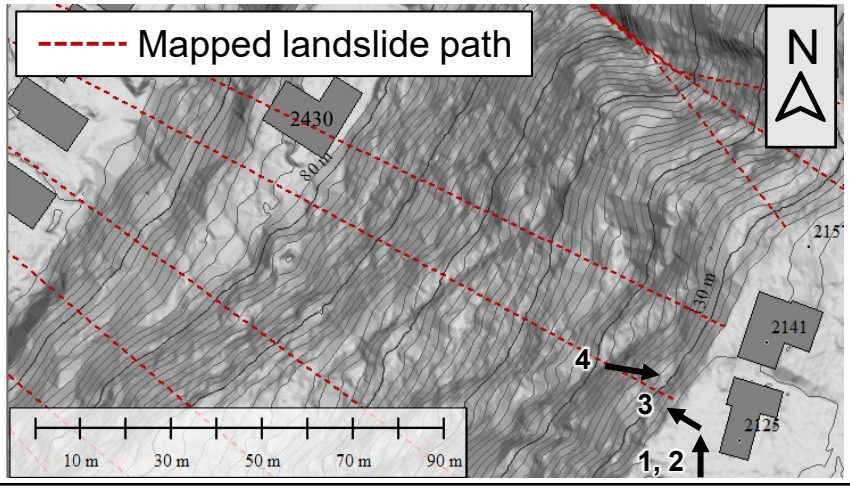
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Observations	• Back yard is level (Photo 1). Small depression in grass near garden bed (Photo 2). Garden irrigation at the crest of slope (Photo 2). • No retaining wall. • Yard trimmings and loose fill (<0.5 m^3) pushed over edge of slope (Photo 3). • Less mature trees compared to slope below 2141 Berkley. Some pistol butted trees observed.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2125 Berkley		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-7

0 5 10 mm in ANSI A sized paper

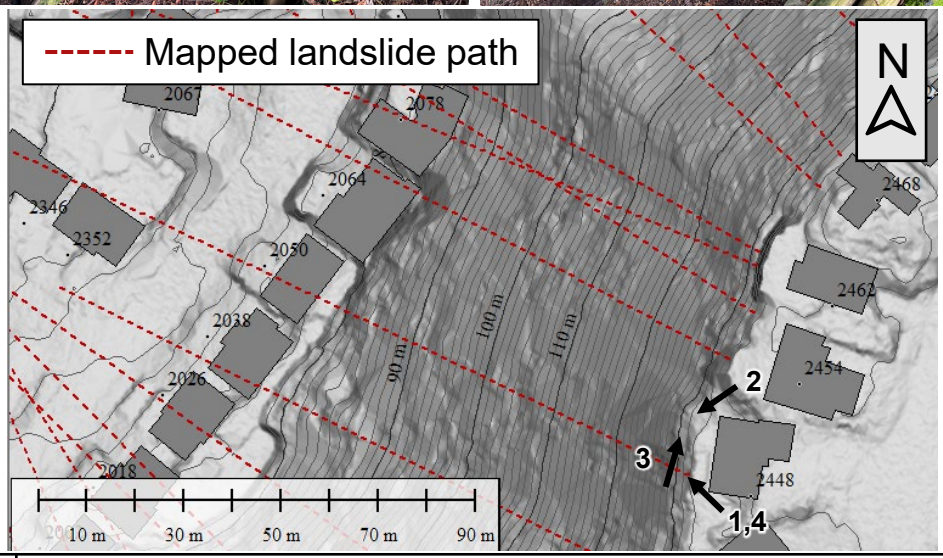
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Observations

- Hot tub previously reported no longer there.
- Tiered timber crib retaining walls holding back garden beds in relatively good condition at time of inspection (Photo 3).
- Some pistol butted cedars observed on slope (Photo 4).

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

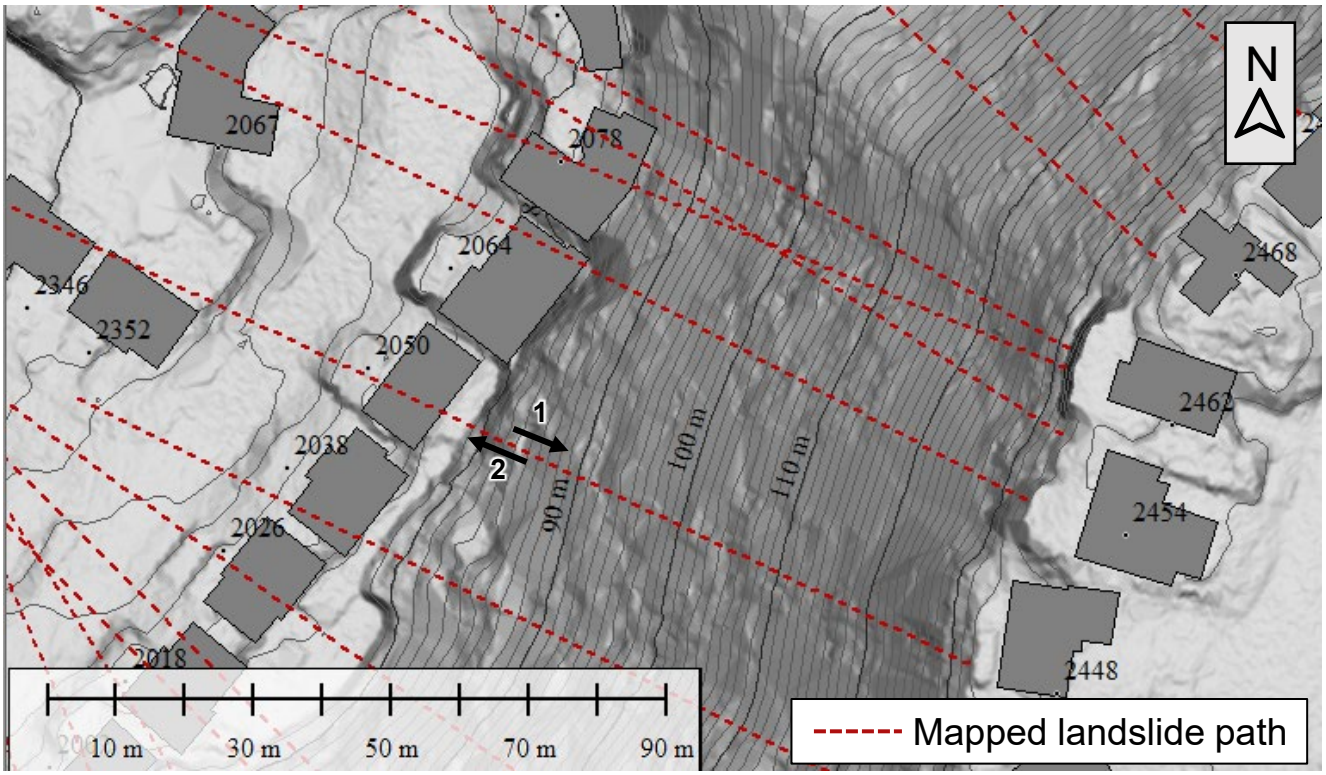
PREPARED BY:	FIGURE TITLE:		
LCH	2448 Hayseed		
CHECKED BY:	CLIENT:		
SZ	District of North Vancouver		
APPROVED BY:	SCALE:	PROJECT NO:	FIGURE NO:
LCH	N/A	0404103	C-8

0 5 10 mm in ANSI A sized paper

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Observations	• BGC traversed slope above 2050 Rivergrove but did not enter backyard to observe condition of retaining wall.

NOTES:

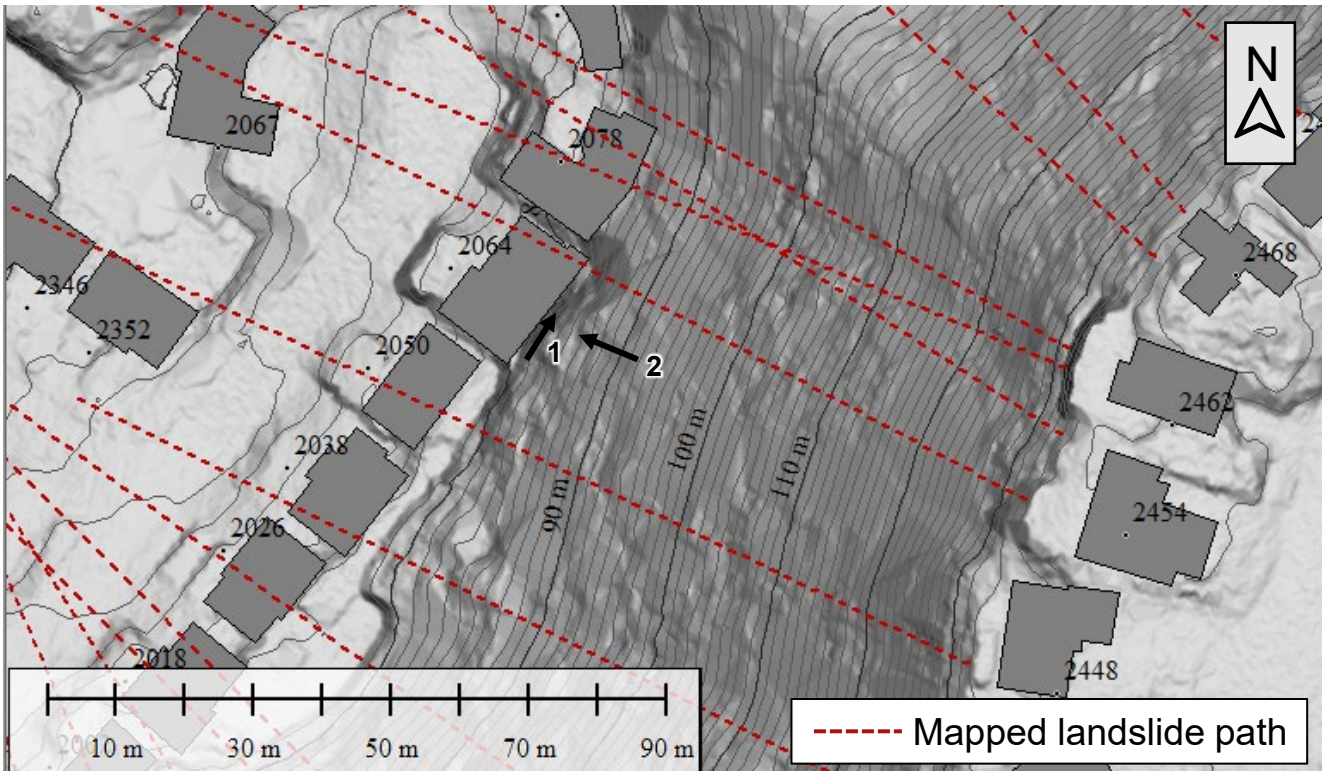
1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2050 Rivergrove		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-9

0 5 10 mm in ANSI A sized paper







Observations	• Stone retaining wall in good condition (Photo 1). • House very close to base of slope.

NOTES:

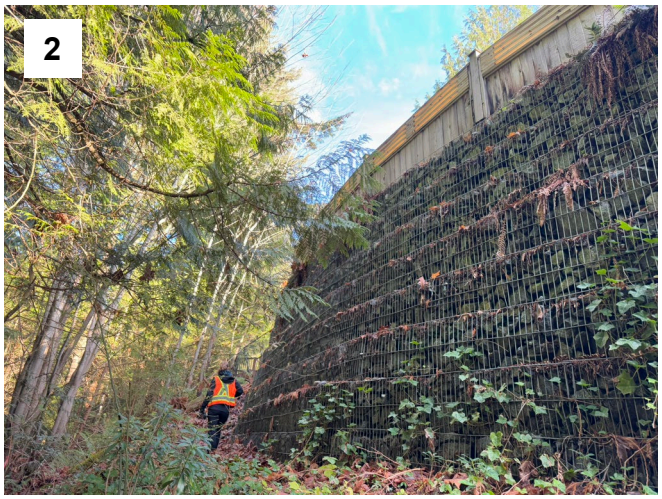
1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

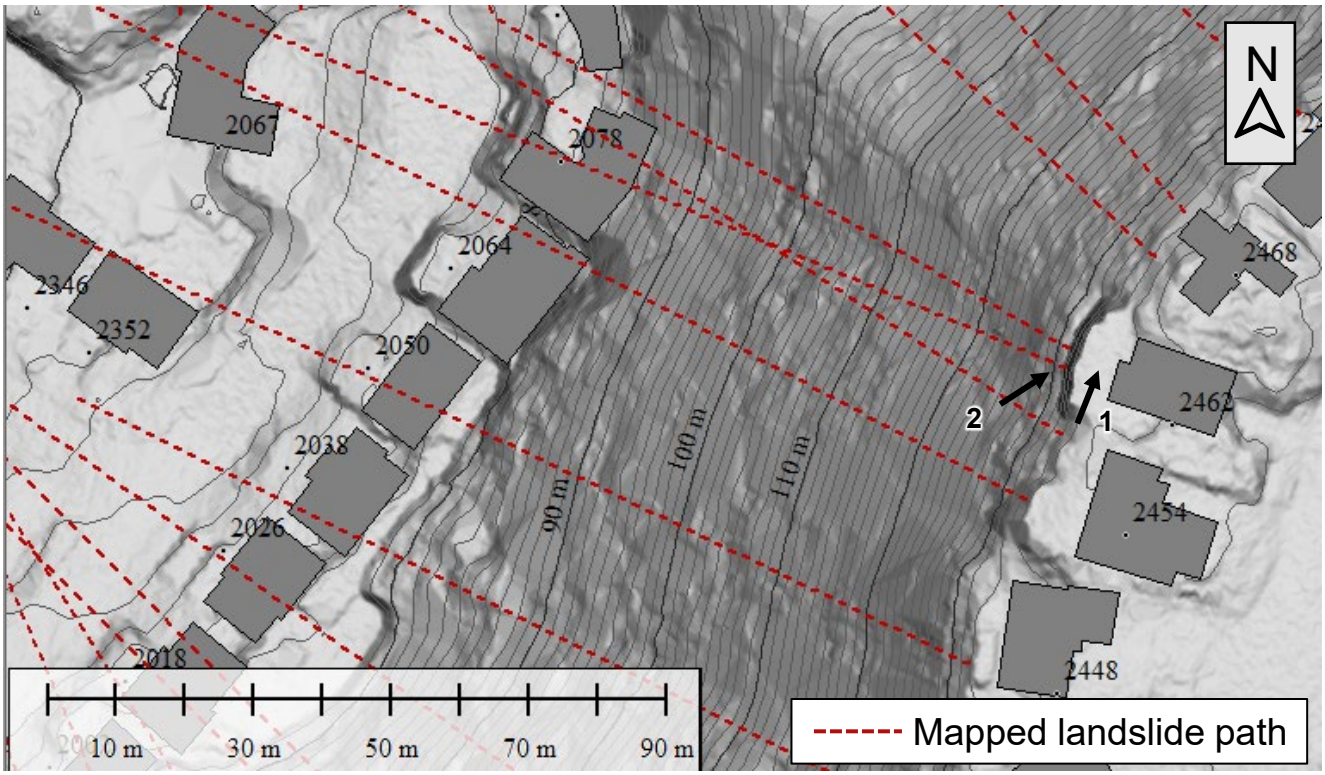
PREPARED BY: LCH	FIGURE TITLE: 2064 Rivergrove		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-10

0 5 10 mm in ANSI A sized paper

BGC ENGINEERING INC.







Observations	• Backyard supported with retaining wall (Photo 1). Fence at west side of backyard is tilted. Property owner acknowledged that the fence has never been straight. • Approximately 4 m tall stepped gabion basket retaining wall with 0.5 m tall gabions (Photo 2). Property owner mentioned the gabion baskets were tied back with geogrid. Retaining wall appeared to be in good condition with no observed bulging or settling at the time of inspection.

NOTES:

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2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 2462 Hayseed		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-11

0 5 10 mm in ANSI A sized paper

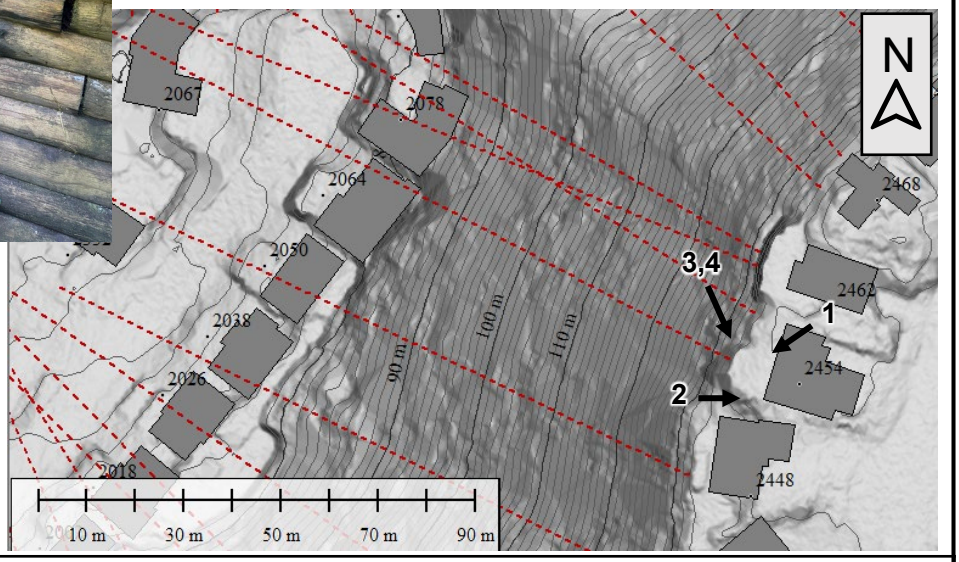
BGC ENGINEERING INC.











------ Mapped landslide path

Observations	• Backyard slopes toward crest (Photo 1). • Concrete retaining wall <1 m tall at south side of property (Photo 2). Steps adjacent to concrete retaining wall are tilted downslope. • Timber crib retaining wall at north end of backyard. Some logs in structure are rotting and/or splitting. Downslope face shows minimal signs of differential movement or tilting; however, joints at corners show separation downslope (Photos 3, 4).

NOTES:

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2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

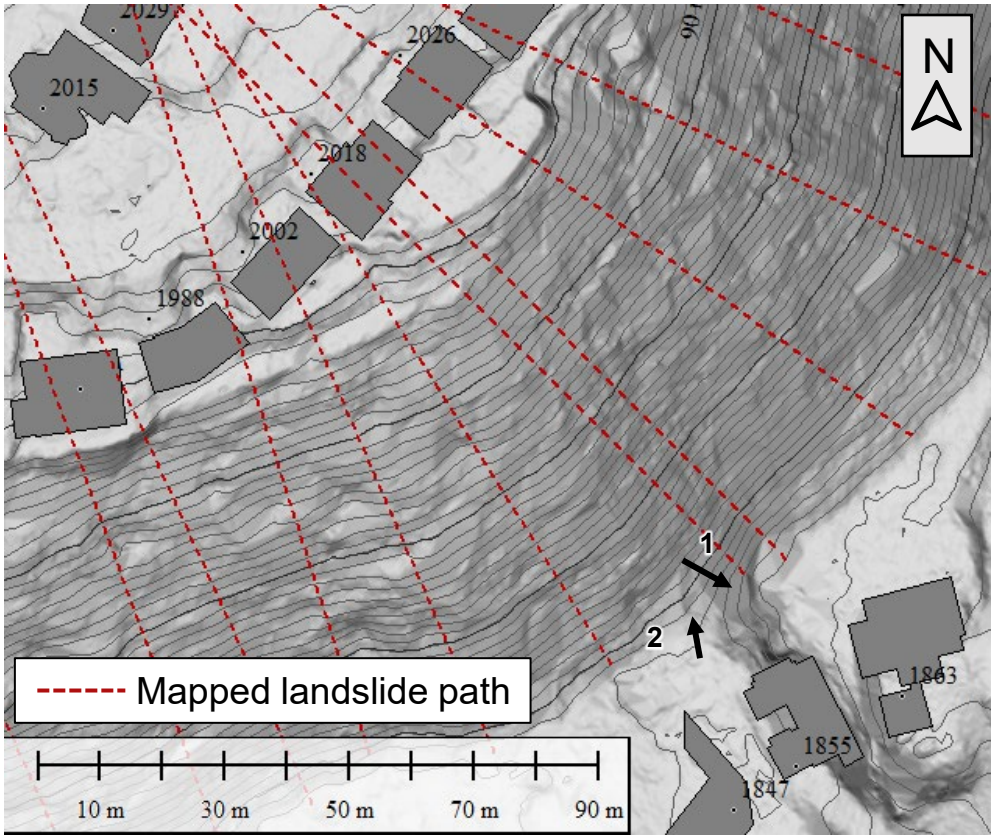
PREPARED BY: LCH	FIGURE TITLE: 2454 Hayseed		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-12

0 5 10 mm in ANSI A sized paper

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Observations	• Yard waste and cuttings observed over slope crest. • No retaining wall. Relatively gentle slope at crest.

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
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3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

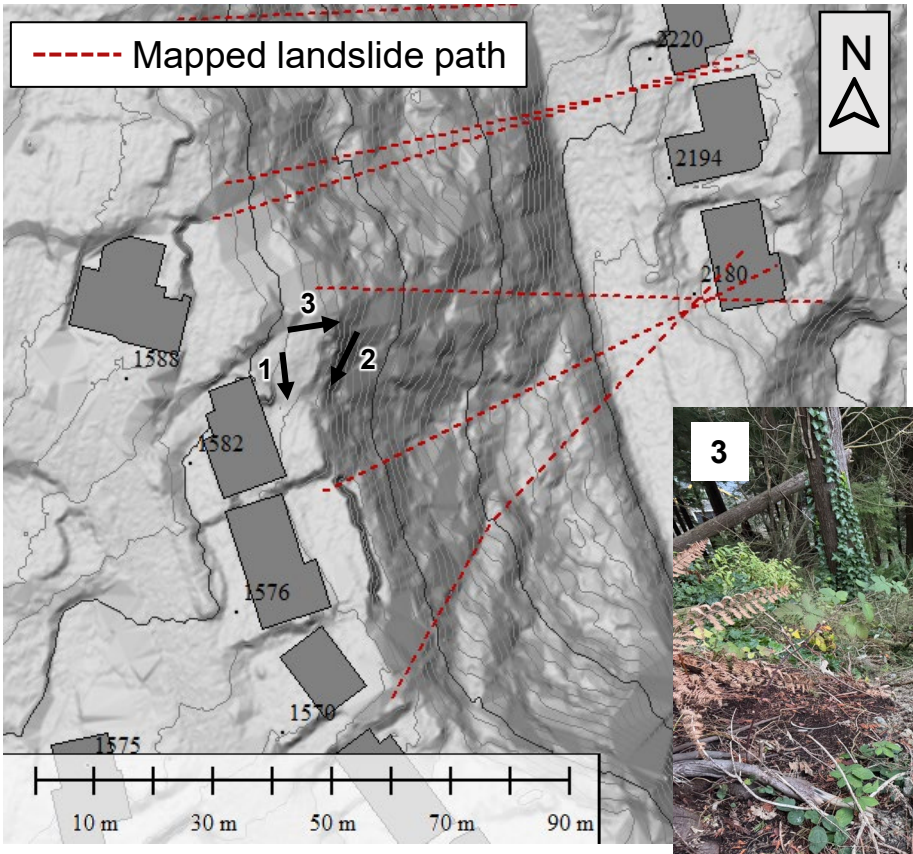
PREPARED BY: LCH	FIGURE TITLE: 1855 Layton		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-13

0 5 10 mm in ANSI A sized paper

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Observations	• Gabion basket retaining wall appears to be in good condition (Photo 2) • Approximately <0.5 m^3 of saturated material (silt and gravel, some clay) placed over the crest of slope at north end of property (Photo 3).

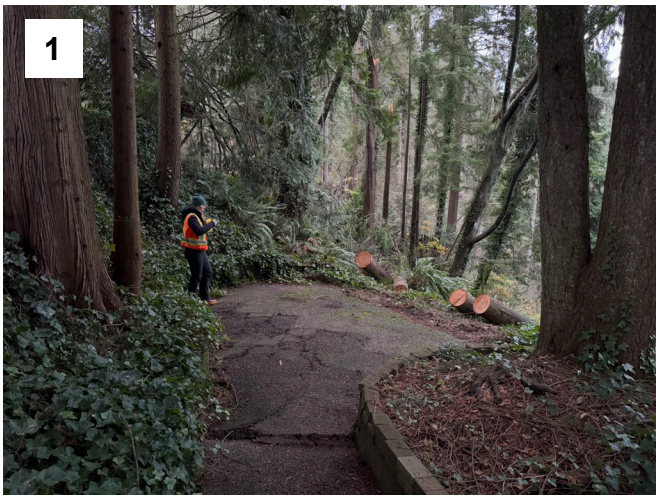
NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

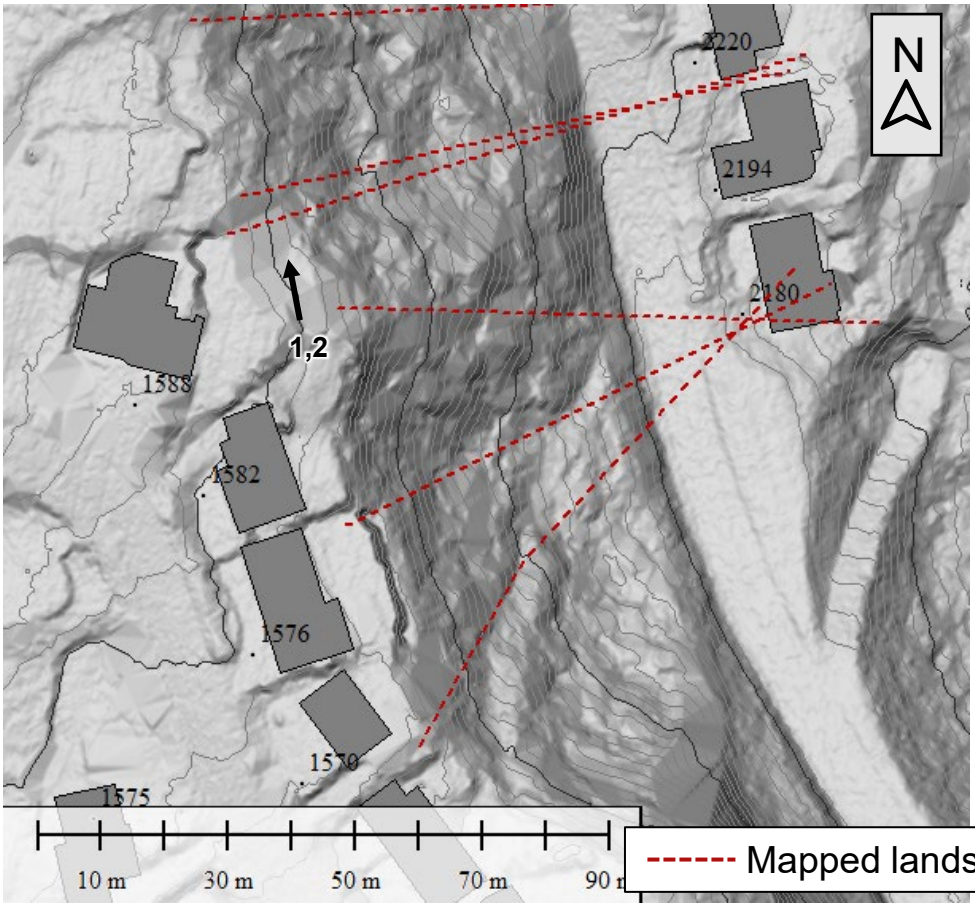
PREPARED BY: LCH	FIGURE TITLE: 1582 Merlynn		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-14

0 5 10 mm in ANSI A sized paper

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Observations	• Concrete seating area downslope of backyard, sloping outward (Photo 1). Cracks observed in concrete. No retaining wall observed. • Trees and yard cuttings observed deposited over edge of slope (Photos 1, 2).

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "Landslide Risk Assessment – 2026 Update" and dated June 2026.
2. Photos were collected by BGC on December 5, 2024 with landowner permission to access site. Approximate locations and direction of photos shown on base map.
3. Base map is 2022 lidar with 1 m contours. Landslide paths mapped by BGC.

PREPARED BY: LCH	FIGURE TITLE: 1588 Merlynn		
CHECKED BY: SZ	CLIENT: District of North Vancouver		
APPROVED BY: LCH	SCALE: N/A	PROJECT NO: 0404103	FIGURE NO: C-15

0 5 10 mm in ANSI A sized paper

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APPENDIX D
RISK ESTIMATE TABLES

Table D-1. Summary of Field Observations to Inform Landslide Likelihood Estimation (Pslide)

Address	Escarpment	Loose Materials at Fence	Loose Materials Down Slope	Slope Angle	Slope Deformation	% Conifers	Tree Condition	Retaining Wall	Wall Type	Wall Deformation	Backyard Deformation	Dist. To Crest	Runoff From	Pool or Hot Tub	Pool Condition	Seepage	Conn. Storm Sewer (according to previous assessment)	Mostly Gravel in Auger Holes	Conn. Storm Sewer (May 2024)
2477 Berton	Berkley	1-2m	1-2m	30-35 deg.	Erosion	50-75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2475 Berton	Berkley	<1m	1-2m	35-40 deg.	Erosion	25-50%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2469 Berton	Berkley	1-2m	1-2m	25-30 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2465 Berton	Berkley	<1m	<1m	25-30 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	Yes	Undeformed	No	Yes		Yes
2461 Berton	Berkley	<1m	1-2m	30-35 deg.	Erosion	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2441 Mowat	Berkley	<1m	1-2m	30-35 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2437 Mowat	Berkley	1-2m	1-2m	30-35 deg.	Erosion	>75%	Leaning	Yes	Timbers	None	None	>12m	Backyard	No	NA	No	Yes		Yes
2433 Mowat	Berkley	1-2m	1-2m	35-40 deg.	Erosion	50-75%	Straight	No	NA	NA	None	>12m	Backyard	Yes	Undeformed	No	Yes		Yes
2429 Mowat	Berkley	1-2m	1-2m	30-35 deg.	Erosion	>75%	Leaning	No	NA	NA	None	>12m	Half Roof	Yes	Undeformed	No	Yes		Yes
2425 Mowat	Berkley	<1m	1-2m	35-40 deg.	Slides	25-50%	Leaning	Yes	Timbers	None	None	>12m	Street	No	NA	No	Yes		Yes
1231 Lennox	Berkley	2-3m	1-2m	30-35 deg.	Slides	>75%	Straight	Yes	Other	Bulging	None	3-6m	Frontyard	No	NA	No	Yes		Yes
1275 Lennox	Berkley	1-2m	<1m	>40 deg.	Slides	<25%	Straight	No	NA	NA	None	<3m	Full Roof	Yes	Undeformed	No	Yes		Yes
1279 Lennox	Berkley	1-2m	<1m	>40 deg.	Slides	>75%	Straight	Yes	Timbers	Bulging	None	3-6m	Full Roof	No	NA	No	Yes		Yes
1305 Lennox	Berkley	2-3m	2-3m	35-40 deg.	Erosion	50-75%	Straight	Yes	Other	Bulging	None	9-12m	Full Roof	Yes	Undeformed	No	Yes		Yes
1345 Lennox	Berkley	1-2m	2-3m	35-40 deg.	Slides	25-50%	Pistol Butt	Yes	Timbers	None	None	9-12m	Full Roof	No	NA	No	Yes		Yes
1383 Lennox	Berkley	1-2m	2-3m	35-40 deg.	Erosion	50-75%	Straight	Yes	Blocks	None	Settled	3-6m	Full Roof	Yes	Undeformed	No	Yes		Yes
1425 Lennox	Berkley	<1m	1-2m	25-30 deg.	Slides	50-75%	Straight	No	NA	None	None	6-9m	Frontyard	Yes	Undeformed	No	Yes		Yes
1477 Lennox	Berkley	2-3m	1-2m	30-35 deg.	Erosion	25-50%	Straight	Yes	Timbers	None	None	6-9m	Backyard	No	NA	No	Yes		Yes
1479 Lennox	Berkley	2-3m	1-2m	35-40 deg.	Erosion	25-50%	Straight	Yes	Timbers	None	Settled	6-9m	Backyard	No	NA	No	Yes		Yes
1491 Lennox	Berkley	2-3m	1-2m	35-40 deg.	Erosion	25-50%	Leaning	Yes	Concrete	Cracked	None	3-6m	Frontyard	No	NA	No	Yes		Yes
1535 Lennox	Berkley	2-3m	2-3m	35-40 deg.	None	25-50%	Leaning	Yes	Timbers	Bulging	Settled	3-6m	Street	No	NA	No	Yes		Yes
1557 Lennox	Berkley	>3m	1-2m	35-40 deg.	Erosion	<25%	Straight	Yes	Timbers	Cracked	Settled	3-6m	Frontyard	Yes	Undeformed	No	Yes		Yes
1583 Lennox	Berkley	2-3m	1-2m	35-40 deg.	None	50-75%	Straight	Yes	Other	Cracked	None	<3m	Full Roof	No	NA	No	Yes		Yes
1593 Lennox	Berkley	<1m	1-2m	30-35 deg.	Erosion	>75%	Leaning	No	NA	NA	None	<3m	Street	No	NA	Yes	Yes		Yes
2402 Swinburne	Berkley	<1m	1-2m	25-30 deg.	None	>75%	Pistol Butt	No	NA	NA	None	<3m	Full Roof	No	NA	No	Yes		Yes
2410 Swinburne	Berkley	1-2m	>3m	35-40 deg.	Erosion	>75%	Leaning	No	NA	NA	None	6-9m	Backyard	No	NA	No	Yes		Yes
2414 Swinburne	Berkley	1-2m	1-2m	35-40 deg.	Cracks	50-75%	Leaning	Yes	Other	None	None	<3m	Half Roof	No	NA	No	Yes		Yes
1677 Layton	Berkley	1-2m	<1m	35-40 deg.	Slides	>75%	Leaning	No	NA	NA	None	>12m	Full Roof	No	NA	No	Yes		Yes
1691 Layton	Berkley	2-3m	2-3m	35-40 deg.	Cracks	50-75%	Leaning	No	NA	NA	Cracked	>12m	Full Roof	No	NA	No	Yes		Yes
1709 Layton	Berkley	2-3m	2-3m	35-40 deg.	None	50-75%	Leaning	No	NA	NA	None	>12m	Full Roof	Yes	Undeformed	No	Yes		Yes
1731 Layton	Berkley	2-3m	2-3m	35-40 deg.	None	50-75%	Straight	No	NA	NA	Settled	>12m	Full Roof	Yes	Undeformed	No	Yes		Yes
1753 Layton	Berkley	1-2m	1-2m	30-35 deg.	None	50-75%	Leaning	Yes	Other	Settled	Settled	>12m	Full Roof	Yes	Undeformed	No	Yes		Yes
1775 Layton	Berkley	>3m	2-3m	35-40 deg.	None	>75%	Straight	Yes	Timbers	None	None	6-9m	Frontyard	Yes	Undeformed	No	Yes		Yes
1797 Layton	Berkley	1-2m	1-2m	>40 deg.	None	50-75%	Straight	No	NA	NA	None	6-9m	Full Roof	No	NA	No	Yes		Yes
1815 Layton	Berkley	1-2m	2-3m	30-35 deg.	None	>75%	Straight	Yes	Concrete	None	Settled	6-9m	Backyard	No	NA	No	Yes		Yes
2391 Carman	Berkley	>3m	1-2m	35-40 deg.	Erosion	50-75%	Straight	Yes	Other	Bulging	Settled	6-9m	Frontyard	Yes	Undeformed	No	Yes		Yes
2379 Carman	Berkley	<1m	1-2m	25-30 deg.	Slides	50-75%	Straight	No	NA	NA	None	<3m	Frontyard	Yes	Undeformed	No	Yes		Yes
2360 Carman S.	Berkley	1-2m	1-2m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	Settled	3-6m	Frontyard	No	NA	No	Yes		Yes
2360 Carman N.	Berkley	1-2m	1-2m	35-40 deg.	None	50-75%	Straight	No	NA	NA	Settled	3-6m	Frontyard	No	NA	No	Yes		Yes
2372 Carman	Berkley	<1m	1-2m	25-30 deg.	None	>75%	Leaning	No	NA	NA	None	9-12m	Full Roof	No	NA	No	Yes		Yes
2386 Carman	Berkley	1-2m	1-2m	30-35 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Half Roof	No	NA	No	Yes		Yes
1839 Layton	Berkley	1-2m	1-2m	30-35 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Full Roof	No	NA	No	Yes		Yes
1847 Layton	Berkley	1-2m	1-2m	30-35 deg.	None	>75%	Straight	No	NA	NA	Settled	>12m	Street	No	NA	No	Yes		Yes
1855 Layton	Berkley	1-2m	1-2m	35-40 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Street	No	NA	No	Yes		Yes
1863 Layton	Berkley	<1m	1-2m	25-30 deg.	None	>75%	Pistol Butt	No	NA	NA	None	>12m	Full Roof	No	NA	No	Yes		Yes
Hayseed/Layton Gully	Berkley	<1m	1-2m	25-30 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes		Yes
2448 Hayseed	Berkley	1-2m	2-3m	30-35 deg.	Erosion	>75%	Pistol Butt	Yes	Timbers	None	None	6-9m	Half Roof	Yes	Undeformed	No	Yes		Yes
2454 Hayseed	Berkley	2-3m	1-2m	35-40 deg.	Erosion	>75%	Straight	Yes	Timbers	Settled	None	9-12m	Half Roof	No	NA	No	Yes		Yes
2462 Hayseed	Berkley	<1m	1-2m	30-35 deg.	Erosion	25-50%	Leaning	No	NA	None	None	9-12m	Full Roof	No	NA	No	Yes		Yes
2468 Hayseed	Berkley	<1m	1-2m	30-35 deg.	None	50-75%	Straight	No	NA	NA	None	<3m	Full Roof	Yes	Undeformed	No	Yes		Yes
2474 Hayseed	Berkley	1-2m	<1m	30-35 deg.	Erosion	>75%	Straight	Yes	Concrete	None	None	<3m	Full Roof	No	NA	Yes	Yes		Yes
2480 Hayseed	Berkley	1-2m	1-2m	30-35 deg.	Erosion	>75%	Leaning	Yes	Timbers	None	Settled	3-6m	Full Roof	No	NA	No	Yes		Yes
2486 Hayseed	Berkley	1-2m	1-2m	35-40 deg.	Erosion	>75%	Straight	Yes	Timbers	Settled	Settled	6-9m	Half Roof	No	NA	No	Yes		Yes
2125 Berkley	Berkley	<1m	1-2m	25-30 deg.	None	25-50%	Straight	Yes	Other	None	Settled	>12m	Street	No	NA	No	Yes		Yes
2141 Berkley	Berkley	<1m	2-3m	25-30 deg.	None	>75%	Straight	Yes	Timbers	None	None	3-6m	Half Roof	No	NA	No	Yes		Yes
2157 Berkley	Berkley	<1m	1-2m	25-30 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Full Roof	No	NA	No	Yes		Yes
2175 Berkley	Berkley	<1m	<1m	25-30 deg.	None	<25%	Straight	No	NA	NA	None	<3m	Street	No	NA	No	Yes		Yes
2191 Berkley	Berkley	<1m	1-2m	25-30 deg.	None	25-50%	Straight	No	NA	NA	None	3-6m	Frontyard	No	NA	No	Yes		Yes
2205 Berkley	Berkley	<1m	1-2m	25-30 deg.	None	25-50%	Straight	No	NA	NA	None	9-12m	Full Roof	No	NA	No	Yes		Yes
2217 Berkley	Berkley	>3m	2-3m	>40 deg.	Slides	<25%	Leaning	No	NA	NA	None	9-12m	Full Roof	Yes	Undeformed	Yes	Yes		Yes
2223 Berkley	Berkley	2-3m	1-2m	30-35 deg.	Erosion	50-75%	Straight	No	NA	NA	Settled	9-12m	Full Roof	No	NA	Yes	Yes		Yes
2249 Berkley	Berkley	2-3m	2-3m	35-40 deg.	None	25-50%	Straight	No	NA	NA	Settled	>12m	Full Roof	No	NA	Yes	Yes		Yes
2251 Berkley	Berkley	2-3m	1-2m	30-35 deg.	Erosion	>75%	Straight	No	NA	NA	None	>12m	Street	No	NA	Yes	Yes		Yes
2265 Berkley	Berkley	1-2m	1-2m	35-40 deg.	None	50-75%	Pistol Butt	Yes	Concrete	Cracked	Cracked	6-9m	Full Roof	No	NA	Yes	Yes		Yes
2279 Berkley	Berkley	1-2m	1-2m	30-35 deg.	Erosion	25-50%	Leaning	Yes	Timbers	None	None	9-12m	Full Roof	No	NA	Yes	Yes		Yes
2293 Berkley	Berkley	2-3m	1-2m	35-40 deg.	Slides	25-50%	Leaning	Yes	Timbers	None	None	>12m	Full Roof	Yes	Undeformed	No	Yes		Yes

Table D-1. Summary of Field Observations to Inform Landslide Likelihood Estimation (Pslide)

Address	Escarpment	Loose Materials at Fence	Loose Materials Down Slope	Slope Angle	Slope Deformation	% Conifers	Tree Condition	Retaining Wall	Wall Type	Wall Deformation	Backyard Deformation	Dist. To Crest	Runoff From	Pool or Hot Tub	Pool Condition	Seepage	Conn. Storm Sewer (according to previous assessment)	Mostly Gravel in Auger Holes	Conn. Storm Sewer (May 2024)
2307 Berkley	Berkley	2-3m	1-2m	35-40 deg.	None	<25%	Straight	Yes	Timbers	None	None	9-12m	Full Roof	Yes	Cracked	No	Yes		Yes
2321 Berkley	Berkley	1-2m	1-2m	35-40 deg.	Erosion	50-75%	Straight	Yes	Timbers	Settled	Settled	3-6m	Full Roof	No	NA	Yes	Yes		Yes
2335 Berkley	Berkley	2-3m	1-2m	35-40 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Full Roof	No	NA	No	Yes		Yes
2349 Berkley	Berkley	1-2m	1-2m	35-40 deg.	Erosion	>75%	Pistol Butt	Yes	Other	Bulging	Settled	>12m	Full Roof	No	NA	No	Yes		Yes
2363 Berkley	Berkley	1-2m	1-2m	35-40 deg.	Slides	25-50%	Pistol Butt	No	NA	NA	None	9-12m	Frontyard	No	NA	Yes	Yes		Yes
2377 Berkley	Berkley	>3m	2-3m	>40 deg.	Slides	50-75%	Straight	Yes	Concrete	Cracked	Settled	6-9m	Full Roof	No	NA	Yes	Yes		Yes
2391 Berkley	Berkley	1-2m	<1m	>40 deg.	Slides	<25%	Straight	Yes	Other	Bulging	Cracked	>12m	Street	No	NA	Yes	Yes		Yes
2409 Berkley	Berkley	1-2m	>3m	35-40 deg.	Cracks	25-50%	Leaning	No	NA	NA	Settled	>12m	Street	No	NA	No	Yes		Yes
2425 Berkley	Berkley	1-2m	<1m	<25 deg.	Slides	<25%	Straight	No	NA	NA	Settled	>12m	Full Roof	No	NA	No	Yes		Yes
4780 Hoskins	Westlynn	<1m	1-2m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	Yes	Yes	Yes
4778 Hoskins	Westlynn	<1m	1-2m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	9-12m	Backyard	No	NA	No	Yes	Yes	Yes
4774 Hoskins	Westlynn	1-2m	1-2m	30-35 deg.	Slides	>75%	Straight	Yes	Timbers	Bulging	None	>12m	Backyard	No	NA	No	Yes	Yes	Yes
4772 Hoskins	Westlynn	<1m	<1m	30-35 deg.	None	>75%	Straight	No	NA	NA	None	9-12m	Backyard	No	NA	No	Yes	Yes	Yes
2345 Kilmarnock	Westlynn	1-2m	1-2m	30-35 deg.	None	25-50%	Straight	Yes	Blocks	Cracked	Cracked	>12m	Backyard	Yes	Undeformed	No	No	No	No
2339 Kilmarnock	Westlynn	2-3m	1-2m	30-35 deg.	None	<25%	Straight	Yes	Timbers	Bulging	Settled	3-6m	Half Roof	No	NA	No	Yes	No	Yes
1864 Beaulynn	Westlynn	1-2m	<1m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	<3m	Frontyard	No	NA	No	Yes	No	Yes
1858 Beaulynn	Westlynn	0	1-2m	30-35 deg.	Slides	25-50%	Straight	No	NA	NA	None	3-6m	Frontyard	No	NA	No	Yes	No	No
1751 Irene	Westlynn	<1m	<1m	35-40 deg.	Slides	>75%	Straight	Yes	Timbers	Bulging	Settled	<3m	Half Roof	No	NA	No	No	No	Yes
1742 Irene	Westlynn	<1m	<1m	35-40 deg.	Slides	>75%	Straight	Yes	Timbers	None	Settled	<3m	Half Roof	No	NA	No	No	No	Yes
4150 Lynn Valley	Westlynn	1-2m	<1m	35-40 deg.	Slides	>75%	Straight	No	NA	NA	None	<3m	Frontyard	No	NA	No	No	No	No
2620 Lauralynn	Westlynn	1-2m	<1m	35-40 deg.	Erosion	25-50%	Straight	Yes	Timbers	Settled	None	3-6m	Frontyard	No	NA	Yes	No	No	Yes
1595 Graveley (W)	Pemberton	<1m	<1m	35-40 deg.	None	50-75%	Straight	No	NA	NA	None	<3m	Half Roof	No	NA	No	No	Yes	Yes
1595 Graveley (S)	Pemberton	<1m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	<3m	Half Roof	No	NA	No	No	Yes	Yes
1567 Graveley	Pemberton	<1m	<1m	35-40 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	Yes	Yes
1565 Graveley	Pemberton	<1m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	Yes	Yes
1415 W Keith	Pemberton	1-2m	1-2m	35-40 deg.	None	25-50%	Straight	Yes	Timbers	None	None	9-12m	Half Roof	No	NA	No	No	Yes	Yes
1395 W Keith	Pemberton	<1m	<1m	35-40 deg.	None	25-50%	Straight	Yes	Timbers	None	None	>12m	Half Roof	No	NA	No	Yes	Yes	Yes
4085 Capilano	Capilano	1-2m	<1m	30-35 deg.	Cracks	25-50%	Pistol Butt	Yes	Timbers	None	None	<3m	Full Roof	No	NA	No	No	No	Yes
4421 Patterdale	Capilano	1-2m	1-2m	25-30 deg.	Erosion	25-50%	Pistol Butt	Yes	Concrete	None	None	3-6m	Full Roof	No	NA	Yes	Unknown	No	Yes
1287 Seymour	Riverside West	1-2m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
1273 Seymour	Riverside West	<1m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
1261 Seymour	Riverside West	<1m	<1m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
1147 Heritage	Riverside West	<1m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1151 Heritage	Riverside West	<1m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1155 Heritage	Riverside West	<1m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1159 Heritage	Riverside West	<1m	1-2m	35-40 deg.	Slides	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1163 Heritage	Riverside West	<1m	1-2m	35-40 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	Yes	No	No	No
1167 Heritage	Riverside West	1-2m	1-2m	35-40 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1171 Heritage	Riverside West	1-2m	1-2m	35-40 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1175 Heritage	Riverside West	<1m	1-2m	35-40 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
1179 Heritage	Riverside West	<1m	1-2m	35-40 deg.	None	>75%	Leaning	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
985 Heritage	Riverside West	<1m	1-2m	25-30 deg.	None	25-50%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
979 Heritage	Riverside West	<1m	1-2m	25-30 deg.	None	25-50%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	No
973 Heritage	Riverside West	<1m	1-2m	25-30 deg.	None	25-50%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	Yes	No	No	No
967 Heritage	Riverside West	<1m	1-2m	25-30 deg.	None	25-50%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	Yes	No	No	No
689 Bow	Riverside West	1-2m	<1m	>40 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
687 Bow	Riverside West	<1m	<1m	>40 deg.	None	50-75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
683 Bow	Riverside West	1-2m	<1m	35-40 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
679 Seymour	Riverside West	<1m	1-2m	>40 deg.	Slides	50-75%	Pistol Butt	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
647 Seymour	Riverside West	1-2m	<1m	>40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
639 Seymour	Riverside West	1-2m	<1m	>40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
633 Seymour	Riverside West	1-2m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
631 Seymour	Riverside West	1-2m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
625 Seymour	Riverside West	1-2m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
621 Seymour	Riverside West	1-2m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	>12m	Backyard	No	NA	No	No	No	Yes
4424 Skyline	Mosquito Creek	<1m	<1m	35-40 deg.	Slides	<25%	Straight	No	NA	NA	None	3-6m	Half Roof	No	NA	No	No	No	No
518 Alpine Court - West	Mosquito Creek	<1m	<1m	>40 deg.	Erosion	>75%	Straight	No	NA	None	None	<3m	Frontyard	No	NA	No	No	No	No
518 Alpine Court - East	Mosquito Creek	<1m	1-2m	35-40 deg.	Erosion	>75%	Straight	No	NA	NA	None	<3m	Frontyard	No	NA	No	No	No	No
515 Alpine	Mosquito Creek	<1m	<1m	35-40 deg.	Erosion	25-50%	Straight	Yes	Concrete	None	None	<3m	Frontyard	No	NA	No	No	No	Yes
4867 Skyline	Mosquito Creek	<1m	1-2m	>40 deg.	Erosion	>75%	Straight	Yes	Other	None	None	<3m	Frontyard	Yes	Undeformed	Yes	No	No	Yes
647 Croydon	Mosquito Creek	<1m	1-2m	35-40 deg.	Slides	50-75%	Straight	Yes	Timbers	None	None	3-6m	Backyard	No	NA	Yes	No	No	Yes
481 Ventura	Mosquito Creek	<1m	<1m	>40 deg.	Slides	25-50%	Straight	No	NA	NA	Settled	3-6m	Frontyard	No	NA	No	No	No	No
4717 Prospect	Mosquito Creek	1-2m	1-2m	35-40 deg.	Cracks	50-75%	Pistol Butt	Yes	Other	None	None	>12m	Backyard	No	NA	Yes	No	No	Yes
4685 Prospect	Mosquito Creek	<1m	<1m	35-40 deg.	Erosion	50-75%	Straight	Yes	Other	Settled	Settled	3-6m	Backyard	Yes	Undeformed	No	Yes	No	No
2604 Lauralynn	West Hastings	<1m	1-2m	<25 deg.	None	>75%	Straight	No	NA	NA	None	>12m	Frontyard	No	NA	No	No	No	No
2602 Lauralynn	West Hastings	1-2m	1-2m	25-30 deg.	Slides	>75%	Straight	No	NA	NA	None	>12m	Frontyard	No	NA	No	No	No	No

Table D-1. Summary of Field Observations to Inform Landslide Likelihood Estimation (Pslide)

Address	Escarpment	Loose Materials at Fence	Loose Materials Down Slope	Slope Angle	Slope Deformation	% Conifers	Tree Condition	Retaining Wall	Wall Type	Wall Deformation	Backyard Deformation	Dist. To Crest	Runoff From	Pool or Hot Tub	Pool Condition	Seepage	Conn. Storm Sewer (according to previous assessment)	Mostly Gravel in Auger Holes	Conn. Storm Sewer (May 2024)
2590 Lauralynn	West Hastings	1-2m	<1m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	6-9m	Frontyard	No	NA	Yes	No	No	Yes
2574 Lauralynn	West Hastings	1-2m	<1m	35-40 deg.	Slides	50-75%	Straight	No	NA	NA	None	6-9m	Frontyard	No	NA	Yes	No	No	No
2558 Lauralynn	West Hastings	1-2m	1-2m	35-40 deg.	Slides	>75%	Leaning	No	NA	NA	Settled	6-9m	Frontyard	Yes	Undeformed	Yes	No	No	Yes
2542 Lauralynn	West Hastings	1-2m	1-2m	>40 deg.	Slides	50-75%	Straight	Yes	Other	None	None	>12m	Frontyard	No	NA	Yes	No	No	Yes
2526 Lauralynn	West Hastings	2-3m	1-2m	25-30 deg.	None	50-75%	Straight	No	NA	NA	None	>12m	Frontyard	Yes	Undeformed	No	No	No	No
2510 Lauralynn	West Hastings	1-2m	<1m	30-35 deg.	Slides	50-75%	Straight	No	NA	NA	None	9-12m	Frontyard	No	NA	No	No	No	No
2498 Lauralynn	West Hastings	2-3m	1-2m	35-40 deg.	Erosion	50-75%	Leaning	Yes	Timbers	None	None	6-9m	Frontyard	No	NA	No	No	No	No
2486 Lauralynn	West Hastings	1-2m	<1m	25-30 deg.	Slides	50-75%	Leaning	No	NA	NA	None	9-12m	Frontyard	No	NA	No	No	No	No
2474 Lauralynn	West Hastings	1-2m	1-2m	25-30 deg.	None	50-75%	Straight	No	NA	NA	Settled	>12m	Frontyard	No	NA	Yes	No	No	No
2462 Lauralynn	West Hastings	1-2m	1-2m	30-35 deg.	None	25-50%	Pistol Butt	Yes	Timbers	Bulging	None	>12m	Frontyard	No	NA	Yes	No	No	Yes
2450 Lauralynn	West Hastings	1-2m	1-2m	25-30 deg.	Slides	25-50%	Straight	No	NA	NA	None	>12m	Frontyard	No	NA	No	No	No	Yes
2438 Lauralynn	West Hastings	1-2m	<1m	30-35 deg.	Erosion	>75%	Straight	No	NA	NA	None	>12m	Frontyard	No	NA	No	No	No	Yes
2248 Greylynn	West Hastings	1-2m	<1m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	>12m	Frontyard	No	NA	Yes	No	No	Yes
2240 Greylynn	West Hastings	1-2m	1-2m	30-35 deg.	Slides	>75%	Straight	No	NA	NA	None	>12m	Frontyard	Yes	Undeformed	No	No	No	Yes
2232 Greylynn	West Hastings	<1m	1-2m	30-35 deg.	Slides	>75%	Straight	Yes	Timbers	Settled	None	>12m	Frontyard	No	NA	No	No	No	Yes
2224 Greylynn	West Hastings	<1m	<1m	30-35 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Frontyard	No	NA	Yes	No	No	Yes
2208 Greylynn	West Hastings	<1m	<1m	25-30 deg.	Slides	>75%	Pistol Butt	No	NA	NA	None	>12m	Frontyard	No	NA	Yes	No	No	No
2190 Greylynn	West Hastings	<1m	1-2m	35-40 deg.	Slides	>75%	Pistol Butt	Yes	Timbers	None	None	>12m	Frontyard	No	NA	Yes	No	No	Yes
1588 Merlynn	West Hastings	<1m	1-2m	30-35 deg.	None	>75%	Straight	No	NA	NA	Cracked	9-12m	Full Roof	No	NA	No	No	No	No
1582 Merlynn	West Hastings	<1m	1-2m	>40 deg.	Slides	50-75%	Pistol Butt	Yes	Other	None	None	6-9m	Frontyard	No	NA	No	Yes	No	Yes
1576 Merlynn	West Hastings	<1m	2-3m	>40 deg.	Slides	50-75%	Leaning	Yes	Concrete	None	None	3-6m	Frontyard	No	NA	No	No	No	Yes
1570 Merlynn	West Hastings	1-2m	<1m	35-40 deg.	Slides	>75%	Pistol Butt	Yes	Timbers	None	None	6-9m	Frontyard	No	NA	No	No	No	No

Table D-2. Summary of Landslide Likelihood (Pslide) values.

Berkley Escarpment

		Pslide values (Following 10-4 Remediation (BGC, January 15, 2007))												2025 Pslide values				
Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
2477 Berton	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	1	1	1		0.14	0.0003	0.35	0.14	0.0001	0	-
2475 Berton	Berkley	1	0	0	0	0.35	0.35	0	1	1	1		0.12	0.0003	0.35	0.12	0.0001	0	-
2469 Berton	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.07	0.0002	0.35	0.07	0.0001	0	-
2465 Berton	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	0	-
2461 Berton	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	0	-
2441 Mowat	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	0	-
2437 Mowat	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	1	1	1		0.14	0.0003	0.35	0.14	0.0001	0	-
2433 Mowat	Berkley	1	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.09	0.0002	0.35	0.09	0.0001	0	-
2429 Mowat	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	1	1	1		0.14	0.0003	0.35	0.14	0.0001	0	-
2425 Mowat	Berkley	1	0	0	0	0.35	0.35	0	1	1	1		0.12	0.0003	0.35	0.12	0.0001	0	-
1231 Lennox	Berkley	0.8	1	0	1	1	0.35	1	1	2	2		0.56	0.0013	0.35	0.56	0.0006	0	-
1275 Lennox	Berkley	1.25	0.5	0	0.5	0.5	0.35	0	1	1	1		0.22	0.0005	0.35	0.22	0.0002	1	0.00022
1279 Lennox	Berkley	1.25	0.5	0	0.5	0.5	0.35	1	1	2	2		0.44	0.0011	0.35	0.44	0.0004	0	-
1305 Lennox	Berkley	1	1	1	2	2	0.35	1	0	1	1		0.70	0.0017	0.35	0.70	0.0007	1	0.00070
1345 Lennox	Berkley	1	0.5	1	1.5	1	0.35	0	1	1	1		0.35	0.0008	0.35	0.35	0.0004	0	-
1383 Lennox	Berkley	1	0.5	1	1.5	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
1425 Lennox	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	4	0.00002
1477 Lennox	Berkley	0.8	1	0	1	1	0.35	0	0	0	0.5		0.14	0.0003	0.35	0.14	0.0001	2	0.00007
1479 Lennox	Berkley	1	1	0	1	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
1491 Lennox	Berkley	1	1	0	1	1	0.35	1	1	2	2		0.70	0.0017	0.35	0.70	0.0007	2	0.00035
1535 Lennox	Berkley	1	1	1	2	2	0.35	1	1	2	2		1.40	0.0034	0.35	1.40	0.0014	2	0.00070
1557 Lennox	Berkley	1	1	0	1	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
1583 Lennox	Berkley	1	1	0	1	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
1593 Lennox	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	3	0.00003
2402 Swinburne	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	1	0.00010
2410 Swinburne	Berkley	1	0.5	1	1.5	1	0.35	0	1	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
2414 Swinburne	Berkley	1	0.5	0	0.5	0.5	0.35	0	1	1	1		0.18	0.0004	0.35	0.18	0.0002	1	0.00018
1677 Layton	Berkley	1	0.5	0	0.5	0.5	0.35	0	1	1	1		0.18	0.0004	0.35	0.18	0.0002	1	0.00018
1691 Layton	Berkley	1	1	1	2	2	0.35	1	1	2	2		1.40	0.0034	0.35	1.40	0.0014	1	0.00140
1709 Layton	Berkley	1	1	1	2	2	0.35	0	1	1	1		0.70	0.0017	0.35	0.70	0.0007	1	0.00070
1731 Layton	Berkley	1	1	1	2	2	0.35	1	0	1	1		0.70	0.0017	0.35	0.70	0.0007	1	0.00070
1753 Layton	Berkley	0.8	0.5	0	0.5	0.5	0.35	1	1	2	2		0.28	0.0007	0.35	0.28	0.0003	2	0.00014
1775 Layton	Berkley	1	1	1	2	2	0.35	0	0	0	0.5		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
1797 Layton	Berkley	1.25	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.11	0.0003	0.35	0.11	0.0001	1	0.00011
1815 Layton	Berkley	0.8	0.5	1	1.5	1	0.35	1	0	1	1		0.28	0.0007	0.35	0.28	0.0003	2	0.00014
2391 Carman	Berkley	1	1	0	1	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
2379 Carman	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	3	0.00003
2360 Carman S.	Berkley	1	0.5	0	0.5	0.5	0.35	1	1	2	2		0.35	0.0008	0.35	0.35	0.0004	1	0.00035
2360 Carman N.	Berkley	1	0.5	0	0.5	0.5	0.35	1	0	1	1		0.18	0.0004	0.35	0.18	0.0002	1	0.00018
2372 Carman	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	2	0.00005
2386 Carman	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.07	0.0002	0.35	0.07	0.0001	2	0.00004
1839 Layton	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.07	0.0002	0.35	0.07	0.0001	1	0.00007
1847 Layton	Berkley	0.8	0.5	0	0.5	0.5	0.35	1	0	1	1		0.14	0.0003	0.35	0.14	0.0001	1	0.00014
1855 Layton	Berkley	1	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.09	0.0002	0.35	0.09	0.0001	1	0.00009
1863 Layton	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	0.0001	1	0.00010
Hayseed/Layton Gully	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	9.80E-05	2	0.00005
2448 Hayseed	Berkley	0.8	0.5	1	1.5	1	0.35	0	1	1	1		0.28	0.0007	0.35	0.28	2.80E-04	1	0.00028
2454 Hayseed	Berkley	1	1	0	1	1	0.35	1	0	1	1		0.35	0.0008	0.35	0.35	3.50E-04	1	0.00035
2462 Hayseed	Berkley	0.8	0	0	0	0.35	0.35	0	1	1	1		0.10	0.0002	0.35	0.10	9.80E-05	2	0.00005
2468 Hayseed	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	4.90E-05	2	0.00002
2474 Hayseed	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	0	0	0.5		0.07	0.0002	0.35	0.07	7.00E-05	1	0.00007
2480 Hayseed	Berkley	0.8	0.5	0	0.5	0.5	0.35	1	1	2	2		0.28	0.0007	0.35	0.28	2.80E-04	1	0.00028
2486 Hayseed	Berkley	1	0.5	0	0.5	0.5	0.35	1	0	1	1		0.18	0.0004	0.35	0.18	1.75E-04	1	0.00018
2125 Berkley	Berkley	0.8	0	0	0	0.35	0.35	1	0	1	1		0.10	0.0002	0.35	0.10	0.0001	1	0.00010
2141 Berkley	Berkley	0.8	0	1	1	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	1	0.00005
2157 Berkley	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	1	0.00005
2175 Berkley	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	1	0.00005
2191 Berkley	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	1	0.00005
2205 Berkley	Berkley	0.8	0	0	0	0.35	0.35	0	0	0	0.5		0.05	0.0001	0.35	0.05	0.00005	1	0.00005
2217 Berkley	Berkley	1.25	1	1	2	2	0.35	0	1	1	1		0.88	0.0021	0.35	0.88	0.0009	1	0.00088
2223 Berkley	Berkley	0.8	1	0	1	1	0.35	1	0	1	1		0.28	0.0007	0.35	0.28	0.0003	1	0.00028
2249 Berkley	Berkley	1	1	1	2	2	0.35	1	0	1	1		0.70	0.0017	0.35	0.70	0.0007	0	-
2251 Berkley	Berkley	0.8	1	0	1	1	0.35	0	0	0	0.5		0.14	0.0003	0.35	0.14	0.0001	0	-
2265 Berkley	Berkley	1	0.5	0	0.5	0.5	0.35	1	1	2	2		0.35	0.0008	0.35	0.35	0.0004	0	-
2279 Berkley	Berkley	0.8	0.5	0	0.5	0.5	0.35	0	1	1	1		0.14	0.0003	0.35	0.14	0.0001	0	-
2293 Berkley	Berkley	1	1	0	1	1	0.35	0	1	1	1		0.35	0.0008	0.35	0.35	0.0004	0	-
2307 Berkley	Berkley	1	1	0	1	1	0.35	0	0	0	0.5		0.18	0.0004	0.35	0.18	0.0002	0	-
2321 Berkley	Berkley	1	0.5	0	0.5	0.5	0.35	1	0	1	1		0.18	0.0004	0.35	0.18	0.0002	0	-
2335 Berkley	Berkley	1	1	0	1	1	0.35	0	0	0	0.5		0.18	0.0004	0.35	0.18	0.0002	0	-
2349 Berkley	Berkley	1	0.5	0	0.5	0.5	0.35	1	1	2	2		0.35	0.0008	0.35	0.35	0.0004	0	-
2363 Berkley	Berkley	1	0.5	0	0.5	0.5	0.35	0	1	1	1		0.18	0.0004	0.35	0.18	0.0002	0	-
2377 Berkley	Berkley	1.25	1	1	2	2	0.35	1	1	2	2		1.75	0.0042	0.35	1.75	0.0018	0	-
2391 Berkley	Berkley	1.25	0.5	0	0.5	0.5	0.35	1	1	2	2		0.44	0.0011	0.35	0.44	0.0004	0	-
2409 Berkley	Berkley	1	0.5	1	1.5	1	0.35	1	1	2	2		0.70	0.0017	0.35	0.70	0.0007	0	-
2425 Berkley	Berkley	0.8	0.5	0	0.5	0.5	0.35	1	1	2	2		0.28	0.0007	0.35	0.28	0.0003	0	-

Westlynn, Pemberton Heights

Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
4780 Hoskins	Westlynn	0.8	0	0	0	0.35	0.35	0	1	1	1	0.8	0.08	0.0002	0.35	0.08	0.0001	1	0.00008
4778 Hoskins	Westlynn	0.8	0	0	0	0.35	0.35	0	1	1	1	0.8	0.08	0.0002	0.35	0.08	0.0001	1	0.00008
4774 Hoskins	Westlynn	0.8	0.5	0	0.5	0.5	0.35	1	1	2	2	0.8	0.22	0.0005	0.35	0.22	0.0002	2	0.00011
4772 Hoskins	Westlynn	0.8	0	0	0	0.35	0.35	0	0	0	0.5	0.8	0.04	0.0001	0.35	0.04	0.00004	2	0.00002
2345 Kilmarnock	Westlynn	0.8	0.5	0	0.5	0.5	0.5	1	0	1	1	1	0.20	0.0005	0.5	0.20	0.0002	2	0.00010
2339 Kilmarnock	Westlynn	0.8	1	0	1	1	0.35	1	0	1	1	1	0.28	0.0007	0.35	0.28	0.0003	1	0.00028
1864 Beaulynn	Westlynn	0.8	0.5	0	0.5	0.5	0.35	0	1	1	1	1	0.14	0.0003	0.35	0.14	0.0001	2	0.00007
1858 Beaulynn	Westlynn	0.8	1	0	1	1	0.35	0	1	1	1	1	0.28	0.0007	1.25	1.00	0.0010	2	0.00050
1751 Irene	Westlynn	1	0	0	0	0.35	0.75	1	1	2	2	1	0.53	0.0013	0.35	0.25	0.0002	0	-
1742 Irene	Westlynn	1	0	0	0	0.35	0.75	1	1	2	2	1	0.53	0.0013	0.35	0.25	0.0002	0	-
4150 Lynn Valley	Westlynn	1	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.63	0.0015	1.25	0.63	0.0006	0	-
2620 Lauralynn	Westlynn	1	0.5	0	0.5	0.5	1.25	1	0	1	1	1	0.63	0.0015	0.35	0.18	0.0002	0	-
1595 Graveley (W)	Pemberton Heights	1	0	0	0	0.35	0.75	0	0	0	0.5	0.8	0.11	0.0003	0.35	0.05	0.0000	1	0.00005
1595 Graveley (S)	Pemberton Heights	1	0	0	0	0.35	0.75	0	1	1	1	0.8	0.21	0.0005	0.35	0.10	0.0001	1	0.00010
1567 Graveley	Pemberton Heights	1	0	0	0	0.35	0.5	0	0	0	0.5	0.8	0.07	0.0002	0.35	0.05	0.0000	3	0.00002
1565 Graveley	Pemberton Heights	1	0	0	0	0.35	0.5	0	1	1	1	0.8	0.14	0.0003	0.35	0.10	0.0001	1	0.00010
1415 W Keith	Pemberton Heights	1	0.5	0	0.5	0.5	0.75	0	0	0	0.5	0.8	0.15	0.0004	0.35	0.07	0.0001	2	0.00004
1395 W Keith	Pemberton Heights	1	0	0	0	0.35	0.35	0	0	0	0.5	0.8	0.05	0.0001	0.35	0.05	0.0000	1	0.00005

Capilano

Average Slide Likelihood = 0.0024 | Average Slide Likelihood = 0.0010

		2009 Pslide values (BGC, 2009)													2025 Pslide values				
Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
4085 Capilano	Capilano	0.8				0.5	1	0	1	1	1		0.4	0.0010	0.35	0.14	0.0001	1	0.00014
4421 Patterdale	Capilano	0.8				0.5	1	0	1	1	1		0.4	0.0010	0.35	0.14	0.0001	0	-

Riverside West

Average Slide Likelihood = 0.0024 | Average Slide Likelihood = 0.0010

		2010 Pslide values													2025 Pslide values				
Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
1287 Seymour	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.35	0.18	0.0002	1	0.00018
1273 Seymour	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.35	0.12	0.0001	1	0.00012
1261 Seymour	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.35	0.12	0.0001	1	0.00012
1147 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1151 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1155 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1159 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1163 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1167 Heritage	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.5	0.25	0.0003	1	0.00025
1171 Heritage	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.5	0.25	0.0003	1	0.00025
1175 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
1179 Heritage	Riverside West	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	1	0.00018
985 Heritage	Riverside West	0.8	0	0	0	0.35	0.5	0	1	1	1		0.14	0.0003	0.5	0.14	0.0001	1	0.00014
979 Heritage	Riverside West	0.8	0	0	0	0.35	0.5	0	1	1	1		0.14	0.0003	0.5	0.14	0.0001	1	0.00014
973 Heritage	Riverside West	0.8	0	0	0	0.35	0.5	0	1	1	1		0.14	0.0003	0.5	0.14	0.0001	1	0.00014
967 Heritage	Riverside West	0.8	0	0	0	0.35	0.5	0	1	1	1		0.14	0.0003	0.5	0.14	0.0001	1	0.00014
689 Bow	Riverside West	1.25	0.5	0	0.5	0.5	0.5	0	0	0	0.5		0.16	0.0004	0.35	0.11	0.0001	1	0.00011
687 Bow	Riverside West	1.25	0	0	0	0.35	0.5	0	1	1	1		0.22	0.0005	0.35	0.15	0.0002	1	0.00015
683 Bow	Riverside West	1	0.5	0	0.5	0.5	0.5	0	0	0	0.5		0.13	0.0003	0.35	0.09	0.0001	1	0.00009
679 Seymour	Riverside West	1.25	0	0	0	0.35	0.5	0	1	1	1		0.22	0.0005	0.35	0.15	0.0002	1	0.00015
647 Seymour	Riverside West	1.25	0.5	0	0.5	0.5	0.5	0	1	1	1		0.31	0.0008	0.35	0.22	0.0002	1	0.00022
639 Seymour	Riverside West	1.25	0.5	0	0.5	0.5	0.5	0	1	1	1		0.31	0.0008	0.35	0.22	0.0002	1	0.00022
633 Seymour	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.35	0.18	0.0002	1	0.00018
631 Seymour	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.35	0.18	0.0002	1	0.00018
625 Seymour	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.35	0.18	0.0002	1	0.00018
621 Seymour	Riverside West	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.35	0.18	0.0002	1	0.00018

Mosquito Creek West

Average Slide Likelihood = 0.0024 | Average Slide Likelihood = 0.0010

		2010 Pslide values													2025 Pslide values				
Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
4424 Skyline	Mosquito Creek	1	0	0	0	0.35	0.75	0	1	1	1		0.26	0.0006	0.75	0.26	0.0003	0	-
518 Alpine Court - West	Mosquito Creek	1.25	0	0	0	0.35	1.25	0	0	0	0.5		0.27	0.0007	1.25	0.27	0.0003	1	0.00027
518 Alpine Court - East	Mosquito Creek	1	0	0	0	0.35	1.25	0	0	0	0.5		0.22	0.0005	1.25	0.22	0.0002	0	-
515 Alpine	Mosquito Creek	1	0	0	0	0.35	1.25	0	0	0	0.5		0.22	0.0005	0.5	0.09	0.0001	2	0.00004
4867 Skyline	Mosquito Creek	1.25	0	0	0	0.35	1.25	0	0	0	0.5		0.27	0.0007	0.5	0.11	0.0001	0	-
647 Croydon	Mosquito Creek	1	0	0	0	0.35	0.5	0	1	1	1		0.18	0.0004	0.5	0.18	0.0002	0	-
481 Ventura	Mosquito Creek	1.25	0	0	0	0.35	1.25	1	1	2	2		1.09	0.0026	1.25	1.09	0.0011	0	-
4717 Prospect	Mosquito Creek	1	0.5	0	0.5	0.5	0.5	0	1	1	1		0.25	0.0006	0.5	0.25	0.0003	0	-
4685 Prospect	Mosquito Creek	1	0	0	0	0.35	0.5	1	0	1	1		0.18	0.0004	0.5	0.18	0.0002	6	0.00003

West Hastings Escarpment

													Average Slide Likelihood = 0.0024				Average Slide Likelihood = 0.0010		
		2013 Pslide values (BGC, May 2013)													2025 Pslide values				
Address	Escarpment	Slope Score	Soil Crest	Soil Slope	Soil Sum	Soil Score	Water Score	Def Crest	Def Slope	Def Sum	Deformation Score	Gravel Content	Adjustment Factor	Pslide	Water Score	Adjustment Factor	Pslide	Slide Paths with Homes Downslope (mapped from 2022 lidar)	Pslide/path
2604 Lauralynn	West Hastings	0.8	0	0	0	0.35	1.25	0	0	0	0.5	1	0.18	0.0004	1.25	0.18	0.0002	0	-
2602 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	1.25	0.50	0.0005	1	0.00050
2590 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	0.35	0.14	0.0001	0	-
2574 Lauralynn	West Hastings	1	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.63	0.0015	1.25	0.63	0.0006	0	-
2558 Lauralynn	West Hastings	1	0.5	0	0.5	0.5	1.25	1	1	2	2	1	1.25	0.0030	0.35	0.35	0.0004	0	-
2542 Lauralynn	West Hastings	1.25	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.78	0.0019	0.35	0.22	0.0002	1	0.00022
2526 Lauralynn	West Hastings	0.8	1	0	1	1	1.25	0	0	0	0.5	1	0.50	0.0012	1.25	0.50	0.0005	1	0.00050
2510 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	1.25	0.50	0.0005	0	-
2498 Lauralynn	West Hastings	1	1	0	1	1	1.25	0	1	1	1	1	1.25	0.0030	1.25	1.25	0.0013	0	-
2486 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	1.25	0.50	0.0005	0	-
2474 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	1	0	1	1	1	0.50	0.0012	1.25	0.50	0.0005	0	-
2462 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	1	1	2	2	1	1.00	0.0024	0.35	0.28	0.0003	1	0.00028
2450 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	0.35	0.14	0.0001	3	0.00005
2438 Lauralynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	0	0	0.5	1	0.25	0.0006	0.35	0.07	0.0001	1	0.00007
2248 Greylynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	0.35	0.14	0.0001	3	0.00005
2240 Greylynn	West Hastings	0.8	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.50	0.0012	0.35	0.14	0.0001	1	0.00014
2232 Greylynn	West Hastings	0.8	0	0	0	0.35	1.25	1	1	2	2	1	0.70	0.0017	0.35	0.20	0.0002	1	0.00020
2224 Greylynn	West Hastings	0.8	0	0	0	0.35	1.25	0	1	1	1	1	0.35	0.0008	0.35	0.10	0.0001	1	0.00010
2208 Greylynn	West Hastings	0.8	0	0	0	0.35	1.25	0	1	1	1	1	0.35	0.0008	1.25	0.35	0.0004	1	0.00035
2190 Greylynn	West Hastings	1	0	0	0	0.35	1.25	0	1	1	1	1	0.44	0.0011	0.35	0.12	0.0001	1	0.00012
1588 Merlynn	West Hastings	0.8	0	0	0	0.35	1	1	0	1	1	1	0.28	0.0007	1	0.28	0.0003	1	0.00028
1582 Merlynn	West Hastings	1.25	0	0	0	0.35	0.35	0	1	1	1	1	0.15	0.0004	0.35	0.15	0.0002	1	0.00015
1576 Merlynn	West Hastings	1.25	0	1	1	0.35	1.25	0	1	1	1	1	0.55	0.0013	0.35	0.15	0.0002	1	0.00015
1570 Merlynn	West Hastings	1	0.5	0	0.5	0.5	1.25	0	1	1	1	1	0.63	0.0015	1.25	0.63	0.0006	1	0.00063

Table D-3. Life-Safety Risk to Properties at the Base of Escarpment Slopes

Downslope Address	Building ID	Escarpment	Property at Slope Crest	Closest Upslope Property			Slope Angle (deg)	Slope Height (m)	Pslide	Spatial Impact + Vulnerability (V)	Individual Risk	Group Risk			
				Upslope Property (Y/N)	Upslope Property	Vulnerability at Upslope property					Annual PDI	No. Occupants (E)	Occupant Temporal (PT:S)	N (Fatalities)	Societal Risk (per year)
2336 TreeTop Lane	BLDG13192	Berkley	2223 Berkley	No	-	-	21	53	2.80E-04	0.004	8.3E-07	4	0.5	8.88E-03	2.49E-06
2354 TreeTop Lane	BLDG13125	Berkley	2223 Berkley	No	-	-	21	53	2.80E-04	0.004	8.3E-07	4	0.5	8.88E-03	2.49E-06
2336 TreeTop Lane	BLDG13192	Berkley	2217 Berkley	No	-	-	21	53	8.75E-04	0.004	2.6E-06	4	0.5	8.88E-03	7.77E-06
2296 Chapman Way	BLDG25600	Berkley	2205 Berkley	No	-	-	19	55	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2296 Chapman Way	BLDG25600	Berkley	2191 Berkley	No	-	-	19	56	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2296 Chapman Way	BLDG25600	Berkley	2175 Berkley	No	-	-	19	56	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2296 Chapman Way	BLDG25600	Berkley	2157 Berkley	No	-	-	19	56	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2430 Chapman Way	BLDG13703	Berkley	2141 Berkley	No	-	-	29	53	4.90E-05	0.562	1.8E-05	4	0.5	1.12E+00	5.50E-05
2230 Chapman Way	BLDG13634	Berkley	2141 Berkley	Yes	2430 Chapman Way	0.562	24	69	4.90E-05	0.155	5.1E-06	4	0.5	3.11E-01	1.52E-05
2256 Chapman Way	BLDG13586	Berkley	2141 Berkley	Yes	2430 Chapman Way	0.562	24	69	4.90E-05	0.155	5.1E-06	4	0.5	3.11E-01	1.52E-05
2243 Chapman Way	BLDG13522	Berkley	2141 Berkley	Yes	2230 Chapman Way	0.155	19	69	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2230 Chapman Way	BLDG13634	Berkley	2125 Berkley	No	-	-	24	70	9.80E-05	0.193	1.3E-05	4	0.5	3.86E-01	3.78E-05
2222 Chapman Way	BLDG13704	Berkley	2125 Berkley	No	-	-	24	70	9.80E-05	0.193	1.3E-05	4	0.5	3.86E-01	3.78E-05
2243 Chapman Way	BLDG13522	Berkley	2125 Berkley	Yes	2230 Chapman Way	0.155	19	70	9.80E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2225 Chapman Way	BLDG13595	Berkley	2125 Berkley	Yes	2230 Chapman Way	0.155	19	70	9.80E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2222 Chapman Way	BLDG13704	Berkley	2486 Hayseed	No	-	-	25	70	1.75E-04	0.285	3.3E-05	4	0.5	5.70E-01	9.97E-05
2206 Chapman Way	BLDG13767	Berkley	2486 Hayseed	No	-	-	20	70	1.75E-04	0.002	2.4E-07	4	0.5	4.10E-03	7.17E-07
2225 Chapman Way	BLDG13595	Berkley	2486 Hayseed	Yes	2222 Chapman Way	0.193	20	70	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2192 Chapman Way	BLDG13812	Berkley	2480 Hayseed	No	-	-	25	71	2.80E-04	0.285	5.3E-05	4	0.5	5.70E-01	1.59E-04
2206 Chapman Way	BLDG13767	Berkley	2480 Hayseed	No	-	-	25	71	2.80E-04	0.285	5.3E-05	4	0.5	5.70E-01	1.59E-04
2207 Chapman Way	BLDG13681	Berkley	2480 Hayseed	Yes	2192 Chapman Way	0.285	20	71	2.80E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2225 Chapman Way	BLDG13595	Berkley	2480 Hayseed	Yes	2192 Chapman Way	0.285	20	71	2.80E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2180 Chapman Way	BLDG13877	Berkley	2474 Hayseed	No	-	-	28	72	7.00E-05	0.566	2.6E-05	4	0.5	1.13E+00	7.92E-05
2192 Chapman Way	BLDG13812	Berkley	2474 Hayseed	No	-	-	28	72	7.00E-05	0.566	2.6E-05	4	0.5	1.13E+00	7.92E-05
2207 Chapman Way	BLDG13681	Berkley	2474 Hayseed	Yes	2180 Chapman Way	0.566	21	72	7.00E-05	0.004	2.1E-07	4	0.5	8.88E-03	6.22E-07
2185 Chapman Way	BLDG13755	Berkley	2474 Hayseed	Yes	2180 Chapman Way	0.566	21	72	7.00E-05	0.004	2.1E-07	4	0.5	8.88E-03	6.22E-07
2180 Chapman Way	BLDG13877	Berkley	2468 Hayseed	No	-	-	27	71	2.45E-05	0.511	8.3E-06	4	0.5	1.02E+00	2.50E-05
2192 Chapman Way	BLDG13812	Berkley	2468 Hayseed	No	-	-	27	71	2.45E-05	0.511	8.3E-06	4	0.5	1.02E+00	2.50E-05
2207 Chapman Way	BLDG13681	Berkley	2468 Hayseed	Yes	2180 Chapman Way	0.566	20	71	2.45E-05	0.001	1.5E-08	4	0.5	1.82E-03	4.47E-08
2185 Chapman Way	BLDG13755	Berkley	2468 Hayseed	Yes	2180 Chapman Way	0.566	20	71	2.45E-05	0.001	1.5E-08	4	0.5	1.82E-03	4.47E-08
2170 Chapman Way	BLDG13932	Berkley	2468 Hayseed	No	-	-	27	64	2.45E-05	0.511	8.3E-06	4	0.5	1.02E+00	2.50E-05
2151 Chapman Way	BLDG13817	Berkley	2468 Hayseed	Yes	2170 Chapman Way	0.511	20	64	2.45E-05	0.001	1.5E-08	4	0.5	1.82E-03	4.47E-08
2086 Rivergrove	BLDG14099	Berkley	2462 Hayseed	Yes	2078 Rivergrove	0.636	33	73	4.90E-05	0.595	1.9E-05	4	0.5	1.19E+00	5.83E-05
2078 Rivergrove	BLDG14216	Berkley	2462 Hayseed	No	-	-	35	73	4.90E-05	0.636	2.1E-05	4	0.5	1.27E+00	6.23E-05
2158 Chapman Way	BLDG13960	Berkley	2462 Hayseed	Yes	2078 Rivergrove	0.636	26	73	4.90E-05	0.379	1.2E-05	4	0.5	7.58E-01	3.71E-05
2151 Chapman Way	BLDG13817	Berkley	2462 Hayseed	Yes	2158 Chapman Way	0.379	20	73	4.90E-05	0.001	3.0E-08	4	0.5	1.82E-03	8.94E-08
2078 Rivergrove	BLDG14216	Berkley	2462 Hayseed	No	-	-	34	57	4.90E-05	0.595	1.9E-05	4	0.5	1.19E+00	5.83E-05
2067 Rivergrove	BLDG14143	Berkley	2462 Hayseed	Yes	2078 Rivergrove	0.636	25	57	4.90E-05	0.137	4.5E-06	4	0.5	2.74E-01	1.34E-05
2148 Chapman Way	BLDG13997	Berkley	2462 Hayseed	Yes	2067 Rivergrove	0.137	24	57	4.90E-05	0.006	2.0E-07	4	0.5	1.25E-02	6.14E-07
2078 Rivergrove	BLDG14216	Berkley	2454 Hayseed	No	-	-	33	58	1.75E-04	0.595	6.9E-05	4	0.5	1.19E+00	2.08E-04
2158 Chapman Way	BLDG13960	Berkley	2454 Hayseed	Yes	2078 Rivergrove	0.636	25	58	3.50E-04	0.137	3.2E-05	4	0.5	2.74E-01	9.58E-05
2067 Rivergrove	BLDG14143	Berkley	2454 Hayseed	Yes	2064 Rivergrove	0.501	25	56	3.50E-04	0.137	3.2E-05	4	0.5	2.74E-01	9.58E-05
2038 Rivergrove	BLDG14398	Berkley	Hayseed/Layton Gully	No	-	-	29	53	4.90E-05	0.562	1.8E-05	4	0.5	1.12E+00	5.50E-05
2352 Riverbank	BLDG14297	Berkley	2448 Hayseed	Yes	2050 Rivergrove	0.501	24	52	2.80E-04	0.042	7.8E-06	4	0.5	8.31E-02	2.33E-05
2346 Riverbank	BLDG14254	Berkley	2448 Hayseed	Yes	2352 Riverbank	0.042	22	52	2.80E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2336 Riverbank	BLDG14212	Berkley	2448 Hayseed	Yes	2346 Riverbank	0.000	20	52	2.80E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2026 Rivergrove	BLDG14449	Berkley	Hayseed/Layton Gully	No	-	-	27	47	4.90E-05	0.464	1.5E-05	4	0.5	9.28E-01	4.54E-05
2018 Rivergrove	BLDG14549	Berkley	1863 Layton	No	-	-	28	47	9.80E-05	0.520	3.4E-05	4	0.5	1.04E+00	1.02E-04
2018 Rivergrove	BLDG14549	Berkley	1855 Layton	No	-	-	28	43	8.75E-05	0.520	3.0E-05	4	0.5	1.04E+00	9.10E-05
2029 Rivergrove	BLDG14407	Berkley	1855 Layton	Yes	2018 Rivergrove	0.520	21	43	8.75E-05	0.001	5.3E-08	4	0.5	1.82E-03	1.60E-07
2002 Rivergrove	BLDG14610	Berkley	1847 Layton	No	-	-	27	42	1.40E-04	0.464	4.3E-05	4	0.5	9.28E-01	1.30E-04
2018 Rivergrove	BLDG14549	Berkley	1847 Layton	No	-	-	27	42	1.40E-04	0.464	4.3E-05	4	0.5	9.28E-01	1.30E-04
2029 Rivergrove	BLDG14407	Berkley	1847 Layton	Yes	2002 Rivergrove	0.464	20	42	1.40E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2002 Rivergrove	BLDG14610	Berkley	1839 Layton	No	-	-	28	42	7.00E-05	0.520	2.4E-05	4	0.5	1.04E+00	7.28E-05
2029 Rivergrove	BLDG14407	Berkley	1839 Layton	Yes	2002 Rivergrove	0.464	20	42	7.00E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1988 Rivergrove	BLDG14675	Berkley	2386 Carman	No	-	-	29	42	3.50E-05	0.562	1.3E-05	4	0.5	1.12E+00	3.93E-05
2002 Rivergrove	BLDG14610	Berkley	2386 Carman	No	-	-	29	42	3.50E-05	0.562	1.3E-05	4	0.5	1.12E+00	3.93E-05
2015 Rivergrove	BLDG14458	Berkley	2386 Carman	Yes	1988 Rivergrove	0.562	22	42	3.50E-05	0.003	6.9E-08	4	0.5	5.95E-03	2.08E-07
2029 Rivergrove	BLDG14407	Berkley	2386 Carman	Yes	1988 Rivergrove	0.562	22	42	3.50E-05	0.003	6.9E-08	4	0.5	5.95E-03	2.08E-07
1978 Rivergrove	BLDG14709	Berkley	2386 Carman	No	-	-	30	40	3.50E-05	0.595	1.4E-05	4	0.5	1.19E+00	4.16E-05
1988 Rivergrove	BLDG14675	Berkley	2386 Carman	No	-	-	30	40	3.50E-05	0.595	1.4E-05	4	0.5	1.19E+00	4.16E-05
1985 Rivergrove	BLDG14510	Berkley	2386 Carman	Yes	1978 Rivergrove	0.595	22	40	3.50E-05	0.003	6.9E-08	4	0.5	5.95E-03	2.08E-07
2015 Rivergrove	BLDG14458	Berkley	2386 Carman	Yes	1978 Rivergrove	0.595	22	40	3.50E-05	0.003	6.9E-08	4	0.5	5.95E-03	2.08E-07
2353 Riverbank	BLDG14319	Berkley	2386 Carman	Yes	2015 Rivergrove	0.003	20	40	3.50E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1978 Rivergrove	BLDG14709	Berkley	2372 Carman	No	-	-	28	40	4.90E-05	0.520	1.7E-05	4	0.5	1.04E+00	5.09E-05

Downslope Address	Building ID	Escarpment	Property at Slope Crest	Closest Upslope Property			Slope Angle (deg)	Slope Height (m)	Pslide	Spatial Impact + Vulnerability (V)	Individual Risk	Group Risk			
				Upslope Property (Y/N)	Upslope Property	Vulnerability at Upslope property					Annual PDI	No. Occupants (E)	Occupant Temporal (PT:S)	N (Fatalities)	Societal Risk (per year)
1950 Rivergrove	BLDG14716	Berkley	2372 Carman	No	-	-	28	40	4.90E-05	0.520	1.7E-05	4	0.5	1.04E+00	5.09E-05
1985 Rivergrove	BLDG14510	Berkley	2372 Carman	Yes	1978 Rivergrove	0.595	21	40	4.90E-05	0.001	3.0E-08	4	0.5	1.82E-03	8.94E-08
2015 Rivergrove	BLDG14458	Berkley	2372 Carman	Yes	1978 Rivergrove	0.595	21	40	4.90E-05	0.001	3.0E-08	4	0.5	1.82E-03	8.94E-08
2353 Riverbank	BLDG14319	Berkley	2372 Carman	Yes	1985 Rivergrove	0.003	19	40	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1946 Rivergrove	BLDG14727	Berkley	2372 Carman	No	-	-	26	44	4.90E-05	0.379	1.2E-05	4	0.5	7.58E-01	3.71E-05
1946 Rivergrove	BLDG14727	Berkley	2372 Carman	No	-	-	26	44	4.90E-05	0.379	1.2E-05	4	0.5	7.58E-01	3.71E-05
1838 Riverside	BLDG15090	Berkley	2360 Carman N.	No	-	-	28	72	1.75E-04	0.566	6.6E-05	4	0.5	1.13E+00	1.98E-04
1875 Riverside	BLDG15032	Berkley	2360 Carman N.	Yes	1838 Riverside	0.566	22	72	1.75E-04	0.024	2.8E-06	4	0.5	4.77E-02	8.36E-06
1777 Riverside	BLDG15440	Berkley	2360 Carman S.	Yes	1788 Riverside	0.372	21	78	3.50E-04	0.004	1.0E-06	4	0.5	8.88E-03	3.11E-06
1819 Riverside	BLDG15318	Berkley	2360 Carman S.	Yes	1788 Riverside	0.372	21	78	3.50E-04	0.004	1.0E-06	4	0.5	8.88E-03	3.11E-06
1758 Riverside	BLDG23255	Berkley	2379 Carman	No	-	-	27	80	3.27E-05	0.511	1.1E-05	4	0.5	1.02E+00	3.34E-05
1748 Riverside	BLDG23256	Berkley	2379 Carman	No	-	-	27	80	3.27E-05	0.511	1.1E-05	4	0.5	1.02E+00	3.34E-05
1733 Riverside	BLDG15550	Berkley	2379 Carman	Yes	1758 Riverside	0.511	21	80	3.27E-05	0.004	9.7E-08	4	0.5	8.88E-03	2.90E-07
1715 Riverside	BLDG15629	Berkley	2379 Carman	Yes	1748 Riverside	0.511	21	80	3.27E-05	0.004	9.7E-08	4	0.5	8.88E-03	2.90E-07
1730 Riverside	BLDG15690	Berkley	2379 Carman	No	-	-	25	75	3.27E-05	0.285	6.2E-06	4	0.5	5.70E-01	1.86E-05
1718 Riverside	BLDG15653	Berkley	2379 Carman	Yes	1730 Riverside	0.285	21	75	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1710 Riverside	BLDG15727	Berkley	2379 Carman	Yes	1730 Riverside	0.285	21	75	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1730 Riverside	BLDG15690	Berkley	2379 Carman	No	-	-	25	78	3.27E-05	0.285	6.2E-06	4	0.5	5.70E-01	1.86E-05
1748 Riverside	BLDG23256	Berkley	2379 Carman	Yes	1730 Riverside	0.285	21	78	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1730 Riverside	BLDG15690	Berkley	2391 Carman	No	-	-	24	78	3.50E-04	0.193	4.5E-05	4	0.5	3.86E-01	1.35E-04
1718 Riverside	BLDG15653	Berkley	2391 Carman	Yes	1730 Riverside	0.285	21	78	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1710 Riverside	BLDG15727	Berkley	2391 Carman	Yes	1730 Riverside	0.285	21	78	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1730 Riverside	BLDG15690	Berkley	1815 Layton	No	-	-	23	76	1.40E-04	0.068	6.3E-06	4	0.5	1.35E-01	1.89E-05
1718 Riverside	BLDG15653	Berkley	1815 Layton	Yes	1730 Riverside	0.285	20	76	1.40E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1710 Riverside	BLDG15727	Berkley	1815 Layton	Yes	1730 Riverside	0.285	20	76	1.40E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1650 Riverside	BLDG15815	Berkley	1815 Layton	No	-	-	22	69	1.40E-04	0.035	3.3E-06	4	0.5	7.00E-02	9.80E-06
1730 Riverside	BLDG15690	Berkley	1797 Layton	No	-	-	22	76	1.09E-04	0.035	2.6E-06	4	0.5	7.00E-02	7.66E-06
1718 Riverside	BLDG15653	Berkley	1797 Layton	Yes	1730 Riverside	0.285	20	76	1.09E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1710 Riverside	BLDG15727	Berkley	1797 Layton	Yes	1730 Riverside	0.285	20	76	1.09E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1730 Riverside	BLDG15690	Berkley	1775 Layton	No	-	-	21	74	3.50E-04	0.006	1.3E-06	4	0.5	1.12E-02	3.90E-06
1718 Riverside	BLDG15653	Berkley	1775 Layton	Yes	1730 Riverside	0.285	19	74	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1710 Riverside	BLDG15727	Berkley	1775 Layton	Yes	1730 Riverside	0.285	19	74	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1730 Riverside	BLDG15690	Berkley	1753 Layton	No	-	-	20	68	1.40E-04	0.002	1.9E-07	4	0.5	4.10E-03	5.73E-07
1650 Riverside	BLDG15815	Berkley	1753 Layton	No	-	-	22	68	1.40E-04	0.035	3.3E-06	4	0.5	7.00E-02	9.80E-06
1650 Riverside	BLDG15815	Berkley	1731 Layton	No	-	-	21	68	7.00E-04	0.006	2.6E-06	4	0.5	1.12E-02	7.81E-06
1650 Riverside	BLDG15815	Berkley	1709 Layton	No	-	-	21	68	7.00E-04	0.006	2.6E-06	4	0.5	1.12E-02	7.81E-06
1650 Riverside	BLDG15815	Berkley	1691 Layton	No	-	-	21	68	1.40E-03	0.006	5.2E-06	4	0.5	1.12E-02	1.56E-05
1650 Riverside	BLDG15815	Berkley	2410 Swinburne	No	-	-	20	60	3.50E-04	0.002	4.8E-07	4	0.5	4.10E-03	1.43E-06
1650 Riverside	BLDG15815	Berkley	2414 Swinburne	No	-	-	21	61	1.75E-04	0.006	6.5E-07	4	0.5	1.12E-02	1.95E-06
1650 Riverside	BLDG15815	Berkley	2402 Swinburne	No	-	-	22	57	9.80E-05	0.024	1.6E-06	4	0.5	4.77E-02	4.68E-06
1730 Riverside	BLDG15690	Berkley	2402 Swinburne	Yes	1650 Riverside	0.035	19	57	9.80E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1650 Riverside	BLDG15815	Berkley	1593 Lennox	No	-	-	21	58	3.27E-05	0.004	9.7E-08	4	0.5	8.88E-03	2.90E-07
1730 Riverside	BLDG15690	Berkley	1593 Lennox	Yes	1650 Riverside	0.035	19	58	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2300 Swinburne	BLDG16053	Berkley	1593 Lennox	Yes	2312 Swinburne	0.000	19	70	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2312 Swinburne	BLDG15995	Berkley	1593 Lennox	Yes	2316 Swinburne	0.035	21	70	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2316 Swinburne	BLDG15988	Berkley	1593 Lennox	No	-	-	22	70	3.27E-05	0.035	7.6E-07	4	0.5	7.00E-02	2.29E-06
2300 Swinburne	BLDG16053	Berkley	1583 Lennox	Yes	2312 Swinburne	0.000	19	72	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2312 Swinburne	BLDG15995	Berkley	1583 Lennox	Yes	2316 Swinburne	0.035	21	72	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2316 Swinburne	BLDG15988	Berkley	1583 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
2315 Swinburne	BLDG16239	Berkley	1593 Lennox	No	-	-	23	77	3.27E-05	0.068	1.5E-06	4	0.5	1.35E-01	4.41E-06
2311 Swinburne	BLDG16222	Berkley	1593 Lennox	Yes	2315 Swinburne	0.068	22	77	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1590 Riverside	BLDG16217	Berkley	1593 Lennox	Yes	2311 Swinburne	0.000	19	77	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1580 Riverside	BLDG16322	Berkley	1593 Lennox	Yes	2311 Swinburne	0.000	19	77	3.27E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2300 Swinburne	BLDG16053	Berkley	1557 Lennox	Yes	2312 Swinburne	0.000	19	73	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2312 Swinburne	BLDG15995	Berkley	1557 Lennox	Yes	2316 Swinburne	0.035	20	73	3.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2316 Swinburne	BLDG15988	Berkley	1557 Lennox	No	-	-	22	73	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
2300 Swinburne	BLDG16053	Berkley	1535 Lennox	Yes	2312 Swinburne	0.000	19	76	7.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2312 Swinburne	BLDG15995	Berkley	1535 Lennox	Yes	2316 Swinburne	0.035	21	76	7.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2316 Swinburne	BLDG15988	Berkley	1535 Lennox	No	-	-	22	76	7.00E-04	0.035	1.6E-05	4	0.5	7.00E-02	4.90E-05
1580 Riverside	BLDG16322	Berkley	1535 Lennox	No	-	-	21	82	7.00E-04	0.006	2.6E-06	4	0.5	1.12E-02	7.81E-06
1580 Riverside	BLDG16322	Berkley	1491 Lennox	No	-	-	21	72	3.50E-04	0.006	1.3E-06	4	0.5	1.12E-02	3.90E-06
1554 Riverside	BLDG16375	Berkley	1491 Lennox	No	-	-	21	72	3.50E-04	0.006	1.3E-06	4	0.5	1.12E-02	3.90E-06
1530 Riverside	BLDG16467	Berkley	1491 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1502 Riverside	BLDG16555	Berkley	1491 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1488 Riverside	BLDG16598	Berkley	1491 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1460 Riverside	BLDG16639	Berkley	1491 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1460 Riverside	BLDG16639	Berkley	1477 Lennox	No	-	-	21	70	7.00E-05	0.006	2.6E-07	4	0.5	1.12E-02	7.81E-07

Downslope Address	Building ID	Escarpment	Property at Slope Crest	Closest Upslope Property			Slope Angle (deg)	Slope Height (m)	Pslide	Spatial Impact + Vulnerability (V)	Individual Risk	Group Risk			
				Upslope Property (Y/N)	Upslope Property	Vulnerability at Upslope property					Annual PDI	No. Occupants (E)	Occupant Temporal (PT:S)	N (Fatalities)	Societal Risk (per year)
1458 Riverside	BLDG16679	Berkley	1477 Lennox	No	-	-	21	70	7.00E-05	0.006	2.6E-07	4	0.5	1.12E-02	7.81E-07
1488 Riverside	BLDG16598	Berkley	1477 Lennox	No	-	-	21	70	7.00E-05	0.006	2.6E-07	4	0.5	1.12E-02	7.81E-07
1418 Riverside	BLDG16824	Berkley	1477 Lennox	No	-	-	26	65	7.00E-05	0.429	2.0E-05	4	0.5	8.59E-01	6.01E-05
1426 Riverside	BLDG16826	Berkley	1477 Lennox	Yes	1418 Riverside	0.429	23	65	7.00E-05	0.057	2.7E-06	4	0.5	1.14E-01	7.95E-06
1350 Riverside	BLDG17167	Berkley	1425 Lennox	No	-	-	22	71	2.45E-05	0.035	5.7E-07	4	0.5	7.00E-02	1.72E-06
1320 Riverside	BLDG17306	Berkley	1425 Lennox	No	-	-	22	71	2.45E-05	0.035	5.7E-07	4	0.5	7.00E-02	1.72E-06
1372 Riverside	BLDG17045	Berkley	1383 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1260 Riverside	BLDG17502	Berkley	1305 Lennox	No	-	-	20	69	7.00E-04	0.002	9.6E-07	4	0.5	4.10E-03	2.87E-06
1238 Riverside	BLDG17593	Berkley	1305 Lennox	No	-	-	20	69	7.00E-04	0.002	9.6E-07	4	0.5	4.10E-03	2.87E-06
1226 Riverside	BLDG17672	Berkley	1305 Lennox	No	-	-	19	69	7.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1260 Riverside	BLDG17502	Berkley	1425 Lennox	No	-	-	22	70	2.45E-05	0.035	5.7E-07	4	0.5	7.00E-02	1.72E-06
1238 Riverside	BLDG17593	Berkley	1425 Lennox	No	-	-	21	70	2.45E-05	0.006	9.1E-08	4	0.5	1.12E-02	2.73E-07
1238 Riverside	BLDG17593	Berkley	1275 Lennox	No	-	-	20	66	2.19E-04	0.002	3.0E-07	4	0.5	4.10E-03	8.96E-07
1226 Riverside	BLDG17672	Berkley	1275 Lennox	No	-	-	20	66	2.19E-04	0.002	3.0E-07	4	0.5	4.10E-03	8.96E-07
2424 Carmaria	BLDG12210	West Hastings	2602 Lauralynn	No	-	-	20	19	5.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2344 Carmaria	BLDG12739	West Hastings	2248 Greylynn	No	-	-	20	27	4.67E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2252 Carmaria	BLDG12944	West Hastings	2240 Greylynn	No	-	-	21	32	1.40E-04	0.001	8.5E-08	4	0.5	1.82E-03	2.55E-07
2220 Carmaria	BLDG13043	West Hastings	2240 Greylynn	No	-	-	20	32	1.40E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2220 Carmaria	BLDG13043	West Hastings	2208 Greylynn	No	-	-	22	31	3.50E-04	0.003	6.9E-07	4	0.5	5.95E-03	2.08E-06
2220 Carmaria	BLDG13043	West Hastings	2190 Greylynn	No	-	-	22	31	1.23E-04	0.003	2.4E-07	4	0.5	5.95E-03	7.29E-07
2194 Carmaria	BLDG13107	West Hastings	2190 Greylynn	No	-	-	22	31	1.23E-04	0.003	2.4E-07	4	0.5	5.95E-03	7.29E-07
1672 Davenport	BLDG13539	Westlynn	2345 Kilmarnock	No	-	-	19	22	1.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1680 Davenport	BLDG13510	Westlynn	2345 Kilmarnock	No	-	-	21	22	1.00E-04	0.001	6.1E-08	4	0.5	1.82E-03	1.82E-07
1688 Davenport	BLDG13460	Westlynn	2339 Kilmarnock	No	-	-	23	22	2.80E-04	0.022	4.1E-06	4	0.5	4.37E-02	1.22E-05
1761 Bellelynn	BLDG15137	Westlynn	1864 Beaulynn	No	-	-	22	20	7.00E-05	0.003	1.4E-07	4	0.5	5.95E-03	4.17E-07
1747 Bellelynn	BLDG15222	Westlynn	1858 Beaulynn	No	-	-	26	18	5.00E-04	0.074	2.5E-05	4	0.5	1.48E-01	7.38E-05
1747 Bellelynn	BLDG15222	Westlynn	1858 Beaulynn	No	-	-	22	19	5.00E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2306 Carmaria	BLDG12811	West Hastings	2248 Greylynn	No	-	-	21	29	4.67E-05	0.001	2.8E-08	4	0.5	1.82E-03	8.51E-08
4741 Woodrow	BLDG01818	Westlynn	4772 Hoskins	No	-	-	21	11	1.96E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
4745 Woodrow	BLDG01773	Westlynn	4772 Hoskins	No	-	-	20	10	1.96E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
4749 Woodrow	BLDG01703	Westlynn	4774 Hoskins	No	-	-	19	12	1.12E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
4753 Woodrow	BLDG01672	Westlynn	4774 Hoskins	No	-	-	19	10	1.12E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
4753 Woodrow	BLDG01672	Westlynn	4778 Hoskins	No	-	-	19	10	7.84E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
4757 Woodrow	BLDG01643	Westlynn	4780 Hoskins	No	-	-	19	12	7.84E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
500 Ventura	BLDG01681	Mosquito	4685 Prospect	No	-	-	20	27	2.92E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
522 Ventura	BLDG01640	Mosquito	4685 Prospect	No	-	-	29	21	2.92E-05	0.415	8.1E-06	4	0.5	8.30E-01	2.42E-05
544 Ventura	BLDG01565	Mosquito	4685 Prospect	No	-	-	29	18	2.92E-05	0.261	5.1E-06	4	0.5	5.23E-01	1.53E-05
550 Ventura	BLDG01486	Mosquito	4685 Prospect	No	-	-	27	16	2.92E-05	0.143	2.8E-06	4	0.5	2.87E-01	8.37E-06
4717 Prospect	BLDG01475	Mosquito	4685 Prospect	No	-	-	29	12	2.92E-05	0.261	5.1E-06	4	0.5	5.23E-01	1.53E-05
552 Palisade	BLDG01730	Mosquito	518 Alpine Court - West	No	-	-	31	20	2.73E-04	0.452	8.2E-05	4	0.5	9.03E-01	2.47E-04
568 Palisade	BLDG01700	Mosquito	515 Alpine	No	-	-	28	14	4.38E-05	0.210	6.1E-06	4	0.5	4.20E-01	1.84E-05
1893 Bowser	BLDG13913	Pemberton	1567 Graveley	No	-	-	26	28	1.63E-05	0.220	2.4E-06	4	0.5	4.40E-01	7.18E-06
1877 Bowser	BLDG13952	Pemberton	1567 Graveley	Yes	1893 Bowser	0.220	22	28	1.63E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1890 Bowser	BLDG13938	Pemberton	1567 Graveley	No	-	-	30	29	1.63E-05	0.452	4.9E-06	4	0.5	9.03E-01	1.47E-05
1866 Bowser	BLDG13967	Pemberton	1567 Graveley	Yes	1890 Bowser	0.452	24	29	1.63E-05	0.006	6.8E-08	4	0.5	1.25E-02	2.05E-07
1850 Bowser	BLDG14011	Pemberton	1567 Graveley	Yes	1866 Bowser	0.006	21	29	1.63E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1844 Bowser	BLDG14046	Pemberton	1567 Graveley	Yes	1850 Bowser	0.000	19	29	1.63E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1890 Bowser	BLDG13938	Pemberton	1565 Graveley	No	-	-	29	29	9.80E-05	0.415	2.7E-05	4	0.5	8.30E-01	8.14E-05
1866 Bowser	BLDG13967	Pemberton	1565 Graveley	Yes	1890 Bowser	0.452	25	29	9.80E-05	0.020	1.3E-06	4	0.5	4.07E-02	3.99E-06
1850 Bowser	BLDG14011	Pemberton	1565 Graveley	Yes	1866 Bowser	0.006	21	29	9.80E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1844 Bowser	BLDG14046	Pemberton	1565 Graveley	Yes	1850 Bowser	0.000	19	29	9.80E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1871 Philip	BLDG14015	Pemberton	1415 W Keith	No	-	-	27	40	3.50E-05	0.464	1.1E-05	4	0.5	9.28E-01	3.25E-05
1861 Philip	BLDG14050	Pemberton	1415 W Keith	Yes	1871 Philip	0.464	24	40	3.50E-05	0.042	9.7E-07	4	0.5	8.31E-02	2.91E-06
1412 Hope	BLDG14142	Pemberton	1415 W Keith	Yes	1861 Philip	0.042	20	40	3.50E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1856 Philip	BLDG14076	Pemberton	1395 W Keith	No	-	-	23	39	4.90E-05	0.022	7.1E-07	4	0.5	4.37E-02	2.14E-06
1840 Philip	BLDG14114	Pemberton	1395 W Keith	Yes	1856 Philip	0.022	20	39	4.90E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1404 Hope	BLDG24585	Pemberton	1415 W Keith	No	-	-	20	39	3.50E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2344 Carmaria	BLDG12739	West Hastings	2248 Greylynn	No	-	-	19	26	4.67E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2252 Carmaria	BLDG12944	West Hastings	2224 Greylynn	No	-	-	23	30	9.80E-05	0.022	1.4E-06	4	0.5	4.37E-02	4.28E-06
2180 Carmaria	BLDG13176	West Hastings	1582 Merlynn	No	-	-	23	29	1.53E-04	0.022	2.2E-06	4	0.5	4.37E-02	6.69E-06
1372 Riverside	BLDG17045	Berkley	1425 Lennox	No	-	-	24	76	2.45E-05	0.193	3.1E-06	4	0.5	3.86E-01	9.45E-06
1408 Riverside	BLDG16888	Berkley	1425 Lennox	No	-	-	27	70	2.45E-05	0.511	8.3E-06	4	0.5	1.02E+00	2.50E-05
1400 Riverside	BLDG16913	Berkley	1425 Lennox	Yes	1408 Riverside	0.511	23	70	2.45E-05	0.057	9.3E-07	4	0.5	1.14E-01	2.78E-06
1418 Riverside	BLDG16824	Berkley	1425 Lennox	No	-	-	27	70	2.45E-05	0.511	8.3E-06	4	0.5	1.02E+00	2.50E-05
1426 Riverside	BLDG16826	Berkley	1425 Lennox	Yes	1418 Riverside	0.429	24	70	2.45E-05	0.155	2.5E-06	4	0.5	3.11E-01	7.62E-06
1444 Riverside	BLDG16719	Berkley	1479 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1458 Riverside	BLDG16679	Berkley	1479 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05

Downslope Address	Building ID	Escarpment	Property at Slope Crest	Closest Upslope Property			Slope Angle (deg)	Slope Height (m)	Pslide	Spatial Impact + Vulnerability (V)	Individual Risk	Group Risk			
				Upslope Property (Y/N)	Upslope Property	Vulnerability at Upslope property					Annual PDI	No. Occupants (E)	Occupant Temporal (PT:S)	N (Fatalities)	Societal Risk (per year)
1460 Riverside	BLDG16639	Berkley	1479 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
1488 Riverside	BLDG16598	Berkley	1479 Lennox	No	-	-	22	72	3.50E-04	0.035	8.2E-06	4	0.5	7.00E-02	2.45E-05
2252 Carmaria	BLDG12944	West Hastings	2232 Greylynn	No	-	-	23	32	1.96E-04	0.022	2.9E-06	4	0.5	4.37E-02	8.56E-06
2220 Carmaria	BLDG13043	West Hastings	2232 Greylynn	No	-	-	22	32	1.96E-04	0.003	3.9E-07	4	0.5	5.95E-03	1.17E-06
2220 Carmaria	BLDG13043	West Hastings	1588 Merlynn	No	-	-	21	31	2.80E-04	0.001	1.7E-07	4	0.5	1.82E-03	5.11E-07
2194 Carmaria	BLDG13107	West Hastings	1588 Merlynn	No	-	-	21	31	2.80E-04	0.001	1.7E-07	4	0.5	1.82E-03	5.11E-07
2180 Carmaria	BLDG13176	West Hastings	1576 Merlynn	No	-	-	22	28	1.53E-04	0.003	3.0E-07	4	0.5	5.95E-03	9.11E-07
2180 Carmaria	BLDG13176	West Hastings	1570 Merlynn	No	-	-	19	28	6.25E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
2344 Carmaria	BLDG12739	West Hastings	2438 Lauralynn	No	-	-	21	30	7.00E-05	0.001	4.3E-08	4	0.5	1.82E-03	1.28E-07
1650 Riverside	BLDG15815	Berkley	1677 Layton	No	-	-	21	71	1.75E-04	0.006	6.5E-07	4	0.5	1.12E-02	1.95E-06
621 Seymour	BLDG20656	Riverside West	621 Seymour	No	-	-	30	26	1.75E-04	0.452	5.3E-05	4	0.5	9.03E-01	1.58E-04
615 Seymour	BLDG20714	Riverside West	621 Seymour	Yes	621 Seymour	0.452	21	26	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
625 Seymour	BLDG20632	Riverside West	625 Seymour	No	-	-	30	27	1.75E-04	0.452	5.3E-05	4	0.5	9.03E-01	1.58E-04
615 Seymour	BLDG20714	Riverside West	625 Seymour	Yes	625 Seymour	0.452	21	27	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
631 Seymour	BLDG20584	Riverside West	631 Seymour	No	-	-	30	28	1.75E-04	0.452	5.3E-05	4	0.5	9.03E-01	1.58E-04
633 Seymour	BLDG20559	Riverside West	633 Seymour	No	-	-	31	30	1.75E-04	0.452	5.3E-05	4	0.5	9.03E-01	1.58E-04
639 Seymour	BLDG20541	Riverside West	639 Seymour	No	-	-	31	32	2.19E-04	0.452	6.6E-05	4	0.5	9.03E-01	1.98E-04
657 Seymour	BLDG20618	Riverside West	639 Seymour	Yes	639 Seymour	0.452	22	32	2.19E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
647 Seymour	BLDG20533	Riverside West	647 Seymour	No	-	-	30	34	2.19E-04	0.452	6.6E-05	4	0.5	9.03E-01	1.98E-04
657 Seymour	BLDG20618	Riverside West	647 Seymour	Yes	647 Seymour	0.452	23	34	2.19E-04	0.001	1.3E-07	4	0.5	1.82E-03	3.99E-07
679 Seymour	BLDG20462	Riverside West	679 Seymour	No	-	-	32	36	1.53E-04	0.452	4.6E-05	4	0.5	9.03E-01	1.38E-04
683 Bow	BLDG20417	Riverside West	683 Bow	No	-	-	27	36	8.75E-05	0.314	1.8E-05	4	0.5	6.29E-01	5.50E-05
677 Bow	BLDG20524	Riverside West	683 Bow	Yes	683 Bow	0.314	20	36	8.75E-05	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
687 Bow	BLDG20385	Riverside West	683 Bow	No	-	-	27	36	8.75E-05	0.314	1.8E-05	4	0.5	6.29E-01	5.50E-05
687 Bow	BLDG20385	Riverside West	687 Bow	No	-	-	27	35	1.53E-04	0.314	3.2E-05	4	0.5	6.29E-01	9.62E-05
683 Bow	BLDG20417	Riverside West	687 Bow	No	-	-	27	35	1.53E-04	0.314	3.2E-05	4	0.5	6.29E-01	9.62E-05
677 Bow	BLDG20524	Riverside West	687 Bow	Yes	687 Bow	0.314	20	35	1.53E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
689 Bow	BLDG23093	Riverside West	689 Bow	No	-	-	34	37	1.09E-04	0.452	3.3E-05	4	0.5	9.03E-01	9.88E-05
687 Bow	BLDG20385	Riverside West	689 Bow	No	-	-	34	37	1.09E-04	0.452	3.3E-05	4	0.5	9.03E-01	9.88E-05
677 Bow	BLDG20524	Riverside West	689 Bow	Yes	687 Bow	0.314	24	37	1.09E-04	0.006	4.6E-07	4	0.5	1.25E-02	1.37E-06
967 Heritage	BLDG18396	Riverside West	967 Heritage	No	-	-	19	29	1.40E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
973 Heritage	BLDG18370	Riverside West	973 Heritage	No	-	-	25	34	1.40E-04	0.137	1.3E-05	4	0.5	2.74E-01	3.83E-05
979 Heritage	BLDG18318	Riverside West	979 Heritage	No	-	-	27	34	1.40E-04	0.314	2.9E-05	4	0.5	6.29E-01	8.80E-05
985 Heritage	BLDG18303	Riverside West	985 Heritage	No	-	-	26	34	1.40E-04	0.220	2.1E-05	4	0.5	4.40E-01	6.16E-05
1175 Heritage	BLDG18164	Riverside West	1175 Heritage	No	-	-	26	36	1.75E-04	0.220	2.6E-05	4	0.5	4.40E-01	7.70E-05
1175 Heritage	BLDG18164	Riverside West	1175 Heritage	No	-	-	26	36	1.75E-04	0.220	2.6E-05	4	0.5	4.40E-01	7.70E-05
1171 Heritage	BLDG18117	Riverside West	1171 Heritage	No	-	-	28	35	2.50E-04	0.372	6.2E-05	4	0.5	7.43E-01	1.86E-04
1111 Heritage	BLDG18127	Riverside West	1171 Heritage	Yes	1171 Heritage	0.372	21	38	2.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1191 Seymour	BLDG18208	Riverside West	1171 Heritage	Yes	1111 Heritage	0.000	20	50	2.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1167 Heritage	BLDG18093	Riverside West	1167 Heritage	No	-	-	26	35	2.50E-04	0.220	3.7E-05	4	0.5	4.40E-01	1.10E-04
1115 Heritage	BLDG18127	Riverside West	1167 Heritage	Yes	1167 Heritage	0.220	21	38	2.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1191 Seymour	BLDG18208	Riverside West	1167 Heritage	Yes	1115 Heritage	0.000	20	50	2.50E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1163 Heritage	BLDG18006	Riverside West	1163 Heritage	No	-	-	27	34	1.75E-04	0.314	3.7E-05	4	0.5	6.29E-01	1.10E-04
1119 Heritage	BLDG18083	Riverside West	1163 Heritage	Yes	1163 Heritage	0.314	21	38	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1193 Seymour	BLDG18131	Riverside West	1163 Heritage	Yes	1119 Heritage	0.000	20	50	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1159 Heritage	BLDG17962	Riverside West	1159 Heritage	No	-	-	27	35	1.75E-04	0.314	3.7E-05	4	0.5	6.29E-01	1.10E-04
1195 Seymour	BLDG18013	Riverside West	1159 Heritage	Yes	1159 Heritage	0.314	20	49	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1155 Heritage	BLDG17902	Riverside West	1155 Heritage	No	-	-	27	37	1.75E-04	0.314	3.7E-05	4	0.5	6.29E-01	1.10E-04
1123 Heritage	BLDG17936	Riverside West	1155 Heritage	Yes	1155 Heritage	0.314	22	41	1.75E-04	0.003	3.5E-07	4	0.5	5.95E-03	1.04E-06
1195 Seymour	BLDG18013	Riverside West	1155 Heritage	Yes	1123 Heritage	0.003	21	50	1.75E-04	0.000	0.0E+00	4	0.5	0.00E+00	0.00E+00
1151 Heritage	BLDG17821	Riverside West	1151 Heritage	No	-	-	28	38	1.75E-04	0.372	4.3E-05	4	0.5	7.43E-01	1.30E-04
1127 Heritage	BLDG19536	Riverside West	1151 Heritage	Yes	1151 Heritage	0.372	22	40	1.75E-04	0.003	3.5E-07	4	0.5	5.95E-03	1.04E-06
1151 Heritage	BLDG17821	Riverside West	1151 Heritage	No	-	-	30	37	1.75E-04	0.452	5.3E-05	4	0.5	9.03E-01	1.58E-04
1147 Heritage	BLDG17660	Riverside West	1147 Heritage	No	-	-	27	38	1.75E-04	0.314	3.7E-05	4	0.5	6.29E-01	1.10E-04
1143 Heritage	BLDG17657	Riverside West	1147 Heritage	Yes	1147 Heritage	0.314	24	41	1.75E-04	0.042	4.8E-06	4	0.5	8.31E-02	1.45E-05
1261 Seymour	BLDG17512	Riverside West	1261 Seymour	No	-	-	29	49	1.23E-04	0.562	4.6E-05	4	0.5	1.12E+00	1.38E-04
1273 Seymour	BLDG17416	Riverside West	1273 Seymour	No	-	-	29	48	1.23E-04	0.562	4.6E-05	4	0.5	1.12E+00	1.38E-04
1287 Seymour	BLDG17277	Riverside West	1287 Seymour	No	-	-	26	46	1.75E-04	0.379	4.4E-05	4	0.5	7.58E-01	1.33E-04
DAN3D Modelled - Spatial Impact + Vulnerability based on DAN3D models outputs.															
1788 Riverside	BLDG15312	Berkley	2360 Carman S.	No	-	-	29	78	3.50E-04	0.372	8.7E-05	4	0.5	7.44E-01	2.60E-04
1802 Riverside	BLDG15357	Berkley	2360 Carman S.	Yes	1788 Riverside	0.372	28	78	3.50E-04	0.360	8.4E-05	4	0.5	7.20E-01	2.52E-04
2064 Rivergrove	BLDG14277	Berkley	2454 Hayseed	No	-	-	34	56	3.50E-04	0.501	1.2E-04	4	0.5	1.00E+00	3.51E-04
2064 Rivergrove	BLDG14277	Berkley	2448 Hayseed	No	-	-	34	56	2.80E-04	0.458	8.5E-05	4	0.5	9.16E-01	2.56E-04
2050 Rivergrove	BLDG14327	Berkley	2448 Hayseed	No	-	-	31	52	2.80E-04	0.501	9.4E-05	4	0.5	1.00E+00	2.81E-04
2050 Rivergrove	BLDG14327	Berkley	2454 Hayseed	No	-	-	35	52	3.50E-04	0.458	1.1E-04	4	0.5	9.16E-01	3.21E-04

Table D-4. Risk to Properties at Crest of Escarpment Slopes

Address	Building ID	Escarpment	Pslide	Distance from crest (m)	Yard Spatial (PS:H)	Occupant Temporal (PT:S)	Occupant Vulnerability (V)	Individual Risk	Group Risk			
								Annual PDI	Occupant Temporal (PT:S)	No. Occupants (E)	N (Fatalities)	Societal Risk (per year)
2477 Berton	BLDG18983	Berkley	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2475 Berton	BLDG18904	Berkley	1.23E-04	>12m	0.2	0.01	0.5	1.3E-07	0.007	4	2.78E-03	3.40E-07
2469 Berton	BLDG18794	Berkley	7.00E-05	>12m	0.2	0.01	0.5	7.3E-08	0.007	4	2.78E-03	1.94E-07
2465 Berton	BLDG18662	Berkley	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
2461 Berton	BLDG18552	Berkley	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
2441 Mowat	BLDG18329	Berkley	4.90E-05	>12m	0.2	0.01	0.5	5.1E-08	0.007	4	2.78E-03	1.36E-07
2437 Mowat	BLDG18205	Berkley	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2433 Mowat	BLDG18130	Berkley	8.75E-05	>12m	0.2	0.01	0.5	9.1E-08	0.007	4	2.78E-03	2.43E-07
2429 Mowat	BLDG18070	Berkley	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2425 Mowat	BLDG17947	Berkley	1.23E-04	>12m	0.2	0.01	0.5	1.3E-07	0.007	4	2.78E-03	3.40E-07
1231 Lennox	BLDG17682	Berkley	5.60E-04	3-6m	0.67	0.01	0.5	2.0E-06	0.007	4	9.31E-03	5.21E-06
1275 Lennox	BLDG17490	Berkley	2.19E-04	<3m	0.99	0.01	0.5	1.1E-06	0.007	4	1.38E-02	3.01E-06
1279 Lennox	BLDG17417	Berkley	4.38E-04	3-6m	0.67	0.01	0.5	1.5E-06	0.007	4	9.31E-03	4.07E-06
1305 Lennox	BLDG17313	Berkley	7.00E-04	9-12m	0.29	0.01	0.5	1.1E-06	0.007	4	4.03E-03	2.82E-06
1345 Lennox	BLDG17208	Berkley	3.50E-04	9-12m	0.29	0.01	0.5	5.3E-07	0.007	4	4.03E-03	1.41E-06
1383 Lennox	BLDG17055	Berkley	3.50E-04	3-6m	0.67	0.01	0.5	1.2E-06	0.007	4	9.31E-03	3.26E-06
1425 Lennox	BLDG16899	Berkley	9.80E-05	6-9m	0.4	0.01	0.5	2.0E-07	0.007	4	5.56E-03	5.44E-07
1477 Lennox	BLDG16836	Berkley	1.40E-04	6-9m	0.4	0.01	0.5	2.9E-07	0.007	4	5.56E-03	7.78E-07
1479 Lennox	BLDG16724	Berkley	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
1491 Lennox	BLDG16578	Berkley	7.00E-04	3-6m	0.67	0.01	0.5	2.4E-06	0.007	4	9.31E-03	6.51E-06
1535 Lennox	BLDG16463	Berkley	1.40E-03	3-6m	0.67	0.01	0.5	4.9E-06	0.007	4	9.31E-03	1.30E-05
1557 Lennox	BLDG16381	Berkley	3.50E-04	3-6m	0.67	0.01	0.5	1.2E-06	0.007	4	9.31E-03	3.26E-06
1583 Lennox	BLDG16324	Berkley	3.50E-04	<3m	0.99	0.01	0.5	1.8E-06	0.007	4	1.38E-02	4.81E-06
1593 Lennox	BLDG16220	Berkley	9.80E-05	<3m	0.99	0.01	0.5	5.1E-07	0.007	4	1.38E-02	1.35E-06
2402 Swinburne	BLDG16061	Berkley	9.80E-05	<3m	0.99	0.01	0.5	5.1E-07	0.007	4	1.38E-02	1.35E-06
2410 Swinburne	BLDG15959	Berkley	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
2414 Swinburne	BLDG22813	Berkley	1.75E-04	<3m	0.99	0.01	0.5	9.0E-07	0.007	4	1.38E-02	2.41E-06
1677 Layton	BLDG15739	Berkley	1.75E-04	>12m	0.2	0.01	0.5	1.8E-07	0.007	4	2.78E-03	4.86E-07
1691 Layton	BLDG15682	Berkley	1.40E-03	>12m	0.2	0.01	0.5	1.5E-06	0.007	4	2.78E-03	3.89E-06
1709 Layton	BLDG15597	Berkley	7.00E-04	>12m	0.2	0.01	0.5	7.3E-07	0.007	4	2.78E-03	1.94E-06
1731 Layton	BLDG15554	Berkley	7.00E-04	>12m	0.2	0.01	0.5	7.3E-07	0.007	4	2.78E-03	1.94E-06
1753 Layton	BLDG15514	Berkley	2.80E-04	>12m	0.2	0.01	0.5	2.9E-07	0.007	4	2.78E-03	7.78E-07
1775 Layton	BLDG15452	Berkley	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
1797 Layton	BLDG15403	Berkley	1.09E-04	6-9m	0.4	0.01	0.5	2.3E-07	0.007	4	5.56E-03	6.08E-07
1815 Layton	BLDG15356	Berkley	2.80E-04	6-9m	0.4	0.01	0.5	5.8E-07	0.007	4	5.56E-03	1.56E-06
2391 Carman	BLDG15291	Berkley	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
2379 Carman	BLDG15274	Berkley	9.80E-05	<3m	0.99	0.01	0.5	5.1E-07	0.007	4	1.38E-02	1.35E-06
2360 Carman S.	BLDG15185	Berkley	3.50E-04	3-6m	0.67	0.01	0.5	1.2E-06	0.007	4	9.31E-03	3.26E-06
2360 Carman N.	BLDG15185	Berkley	1.75E-04	3-6m	0.67	0.01	0.5	6.1E-07	0.007	4	9.31E-03	1.63E-06
2372 Carman	BLDG15094	Berkley	9.80E-05	9-12m	0.29	0.01	0.5	1.5E-07	0.007	4	4.03E-03	3.95E-07
2386 Carman	BLDG15087	Berkley	7.00E-05	>12m	0.2	0.01	0.5	7.3E-08	0.007	4	2.78E-03	1.94E-07
1839 Layton	BLDG15066	Berkley	7.00E-05	>12m	0.2	0.01	0.5	7.3E-08	0.007	4	2.78E-03	1.94E-07
1847 Layton	BLDG14993	Berkley	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
1855 Layton	BLDG14936	Berkley	8.75E-05	>12m	0.2	0.01	0.5	9.1E-08	0.007	4	2.78E-03	2.43E-07
1863 Layton	BLDG14890	Berkley	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
Hayseed/Layton Gully	not found	Berkley	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	0	0.00E+00	0.00E+00
2448 Hayseed	BLDG14513	Berkley	2.80E-04	6-9m	0.4	0.01	0.5	5.8E-07	0.007	4	5.56E-03	1.56E-06
2454 Hayseed	BLDG14408	Berkley	3.50E-04	9-12m	0.29	0.01	0.5	5.3E-07	0.007	4	4.03E-03	1.41E-06
2462 Hayseed	BLDG14331	Berkley	9.80E-05	9-12m	0.29	0.01	0.5	1.5E-07	0.007	4	4.03E-03	3.95E-07
2468 Hayseed	BLDG14269	Berkley	4.90E-05	<3m	0.99	0.01	0.5	2.5E-07	0.007	4	1.38E-02	6.74E-07

Address	Building ID	Escarpment	Pslide	Distance from crest (m)	Yard Spatial (PS:H)	Occupant Temporal (PT:S)	Occupant Vulnerability (V)	Individual Risk	Group Risk			
								Annual PDI	Occupant Temporal (PT:S)	No. Occupants (E)	N (Fatalities)	Societal Risk (per year)
2474 Hayseed	BLDG14201	Berkley	7.00E-05	<3m	0.99	0.01	0.5	3.6E-07	0.007	4	1.38E-02	9.63E-07
2480 Hayseed	BLDG14136	Berkley	2.80E-04	3-6m	0.67	0.01	0.5	9.8E-07	0.007	4	9.31E-03	2.61E-06
2486 Hayseed	BLDG14088	Berkley	1.75E-04	6-9m	0.4	0.01	0.5	3.6E-07	0.007	4	5.56E-03	9.72E-07
2125 Berkley	BLDG13935	Berkley	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
2141 Berkley	BLDG13876	Berkley	4.90E-05	3-6m	0.67	0.01	0.5	1.7E-07	0.007	4	9.31E-03	4.56E-07
2217 Berkley	BLDG13546	Berkley	8.75E-04	9-12m	0.29	0.01	0.5	1.3E-06	0.007	4	4.03E-03	3.52E-06
2223 Berkley	BLDG13498	Berkley	2.80E-04	9-12m	0.29	0.01	0.5	4.2E-07	0.007	4	4.03E-03	1.13E-06
2249 Berkley	BLDG13437	Berkley	7.00E-04	>12m	0.2	0.01	0.5	7.3E-07	0.007	4	2.78E-03	1.94E-06
2251 Berkley	BLDG13392	Berkley	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2265 Berkley	BLDG13329	Berkley	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
2279 Berkley	BLDG13310	Berkley	1.40E-04	9-12m	0.29	0.01	0.5	2.1E-07	0.007	4	4.03E-03	5.64E-07
2293 Berkley	BLDG13258	Berkley	3.50E-04	>12m	0.2	0.01	0.5	3.6E-07	0.007	4	2.78E-03	9.72E-07
2307 Berkley	BLDG13173	Berkley	1.75E-04	9-12m	0.29	0.01	0.5	2.6E-07	0.007	4	4.03E-03	7.05E-07
2321 Berkley	BLDG13129	Berkley	1.75E-04	3-6m	0.67	0.01	0.5	6.1E-07	0.007	4	9.31E-03	1.63E-06
2335 Berkley	BLDG13096	Berkley	1.75E-04	>12m	0.2	0.01	0.5	1.8E-07	0.007	4	2.78E-03	4.86E-07
2349 Berkley	BLDG13058	Berkley	3.50E-04	>12m	0.2	0.01	0.5	3.6E-07	0.007	4	2.78E-03	9.72E-07
2363 Berkley	BLDG12990	Berkley	1.75E-04	9-12m	0.29	0.01	0.5	2.6E-07	0.007	4	4.03E-03	7.05E-07
2377 Berkley	BLDG12939	Berkley	1.75E-03	6-9m	0.4	0.01	0.5	3.6E-06	0.007	4	5.56E-03	9.72E-06
2391 Berkley	BLDG12879	Berkley	4.38E-04	>12m	0.2	0.01	0.5	4.6E-07	0.007	4	2.78E-03	1.22E-06
2409 Berkley	BLDG12859	Berkley	7.00E-04	>12m	0.2	0.01	0.5	7.3E-07	0.007	4	2.78E-03	1.94E-06
2425 Berkley	BLDG12820	Berkley	2.80E-04	>12m	0.2	0.01	0.5	2.9E-07	0.007	4	2.78E-03	7.78E-07
4780 Hoskins	BLDG01683	Westlynn	7.84E-05	>12m	0.2	0.01	0.5	8.2E-08	0.007	4	2.78E-03	2.18E-07
4778 Hoskins	BLDG01725	Westlynn	7.84E-05	9-12m	0.29	0.01	0.5	1.2E-07	0.007	4	4.03E-03	3.16E-07
4774 Hoskins	BLDG01778	Westlynn	2.24E-04	>12m	0.2	0.01	0.5	2.3E-07	0.007	4	2.78E-03	6.22E-07
4772 Hoskins	BLDG01826	Westlynn	3.92E-05	9-12m	0.29	0.01	0.5	5.9E-08	0.007	4	4.03E-03	1.58E-07
2345 Kilmarnock	BLDG13209	Westlynn	2.00E-04	>12m	0.2	0.01	0.5	2.1E-07	0.007	4	2.78E-03	5.56E-07
2339 Kilmarnock	BLDG13223	Westlynn	2.80E-04	3-6m	0.67	0.01	0.5	9.8E-07	0.007	4	9.31E-03	2.61E-06
1864 Beaulynn	BLDG14892	Westlynn	1.40E-04	<3m	0.99	0.01	0.5	7.2E-07	0.007	4	1.38E-02	1.93E-06
1858 Beaulynn	BLDG15084	Westlynn	1.00E-03	3-6m	0.67	0.01	0.5	3.5E-06	0.007	4	9.31E-03	9.31E-06
1595 Graveley (W)	BLDG13557	Pemberton Heights	4.90E-05	<3m	0.99	0.01	0.5	2.5E-07	0.007	4	1.38E-02	6.74E-07
1595 Graveley (S)	BLDG13557	Pemberton Heights	9.80E-05	<3m	0.99	0.01	0.5	5.1E-07	0.007	4	1.38E-02	1.35E-06
1567 Graveley	BLDG13570	Pemberton Heights	4.90E-05	>12m	0.2	0.01	0.5	5.1E-08	0.007	4	2.78E-03	1.36E-07
1565 Graveley	BLDG13559	Pemberton Heights	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
1415 W Keith	BLDG13633	Pemberton Heights	7.00E-05	9-12m	0.29	0.01	0.5	1.1E-07	0.007	4	4.03E-03	2.82E-07
1395 W Keith	BLDG13672	Pemberton Heights	4.90E-05	>12m	0.2	0.01	0.5	5.1E-08	0.007	4	2.78E-03	1.36E-07
4085 Capilano	BLDG04603	Capilano	1.40E-04	<3m	0.99	0.01	1.5	2.2E-06	0.007	5	5.16E-02	7.22E-06
4421 Patterdale	BLDG02555	Capilano	1.40E-04	3-6m	0.67	0.01	2.5	2.4E-06	0.007	6	6.98E-02	9.77E-06
4867 Skyline	BLDG01426	Mosquito Creek	1.09E-04	<3m	0.99	0.01	0.5	5.6E-07	0.007	4	1.38E-02	1.50E-06
518 Alpine Court - West	BLDG26161	Mosquito Creek	2.73E-04	<3m	0.99	0.01	0.5	1.4E-06	0.007	4	1.38E-02	3.76E-06
518 Alpine Court - East	BLDG26161	Mosquito Creek	2.19E-04	<3m	0.99	0.01	0.5	1.1E-06	0.007	4	1.38E-02	3.01E-06
515 Alpine	BLDG01638	Mosquito Creek	8.75E-05	<3m	0.99	0.01	0.5	4.5E-07	0.007	4	1.38E-02	1.20E-06
4424 Skyline	BLDG26234	Mosquito Creek	2.63E-04	3-6m	0.67	0.01	0.5	9.2E-07	0.007	4	9.31E-03	2.44E-06
4717 Prospect	BLDG01475	Mosquito Creek	2.50E-04	>12m	0.2	0.01	0.5	2.6E-07	0.007	4	2.78E-03	6.94E-07
4685 Prospect	BLDG01561	Mosquito Creek	1.75E-04	3-6m	0.67	0.01	0.5	6.1E-07	0.007	4	9.31E-03	1.63E-06
481 Ventura	BLDG01675	Mosquito Creek	1.09E-03	3-6m	0.67	0.01	0.5	3.8E-06	0.007	4	9.31E-03	1.02E-05
647 Croydon	BLDG05472	Mosquito Creek	1.75E-04	3-6m	0.67	0.01	0.5	6.1E-07	0.007	4	9.31E-03	1.63E-06
2620 Lauralynn	BLDG11890	Westlynn	1.75E-04	3-6m	0.67	0.01	0.5	6.1E-07	0.007	4	9.31E-03	1.63E-06
1742 Irene	BLDG02331	Westlynn	2.45E-04	<3m	0.99	0.01	0.5	1.3E-06	0.007	4	1.38E-02	3.37E-06
1751 Irene	BLDG02388	Westlynn	2.45E-04	<3m	0.99	0.01	0.5	1.3E-06	0.007	4	1.38E-02	3.37E-06
4150 Lynn Valley	BLDG04400	Westlynn	6.25E-04	<3m	0.99	0.01	0.5	3.2E-06	0.007	4	1.38E-02	8.59E-06
2604 Lauralynn	BLDG12001	West Hastings	1.75E-04	>12m	0.2	0.01	0.5	1.8E-07	0.007	4	2.78E-03	4.86E-07

Address	Building ID	Escarpment	Pslide	Distance from crest (m)	Yard Spatial (PS:H)	Occupant Temporal (PT:S)	Occupant Vulnerability (V)	Individual Risk	Group Risk			
								Annual PDI	Occupant Temporal (PT:S)	No. Occupants (E)	N (Fatalities)	Societal Risk (per year)
2602 Lauralynn	BLDG12039	West Hastings	5.00E-04	>12m	0.2	0.01	0.5	5.2E-07	0.007	4	2.78E-03	1.39E-06
2590 Lauralynn	BLDG26143	West Hastings	1.40E-04	6-9m	0.4	0.01	0.5	2.9E-07	0.007	4	5.56E-03	7.78E-07
2574 Lauralynn	BLDG12131	West Hastings	6.25E-04	6-9m	0.4	0.01	0.5	1.3E-06	0.007	4	5.56E-03	3.47E-06
2558 Lauralynn	BLDG12173	West Hastings	3.50E-04	6-9m	0.4	0.01	0.5	7.3E-07	0.007	4	5.56E-03	1.94E-06
2542 Lauralynn	BLDG12196	West Hastings	2.19E-04	>12m	0.2	0.01	0.5	2.3E-07	0.007	4	2.78E-03	6.08E-07
2526 Lauralynn	BLDG12261	West Hastings	5.00E-04	>12m	0.2	0.01	0.5	5.2E-07	0.007	4	2.78E-03	1.39E-06
2510 Lauralynn	BLDG12296	West Hastings	5.00E-04	9-12m	0.29	0.01	0.5	7.6E-07	0.007	4	4.03E-03	2.01E-06
2498 Lauralynn	BLDG12326	West Hastings	1.25E-03	6-9m	0.4	0.01	0.5	2.6E-06	0.007	4	5.56E-03	6.94E-06
2486 Lauralynn	BLDG12388	West Hastings	5.00E-04	9-12m	0.29	0.01	0.5	7.6E-07	0.007	4	4.03E-03	2.01E-06
2474 Lauralynn	BLDG12435	West Hastings	5.00E-04	>12m	0.2	0.01	0.5	5.2E-07	0.007	4	2.78E-03	1.39E-06
2462 Lauralynn	BLDG12476	West Hastings	2.80E-04	>12m	0.2	0.01	0.5	2.9E-07	0.007	4	2.78E-03	7.78E-07
2450 Lauralynn	BLDG12519	West Hastings	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2438 Lauralynn	BLDG12601	West Hastings	0.00E+00	>12m	0.2	0.01	0.5	0.0E+00	0.007	4	2.78E-03	0.00E+00
2248 Greylynn	BLDG12724	West Hastings	0.00E+00	>12m	0.2	0.01	0.5	0.0E+00	0.007	4	2.78E-03	0.00E+00
2240 Greylynn	BLDG12826	West Hastings	1.40E-04	>12m	0.2	0.01	0.5	1.5E-07	0.007	4	2.78E-03	3.89E-07
2232 Greylynn	BLDG12877	West Hastings	1.96E-04	>12m	0.2	0.01	0.5	2.0E-07	0.007	4	2.78E-03	5.44E-07
2224 Greylynn	BLDG12953	West Hastings	9.80E-05	>12m	0.2	0.01	0.5	1.0E-07	0.007	4	2.78E-03	2.72E-07
2208 Greylynn	BLDG13062	West Hastings	3.50E-04	>12m	0.2	0.01	0.5	3.6E-07	0.007	4	2.78E-03	9.72E-07
2190 Greylynn	BLDG25603	West Hastings	1.23E-04	>12m	0.2	0.01	0.5	1.3E-07	0.007	4	2.78E-03	3.40E-07
1588 Merlynn	BLDG13203	West Hastings	2.80E-04	9-12m	0.29	0.01	0.5	4.2E-07	0.007	4	4.03E-03	1.13E-06
1582 Merlynn	BLDG13316	West Hastings	1.53E-04	6-9m	0.4	0.01	0.5	3.2E-07	0.007	4	5.56E-03	8.51E-07
1576 Merlynn	BLDG13370	West Hastings	0.00E+00	3-6m	0.67	0.01	0.5	0.0E+00	0.007	4	9.31E-03	0.00E+00
1570 Merlynn	BLDG13478	West Hastings	6.25E-04	6-9m	0.4	0.01	0.5	1.3E-06	0.007	4	5.56E-03	3.47E-06

Table D-5. Life-Loss Risk for Properties at Base of Escarpment

Address	Building ID	Escarpment	Max Individual Risk (PDI)	
			2010	2025
2336 TreeTop Lane	BLDG13192	Berkley	8.1E-07	2.6E-06
2354 TreeTop Lane	BLDG13125	Berkley	8.1E-07	8.3E-07
2296 Chapman Way	BLDG25600	Berkley	8.1E-07	0.0E+00
2430 Chapman Way	BLDG13703	Berkley	6.9E-05	1.8E-05
2230 Chapman Way	BLDG13634	Berkley	6.9E-05	1.3E-05
2256 Chapman Way	BLDG13586	Berkley	1.7E-05	5.1E-06
2243 Chapman Way	BLDG13522	Berkley	2.6E-07	0.0E+00
2222 Chapman Way	BLDG13704	Berkley	6.9E-05	3.3E-05
2225 Chapman Way	BLDG13595	Berkley	2.6E-07	0.0E+00
2206 Chapman Way	BLDG13767	Berkley	6.9E-05	5.3E-05
2192 Chapman Way	BLDG13812	Berkley	6.9E-05	5.3E-05
2207 Chapman Way	BLDG13681	Berkley	8.6E-06	2.1E-07
2180 Chapman Way	BLDG13877	Berkley	1.7E-05	2.6E-05
2185 Chapman Way	BLDG13755	Berkley	8.6E-06	2.1E-07
2170 Chapman Way	BLDG13932	Berkley	1.7E-05	8.3E-06
2151 Chapman Way	BLDG13817	Berkley	2.1E-06	3.0E-08
2086 Rivergrove	BLDG14099	Berkley	2.4E-05	1.9E-05
2078 Rivergrove	BLDG14216	Berkley	3.5E-05	6.9E-05
2158 Chapman Way	BLDG13960	Berkley	2.4E-05	3.2E-05
2067 Rivergrove	BLDG14143	Berkley	8.7E-05	3.2E-05
2148 Chapman Way	BLDG13997	Berkley	2.4E-05	2.0E-07
2064 Rivergrove	BLDG14277	Berkley	8.7E-05	1.2E-04
2050 Rivergrove	BLDG14327	Berkley	8.7E-05	1.1E-04
2038 Rivergrove	BLDG14398	Berkley	8.7E-05	1.8E-05
2352 Riverbank	BLDG14297	Berkley	2.2E-05	7.8E-06
2346 Riverbank	BLDG14254	Berkley	1.1E-05	0.0E+00
2336 Riverbank	BLDG14212	Berkley	1.1E-05	0.0E+00
2026 Rivergrove	BLDG14449	Berkley	2.4E-05	1.5E-05
2018 Rivergrove	BLDG14549	Berkley	3.5E-05	4.3E-05
2029 Rivergrove	BLDG14407	Berkley	4.3E-06	6.9E-08
2002 Rivergrove	BLDG14610	Berkley	3.5E-05	4.3E-05
1988 Rivergrove	BLDG14675	Berkley	3.5E-05	1.4E-05
2015 Rivergrove	BLDG14458	Berkley	4.3E-06	6.9E-08
1978 Rivergrove	BLDG14709	Berkley	1.7E-05	1.7E-05
1985 Rivergrove	BLDG14510	Berkley	1.3E-07	6.9E-08
2353 Riverbank	BLDG14319	Berkley	1.3E-07	0.0E+00
1950 Rivergrove	BLDG14716	Berkley	2.4E-05	1.7E-05
1946 Rivergrove	BLDG14727	Berkley	2.4E-05	1.2E-05
1838 Riverside	BLDG15090	Berkley	4.3E-05	6.6E-05
1875 Riverside	BLDG15032	Berkley	1.1E-05	2.8E-06
1788 Riverside	BLDG15312	Berkley	8.7E-05	8.7E-05
1802 Riverside	BLDG15357	Berkley	8.7E-05	8.4E-05
1777 Riverside	BLDG15440	Berkley	3.2E-07	1.0E-06
1819 Riverside	BLDG15318	Berkley	1.1E-05	1.0E-06
1758 Riverside	BLDG23255	Berkley	2.4E-05	1.1E-05
1748 Riverside	BLDG23256	Berkley	2.4E-05	1.1E-05
1733 Riverside	BLDG15550	Berkley	9.1E-08	9.7E-08
1715 Riverside	BLDG15629	Berkley	9.1E-08	9.7E-08
1730 Riverside	BLDG15690	Berkley	8.7E-05	4.5E-05
1718 Riverside	BLDG15653	Berkley	6.1E-06	0.0E+00
1710 Riverside	BLDG15727	Berkley	1.1E-05	0.0E+00
1650 Riverside	BLDG15815	Berkley	4.3E-05	5.2E-06
2300 Swinburne	BLDG16053	Berkley	1.3E-06	0.0E+00
2312 Swinburne	BLDG15995	Berkley	1.1E-05	0.0E+00
2316 Swinburne	BLDG15988	Berkley	4.3E-05	1.6E-05
2315 Swinburne	BLDG16239	Berkley	8.7E-05	1.5E-06
2311 Swinburne	BLDG16222	Berkley	4.3E-05	0.0E+00
1590 Riverside	BLDG16217	Berkley	1.3E-06	0.0E+00
1580 Riverside	BLDG16322	Berkley	4.3E-05	2.6E-06
1554 Riverside	BLDG16375	Berkley	4.3E-05	1.3E-06
1530 Riverside	BLDG16467	Berkley	4.4E-05	8.2E-06
1502 Riverside	BLDG16555	Berkley	4.4E-05	8.2E-06
1488 Riverside	BLDG16598	Berkley	2.2E-05	8.2E-06
1460 Riverside	BLDG16639	Berkley	2.2E-05	8.2E-06
1458 Riverside	BLDG16679	Berkley	2.2E-05	8.2E-06
1418 Riverside	BLDG16824	Berkley	3.5E-05	2.0E-05
1426 Riverside	BLDG16826	Berkley	8.7E-06	2.7E-06
1350 Riverside	BLDG17167	Berkley	2.2E-05	5.7E-07
1320 Riverside	BLDG17306	Berkley	6.5E-07	5.7E-07
1372 Riverside	BLDG17045	Berkley	2.2E-05	8.2E-06
1260 Riverside	BLDG17502	Berkley	4.1E-07	9.6E-07
1238 Riverside	BLDG17593	Berkley	5.2E-07	9.6E-07
1226 Riverside	BLDG17672	Berkley	5.2E-07	3.0E-07
2424 Carmaria	BLDG12210	West Hastings	4.6E-07	0.0E+00
2344 Carmaria	BLDG12739	West Hastings	1.5E-05	4.3E-08
2252 Carmaria	BLDG12944	West Hastings	1.5E-05	2.9E-06
2220 Carmaria	BLDG13043	West Hastings	1.5E-05	6.9E-07
2194 Carmaria	BLDG13107	West Hastings	2.5E-05	2.4E-07
1672 Davenport	BLDG13539	Westlynn	6.1E-06	0.0E+00
1680 Davenport	BLDG13510	Westlynn	1.8E-05	6.1E-08
1688 Davenport	BLDG13460	Westlynn	3.7E-05	4.1E-06
1761 Bellelynn	BLDG15137	Westlynn	8.7E-06	1.4E-07

Address	Building ID	Escarpment	Max Individual Risk (PDI)	
			2010	2025
1747 Bellelynn	BLDG15222	Westlynn	6.9E-05	2.5E-05
2306 Carmaria	BLDG12811	West Hastings	1.5E-05	2.8E-08
4741 Woodrow	BLDG01818	Westlynn	1.7E-06	0.0E+00
4745 Woodrow	BLDG01773	Westlynn	3.5E-06	0.0E+00
4749 Woodrow	BLDG01703	Westlynn	9.8E-06	0.0E+00
4753 Woodrow	BLDG01672	Westlynn	3.4E-06	0.0E+00
4757 Woodrow	BLDG01643	Westlynn	9.8E-06	0.0E+00
500 Ventura	BLDG01681	Mosquito	1.1E-05	0.0E+00
522 Ventura	BLDG01640	Mosquito	4.3E-05	8.1E-06
544 Ventura	BLDG01565	Mosquito	4.3E-05	5.1E-06
550 Ventura	BLDG01486	Mosquito	4.3E-05	2.8E-06
4717 Prospect	BLDG01475	Mosquito	6.2E-05	5.1E-06
552 Palisade	BLDG01730	Mosquito	6.8E-05	8.2E-05
568 Palisade	BLDG01700	Mosquito	1.7E-05	6.1E-06
1893 Bowser	BLDG13913	Pemberton	3.5E-05	2.4E-06
1877 Bowser	BLDG13952	Pemberton	1.3E-07	0.0E+00
1890 Bowser	BLDG13938	Pemberton	3.5E-05	2.7E-05
1866 Bowser	BLDG13967	Pemberton	8.7E-06	1.3E-06
1850 Bowser	BLDG14011	Pemberton	4.0E-06	0.0E+00
1844 Bowser	BLDG14046	Pemberton	6.5E-08	0.0E+00
1871 Philip	BLDG14015	Pemberton	3.7E-05	1.1E-05
1861 Philip	BLDG14050	Pemberton	9.3E-06	9.7E-07
1412 Hope	BLDG14142	Pemberton	1.4E-07	0.0E+00
1856 Philip	BLDG14076	Pemberton	4.4E-06	7.1E-07
1840 Philip	BLDG14114	Pemberton	6.5E-08	0.0E+00
1404 Hope	BLDG24585	Pemberton	1.4E-07	0.0E+00
2180 Carmaria	BLDG13176	West Hastings	9.6E-05	2.2E-06
1408 Riverside	BLDG16888	Berkley	3.5E-05	8.3E-06
1400 Riverside	BLDG16913	Berkley	8.7E-06	9.3E-07
1444 Riverside	BLDG16719	Berkley	2.2E-05	8.2E-06
621 Seymour	BLDG20656	Riverside West	6.2E-05	5.3E-05
615 Seymour	BLDG20714	Riverside West	7.7E-06	0.0E+00
625 Seymour	BLDG20632	Riverside West	6.2E-05	5.3E-05
631 Seymour	BLDG20584	Riverside West	6.2E-05	5.3E-05
633 Seymour	BLDG20559	Riverside West	6.2E-05	5.3E-05
639 Seymour	BLDG20541	Riverside West	7.7E-05	6.6E-05
657 Seymour	BLDG20618	Riverside West	7.7E-06	1.3E-07
647 Seymour	BLDG20533	Riverside West	7.7E-05	6.6E-05
679 Seymour	BLDG20462	Riverside West	5.4E-05	4.6E-05
683 Bow	BLDG20417	Riverside West	3.1E-05	3.2E-05
677 Bow	BLDG20524	Riverside West	6.7E-07	4.6E-07
687 Bow	BLDG20385	Riverside West	5.4E-05	3.3E-05
689 Bow	BLDG23093	Riverside West	3.9E-05	3.3E-05
967 Heritage	BLDG18396	Riverside West	3.5E-05	0.0E+00
973 Heritage	BLDG18370	Riverside West	3.5E-05	1.3E-05
979 Heritage	BLDG18318	Riverside West	3.5E-05	2.9E-05
985 Heritage	BLDG18303	Riverside West	3.5E-05	2.1E-05
1175 Heritage	BLDG18164	Riverside West	4.3E-05	2.6E-05
1171 Heritage	BLDG18117	Riverside West	6.2E-05	6.2E-05
1111 Heritage	BLDG18127	Riverside West	2.3E-07	0.0E+00
1191 Seymour	BLDG18208	Riverside West	2.3E-07	0.0E+00
1167 Heritage	BLDG18093	Riverside West	6.2E-05	3.7E-05
1115 Heritage	BLDG18127	Riverside West	2.3E-07	0.0E+00
1163 Heritage	BLDG18006	Riverside West	4.3E-05	3.7E-05
1119 Heritage	BLDG18083	Riverside West	2.3E-07	0.0E+00
1193 Seymour	BLDG18131	Riverside West	2.3E-07	0.0E+00
1159 Heritage	BLDG17962	Riverside West	4.3E-05	3.7E-05
1195 Seymour	BLDG18013	Riverside West	1.6E-07	0.0E+00
1155 Heritage	BLDG17902	Riverside West	4.3E-05	3.7E-05
1123 Heritage	BLDG17936	Riverside West	1.6E-07	3.5E-07
1151 Heritage	BLDG17821	Riverside West	4.3E-05	5.3E-05
1127 Heritage	BLDG19536	Riverside West	1.6E-07	3.5E-07
1147 Heritage	BLDG17660	Riverside West	4.3E-05	3.7E-05
1143 Heritage	BLDG17657	Riverside West	1.1E-05	4.8E-06
1261 Seymour	BLDG17512	Riverside West	4.3E-05	4.6E-05
1273 Seymour	BLDG17416	Riverside West	4.3E-05	4.6E-05
1287 Seymour	BLDG17277	Riverside West	6.2E-05	4.4E-05

Table D-6. Life-Loss Risk for Properties at the Base of the Slope by Escarpment Area

Max Risk

Summary Stats - By Property														
Escarpment	**Berkley**		**Mosquito**		**Westlynn**		**Pemberton**		**Riverside West**		**West Hastings**		**District-wide**	
	2010	**2025**	**2010**	**2025**	**2010**	**2025**	**2010**	**2025**	**2010**	**2025**	**2013**	**2025**	**pre-2025**	**2025**
Broadly acceptable	24	48	0	6	7	9	9	10	11	13	1	7	52	93
Tolerable	52	26	7	1	3	1	3	2	26	24	6	0	97	54
Unacceptable	0	2	0	0	0	0	0	0	0	0	0	0	0	2

APPENDIX E
GUIDANCE FOR SLOPE HAZARD ASSESSMENTS ALONG ESCARPMENT SLOPES

June 15, 2026 Project 0404103

District of North Vancouver
355 West Queens Road
North Vancouver, BC V7N 4N5

Attention: Fiona Dercole, Senior Project Manager, Public Safety

Guidance for Slope Hazard Assessments along Escarpment Slopes

1.0 INTRODUCTION

The District of North Vancouver (the District, DNV[1]) manages risk from slope hazards to development through Development Permit Areas (DPAs), described in Schedule B - Slope Hazard DPA, amended July 30, 2021, of the Official Community Plan (OCP) (DNV, July 9, 2012). Applicants for proposed development within the Slope Hazard DPA may be required to provide slope hazard assessment report(s) prepared by a qualified professional (QP).

BGC Engineering Inc. (BGC) has completed a District-wide update of landslide risk from escarpment slopes to reflect advances in scientific knowledge, implementation of risk management works, and extended landslide history (BGC, June 15, 2026a). To accompany this update, DNV requested BGC provide guidance for slope hazard assessments. The objectives of this work are to:

1. Recommend levels of assessment and associated criteria for slope hazard assessments at escarpments in the District.
2. Provide guidance for slope hazard assessments.

This work is intended to serve as guidance for developers, property owners, and QPs when undertaking slope hazard assessments, and as a resource for DNV. It is limited to landslide slope hazards along escarpment[2] slopes and does not include guidance for steep-creek or rockfall hazard assessments. BGC could prepare similar guidance for such hazards at DNV's request.

Work was carried out under Purchase Order 99163-OS-125 and dated July 19, 2023.

[1] In this document, DNV is used to refer to the administrative authority and the District is used to refer to the geographic area.

[2] Escarpment slopes are steep, natural slopes that separate two relatively level land surfaces (e.g., Berkley Escarpment). These slopes range from several meters to approximately 85 meters high with slopes angles ranging from approximately 25 to 45° across the District. Escarpment slopes in the District are susceptible to rapid earth flows (referred to as flow slides), which have historically initiated in fill placed at the crest of the escarpment, entraining natural sediments as they descend the escarpment slope.

2.0 SLOPE HAZARD DPA

The DNV's Slope Hazard DPA applies to parcels that are wholly or partially within 20 meters of the crest or base of a slope with a slope angle greater than 20° (36%) and height greater than 10 meters. While this report pertains only to escarpments, the DNV Slope Hazard DPA includes any slopes within the DNV that meet these criteria.

Along certain escarpment slopes, there are properties located beyond 20 meters from the base of the slope (i.e., outside of the Slope Hazard DPA) that are subject to life-safety risks from landslides, as identified by BGC (June 15, 2026a). Rather than offset distances from the base of the slope, BGC (June 15, 2026a) applied runout angles from the crest of the slope to assess landslide runout extents in the risk assessment. A runout angle is the angle from horizontal between the slope crest to a location downslope along a landslide path, as shown in Figure 2-1, which shows the 21° runout angle referenced in this report.

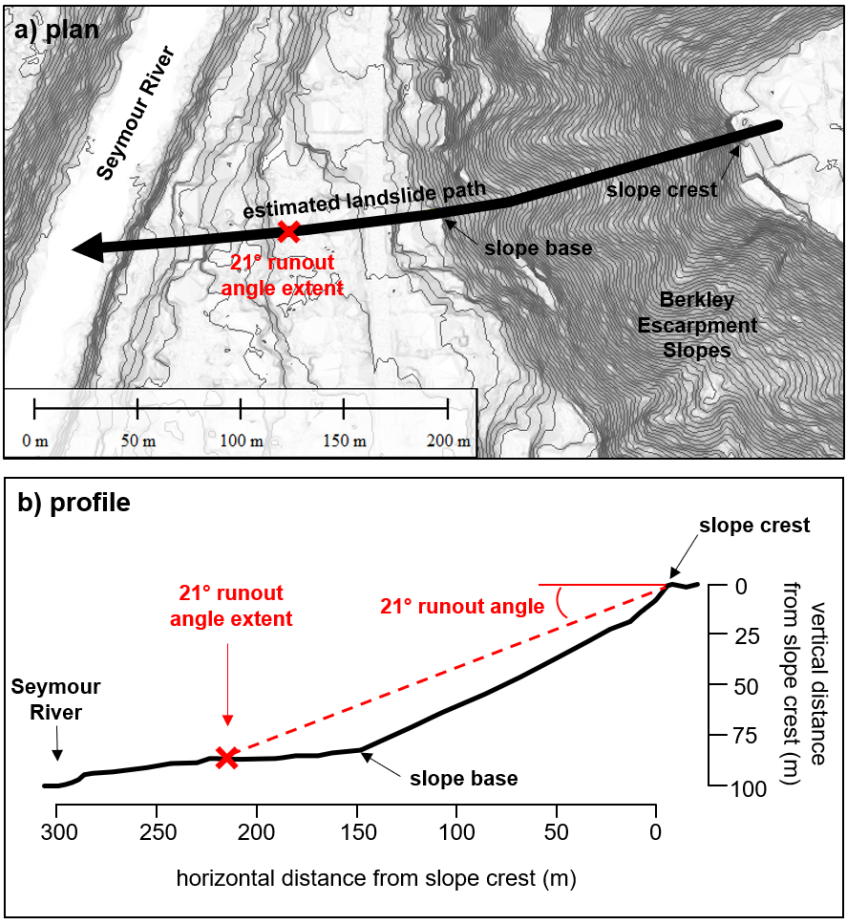


Figure 2-1 Example of a 21° runout angle measurement from an escarpment slope. Panel a) shows a plan view of the slope with 2022 lidar and 1 m contours, and panel b) shows the corresponding slope profile along the estimated landslide path. The estimated landslide path should approximately follow the fall line of topography, and the runout angle measurement should be made from the slope crest corresponding to the maximum landslide initiation height.

3.0 SLOPE HAZARD ASSESSMENT LEVELS OF ASSESSMENT

The DNV's OCP (Schedule B) provides the following guidelines for slope hazard assessment reports:

- The QP is to determine the appropriate method of assessment and level of effort.
- A "preliminary assessment" report, including a qualitative risk assessment, should be completed as an initial step to estimate if slope hazards are present. If the preliminary assessment demonstrates risks are broadly acceptable (annual probability of death of an individual (PDI) less that 1:100,000), further risk assessment may not be required.
- Where the preliminary assessment report demonstrates risk is not broadly acceptable, a "detailed assessment" report with a quantitative risk assessment or factor of safety (FOS) calculations should be required.
- The assessment should meet the latest Engineers and Geoscientists of British Columbia (EGBC) best practice guidelines for landslide assessments (e.g., EGBC, March 1, 2023).

There are many factors a QP may consider when determining the level of assessment, such as the local conditions, hazard type(s), potential consequences to or from the proposed development, and associated uncertainties. In this section, BGC recommends criteria to inform selection of the level of assessment for slope hazard assessments for proposed development. The recommended criteria and levels of effort apply to assessments on, at the base, and at the crest of escarpment slopes subject to landslide hazards. For properties located mid-slope, the QP would be responsible for selecting which criteria are most appropriate based on the relative location on the slope, slope characteristics, and surrounding development.

3.1 Properties On or at the Base of a Slope

3.1.1 Criteria

Table 3-1 provides the recommended the level of assessment based on the type of proposed development and a screening-level individual life-loss risk estimate. For properties on or at the base of the slope, BGC recommends a preliminary assessment where the screening-level risk meets DNV's risk tolerance criteria, and a detailed assessment where it does not (Table 3-1). The screening-level risk may be based on a previous quantitative risk assessment completed at the property, such as the most recent District-wide landslide risk assessment (e.g., BGC, June 15, 2026a) if available, or estimated using criteria in Table 3-2.

Table 3-1 Recommended level of assessment for proposed development on or at the base of a slope.

Proposed development type	Screening-level individual life-loss risk (annual probability of death of an individual, PDI)[1]		
	<1:100,000 (Broadly Acceptable)	<1:10,000 (Tolerable)	>1:10,000 (Unacceptable)
Building permit <25% increase in gross floor area	Preliminary	Preliminary	Detailed
Building permit (>25% increase to gross floor area and/or retaining wall >1.2m), Rezoning, Subdivision, or New development	Preliminary	Detailed	Detailed

Note:

1. Screening-level risk can be based on a previous quantitative risk assessment, such as the most recent District-wide landslide risk assessment (e.g., BGC, June 15, 2026a), or estimated using Table 3 2.

For properties not included in the District-wide landslide risk assessment, or at locations where site conditions have changed since the latest assessment, the criteria in Table 3-2 can be used to estimate risk at a screening-level, using:

- The escarpment slope height,
- The runout angle from the crest of the slope to the upslope side of the building/development,

and assuming:

- The maximum annual landslide probability for DNV escarpment slopes from the most recent landslide risk assessment (BGC, June 15, 2026a),
- The presence of a fully-occupied, typical, single-family wood-frame building.

Screening-level risk estimates in Table 3-2 are based on methods applied in BGC's (June 15, 2026a) landslide risk assessment update. These estimates are intended to guide the level of assessment with Table 3-1, and are not intended to replace further work or be applied outside the DNV.

Table 3-2 Screening-level individual life-loss risk (annual probability of death of an individual, PDI) for proposed development on or at the base of a slope to be used with Table 3-1.

Slope height (m)	Runout angles from slope crest to upslope side of proposed inhabited structure			
	21-22°	23-24°	25-26°	>26°
<20 m	<1:100,000	<1:100,000	<1:10,000	>1:10,000
20-40 m	<1:100,000	<1:10,000	>1:10,000	>1:10,000
>40 m	<1:10,000	<1:10,000	>1:10,000	>1:10,000

Notes:

1. Screening-level risk is estimated using methods applied in BGC's (June 15, 2026a) landslide risk assessment update assuming the maximum annual landslide probability for DNV escarpment slopes and the presence of a fully occupied, typical, single-family wood-frame building on or at the base of the slope. These risk levels are intended to guide the level of assessment with Table 3-1, and are not intended to replace further work or be applied outside the DNV.
2. Slopes must have an angle greater than 20° (36%) and height greater than 10 meters to apply this tool within the District.
3. Slope height is the height difference from the slope crest to the slope base along a credible landslide path (e.g., Figure 2-1).
4. Runout angle is the angle from horizontal between the slope crest (maximum landslide initiation height) to the closest (upslope) side of the proposed development footprint along a landslide path (e.g., Figure 2-1). Properties located beyond the 21° runout angle from all credible landslide paths should not require a slope hazard assessment.

3.1.2 Levels of Assessment

The recommended levels of assessment for properties on or at the base of a slope are:

1. Preliminary Assessment

The screening-level risk suggests the proposed development likely meets DNV's risk tolerance criteria (Table 3-2). A preliminary, site-specific slope hazard assessment should include, at a minimum:

- Desktop study, such as a review of relevant background reports, maps, topography, imagery, climate, and historical hazard event information, as available
- Field visit to assess slope conditions
- Description of slope hazard(s) and characteristics
- Description of existing and proposed development, such as size, layout, construction type, and building use (e.g., residential, commercial, other)
- A qualitative risk assessment to demonstrate the screening-level risk assessment is representative and therefore meets DNV's risk tolerance criteria, showing:
    - The frequency and/or magnitude of the slope hazards affecting the property are not higher than assumed in the most recent District-wide landslide risk assessment, or a typical escarpment slope in the DNV, based on the observed site conditions
    - The proposed development will not increase the exposure or vulnerability of the building's inhabitants to the described slope hazards.
- Demonstrate the proposed development has implemented measures to reduce risk where practical, such as putting bedrooms on upper floors and on the far side away from the slope, locating windows and doors away from potential landslide impacts, or other measures listed in the OCP (Schedule B) Slope Hazard DPA guidelines.

A QP may elect to complete a detailed assessment if more information is required to assess that the proposed development may be safely used for the purpose intended.

2. Detailed Assessment

The screening level risk suggests the proposed development may not meet DNV's risk tolerance criteria (Table 3-2). A detailed, site-specific slope hazard assessment should include, at a minimum:

- Everything included in the Preliminary Assessment
- Quantitative assessment of individual life-loss risk
- Subsurface investigation (e.g., boreholes, CPT testing, test pits, hand augering, geophysics), if required to support risk assessment
- Slope stability analysis, if required to support risk assessment
- Numerical runout modelling to quantify landslide impacts, if required to support risk assessment
- Criteria for the design, construction, and maintenance of mitigative works, if required to achieve DNV risk tolerance criteria, along with a statement that proposed mitigative works will not transfer risk to other properties.

BGC recommends that if the proposed development significantly increases the density such that there could be numerous fatalities from a single hazard scenario, the QP should consider assessing group[3] risk in addition to individual risk in the quantitative risk assessment. In such situations, the DNV may also elect to engage a third party to review the risk assessment, if deemed appropriate by the relevant authorities at the DNV.

3.2 Properties On or at the Crest of a Slope

3.2.1 Criteria

BGC (January 13, 2006) identified that for buildings constructed on native soils at the crest of escarpments within the DNV, the potential for slope failure leading to building foundation collapse and subsequent loss of life is very low, such that life-loss risk to building occupants is typically broadly acceptable. Depending on the site and nature of development, proposed development at the crest or on the slope may contribute to slope stability issues, which may transfer risks to adjacent or downslope properties. The DNV's OCP (Schedule B) recommends various measures to limit changes in slope conditions, such as avoiding the need for retaining walls or limiting the extent of paved surfaces. BGC recommends the level of assessment reflect the potential for proposed development to change slope conditions in a manner that could increase risk to downslope or adjacent properties. The level of assessment for properties on or at the crest of the slope can be guided using the criteria in Table 3-3.

Table 3-3 Recommended level of assessment for proposed development on or at the crest of an escarpment slope.

Proposed development type	Proposed development includes slope modification	Recommended level of assessment
Building permit (<25% increase in gross floor area)	No	Preliminary
	Yes	Detailed
Building permit (>25% increase to gross floor area or retaining wall), Rezoning, Subdivision, or New development	-	Detailed

Notes:

1. Slopes must have an angle greater than 20° (36%) and height greater than 10 meters, with proposed development within 20 m of the slope crest or on the slope.
2. Slope modification refers to any change in the slope conditions, including, but not limited to addition or modification of retaining wall, alteration of slope geometry, change to loading conditions on or at the crest of slope, change to drainage conditions.

[3] The DNV's risk tolerance criteria do not include group (i.e., societal) risk. Group risk evaluates the number of people that could be killed by a hazard scenario considering all those exposed.

3.2.2 Levels of Assessment

The recommended levels of effort for properties on or at the crest of a slope are:

1. Preliminary Assessment

The proposed development is unlikely to increase risk from slope hazards at the proposed site or to other properties. A preliminary, site-specific slope hazard assessment should include, at a minimum:

- Desktop study, such as a review of relevant background reports, maps, topography, imagery, climate, historical hazard event information, as available
- Field visit to assess slope conditions
- Description of slope hazard(s) and characteristics
- Description of existing and proposed development, such as size, layout, construction type, and building use (e.g., residential, commercial, other)
- Description of neighbouring and downslope properties and infrastructure, trails, streams, or other elements of value, such as location relative to the proposed development, layout, type, and intended use
- A qualitative risk assessment to demonstrate that the proposed development does not increase the frequency and/or magnitude of potential slope hazards, thereby increasing risk to the proposed development, neighbouring properties, or downslope properties.
- Demonstrate the proposed development has implemented measures to improve slope conditions where practical, such as connecting buildings to the storm drainage system, grading the lot(s) to direct water away from slopes, revegetating disturbed slopes, removing excess fill from crest of slope, or other measures listed in the OCP (Schedule B) Slope Hazard DPA guidelines.

A QP may select to complete a detailed assessment if more information is required to assess that the proposed development may be safely used for the purpose intended.

2. Detailed Assessment

The proposed development may change the risk from slope hazards at the proposed site or to other properties. A detailed, site-specific slope hazard assessment should include, at a minimum:

- Everything included in the Preliminary Assessment
- Slope stability analysis to estimate a Factor of Safety (FOS) and assess the implications of the proposed development on slope stability (e.g., by adding or modifying retaining wall, altering slope geometry, changing loading conditions on or at the crest of slope, changing drainage conditions)
- Subsurface investigation (e.g., boreholes, CPT testing, test pits, hand augering, geophysics), as required to support slope stability analysis
- Numerical runout modelling to quantify landslide impacts to downslope areas, if required to demonstrate that risk transfer will not occur as a result of the proposed development

- Criteria for the design, construction, and maintenance of mitigative works, if required to achieve DNV FOS criteria, and statement that proposed mitigative works will not transfer risk to other properties.

4.0 GUIDANCE FOR SLOPE HAZARD ASSESSMENTS IN THE DNV

In this section, BGC provides guidance to support the preparation of slope hazard assessment reports for proposed development at the crest, base, or on the slope of an escarpment. The guidance draws on the assessment report guidelines in the OCP (Schedule B) Slope Hazard DPA, EGBC (March 1, 2023) best practice guidelines for landslide assessments, and BGC's geotechnical experience.

Level of Assessment (Preliminary, Detailed)

- Align level of assessment with recommendations in Section 3.1, or provide rationale justifying a different level of assessment.
- Reference latest EGBC best practice guidelines for landslide assessments.

Deliverables (Preliminary, Detailed)

- Include plan drawing(s) with a topographic base map delineating slope hazard areas, parcel boundaries, existing structures, proposed development, and other relevant site features.
- Demonstrate that the proposed development meets DNV's risk tolerance criteria, include a statement that the proposed development may be safely used for the purpose intended with a signed and sealed Landslide Assurance from the EGBC best practice guidelines for landslide assessments.

Desktop Assessment (Preliminary, Detailed)

- Review all relevant background reports, including the most recent landslide hazard assessment and previous reports affecting the property and surrounding area.
- Review topography and imagery of the property and surrounding area.
- Describe the geology, terrain, and climate of the study area.
- Describe any known past slope hazard events at or near the property.
- Describe existing and proposed development, such as size, layout, construction type, and use.
- For properties at the crest of the slope, identify if the property is connected to the stormwater drainage system.
- Identify neighbouring and downslope properties and infrastructure.

Field Visit (Preliminary, Detailed)

- Traverse the slope including beyond the crest and base of the slope, if accessible.
- Collect observations about surface and groundwater drainage, such as channels, gullies, seepage points, and ponding.
- Collect observations related to potential slope movement, such as scarps, tension cracks, uneven ground, depressions or sinkholes, bulging slopes, tilted trees, and landslide debris.
- Describe existing retaining wall(s) or mitigation structures (e.g., berms, basins) on the property or with the potential to influence slope hazards affecting property, including type, size, layout, and current condition, if applicable.
- Provide photographs from the field visit.

Slope Hazard Characterization (Preliminary, Detailed)

- Assess the nature, extent, magnitude, frequency, possible triggering conditions, and potential consequences of slope hazards at a level of detail consistent with the level of assessment.

Subsurface Investigation (Detailed, if completed)

- Describe site investigation methods and techniques, such as sampling equipment and tests performed.
- Describe the underlying geology, including the depth of fill and soil types.
- Provide logs and photos of soil encountered.
- Provide estimates of soil engineering parameters, if applicable.
- Describe limitations of subsurface investigation.

Qualitative Risk Assessment (Preliminary)

- For properties on or at the base of the slope, demonstrate:
    - the frequency and/or magnitude of the slope hazards affecting the property are not higher than assumed in the most recent District-wide landslide risk assessment, or a typical escarpment slope in the DNV, based on the observed site conditions, and/or;
    - the proposed development will not increase the exposure or vulnerability of the building's inhabitants to the described slope hazards.
- For properties on or at the crest of the slope, demonstrate that the proposed development does not increase the frequency and/or magnitude of potential slope hazards, thereby increasing risk to the proposed development, neighbouring properties, or downslope properties.

Quantitative Risk Assessment (Detailed)

- Describe risk assessment methods, variables, and assumptions.
- Compare risk estimate to DNV risk tolerance thresholds.
- Where population density is being increased significantly, describe or estimate the potential implications for societal (group) risk.
- Describe limitations and uncertainties of the risk assessment.

Slope Stability Analysis or Numerical Runout Modelling (Detailed, if completed)

- Describe modelling methods, assumptions, and input parameters
- Provide figures and interpretations of model results.
- Describe modelling limitations and uncertainties.

Risk Reduction Measures and Mitigation (Detailed, Preliminary)

- For properties on or at the base of the slope, demonstrate measures undertaken to reduce risk where practical (e.g., putting bedrooms on upper floors and on the far side away from the slope, locating windows and doors away from potential landslide impacts)
- For properties on or at the crest of the slope, demonstrate measures undertaken to improve slope conditions where practical (e.g., connecting buildings to the storm drainage system, grading lots to direct water away from slopes, revegetating disturbed slopes, removing excess fill from crest of slope).
- For properties requiring mitigative works to meet DNV risk tolerance criteria, provide:

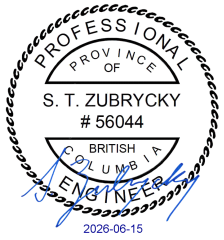
- criteria for design, construction, and maintenance of proposed works;
- statement that proposed works will not transfer risk to other properties.

5.0 CLOSURE

We trust the above satisfies your requirements. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC Engineering Inc.
per:





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EGBC Permit to Practice, BGC Engineering Inc. 1000944

LCH/KH/mjp/mm

Attachment(s): Limitations
References

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