Making a difference...together

DP-05-11 – Strandlund

REPORT TO THE JUAN DE FUCA LAND USE COMMITTEE
MEETING OF TUESDAY, JULY 17, 2012

SUBJECT **DEVELOPMENT PERMIT WITH VARIANCE FOR LOT 41, SECTION 43, HIGHLAND DISTRICT, PLAN 8166 – 6966 MARK LANE**

ISSUE

The purpose of this report is to request a development permit with variance in order to address geotechnical concerns associated with siting of a single-family dwelling, walkways, stairs and decks within a Steep Slopes Development Permit Area and a Foreshore, Wetlands and Riparian Areas Development Permit Area; and to legalize the siting of a "landing" located within the rear setback.

BACKGROUND

The 0.66 ha property is located at 6966 Mark Lane in Willis Point and is zoned Community Residential 1 (CR-1). The property is bounded by CR-1 zoned properties to the south, a lane providing statutory access to water to the north, a Rural Conservation (RC) zoned property to the east, and the Saanich Inlet to the west (Appendix 1). The property is also divided by Mark Lane, with the portion on which the house is sited located adjacent to Saanich Inlet. The front of the home is accessed by a set of stairs that extend from the parking area adjacent to Mark Lane. The stairs continue around the north side of the house where they join a deck that extends along the length of the western side of the house. The "landing" structure, which is the subject of the development variance, is accessed from the deck via a walkway and additional stairs (Appendices 2 and 3).

Building Inspection records indicate that the property has been occupied by a single-family dwelling since 1982; however, the original building permit was never finalized and the file was eventually closed in the year 2000. During a visit to a neighbouring property in January 2010, a CRD Building Inspector noted ongoing work to alter the home and decks. A Stop Work Order was issued on January 21, 2010, with a second Stop Work Order issued on March 29, 2010, as the contractors continued to work in contravention of the first order. The Manager of Building Inspection will recommend to the Electoral Area Services Committee that a Notice on Title be registered against the property, notifying future home owners that the single-family dwelling and decks were partially constructed without the benefit of a Building Permit.

The applicant submitted a development permit with variance application on February 1, 2011, to finalize the building permit for the single-family dwelling, and to legalize the siting of the "landing". Over the past 18 months, several geotechnical reports, completed by a professional geoscientist, have been submitted in order to address the Willis Point Comprehensive Community Plan Steep Slopes and Foreshore, Wetlands and Riparian Areas DP Guidelines. All reports dated prior to September 27, 2011, were summarized by the September 27, 2011, Thurber Engineering report (Appendix 4). The latest report, completed on June 22, 2012, specifically addressed the structures located in the foreshore area (Appendix 5). As there are no identified watercourses located on or within 30 m of the property, a Riparian Areas Assessment report is not required. The concerns related to the foreshore area are strictly geotechnical in nature.

ALTERNATIVES

1) Approve the steep slopes and foreshore, wetlands and riparian areas development permit with variance to relax the rear yard setback from 1.5 m to 0.73 m for the purpose of legalizing the siting of a "landing", as shown on the attached survey plan.

2) Deny the development permit with variance, and require that the structure comply with zoning requirements.

3) Refer the application back to staff for additional information.

LAND USE IMPLICATIONS

The Willis Point Comprehensive Community Plan, Bylaw No. 3027, establishes zoning requirements for the CR-1 Zone. Schedule 'B', Part IV, Section 22.0 (2) (f) states that, "*No accessory building may be located closer than 1.5 metres to a rear parcel line*". Therefore, the "landing" shown on the May 1, 2012, JE Anderson Site Survey must comply with the 1.5 m rear yard setback.

The subject property is partially designated as a Steep Slopes DP Area. In order to finalize the outstanding Building Permit, a Development Permit is required. In accordance with the Steep Slopes DP Guidelines, the applicant has submitted a number of geotechnical reports, prepared by a qualified professional. These reports are summarized below:

1. The January 5, 2011, Thurber Engineering Ltd., Preliminary Geologic Hazard Assessment described the property as having a general western aspect, which extends from sea level at the western boundary, to approximately 40 m in elevation at the eastern boundary. The report included a preliminary geologic hazard assessment for the entire property and identified a steep slope with a moderate to high hazard rating in close proximity to the eastern side of the house.

2. The July 14, 2011, Thurber Engineering Ltd., Recommended Plan of Action provided a recommended plan for further assessment work on the site, including scaling and clearing of the steep slope in order to allow a more detail terrain hazard assessment. The recommended plan included a number of options for mitigating the potential risk associated with the steep slope including intermittent monitoring; additional scaling; the installation of rock bolts, wire mesh and/or shotcrete; the construction of a catchment structure; and abandoning or moving the existing house. The plan recommended that any work beyond scaling be inspected by a geotechnical engineer or professional geoscientist.

3. The August 31, 2011, Thurber Engineering Ltd., Geotechnical Services Memorandum #1 summarized their inspection of the scaling work completed on the steep slope. The inspection revealed that the central portion of the slope consisted of loose blast rock and soil fill, rather than bedrock as was originally anticipated. The memo noted that the risk was higher than previously stated and recommended that the fill slope be pulled back to a slope of 1.5 (horizontal) to 1 (vertical) prior to fall or winter rains. The memo also recommended that a retaining wall may be required to support the remaining fill.

4. The September 21, 2011, Thurber Engineering Ltd., Geotechnical Services Memorandum #2 summarized their inspection of further excavation work completed since Memorandum #1. The inspection found that the excavation work left a 1 to 2 m high vertical exposure of loose blast rock and soil fill on the high hazard slope. The memo commented that the slope had been left in an unsafe condition, but that room had been provided for the construction of a recommended mortared rock retaining wall.

5. The September 27, 2011, Thurber Engineering Ltd., Terrain Assessment and Mitigation Summary, provided a summary of all assessments and reports completed up to that date. The summary also provided a Landslide Assessment Assurance Statement (LAAS), which was based on the understanding of site hazards at that time, and on the assumption that the required construction of the mortared rock retaining wall, site regarding and slope pullback work would be carried out in accordance with their specifications. The LAAS provided the professional geoscientist's assurance that the land may be used safely for the use intended under the stated conditions.

6. The June 22, 2012, Thurber Engineering Ltd., Terrain Hazard Assessment: Deck, Dock and Stairs, was submitted in response to the CRD request that the professional geoscientist certify that that those structures were also safe for the use intended. The assessment reclassified certain areas in proximity to the deck, stairs, landing and dock with regards to their hazard risk potential. Areas of the walkway found to be in a higher geotechnical hazard risk category were determined to be of a lower overall risk due to their infrequency of use. The assessment certified that the previously submitted LAAS was still valid and did not require updating or re-issuing.

The subject property located within 15 m of the natural boundary of the sea (Saanich Inlet) is designated as a Foreshore, Wetlands and Riparian Areas DP area. Since there are no identified watercourses located on or within 30 m of the property, a Riparian Areas Assessment is not required. As previously mentioned, the primary concerns related to the foreshore are geotechnical in nature.

Considerable work has been undertaken to mitigate the potential risk posed by the high-hazard steep slope located on the eastern side of the dwelling. Any further work to mitigate the hazard, such as the construction of the recommended mortared rock retaining wall and slope regrading, should be conducted under the Development Permit. In order that this work may continue, staff recommends approval of the development permit with variance subject to the conditions of the attached geotechnical reports and subject to public notification.

LEGISLATIVE IMPLICATIONS

The Willis Point Comprehensive Community Plan Schedule 'A' outlines development permit guidelines. The property is within the Steep Slopes and Foreshore, Wetlands and Riparian Areas DP areas; therefore, a development permit is required.

The Willis Point Comprehensive Community Plan Schedule 'B' specifies yard requirements for the CR-1 zone. To vary these requirements, a development variance permit is required.

PUBLIC CONSULTATION IMPLICATIONS

Pursuant to the *Local Government Act,* Section 922(4), if a local government is proposing to pass a resolution to issue a development variance permit it must give notice to each resident/tenant within a given distance as specified by bylaw. Capital Regional District Bylaw No. 3110, Fees and Procedures Bylaw, states that the Board at any time may refer an application to an agency or organization for their comment. In addition, it states that a notice of intent must be mailed to adjacent property owners within a distance of not more than 500 metres. Any responses received from the public will be presented at the July 17, 2012 Land Use Committee meeting.

CONCLUSION

The applicant is requesting a Steep Slopes, and Foreshore, Wetlands and Riparian Areas Development Permit with Variance to address geotechnical concerns related to the current siting of a single-family dwelling, walkways, stairs and decks at 6966 Mark Lane in Willis Point. Reports, prepared by a professional geoscientist and meeting the DP Guidelines of the Willis Point Comprehensive Community Plan, have been submitted in support of the application. Given that the "landing" currently exists, and given that its location does not appear to impact the use and enjoyment of neighbouring properties. In light of the above information and in order that hazard mitigation work may continue, staff recommend approval of the development permit with variance subject to the conditions of the attached geotechnical reports and subject to public notification.

RECOMMENDATIONS

That the Land Use Committee recommends to the Capital Regional District Board:

1. That Steep Slopes and Foreshore, Wetlands and Riparian Areas development permit DP-05-11 for Lot 41, Section 43, Highland District, Plan 8166 be approved subject to the following conditions:
    1. That the proposed development comply with the Steep Slopes, and Foreshore, Wetlands and Riparian Areas Development Permit Guidelines outlined in the Willis Point Comprehensive Community Plan, Bylaw No. 3027;
    2. That the proposed development comply with the recommendations outlined in the professional geoscientist's reports prepared by Thurber Engineering Ltd., dated September 27, 2011, (Appendix 4), and June 22, 2012, (Appendix 5);
    3. That the professional geoscientist's reports prepared by Thurber Engineering Ltd., dated September 27, 2011, and June 22, 2012, be secured via a restrictive covenant registered on title prior to the issuance of the Occupancy Permit; and
    4. That the conditions of this development permit with variance be verified as part of the building permit process; and
2. That the Willis Point Comprehensive Community Plan, 2002, Bylaw No. 3027, Schedule 'B', Part IV, Section 22.2(f) be varied to reduce the rear yard setback for accessory buildings from 1.5 m to 0.73 m as shown on the attached site survey prepared by J.E. Anderson & Associates, dated May 1, 2012 (Appendix 2) in order to permit the siting of a "landing" adjacent to the rear parcel line.

Original Signed

Iain Lawrence
Planner

Original Signed

June Klassen, MCIP
Manager, Local Area Planning
Concurrence

Original Signed

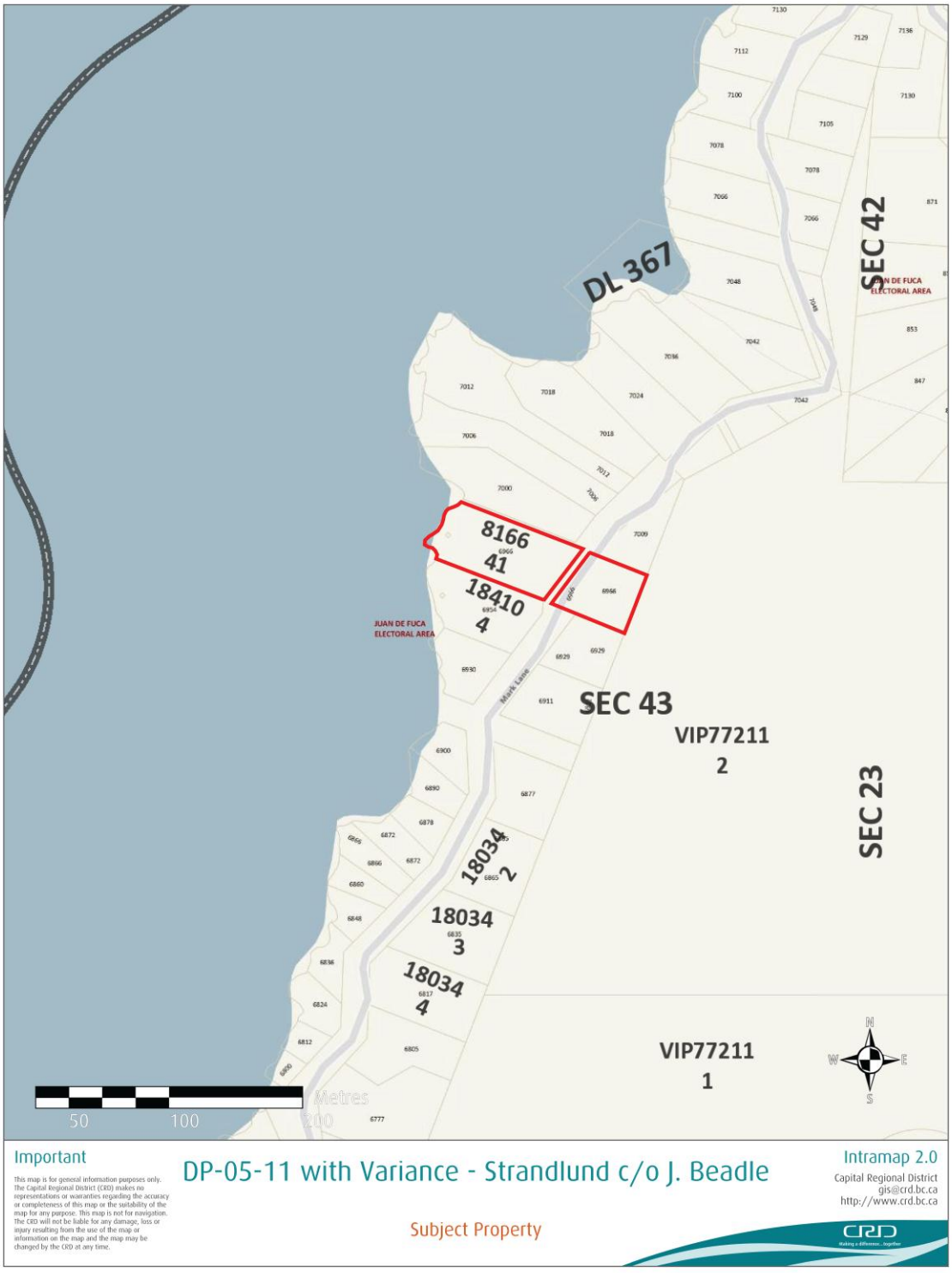
Robert Lapham, MCIP
General Manager, Planning & Protective Services
Concurrence

Original Signed

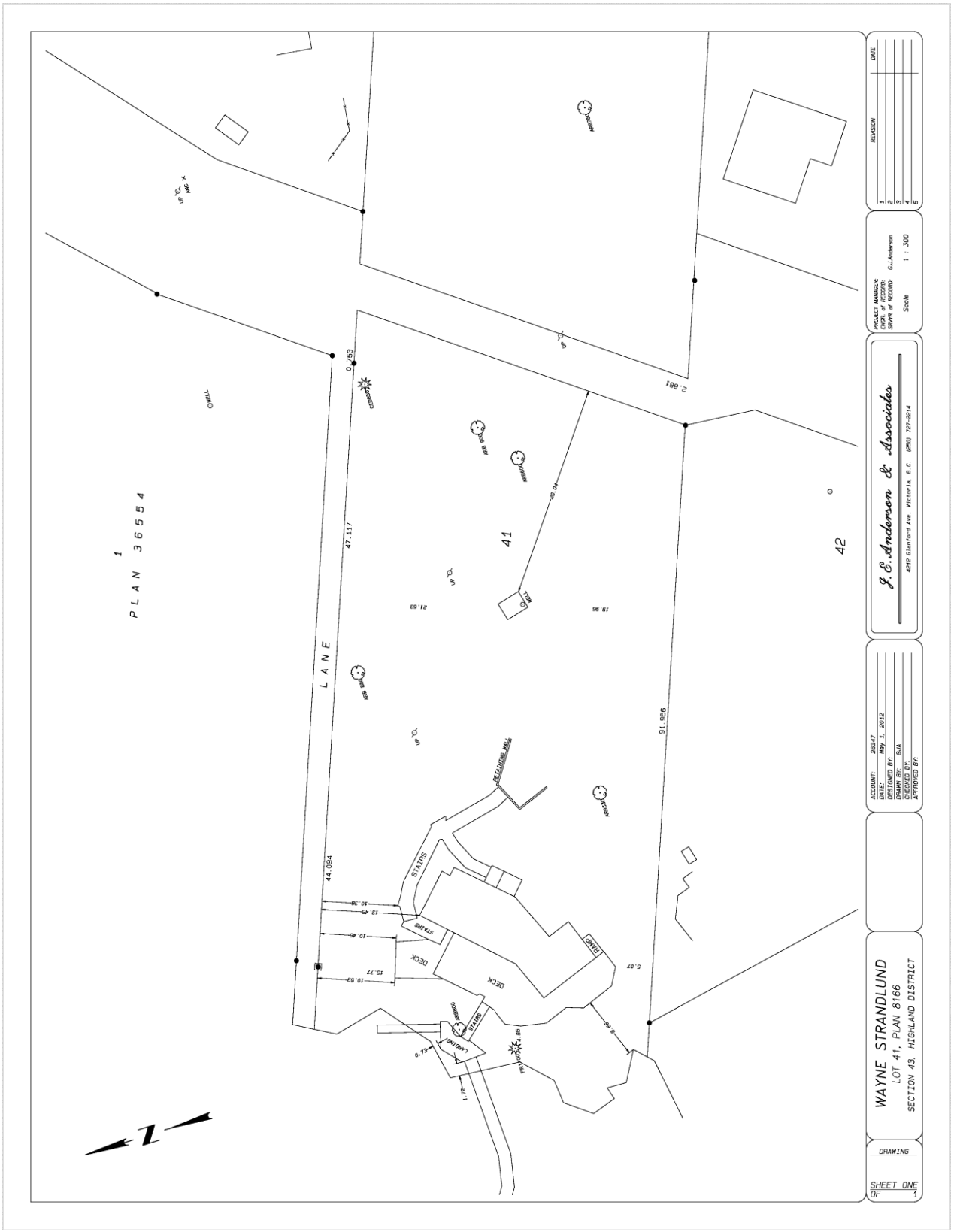
Kelly Daniels
Chief Administrative Officer
Concurrence

Appendix 1: Location Map
Appendix 2: Site Survey
Appendix 3: Single-Family Dwelling As-Built Drawing
Appendix 4: Thurber Engineering Ltd. Terrain Assessment and Mitigation Summary, dated September 27, 2011
Appendix 5: Thurber Engineering Ltd. Terrain Hazard Assessment: Deck, Dock and Stairs, dated June 22, 2012

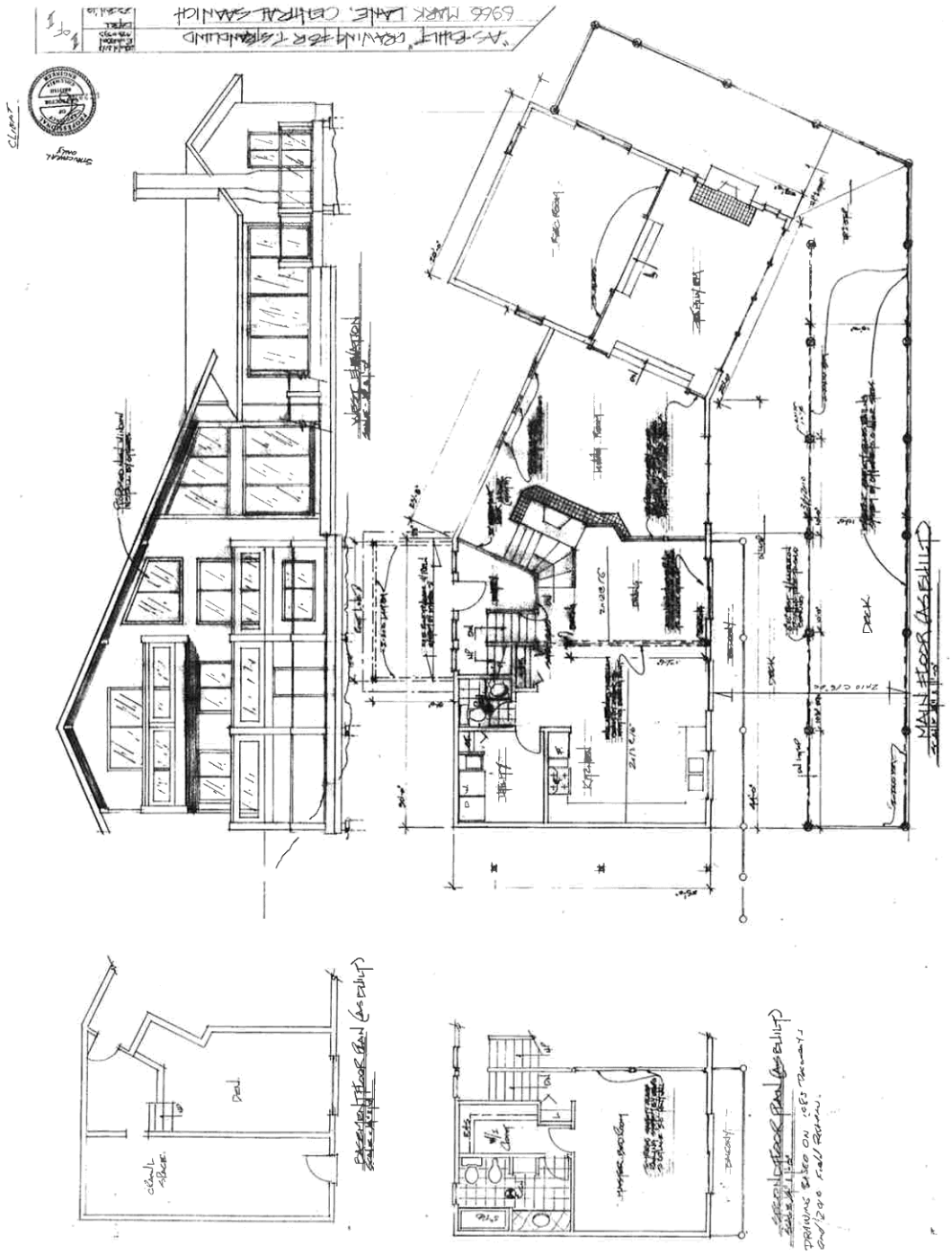
Appendix 1: Location Map



Appendix 2: Site Survey



Appendix 3: Single-Family Dwelling As-Built Drawing



Appendix 4: September 27, 2011, Geotechnical Report

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GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 27, 2011 File: 19-5874-0

Wayne Strandlund
c/o Justin Beadle
Fisgard Capital Corporation
3378 Douglas Street
Victoria, B.C. V8Z 3L3

TERRAIN ASSESSMENT AND MITIGATION SUMMARY
6966 MARK LANE, WILLIS POINT, CRD

Dear Mr. Strandlund;

This letter provides a project update for the terrain assessment and proposed mitigation work at 6966 Mark Lane. This letter has been requested by Emma Taylor, CRD Planner for the purpose of facilitating the issuance of Development and Building Permits at the above referenced site. This work was verbally authorized by Justin Beatle of Fisgard Financial Corporation on September 26, 2011.

Use of this report is subject to the Statement of General Conditions which is included at the end of the text of this report. The reader's attention is specifically drawn to these conditions as it is essential that they be followed for proper use and interpretation of this report. The CRD is an approved user of this report.

Background

As you are aware, we were retained by you in 2010 (via Proctor Engineering Ltd.) to conduct the preliminary geological hazard assessment after you received a request for the assessment from the CRD. Since that time, Thurber Engineering Ltd. has conducted a number of assessments and produced a number of reports and memos relating to terrain stability issues at the property including:

1. "*6966 Mark Lane, Willis Point, CRD Preliminary Geologic Hazard Assessment*" dated January 5, 2011. – This letter report presented the results of a geological hazard assessment conducted for the entire property and included a site drawing which showed that the steep slope located immediately above (east) the existing residence likely had a moderate to high hazard rating. The presence of this steep slope prevented us from completing a Landslide Assessment Assurance Statement for the existing house site.

Suite100 - 4396 West Saanich Road, VICTORIA, B.C., Canada V8Z3E9 T250-727-2201 F250-727-3710 www.thurber.ca
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2. "*Recommended Plan of Action Terrain Assessment and Mitigation, 6966 Mark Lane, Willis Point, CRD*" dated July 14, 2011. – This letter report was produced at the request of the CRD following a project meeting held earlier on the same day. This report summarized the project background and provided a recommended plan for further assessment work at the site including clearing the steep slope of vegetation, soil and loose rock to allow a more detailed terrain hazard assessment. This report also noted a range of potential mitigation options for the slope.

3. *"6966 Mark Lane - Geotechnical Services Memorandum #1, Embankment Inspection"* dated August 31, 2011. – This memo summarized our inspection of the portion of the steep slope that had been partially scaled by Western Grater Ltd. The scaling revealed that the central portion of the steep slope consisted of steeply inclined blast rock and soil fill, and not bedrock as was initially anticipated. The memo noted that the site risk was likely greater than had initially been anticipated and we recommended that the filled portion of the slope be pulled back to a slope of 1.5 (horizontal) to 1 (vertical) (i.e. 66%) prior to the start of significant fall or winter rains which could further erode and weaken the slope. We also noted that depending on the shape of the resulting slope (and underlying bedrock), a new retaining wall may be required to support the remaining fill.

4. *"6966 Mark Lane – Geotechnical Services Memorandum #2, Post Excavation Embankment Inspection and Retaining Wall Design"* dated September 21, 2011. – This memo provided the findings of our inspection of the slope excavation carried out at the site since the issuance of previous memo and a recommended a conceptual design for a mortared rock retaining wall. We found that the excavation work had exposed some bedrock at the base of the slope adjacent to the house and left a 1 to 2 m high vertical exposure of loose blast rock and soil fill on the slope. The remaining slope was considered to have been left in an unsafe condition but provided room for the construction of a recommended mortared rock retaining wall. The memo included a design sketch for the recommended wall as well as our requirements for intermittent construction inspection and additional slope re-grading (pull-back) work required in adjacent areas.

Our Preliminary Geologic Hazard Assessment (Report #1 from the above list) and Memos #1 and #2 (i.e. Reports #3 and #4) have been attached to this report in Appendix B for your convenience.

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Proposed Slope Remediation

The construction of the proposed retaining wall and implementation of the associated site re-grading of the adjacent slope areas described by Memo #2 is intended to significantly lower the geologic hazard rating at the existing house site as shown on the attached Drawing 19-5874-0-2 (Appendix A). Drawing 19-5874-0-2 shows a portion of the subject property and the approximate intended location of the proposed mortared rock retaining wall and location of the required slope re-grading pullback, as well as the anticipated (i.e. post-construction) terrain hazard ratings that will likely result following the supervised implementation of our recommendations.

The yellow "Low Hazard" area on Drawing 19-8574-0-2 indicates that once the work is satisfactorily completed, in our opinion, the probability of the occurrence of an affecting geologic hazard (i.e. one that has the potential to result in personal injury or death) will likely be less than 2% chance in 50 years, and therefore considered "safe" for the use intended (i.e. for the occupation of the existing residential house) unless new, previously unidentified hazards are identified.

Once the work outlined in Memo #2 is adequately completed (and if no additional hazards are found), we plan on issuing a concluding summary report that describes the work that was carried out as well as a clear statement regarding the safety of the site (i.e. *"safe" for the use intended*). However, our ability to produce a final concluding summary report stating that the site is *"safe for the use intended"* will be dependent on adequate monitoring of the work by our geotechnical engineer as described by us in Memo #2.

Landslide Assessment Assurance Statement

The CRD has requested that we provide a completed Landslide Assessment Assurance Statement (LAAS) form with this current report to facilitate their issuance of a Development Permit and a Building Permit to allow the recommended site mitigation work to proceed. The LAAS form is attached following the Drawing 19-5874-0-2 in Appendix A.

Please be advised that the attached form has been completed based on our current understanding of the site hazards (as derived during the course of the work conducted as part of our Preliminary Geological Hazard Assessment and subsequent inspections) and under the assumption that the required mortared rock wall and additional site grading and pullback work will be carried out in accordance with our specifications.

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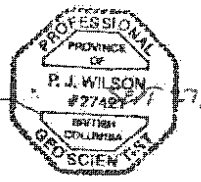
Please be aware that there will still be terrain on the property at 6966 Mark Lane with a Moderate or High Hazard rating following the successful implementation of our recommendations (see Drawing 19-5874-0-1 in Report #1 and the attached Drawing 19-5874-0-2). As such, any future site redevelopments on the property will still need to be specifically evaluated against potential terrain hazards.

Closure

We trust this summary letter is sufficient for your current needs. Please do not hesitate to contact us if you require any additional information.

Yours truly;
Thurber Engineering Ltd.
Stephen Bean, P. Eng.
Review Principal



Paul Wilson, P.Geo.
Project Geoscientist

Attachments:

Statement of General Conditions

Appendix A: Drawing 19-5874-0-2
Landslide Assessment Assurance Statement

Appendix B: Copy of the Jan. 5/11 Preliminary Geologic Hazard Assessment Report
Copy of Aug. 31/11 Memorandum #1
Copy of Sept. 21/11 Memorandum #2

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STATEMENT OF GENERAL CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over . . . .)

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INTERPRETATION OF THE REPORT *(continued . . . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

SGC20050425

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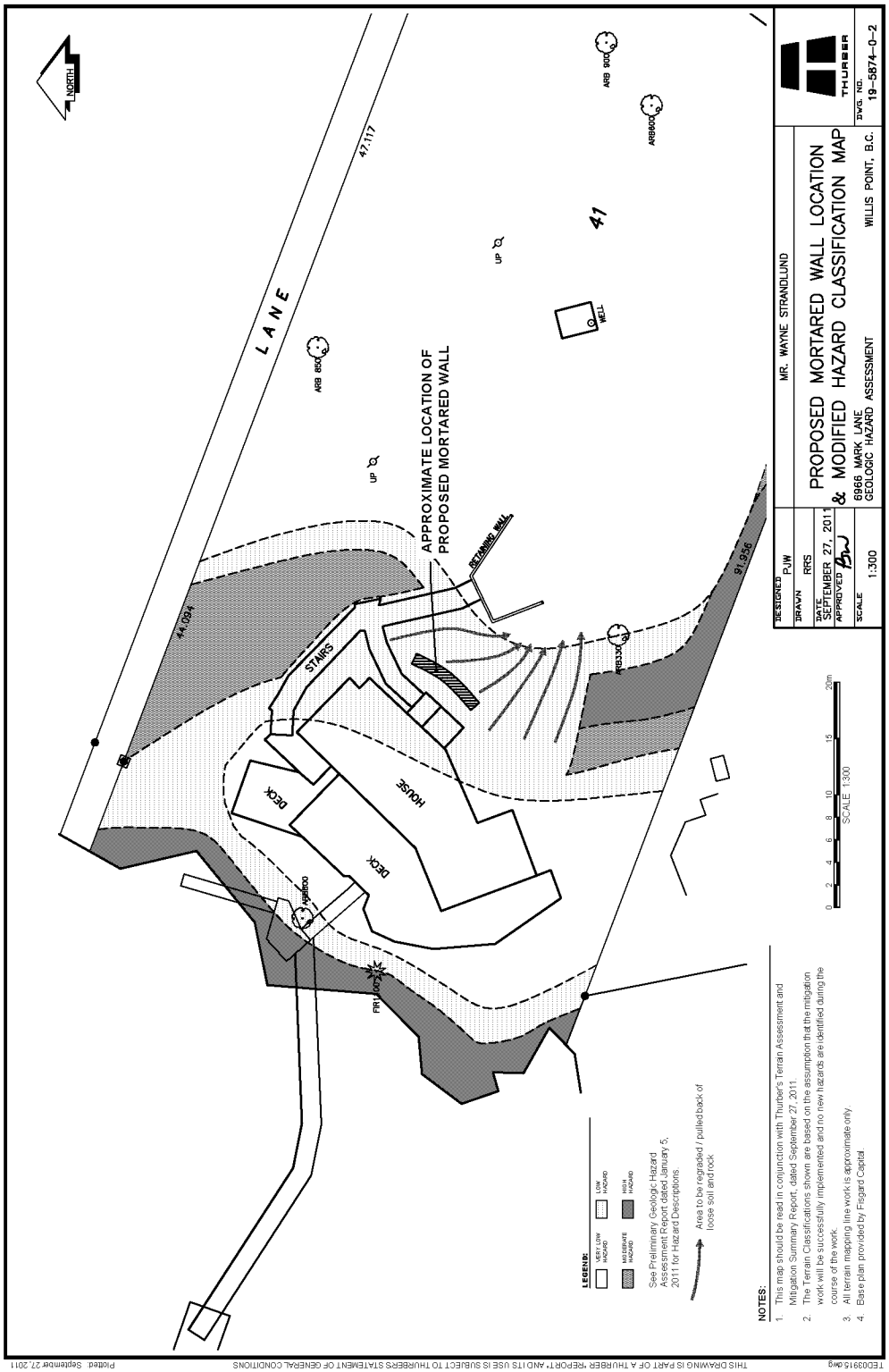
APPENDIX A


NORTH
LANE
47.117
44.094
91.956
41
APPROXIMATE LOCATION OF PROPOSED MORTARED WALL
RETAINING WALL
STAIRS
HOUSE
DECK
DECK
WELL
UP
UP
ARB 850
ARB 900
ARB600
ARB330
ARB600
FIR1100
LEGEND:
VERY LOW HAZARD
LOW HAZARD
MODERATE HAZARD
HIGH HAZARD
See Preliminary Geologic Hazard Assessment Report dated January 5, 2011 for Hazard Descriptions.
Area to be regraded / pulled back of loose soil and rock
NOTES:
1. This map should be read in conjunction with Thurber's Terrain Assessment and Mitigation Summary Report, dated September 27, 2011.
2. The Terrain Classifications shown are based on the assumption that the mitigation work will be successfully implemented and no new hazards are identified during the course of the work.
3. All terrain mapping line work is approximate only.
4. Base plan provided by Fisgard Capital.
0 2 4 6 8 10 15 20m
SCALE 1:300
DESIGNED PJW
DRAWN RRS
DATE SEPTEMBER 27, 2011
APPROVED
SCALE 1:300
MR. WAYNE STRANDLUND
PROPOSED MORTARED WALL LOCATION
& MODIFIED HAZARD CLASSIFICATION MAP
6966 MARK LANE
GEOLOGIC HAZARD ASSESSMENT
WILLIS POINT, B.C.
THURBER
DWG. NO. 19-5874-0-2
THIS DRAWING IS PART OF A THURBER "REPORT" AND ITS USE IS SUBJECT TO THURBER'S STATEMENT OF GENERAL CONDITIONS
Plotted: September 27, 2011
TED0391S.dwg

APPENDIX D: *LANDSLIDE ASSESSMENT ASSURANCE STATEMENT*

Note: This Statement is to be read and completed in conjunction with the *"APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia"*, March 2006/Revised September 2008 ("*APEGBC* Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the *APEGBC* Guidelines.

To: The *Approving Authority* Date: SEPT 27/11

CAPITAL REGIONAL DISTRICT

Jurisdiction and address

With reference to (check one):

- ☐ Land Title Act (Section 86) – Subdivision Approval
- ☒ Local Government Act (Sections 919.1 and 920) – Development Permit
- ☒ Community Charter (Section 56) – Building Permit
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Variance
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- ☐ British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4 4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property:
6966 PARK LANE (LOT 41, PLAN 8166, HIGHLAND DISTRICT)
Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist*,

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- X 1. Collected and reviewed appropriate background information
- X 2. Reviewed the proposed *residential development* on the Property
- X 3. Conducted field work on and, if required, beyond the Property
- X 4. Reported on the results of the field work on and, if required, beyond the Property
- X 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
  - X 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
  - X 6.2 estimated the *landslide hazard*
  - X 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
  - X 6.4 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
  - X 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
  - X 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
  - X 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

___ 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used

___ 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*

___ 8.3 compared this guideline with the findings of my investigation

___ 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison

___ 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*

X 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

☒ the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)

☐ the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions[1] contained in the attached *landslide assessment* report,

Check one

☐ for subdivision approval, as required by the Land Title Act (Section 86), "that the land may be used safely for the use intended"

Check one

☐ with one or more recommended registered covenants.

☐ without any registered covenant.

☒ for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

☒ for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"

Check one

☒ with one or more recommended registered covenants.

☐ without any registered covenant.

☐ for flood plain bylaw variance, as required by the "Flood Hazard Area Land Use Management Guidelines" associated with the Local Government Act (Section 910), "the development may occur safely".

☐ for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

PAUL WILSON
Name (print)

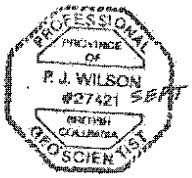
SEPTEMBER 27, 2011
Date

Signature

[1] When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

100 - 4396 WEST SAANICH RD.
Address
VICTORIA, B.C. V8Z 3E9
(250) 727-2201
Telephone



SEPT 27/11

(Affix Professional seal here)

If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm THURBER ENGINEERING LTD.
and I sign this letter on behalf of the firm. (Print name of firm)

THURBER ENGINEERING LTD.

APPENDIX A

APPENDIX B

THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

January 5, 2011 File: 19-5874-0

Wayne Strandlund
c/o Proctor Engineering Ltd.
932 Aral Street
Victoria, B.C. V9A 6S1

Attention: Mr. Strandlund

6966 MARK LANE, WILLIS POINT, CRD
PRELIMINARY GEOLOGIC HAZARD ASSESSMENT

Dear Mr. Strandlund:

This letter presents the results of a preliminary geologic hazard assessment carried out for the Willis Point property at 6966 Mark Lane. We understand that while the property has been occupied by a single family residence since 1983, the CRD has recently requested the completion of a Geological Hazard Assessment for the site as the previous building permit was never closed. This letter summarizes the work carried out and provides our assessment of geologic hazards at the property.

Use of this report is subject to the Statement of General Conditions which is included at the end of the text of this report. The reader's attention is specifically drawn to these conditions as it is essential that they be followed for proper use and interpretation of this report. The CRD is an approved user of this report.

1. SITE DESCRIPTION

The subject property is approximately 1.7 acres (0.68 ha) in size and in two parts which are divided by the Mark Lane right-of-way as shown on Drawing 19-5874-0-1 included at the front of Appendix A. A selection of site photographs are included following the drawing in Appendix A.

The subject property at 6966 Mark Lane has the following legal description: Lot 41, Section 43, Highland District Plan 8166 (PID 005 473 373).

The western portion of the property fronts on the eastern shore of Saanich Inlet while the land to the east of the eastern property boundary is undeveloped treed

land. Similar single-family residential-use properties border the subject property to the north and south. The western portion of the subject property is currently accessed by a gravel-surfaced driveway from Mark Lane. A single family house of wood frame construction is located near the water's edge at the western end of the property. The property has a general western aspect which extends from sea level at the western end to about 40 m elevation at the eastern end above Mark Lane. The house is accessed by an extensive wooden staircase (see Photo 4 in Appendix A) which descends from the western end of the gravel-surfaced parking area (located to the west of Mark Lane, see Photo 3) to the eastern and northern side of the house. The western side of the house is occupied by a large wooden deck (Photo 8).

Canadian Climate Normals for the Victoria International Airport (1971 – 2000) (10 km northeast of the site) indicate the region receives about 883 mm of precipitation per year of which 95% falls as rain. The "wet season" (i.e. >100 mm per month) extends from November to February.

The local geology mapping indicates that the site is underlain by of Bonanza Group lithologies including basaltic to rhyolitic tuff, breccia and minor argillite and greywacke. The rocks in the study area generally appear to be strong and competent but are fractured in some areas.

Additional details regarding the site's terrain conditions are discussed in Section 3.

2. STUDY PROCEDURE

This geological hazard assessment was conducted by Paul Wilson, P.Geo. of Thurber Engineering Ltd. This assessment is qualitative in nature and the hazard assessment and mapping are based on professional judgement using assessor's qualifications and experience working within the general study area (southern Vancouver Island) and in other areas of British Columbia.

Our assessment included a review of recent and historical air photographs followed by an on-the ground site visit. This work did not include a detailed seismic analysis, specific flood hazard assessment or assessment of forest fire or windthrow hazards.

The office study consisted of examining available maps and aerial photographs including:

- CRD Natural Areas Atlas 2009 orthophoto and 1 m contours (accessed on line at http://viewer.crdatlas.ca/public#/Home).

- Historical air photos BC7761, #17 and #18 (1975) and BC84027 #156 and #157 (1984).

- Muller, J.E. 1980. Geology Victoria, British Columbia. GSC Map 1553A. Scale 1:100,000.

- An un-labelled survey plan of the property provided by Justin Beadle of Fisgard Financial Corporation.

The field assessment portion of this project was used to note general terrain characteristics and record instances of observed slope instability and other potential terrain hazards. The field assessment was conducted on foot and covered all portions of the subject property.

3. TERRAIN CONDITIONS

The subject property can be roughly divided into five topographic/terrain zones including:

- The portion of the site to the east of Mark Lane consists of thin organic and cobbly colluvial veneer overlying bedrock with intermittent steeply inclined bedrock outcroppings (see Photo 1 in Appendix A). The terrain in this area is generally inclined at 45 to 65%, with short sections of steeper rocky terrain.

- The central and eastern areas of the western portion of the lot consists of a gently inclined to undulating bench of sandy morainal veneer and blanket with intermittent, undulating bedrock outcrops (Photo 2). Slopes on the bench range from 5 to 20%. The gravel-surfaced driveway and parking area are located in this terrain unit (Photo 3) and appear to consist of up to ~1.5 m of granular and blast rock fill.

- A narrow zone of steeply inclined bedrock and thin colluvial and organic veneers are located along the central portion of the southern property boundary which curves northward around the eastern and northern sides of

the existing house (Photos 4, 5, 6 and 7). This terrain is ~5 to ~7 m high and includes slopes inclined at up to 100% directly above the eastern-most corner of the house (Photos 5, 6 and 7).

- Most of the house site and deck are located on a low gradient bench consisting of colluvial veneer inclined at 5 to 25% (Photo 8).

- The western property boundary is located to the west of the bench and includes a 2 to 3 m high, near vertical rocky bluff which parallels the shoreline (Photo 8).

4. GEOLOGIC HAZARDS AND RATINGS

The geologic hazard ratings for the subject property are shown on the attached map, Drawing 19-5874-0-1. In accordance with the draft CRD guidelines regarding geotechnical report requirements for Development Permit Applications, "safe" means that the probability of occurrence of a geotechnical failure (i.e. natural geological hazard) within a given area is less than 2% in 50 years (i.e. 1 in 2,475).

Potential geologic hazards on the property are generally restricted to rock falls or small open slope failures originating from the steep rocky terrain at the east end of the parcel, or at the steep rocky terrain located immediately to the east of the existing house or along the shore line. Hazards of this type originating at the eastern end of the property could potentially run-out as far as Mark Lane while rockfall or small slides originating on the steep terrain to the east of the house could impact the existing site residence. Rockfalls occurring on the steep terrain along the shoreline would deposit failed materials at the top of the adjacent beach. These geologic hazards could potentially occur without an identifiable triggering mechanism but are much more likely to be triggered by extreme weather events (i.e. heavy rainfall, storms or the uprooting of wind thrown trees) and/or seismic activity.

In general, the observed terrain conditions on the subject property suggest that while significant geologic hazards are rare, evidence of recent small-scale rockfall was observed in the field in several readily identifiable areas at the east side of the house and to the east of Mark Lane.

Very Low Hazard Areas

Low gradient and low and moderately sloping bedrock-controlled terrain within the assessment area (uncoloured on the map) has a Very Low hazard. Very Low hazard means that are no noticeable geologic hazards that could effect building development provided that the buildings are properly constructed. As such, the uncoloured portions of the map are interpreted to be "safe" for residential use with a probability of failure or occurrence of a significant hazardous event of less than 2% chance in 50 years. Additional geological hazard assessments are not required for standard residential development constructed within these areas.

Low Hazard Areas

A Low hazard rating (coloured yellow on the map) indicates that in our opinion, the hazard is likely less than 2% chance in 50 years however, depending on the specific development design, small-scale or rare hazards could occur. While these areas are likely to be "safe" for residential development, we recommend that a more detailed site investigation and seismic analysis be conducted if future buildings are planned for these areas. These assessments are recommended so that the site-specific hazard can be better defined and if necessary, an engineering solution found. Potential hazards in these areas should be able to be mitigated by incorporating one or more of a range of commonly used design elements.

Moderate Hazard Areas

A Moderate hazard rating (coloured orange on the map) indicates that there is moderately sloping or steep terrain that could affect buildings located within these areas, or failure run out from higher hazard areas could occur. The hazard in these areas is assumed to be greater than 2% in 50 years. These areas should generally be avoided if possible. However, within each Moderate hazard zone, there may be small areas where development could proceed. If future development is proposed for these zones, a more detailed site investigation and engineering assessment is required to more accurately define the hazard, and if necessary, engineer a solution. Potential hazards in these areas may be able to be mitigated by incorporating special design elements.

High Hazard Areas

A High hazard rating (coloured red on the map) refers to steep rock bluffs and/or steep slopes where rockfall is more likely to occur, or where failed materials

originating from higher on the slope are likely to be deposited or traverse. The hazard in these areas is assumed to be significantly greater than 2% in 50 years. A detailed engineering assessment is required to more accurately define the extent of the hazard in these areas. Hazard mitigation within these zones, if practical, would likely require significant and extensive engineering design.

5. CONCLUSIONS AND RECOMMENDATIONS

Portions of the building are located in areas that we cannot certify as "safe" under the current draft CRD hazard guidance of 2% probability of failure in 50 years (i.e. one occurrence in 2,475 years). A portion of the eastern side of the house is located on terrain with a High and Moderate hazard. This portion of the house was constructed directly at the base of (and constructed partially on) a steep, potentially unstable rocky bluff. Rockfall or small slides originating on this slope would be expected to impact the eastern side of the house. While it is anticipated that the most likely rockfall or slide events would consist of a relatively small volume of failed material (<1 m^3 to ~2 m^3) and result in little or no structural damage, larger potentially damaging failures are possible.

While a detailed assessment of the risk (e.g. hazard x consequence) posed by failures of this type is beyond the scope of this report, it is our opinion that unprotected individuals who happen to be outside of the building at the base of the slope could be injured or killed by relatively small slope failures or rockfall. Larger failure events could potentially result in some structural damage to the house and possibly result in injury or death under certain worst-case scenarios.

While our proposal stated that we would include a completed Landslide Assessment Assurance Statement, the findings of this preliminary assessment make the completion of a Landslide Assessment Assurance Statement inappropriate for the property at this time.

While the mapped Very Low and Low terrain hazard areas on the property are likely "safe" for potential future residential development, we recommend that any future buildings planned for the Low or Moderate hazard areas undergo a more detailed site investigation and seismic analysis once a specific building layout and design are proposed. The recommended assessments should be conducted before the issuance of a building permit. This additional assessment is not considered to be necessary for future developments proposed for Very Low hazard

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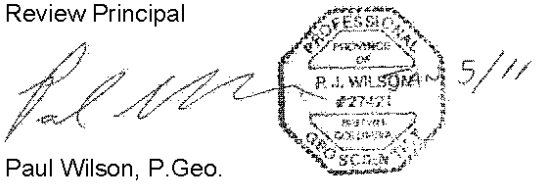
areas. It is recommended that no new residential construction proceed within the High hazard areas.

6. CLOSING

If you have any questions concerning this assessment or our recommendations, please do not hesitate to contact us.

Yours truly;
Thurber Engineering Ltd.
Stephen Bean, P. Eng.
Review Principal



Paul Wilson, P.Geo.
Project Geoscientist

attachments

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STATEMENT OF GENERAL CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over . . . .)

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INTERPRETATION OF THE REPORT *(continued . . . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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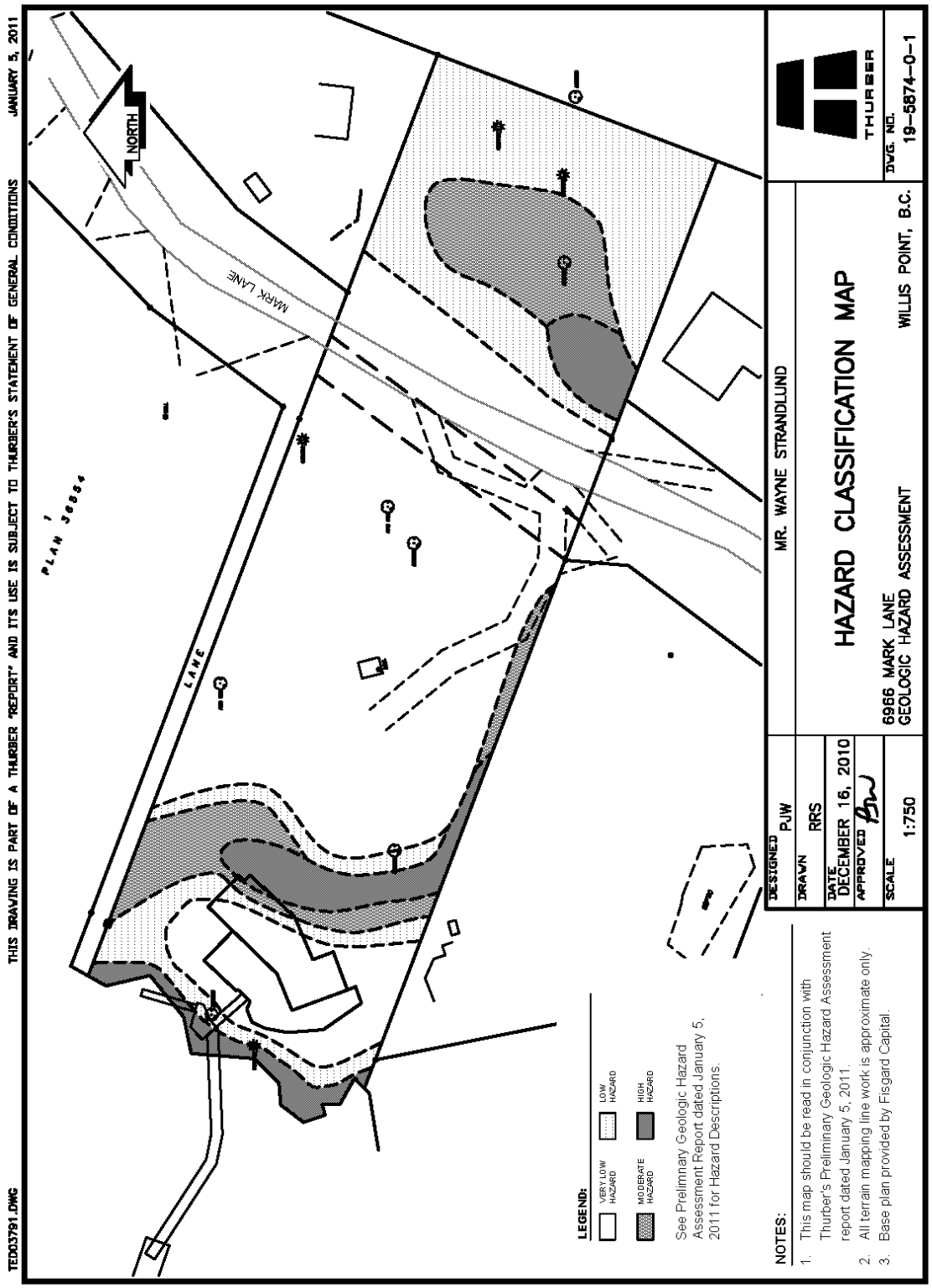
TEDO3791.DWG
THIS DRAWING IS PART OF A THURBER "REPORT" AND ITS USE IS SUBJECT TO THURBER'S STATEMENT OF GENERAL CONDITIONS
JANUARY 5, 2011
NORTH
MARK LANE
PLAN 30884
LANE
LEGEND:
VERY LOW HAZARD
LOW HAZARD
MODERATE HAZARD
HIGH HAZARD
See Preliminary Geologic Hazard Assessment Report dated January 5, 2011 for Hazard Descriptions.
NOTES:
1. This map should be read in conjunction with Thurber's Preliminary Geologic Hazard Assessment report dated January 5, 2011.
2. All terrain mapping line work is approximate only.
3. Base plan provided by Fisgard Capital.
DESIGNED PJW
DRAWN RRS
DATE DECEMBER 16, 2010
APPROVED
SCALE 1:750
MR. WAYNE STRANDLUND
HAZARD CLASSIFICATION MAP
6966 MARK LANE
GEOLOGIC HAZARD ASSESSMENT
WILLIS POINT, B.C.
THURBER
DWG. NO.
19-5874-0-1

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Photo 1: Looking east at the moderately steep, rocky terrain at the eastern end of the subject property.

Photo 2: Looking northwest at the gently inclined terrain immediately west of Mark Lane.

Client: Wayne Strandlund
File No. 19-5874-0
E file: pjw_19-5874-0_6966 Mark Lane Report Photos.doc

Date: January 5, 2011
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Photo 3: Looking west at the driveway and parking area on the low gradient bench below Mark Lane.

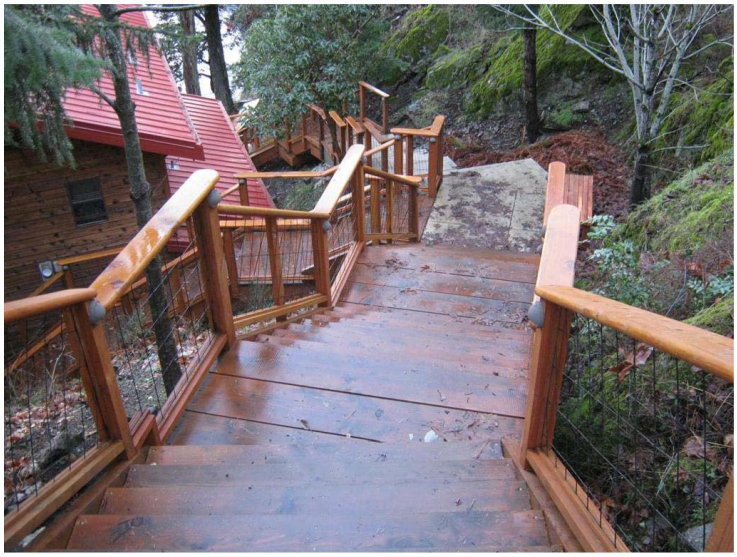

Photo 4: Looking west from near the top of the stairs that leads from the parking area, down the steep rocky terrain to the eastern corner of the house (centre left) and around the northern side (top at centre).

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Photo 5: Looking south at the crest of the steep slope located directly above the eastern corner of the house. Note presence of small stacked boulder retaining wall and pistol butt trees.

Photo 6: A second view of the slope in Photo 5, showing the main entryway of the house located at the base of the slope.

Client: Wayne Strandlund
File No. 19-5874-0
E file: pjw_19-5874-0_6966 Mark Lane Report Photos.doc

Date: January 5, 2011
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Photo 7: Looking north at the eastern side of the house. The raised portion is the main entryway visible in Photo 6.

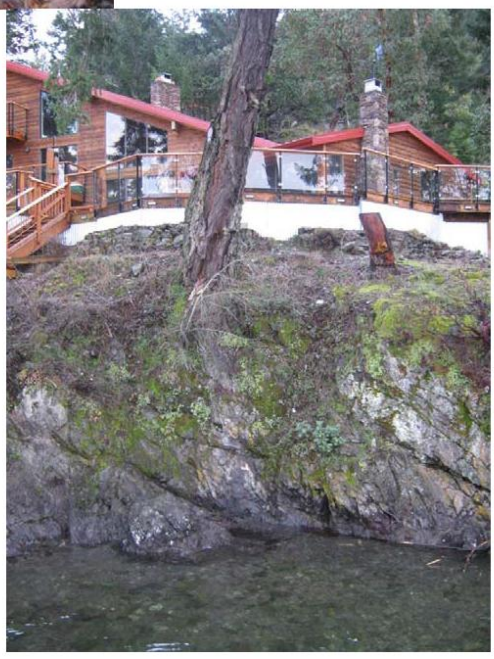

Photo 8: Looking east at the steep rocky bluff above the shoreline and the gently inclined bench located at the western end of the property. The western side of the house and deck are also visible.

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GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

6966 MARK LANE - Geotechnical Services		MEMORANDUM No. 1	
TO:	Wayne Strandlund, c/o Justin Beadle	DATE:	August 31, 2011
COMPANY:	Fisgard Financial Corporation	FILE:	19-5874-0
ADDRESS:	3378 Douglas Street Victoria, B.C. V8Z 3L3	FROM:	Paul Wilson, P.Geo.
		REVIEW:	Stephen Bean, P.Eng.
		PAGES:	2
SUBJECT:	**Embankment Inspection**	COPIES:	

As requested, we attended the above referenced site on August 30, 2011 to observe the steep slope exposed by Western Grater as part of their recent vegetation removal and scaling activity adjacent to the existing residence. The scaling work was being conducted following our recommendation of July 14, 2011 so that the potential hazard posed by the steep slope could be better assessed.

Our observations at the site indicate that the central portion of the steep slope is comprised of a wedge of loose soil, uncompacted blast rock and boulder fill inclined at about 100% which appears to extend at least 5 m back from the existing slope edge. The fill appears to have been placed (some time ago) within a large sloping irregularity in the otherwise steep bedrock face. While the full depth and extent of the fill wedge is not currently known, it is suspected that at least a portion of the upper stair landing / parking area retaining wall structure has been constructed on top of the fill.

The presence of the steeply-inclined fill mass is concerning as it poses a significant hazard to the adjacent down-slope residential structure. The overall risk posed by the slope is likely greater than we initially indicated as part of our earlier site investigations (as reported previously in a letter dated January 5, 2011) due to the much larger potential failure volume of soil, blast rock and boulders.

We recommend that a good excavation contractor be retained in the short term to pull back the non-bedrock material on the steep slope with the goal of lowering the overall fill slope gradient to a slope of 1.5 (horizontal) to 1 (vertical) (i.e. 66%) or less. This work should be completed prior to the start of significant Fall or Winter rains, which could further erode and weaken the slope. However during the course of this excavation work, care should be taken to not undermine the upper stair landing /

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parking area retaining wall structure which appears to be at least partially supported by the fill material. To this end, we recommend that the slope be inspected by us again as the excavation work is nearing completion.

Depending on the shape of the underlying bedrock (which is currently unknown), a new retaining wall may be required near the top of the slope to support any remaining fill situated under the existing stair landing / parking area retaining wall structure. The new retaining wall (if required) would need to be designed by a professional engineer.

Please call us for an inspection when the soil slope has been partially excavated

Please call if you have any questions or wish to discuss this memo further.

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GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

6966 MARK LANE - Geotechnical Services		MEMORANDUM No. 2	
TO:	Wayne Strandlund, c/o Justin Beadle	DATE:	September 21, 2011
COMPANY:	Fisgard Financial Corporation	FILE:	19-5874-0
ADDRESS:	3378 Douglas Street Victoria, B.C. V8Z 3L3	FROM:	Paul Wilson, P.Geo.
		REVIEW:	Stephen Bean, P.Eng.
		PAGES:	3
SUBJECT:	**Post Excavation Embankment Inspection and Retaining Wall Design**	COPIES:	

As requested, we attended the above referenced site on September 15, 2011 to observe the excavated slope located above the site residence. The excavation work was conducted following our August 31, 2011 recommendation (provided in Memo #1) to pull back the steeply inclined fill to a more stable slope angle.

Our observations at the site on September 15th indicate that a ~2.5 to ~3.5 m wide section of the blast rock fill (along a length of about 6 m) was excavated from the slope closest to the residence. The resulting excavation exposed the small bedrock valley (within which the fill was originally placed). The bedrock valley is somewhat irregular but the axis of which appears to be inclined upwards away from the house with a variable slope angle ranging from ~40% to 70% with much steeper, apparently narrowing bedrock sidewalls. The fill was excavated to within ~3 m of the upper parking area stair landing / retaining wall leaving a 1 to 2 m high vertical exposure of remaining blast rock and soil fill. Observations around the base of the stair landing / retaining wall structure suggest that this structure is predominantly supported by the blast rock fill.

The remaining fill has been left in an unsafe condition and should be supported through the construction of a retaining wall as soon as possible. Loose rock and boulders could fall from the remaining vertical exposure and strike the house and a significant failure could result in the loss of support for the upper stair landing / retaining wall structure.

We recommend that the remaining fill be supported by a suitable retaining wall. While a number of different potential conceptual wall designs could be used, it is

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likely that a mortared rock wall may be the simplest and most cost effective option as we understand that you have easy access to a large number of good quality boulders.

The typical-design features of a suitable mortared rock retaining wall are shown on the attached Figure 1 sketch. The sketch includes a number of notes which provide additional details which must be incorporated into the wall design.

The wall must be constructed with intermittent inspections by a geotechnical engineer to ensure the critical design elements are being met. Inspections are critical to this process as the final site slope hazard assessment will be predominantly based on confirmation that the recommended design elements were adequately incorporated into the retaining wall. It is likely that a minimum of 2 or 3 inspections will be required during the course of the work, including (perhaps most critically) a pre-construction inspection to ensure that the bedrock under the wall is sufficiently clean and the appropriate dowels have been placed at the required spacing / depth.

Once the wall has been completed and backfilled, the surrounding area above and adjacent to the wall (including the area of steep rock slope up to 15 m to the south of the wall) should be re-graded with any loose boulders removed. This work will also require a pre and post implementation inspection (with the excavator operator on site) to ensure that it is carried out adequately.

Please call us for the initial pre-construction wall inspection once the dowels have been set and the bedrock is cleaned in preparation for placement of the first row of mortared boulders.

Please call if you have any questions or wish to discuss this memo further.

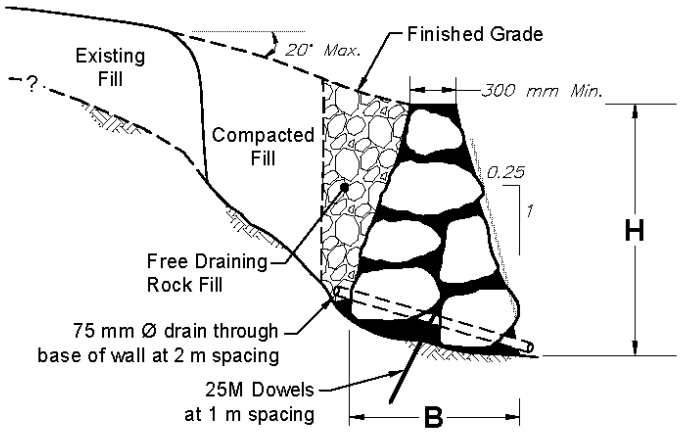
Yours truly,
Thurber Engineering Ltd.
Stephen Bean, P.Eng.
Review Principal

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA S. M. BEAN

Paul Wilson, P.Geo.
Project Geoscientist

Attachment

FILE No. 19-5874-0 SEPTEMBER 22, 2011



NOTES:

1. Mortared Wall to have a maximum height of 2 m; base width 'B' to be at least 60% of wall height 'H'.
2. The bedrock surface under the wall should be free of all soil and loose rock to ensure adequate bonding by mortar.
3. Use 25M epoxy-coated rebar dowels drilled a minimum of 0.5 m into rock and set a minimum of 0.5 m into the wall. The dowels should have a spacing of 1 m along the base and sides of the wall.
4. Stone shall be laid true to a line. All stone shall be laid in a full bed of mortar with head joints and edge joints completely filled. The face shall be aligned or exposed as indicated. Tool the exposed surface to a concave joint profile.
5. Wall rock to range in size from 300 to 1000 mm with occasional smaller sizes to in-fill voids. Clean stone surfaces with water and remove any dirt of other materials that will interfere with the bond.
6. Free draining fine rock fill or other approved material shall be used for backfill behind the wall as shown.
7, Wall to be backfilled in lifts with compact rock fill. Compaction to be monitored by geotechnical consultant.
8. Pointing mortar shall be a Type S mortar meeting the requirements of CSA A179.
9. The final fill slope above the wall should be inclined at 20° or less.

CAD No. TED03914.DWG

6966 MARK LANE

MORTARED ROCK WALL DETAIL

Not to Scale

FIGURE 1

Appendix 5: June 22, 2012, Geotechnical Report

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June 22, 2012 File: 19-5874-0

Wayne Strandlund
c/o Justin Beadle
Fisgard Capital Corporation
3378 Douglas Street
Victoria, B.C. V8Z 3L3

Attention: Wayne Strandlund

TERRAIN HAZARD ASSESSMENT
DECK, DOCK AND STAIRS
6966 MARK LANE, WILLIS POINT, CRD

Dear Mr. Strandlund:

This letter is an update to our previous preliminary geologic hazard assessment reports (dated January 5, 2011 and September 27, 2011) for 6966 Mark Lane in Willis Point. The purpose of this update is to further address the potential for the occurrence of geological hazards in the vicinity of the existing deck, dock and stairs (including the foreshore), (see attached Drawing 19-5874-0-3) and to gain a better understanding of the potential threat posed to people using them. The threat to people's safety posed by the occurrence of a geological hazard incorporates not only the probability of a hazardous event occurring, but also the probability that people will be present within the hazard zone when the hazard occurs.

While the terrain hazards in these areas were addressed on a property-wide basis by our January 5th and September 27th, 2011 reports, we understand that clarification and additional details regarding the geological hazards and structures has been requested by Bob Gutierrez of the Capital Regional District (CRD).

This update report should be read in conjunction with all of the previous reports described below. The hazard rating definitions provided in the January 5, 2011 report are not repeated here. This work was authorized by Justin Beadle of Fisgard Financial Corporation via email on May 10, 2012.

Use of this report is subject to the Statement of Conditions and Limitations which is included at the end of the text of this report. The reader's attention is specifically drawing to these conditions as it is essential that they be followed for proper use and interpretation of this report. The CRD is an approved user of this report.

1. BACKGROUND

1.1 Previous Work

As you are aware, we were retained by you in 2010 (via Proctor Engineering Ltd.) to conduct the preliminary geological hazard assessment after you received a request for the assessment

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from the CRD. Since that time, Thurber Engineering Ltd. has conducted a number of assessments and produced a number of reports and memos relating to various terrain stability issues at the property including:

- "*6966 Mark Lane, Willis Point, CRD Preliminary Geologic Hazard Assessment*" dated January 5, 2011. – This letter report presented the results of a geological hazard assessment conducted for the entire property and included a site drawing which showed that a steep slope located immediately above (east) the existing residence likely had a moderate to high hazard rating. The presence of this steep slope prevented us from completing a Landslide Assessment Assurance Statement for the existing house site.

- "*Recommended Plan of Action Terrain Assessment and Mitigation, 6966 Mark Lane, Willis Point, CRD*" dated July 14, 2011. – This letter report was produced at the request of the CRD following a project meeting held earlier on the same day. This report summarized the project background and provided a recommended plan for further assessment work at the site including clearing the steep slope located to the east of the house of vegetation, soil and loose rock to allow a more detailed terrain hazard assessment. This report also noted a range of potential mitigation options for the slope.

- "*6966 Mark Lane - Geotechnical Services Memorandum #1, Embankment Inspection*" dated August 31, 2011. – This memo summarized our inspection of the portion of the steep slope that had been partially scaled by Western Grater Ltd. The scaling revealed that the central portion of the steep slope consisted of steeply inclined blast rock and soil fill, and not bedrock as was initially anticipated. The memo noted that the site risk was likely greater than had initially been anticipated and we recommended that the filled portion of the slope be pulled back to a slope of 1.5 (horizontal) to 1 (vertical) (i.e. 66%) prior to the start of significant fall or winter rains which could further erode and weaken the slope. We also noted that depending on the shape of the resulting slope (and underlying bedrock), a new retaining wall may be required to support the remaining fill.

- "*6966 Mark Lane – Geotechnical Services Memorandum #2, Post Excavation Embankment Inspection and Retaining Wall Design*" dated September 21, 2011. – This memo provided the findings of our inspection of the slope excavation carried out at the site since the issuance of our previous memo and recommended a conceptual design for a mortared rock retaining wall. We found that the excavation work had exposed some bedrock at the base of the slope adjacent to the house and left a 1 to 2 m high vertical exposure of loose blast rock and soil fill on the slope. The remaining slope was considered to have been left in an unsafe condition but provided room for the construction of a recommended mortared rock retaining wall. The memo included a design sketch for the recommended wall as well as our requirements for intermittent construction inspection and additional slope re-grading (pull-back) work required in adjacent areas.

- "*Terrain Assessment and Mitigation Summary, 6966 Mark Lane, Willis Point, CRD*" dated September 27, 2011. – This letter provided a summary of the project background to that point, included statements describing the proposed slope remediation (for the slope to the east of the house) and included a completed Landslide Assessment Assurance Statement

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based on the assumption that the proposed remediation work described in Memo #2 was going to be successfully completed. Please be advised that this remediation work has not yet been undertaken (as of June 8, 2012).

1.2 Stairs, Deck and Dock

We understand from Mr. Beadle that that the stairs, which descend from a retaining wall structure located to the east of the house to access the front door of the house and deck on the west side of the house were constructed in 2010. The upper and lower flights are of wood construction (with railings), while a middle portion (north of the house) is concrete set on the ground with no railings. The dock floats in deep water but is connected to the deck via a raised ramp, walkway, raised landing area and stairs. We understand that this infrastructure was also constructed in 2010. The deck is generally older, but received some upgrades in 2010 to accommodate the new stairs and dock access infrastructure.

2. METHODOLOGY

The terrain in the vicinity of the deck, stairs and dock to the north and west of the existing residential house was observed and photographed by Paul Wilson, P.Geo. on May 11, 2012. A selection of new site photos are provided following the site drawings.

As stated above, the purpose of this update assessment is to further assess the potential for geologic hazards that could affect the structures in question and to address the threat to people using them. However, this assessment does not include a determination of the structural integrity of these specific structures or others on the property. The findings of this report are based on the assumption that the structures in question are structurally sound.

The attached Drawing 19-5874-0-3 includes more detailed mapping of the location of terrain with low, moderate and high terrain hazard ratings on the subject property in the vicinity of the deck, dock and stairs than has been shown on previous site drawings. On the basis of this more detailed study, some of the hazard ratings shown on previous maps have been downgraded, while others have been upgraded.

It should be noted that Drawing 19-5874-0-3 shows the modified terrain hazard ratings previously shown on Drawing 19-5874-0-2 for the east side of the house (as provided with our September 27, 2011 report). The hazard ratings shown for the east side of the house assume that the proposed remedial work prescribed by our September 21, 2011 Memorandum #2 report will be successfully implemented. However, at the time of writing of this report, the proposed remedial work outlined in Memorandum #2 has not yet been carried out and much of the terrain between the retaining wall and the east side of the house has a high hazard rating.

This geological hazard assessment update was conducted by Paul Wilson, P.Geo. of Thurber Engineering Ltd. This assessment is qualitative in nature and based on professional judgement using the assessor's qualifications and experience. Mr. Wilson has post secondary degrees in the fields of physical geography and Quaternary geology and has over 14 years of terrain hazard assessment experience.

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3. FINDINGS

3.1 General

Potential geological hazards occurring in areas adjacent to the stairs, above and below the deck, below the dock and in the vicinity of the high water mark on the foreshore, are restricted to very small rock falls (<1 m^3) or small open slope failures of colluvium or fill originating from short steep slopes. Rockfall or other small failures occurring above the stairs or deck could runout to the structures and strike them, most-likely resulting in some damage or cleanup requiring relatively minor repairs. Rockfall or small failures occurring below the deck would runout to the upper-most region of foreshore located a few meters below the high water mark. These geologic hazards could potentially occur without an identifiable triggering mechanism, but are much more likely to be triggered by extreme weather events (i.e. heavy rainfall, storms or the uprooting of wind thrown trees) and/or the occurrence of significant seismic event.

3.2 Stairs

The wooden and concrete stairs descend from the concrete retaining wall above the east side of the house to access the front door (on the east side of the house) and the northern portion of the deck on the west side of the house as shown on Drawing 19-5874-0-3. The terrain under and upslope of the stairs is generally inclined at 40 to 60% with short (~1 to 2 m) long sections of steeper terrain and consist of exposed bedrock and thin colluvial and morainal veneer (Photo 1). While most of the exposed rock in the area is smooth and relatively unfractured, one small (~8 m^2) area of bedrock to the east of the first landing (i.e. below the retaining wall where the stairs split, see Photo 2), is moderately fractured due to apparent over-blasting which likely occurred before the house was built during the early 1980's. This small area of blasted rock consists of a ~1.8 m high stepped exposure of rock set back ~0.6 to ~1.2 m from the edge of the concrete stair landing. A small wooden bench and two small maple trees are located at the base of the short slope.

Some of the fractured bedrock or loose boulders east of the stairs could potentially be dislodged (as a sliding or rolling failure) by seismic shaking associated with a large earthquake (with an estimated probability of occurrence likely exceeding 2% chance in 50 years). However, it is likely that the failed rock would either strike the up-slope edge of the base of the stairs, or possibly come to rest on the upper stair landing resulting in little or no damage. Considering the anticipated frequency of use of this portion of the stairs (i.e. total ~1 minute per day?), the probability that someone would be standing or walking by the potential runout area at the exact time of occurrence of a rare triggering mechanism is very low.

3.3 Deck

The deck is of wood construction and located on a gently inclined bench with a very low to low terrain hazard rating. The terrain to the north of the deck slopes upwards, is moderately steep and generally consists of smooth, glacially-eroded bedrock and a few loose sub-angular to sub-rounded boulders. The terrain immediately west (below) the northern end of the deck consists of a ~5 to ~6 m long section of steep colluvial and fill veneer overlying bedrock (see Photo 3), while to the south, the slope below the southern portion of the deck consists of a ~2 to ~3 m

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high, near vertical rock slope which extends to the foreshore (Photo 4). Structures supporting the deck were not directly observed (due to the presence of sheet metal cladding), but we understand that they are set back from the lower steep slopes by ~1 m at the northern end of the deck, and by ~2 to ~5 meters distance at the middle and southern end of the deck.

The rocky terrain to the north of the deck generally has a low terrain hazard rating, while the steep terrain below (to the west) of much of the deck has a moderate to high terrain hazard rating. The most likely type of failure below the northern end of the deck is a shallow slope failure in the exposed colluvial and fill material. A failure of this type could be triggered by a seismic event, heavy rainfall and or period of sustained toe slope erosion. Potential failures would likely be 2 to 4 m wide and bite 0.5 to 1 m deep into the existing slope. The failed materials (i.e. boulders and silty sand soil) would be deposited at the toe of the slope in the vicinity of the high water mark at the top of the beach. A failure of this type, if it occurred, would be unlikely to significantly threaten the overall structural integrity of the deck (in the short term) as the deck is not supported on the steeply-inclined fill and has multiple points of support set back more than 1 m from the steep slope edge.

While rockfall could occur in areas of rocky terrain below the southern end of the deck, the bedrock in this area appears to be relatively stable and has been eroded by the sea so there are few potentially loose pieces of bedrock exposed (Photo 4). Rockfall occurring in areas of steep, rocky terrain west of the southern end of the deck is unlikely to undermine the deck supports.

3.4 Dock and Foreshore

The dock is a floating structure which is accessed by a raised walkway and ramp which extends from the mid-point of the deck via a short set of stairs and raised landing (see Photos 5, 6, 7 and 8). The landing also provides access to the northern foreshore beach via a steep ramp which parallels the foreshore bluff (Photo 7). The stairs west of the deck to the raised landing are predominantly located on moderate sloping terrain consisting of thin colluvial veneers overlying bedrock, while the raised landing is supported by a number of wood posts and concrete footings set (in part) on the steep bedrock slope above the high water line (see Photos 6 and 7). The lower ramp and walkway to the dock are supported by a single concrete post founded on a bedrock hummock located in the foreshore (Photo 8).

A visual inspection of the footings supporting the raised landing suggest that they are generally set into competent rock with a few possibly set on a thin veneer of colluvium overlying low or moderately-sloping irregular bedrock. None of the footings appear to be set in areas with moderate or high terrain hazard ratings as none of the rock appeared to be loose or subject to rockfall. The walkway and ramp support post (Photo 8) is founded on a rounded rock hummock and is unlikely to be subject to significant rockfall.

The only portion of the dock infrastructure located in a moderate hazard area is the (unsecured) north (low) end of the beach access ramp which is located within the potential runout zone of small slope failures that could occur on the steep terrain west of the north end of the deck (Photos 3 and 7). While some failed material originating from the high hazard area would be deposited in the vicinity of the end of the ramp, considering the anticipated frequency of use of

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the ramp (i.e. <1 minute per day?), the probability that someone would be passing through the potential runout area at the exact time of occurrence of a rare triggering mechanism is very low.

The toe of the steep slope above the foreshore is generally not susceptible to significant erosion due to the presence of exposed bedrock (Photos 4 and 7). However, the only area were bedrock is not directly exposed is a short ~5 m long segment adjacent to the northern beach access ramp (west of the deck). However, a lag of loose boulders is present at the toe of the slope which provides some erosion protection and it is suspected that bedrock is present at shallow depth. As such, a significant amount of additional toe-slope erosion is not anticipated.

4. CONCLUSIONS

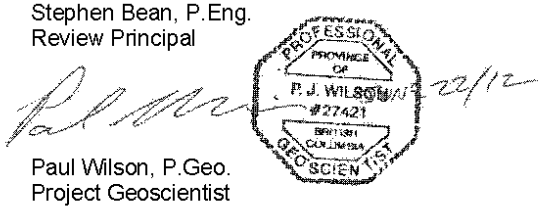
The findings of this update assessment indicate that while a small portion of the stairs and foreshore access ramp are located in areas interpreted to have a "moderate terrain hazard rating" (i.e. greater than 1 in 2,475 chance of the occurrence of a terrain hazard) in our opinion, the geological hazards in the vicinity of stairs, deck and dock do not pose a significant threat to persons who may intermittently use them.

As a result of these findings, it is our opinion that the previous Landslide Assessment Assurance Statement included with the September 27, 2011 report is still valid and does not need to be updated or re-issued.

5. CLOSURE

We trust this letter meets your current needs. Please do not hesitate to contact us if you require any additional information.

Yours truly,
Thurber Engineering Ltd.
Stephen Bean, P.Eng.
Review Principal



Paul Wilson, P.Geo.
Project Geoscientist

Attachments
Statement of Limitations and Conditions
Drawing 19-5874-0-3
Site Photos

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STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over ...)

THURBER

INTERPRETATION OF THE REPORT *(continued. . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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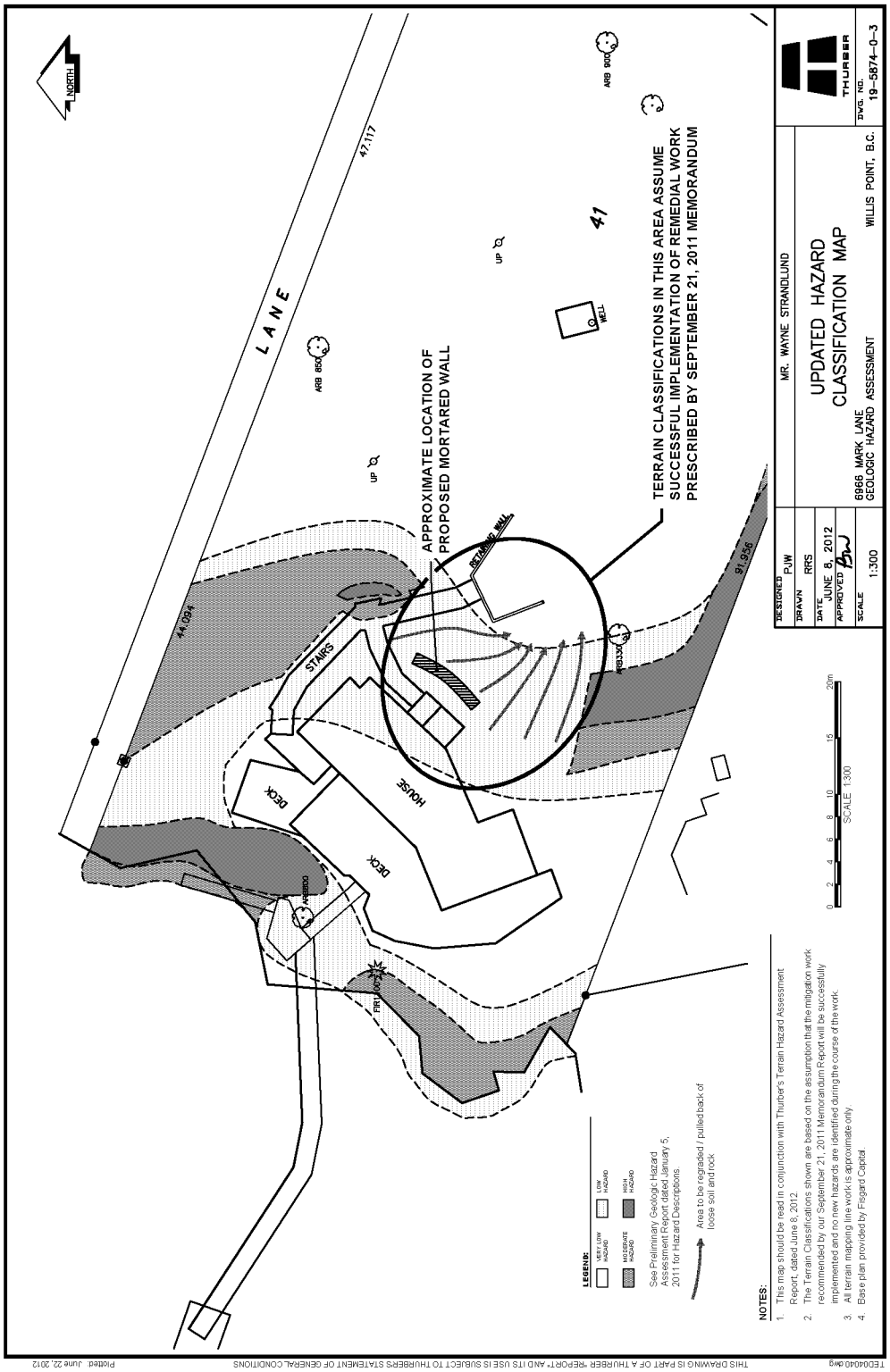
NORTH
LANE
47.117
44.094
91.956
41
UP
WELL
ARB 850
ARB 900
ARB330
APPROXIMATE LOCATION OF PROPOSED MORTARED WALL
TERRAIN CLASSIFICATIONS IN THIS AREA ASSUME SUCCESSFUL IMPLEMENTATION OF REMEDIAL WORK PRESCRIBED BY SEPTEMBER 21, 2011 MEMORANDUM
RETAINING WALL
STAIRS
HOUSE
DECK
DECK
LEGEND:
VERY LOW HAZARD
LOW HAZARD
MODERATE HAZARD
HIGH HAZARD
See Preliminary Geologic Hazard Assessment Report dated January 5, 2011 for Hazard Descriptions.
Area to be regraded / pulled back of loose soil and rock
NOTES:
1. This map should be read in conjunction with Thurber's Terrain Hazard Assessment Report, dated June 8, 2012.
2. The Terrain Classifications shown are based on the assumption that the mitigation work recommended by our September 21, 2011 Memorandum Report will be successfully implemented and no new hazards are identified during the course of the work.
3. All terrain mapping line work is approximate only.
4. Base plan provided by Fisgard Capital.
0 2 4 6 8 10 15 20m
SCALE 1:300
DESIGNED PJW
DRAWN RRS
DATE JUNE 8, 2012
APPROVED
SCALE 1:300
MR. WAYNE STRANDLUND
UPDATED HAZARD CLASSIFICATION MAP
6966 MARK LANE
GEOLOGIC HAZARD ASSESSMENT
WILLIS POINT, B.C.
THURBER
DWG. NO. 19-5874-0-3
THIS DRAWING IS PART OF A THURBER "REPORT" AND ITS USE IS SUBJECT TO THURBER'S STATEMENT OF GENERAL CONDITIONS
Plotted: June 22, 2012
TED04040.dwg

THURBER

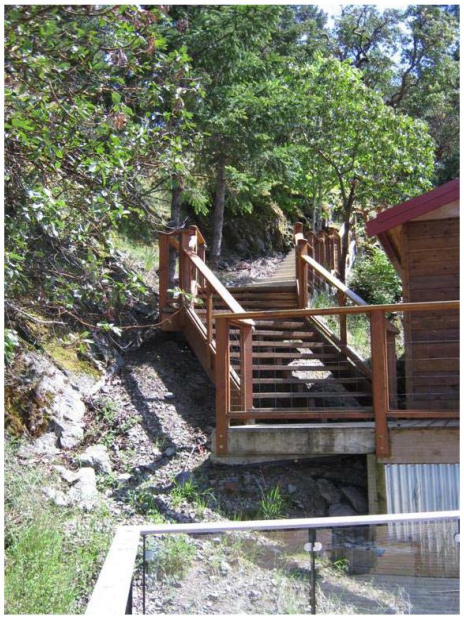

PHOTO 1: Looking east at the bottom portion of the stairs from the north end of the deck.

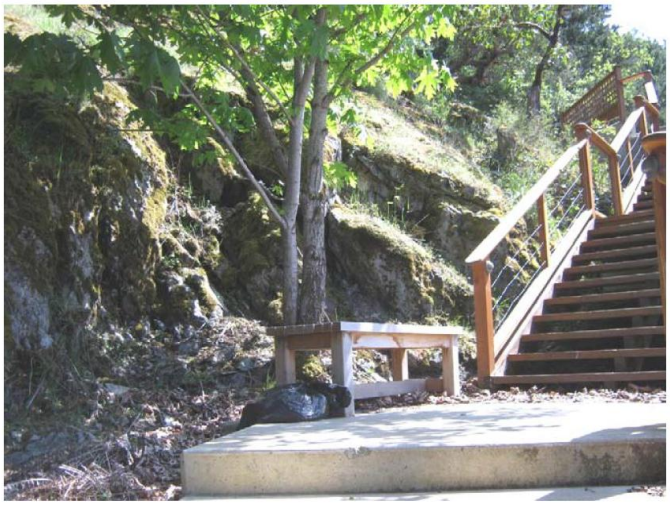

PHOTO 2: The area of moderately fractured rock above the first landing.

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PHOTO 3: Steep terrain of bouldery fill and colluvium below the northern end of the deck.

PHOTO 4: Short rock slope below the south end of the deck.

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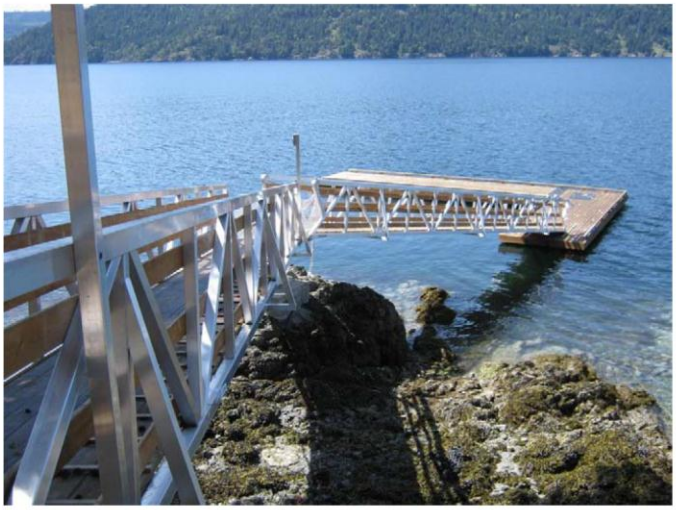

PHOTO 5: Floating dock and access ramp (taken from landing).

PHOTO 6: Raised landing, walkway, northern beach access ramp and stairs to deck.

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PHOTO 7: Landing and underlying slope.

PHOTO 8: Concrete post supporting ramp is founded on a rounded rock outcrop in the foreshore.

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