CITY OF PORT MOODY

DEVELOPMENT PERMIT No. 2021-140 (File No. 3060-20-140)

TO: 0790857 B.C. LTD., INC.NO. BC0790857 9th Floor – 900 West Hastings Street, Vancouver, B.C. V6C 1E5 (the "Developer")

- 1. This Development Permit is issued subject to compliance with all applicable City Bylaws, except as specifically varied or supplemented by this Permit.
- 2. This Permit applies to those lands in Port Moody, British Columbia more particularly described below and including all buildings, structures, and other development thereon:

LOT 17 DISTRICT LOT 190 GROUP 1 NEW WESTMINSTER DISTRICT PLAN 11618

LOT 18 DISTRICT LOT 190 GROUP 1 NEW WESTMINSTER DISTRICT PLAN 11618

LOT 19 DISTRICT LOT 190 GROUP 1 NEW WESTMINSTER DISTRICT PLAN 11618

LOT 20 DISTRICT LOT 190 GROUP 1 NEW WESTMINSTER DISTRICT PLAN 11618

Parcel Identifiers: 002-083-931; 002-083-957; 002-422-875; 002-422-891

(the "Lands")

1) The following plans and documents are made part of this Permit and, notwithstanding any other provision, no works shall be performed upon the Lands covered by this Permit, nor shall any building or structure be erected, constructed, repaired, renovated, or sited, that is not in substantial accordance with the following and strictly in accordance with all terms and conditions of this Permit.

Development Permit: Form and Character

(a) Site and Architectural Plans (33 pages), dated June 28, 2021, prepared by Ankenman Marchand Architects, on file with the City of Port Moody,

marked "ACCEPTED FOR DEVELOPMENT PERMIT PURPOSES, June 28, 2021", attached as Schedule A, and any amendments thereto subsequently approved by the City; and

(b) Landscaping Plans (6 pages), dated June 21, 2021, prepared by PMG Landscape Architects on file with the City of Port Moody, marked "ACCEPTED FOR DEVELOPMENT PERMIT PURPOSES, June 21, 2021", attached as Schedule A, and any amendments thereto subsequently approved by the City.

Development Permit: Hazardous Conditions

Prior to the issuance of a building permit, as a condition of issuance of this Development Permit a covenant shall be registered on the title to the Lands to regulate the development of the property in accordance with the following reports:

- (a) Geotechnical report titled "Geotechnical Investigation Report Proposed Residential Development The Terraces Lots 17-20, 3000 Block Henry Street, Port Moody, BC", dated April 16, 2021, prepared by Geopacific Consultants;
- (b) Hydrogeological Report titled "Hydrogeological Investigation Report: Proposed Residential Development – The Terraces Lots 17-20, 3000 Block Henry Street, Port Moody, BC", dated April 16, 2021, prepared by Geopacific Consultants;

Additional conditions in relation to the Development Permit: Hazardous Conditions are set out in Section 3(a) below.

Development Permit: Environmentally Sensitive Areas

Prior to the issuance of a building permit, as a condition of issuance of this Development Permit a covenant shall be registered on the title to the Lands to regulate the development of the property in accordance with the following reports:

(a) Environmental Report titled "Proposed Enhancement and Maintenance Plan for Covenant Area Lots 17 – 20 Henry Street Port Moody", dated June 25, 2021, prepared by Envirowest Consultants Inc.;

- (b) Environmental Report titled "Proposed Enhancement and Maintenance Plan for Dedicated Park Area Lots 17 – 20 Henry Street Port Moody", dated June 25, 2021, prepared by Envirowest Consultants Inc.
- 2) The works contemplated in plans set out in section 1 hereto shall be substantially started within two (2) years of the date of the Council Resolution authorizing issuance of this permit or the Development Permit will lapse.
- 3) Prior to the issuance of any building permit, as a condition of issuance of this Development Permit, the following shall be provided to the City of Port Moody for review and acceptance:
 - (a) any further geotechnical or hydrogeological reports, or other professional reports related to the Development Permit: Hazardous Conditions that are deemed necessary by the City. The Developer also acknowledges that the City may engage relevant professionals to conduct an independent peer review of any such reports, and that the cost of the peer review shall be borne by the Developer. Such reports shall be informed by detailed design drawings and include a detailed monitoring plan. Aspects of work for further review, include but are not limited to:
 - i. Stripping/Excavation: Review of stripping, temporary cut slopes, and soil conditions
 - ii. Shoring: Review of shoring and cut off wall installation
 - iii. Anchoring: Review of anchor installation, testing, and decommissioning
 - iv. General Compaction: Review of compaction of engineered fill and clear crushed gravel
 - v. Foundation: Review of foundation subgrades
 - vi. Slab on-grade: Review of subgrade, under-slab fill materials, and compaction.
 - vii. Stormwater Design: Completion of Infiltration Testing prior to the design and placement of stormwater amenities, to confirm the capacity of in situ soils, in order to inform their location.

- (b) all necessary documentation for the subdivision approval allowing for the consolidation of lots and creation of two parcels: the development parcel and park parcel;
- (c) erosion and sediment control plan;
- (d) construction impact management plan;
- (e) a stormwater management plan;
- (f) a construction dust abatement plan;
- (g) a construction waste recycling plan;
- (h) a completed Engineering Servicing Agreement;
- (e) the submission of a detailed and plan showing the trail network (formalized trail network and decommissioning informal trail), including the fire access paths and also details of grading and where applicable cross-sections;
- (f) a detailed final planting plan, showing replacement trees and replanting, associated with invasive removal and trail construction and decommissioning;
- (g) submission of a detailed maintenance and monitoring plan for the RPEA/RTA and park dedication areas;
- (h) the submission of a \$250,000 contribution to the Public Art Reserve Fund
- (i) the submission of a detailed plan showing venting, mechanical and utility locations, including both site plans, dimensions of such elements, screening and where applicable cross sections; and
- (j) the preparation and registration of all required legal documents (e.g. covenants, easements and statutory rights of way) on title of the property.
- 4) (a) As a condition of issuance of this Development Permit, the Developer has provided to the City, a security (the "Securities") as set out in Table 1 below, for the completion of items related to landscaping. The Security, in the form of a letter of credit, shall be made out to the City to ensure that the development is carried out in accordance with the terms and conditions set out herein and if for any reason the Permit holder neglects or otherwise fails to complete the works, within two (2) years of the date of issuance of this

Development Permit, the City may, in its sole discretion, provided it has given the Developer seven (7) days' written notice, complete the works or any portion thereof and all costs incurred in so doing shall be deducted by the City from the amount of the Security and on final completion to the satisfaction of the City as evidenced by the issuance of a Certificate of Completion, the City shall thereafter refund the remainder of the monies, except for ten (10) percent of the monies, which shall be released after the maintenance period lasting one (1) year from the date of completion for the landscaping.

- b) Portions of the Securities may be returned to the Developer, or reduced, as stages of the works are completed, to the satisfaction of, and at the sole discretion of, the City's General Manager of Planning and Development.
- 5. As a condition of issuance of this Development Permit, the Developer shall pay to the City an on-site landscaping review fee of two (2) percent of the cost of on-site landscaping and four (4) percent of the cost of the off-site landscaping, in the amount of \$, to be paid by cash or certified cheque.
- 6. The works and services required in accordance with the Engineering Services Agreement are to be completed in compliance with the requirements of the "City of Port Moody Works and Services Bylaw, No. 1789, 1986" and "City of Port Moody Subdivision and Development Servicing Bylaw, No. 2831".

AUTHORIZED BY COUNCIL RESOLUTION passed on the _____ of _____, 2021.

CITY OF PORT MOODY, by its authorized signatories:

R. Vagramov, Mayor

D. Shermer, Corporate Officer

Schedule A: Architectural and Landscape Plans

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DEVELOPMENT PERMIT - 4th READING 3000 BLOCK HENRY STREET PORT MOODY, BC



DRAWING LIST

A001	COVER
A003	STATISTICS
A030	CONTEXT
A050	SURVEY
A060	SHADOW STUDY
A100	SITE PLAN (FULL)
A101	SITE PLAN (BUILDING)
A105	PARKING P1 PLAN
A110	GROUND FLOOR PLAN
A115	LEVEL 2 PLAN
A120	LEVEL 3 PLAN
A125	LEVEL 4 PLAN
A130	LEVEL 5 PLAN
A135	LEVEL 6 PLAN
A140	LEVEL 7 PLAN
A145	LEVEL 8 PLAN
A150	LEVEL 9 PLAN
A155	LEVEL 10 PLAN
A160	LEVEL 11 PLAN
A165	ROOF PLAN
A175	FIRE FIGHTER ACCESS PLAN

SHEET NUMBER	SHEET NAME
A200	NORTH ELEVATION
A205	SOUTH ELEVATION
A210	EAST ELEVATION
A220	WEST ELEVATION
A225	MATERIAL BOARD
A300	COURTYARD SECTION
A305	PARKING RAMP SECTION
A310	LONGITUDINAL BUILDING SECTION
A700	RENDERINGS
A701	RENDERINGS
A702	RENDERINGS
A703	RENDERINGS

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GEOTECHNICAL ENGINEER: GEOPACINC Contact Wyst Jameso 1778 W 75th Ave Vancsuver, BC Vancsuver, BC Vancsuver, BC Vancsuver, BC Tel: E04 218 6910	LAND SURVEYOR: PAROVE NROFESSIONAL LANS SURVEYING 8C, Contact: Bil Pagove 202 - 1122 Westwood Street Cogulian, BC V38 7/06 Tel: 654 464 5189
ARBORIST; MINE FADUM & ASSOCIATES LTD	STRUCTURAL ENGINEER:

GLOTMAN SIMPSON Contact: Geoff Poh 1661 West 5th Avenue Vancouver, BC VEJ 1NS Tal: 604 734 8822

JILDING COD

GHE CONSULTANTS LTO Contact: Adam Notem 409 Granvie Street, Suite 905 Vancouver, BC VEC 112 Tet: 604 689 4449 Ext 130

ARBORIST: MIKE FADUM & ASSOCIATES LTD Consact Wale Fadum #105, 8277 - 129 Street Surrey, BC V3W QAG Tel: 776 593 0200

ELECTRICAL ENGINEER NEME 12 Contact: Gary Geissinger 2009 W 4th Ave W, Vanopuver, BC VSJ 1113 Tet 604 736 6542

SWIDSREAL Contact: Nadja Gehringer Franz Gehringer Jerremy Towning 475 Howe St. Vancouver, DC V8C 283 Tet: 604 685 5311 CIVIL ENGINEER tact: Russell Warren (in Brendan Silevendo 6 - 4540 C. Burnaty, BC VSG 4H7 Tel: 778 945 6049 778 945 6068

> MECHANICAL ENGINEER: AME GROUP Contact, Patrick Stewart 638 Smithe St Suite 200 Vancouver, BC V58 153

ARKETIN UNIT LAYOUT: E-SQUARED DESIGN Contact: Robert Emaile Tel:604 729 6237 PSTH AVE REAL ESTATE MARKETING LTD. Contact: Micholo Des Rosians Jonie Sparres RI, 1324 D Avenue, Surrey, BC Tel 604 583 2212

Henry Street 3000 Henry Street - Port Moody Drawing: COVER Project Status: DP RESUBMISSION Date 2013-03-27 Ra-Island for DP

LANDSCAPE ARCHITECTS:

ENVIRONMENTAL CONSULTANT:

PMG Contact: Rebecta Krebs Surie C102 - 1485 Still Creek Drive Burnaby, BC VSC 609 Tel: 504 294 0011

Contact Line Suite 101 Brt

Port Coguitam, BC V3C 6M2 Tal: 604 944 0502

INTERIOR DESIGNER: CHRSTNE OBERTI INTERIOR Contact Christine Obers 1168 W Georgia SL Varsouwer, BC VBE 4A2 The Set of Data

2015-03-09 Ro-Issued to CP 2020-05-04 Re-Issued its Ruts 021-01-28 Ra-1 2021-05-07 Prior in response 2021-05-21 Prior in response 2021-06-28 4th Reading REVISION No. Date Descri

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ARCHITECTS

ANKENMAN MARCHAND

1645 West 5th Avenue Vancouver, BC V6J 1N5

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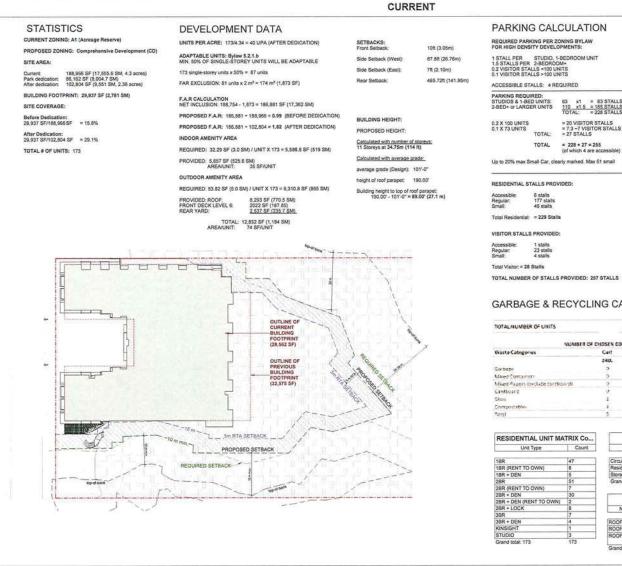
(604) 872-2595Fax: (604) 872-2505 Email: office@AMArchitects.com

Project 1736

Scale

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LEGAL DESCRIPTION LOTS 17, 18, 19 AND 20 DISTRICT LOT 190, GROUP 1 NEW WESTMINSTER DISTRICT, PLAN 11618



Van West REQUIRED BICYCLE PARKING: BC 1.5 LONG TERM SPACES PER UNIT APARTMENT (1.5x173UNITS) = 260 SPACES REQUIRED VBJ 1NS Visitor = 6 Short Term Bicycle Spaces PROVIDED BICYCLE PARKING : TOTAL BICYCLE PARKING PROVIDED = 260 SPACES + 6 Visitor Vertical: 58 Tel Horizontal: 200 Oversized: 2 x1 = 63 STALLS (604) 872-Email: 110 x1 5 = 165 STALLS TOTAL: = 228 STALLS E- COMMUNICATIONS: All parking levels to comply with City of Port Moody e-communication emergency rescue requirements, = 20 VISITOR STALLS office@AM = 7.3 -7 VISITOR STALLS EV CHARGING STATIONS: 100% of stalls to include an energized outlet capable of providing Level 2 Charging for an electric vehicle. = 228 + 27 = 255 (604) 872-MArchitects lof which 4 are accessible -2505 s.com CAR PARKING BICYCLE PARKING Туре Level P1 126 134 Accessible und Floor Accessible - Visitor 177 Grand total: 260 Regular Regular - Visito Small 46 Small - Visito Grand total: 257 Project 1736 SMALL CARS PROVIDED = 50/257 = 20% Henry Street 3000 Henry Street - Port Moody Drawing STATISTICS **GARBAGE & RECYCLING CALCULATIONS** Project Status: DP RESUBMISSION 173 SUBMISSION Date Description NUMBER OF CHOSEN CONTAINERS 2113-03-22 Redmont for DF Cart Cart -A Yand Bin Compactor 2016-03-09 Re-based for OP 2020-05-04 Re-based for Recording 240 510 MINEL. 3965 F (560 H, I 2021-01-38 Ra-Issued for DP 2021-05-07 Prior to response 2021-06-21 Prior to response 2021-06-38 Alth Reading REVISION FAR CALCULATIONS AMENITY AREA (INDOOR) No. Date Descrit Area Type Area Name Area Circulation 29076 SF 158176 SF 1502 SF WORK SPACES 1037 SF DANCE/MULTI-PURPOSE ROOM 2089 SF FITNESS ROOM WITH 1771 SF Storage 188754 SF Grand tota EQUIPMENT NORK SHOP 451 SF 309 SF BICYCLE WORKSHOP OUTDOOR AREA Grand total: 5 5657 SF Name Level Area ROOF DECK Level 6 2537 SF ROOF DECK Level 6 2022 SF ROOF DECK Top of Roof 8293 SF Slab 2022 SF

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Grand total: 3

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From Henry looking East

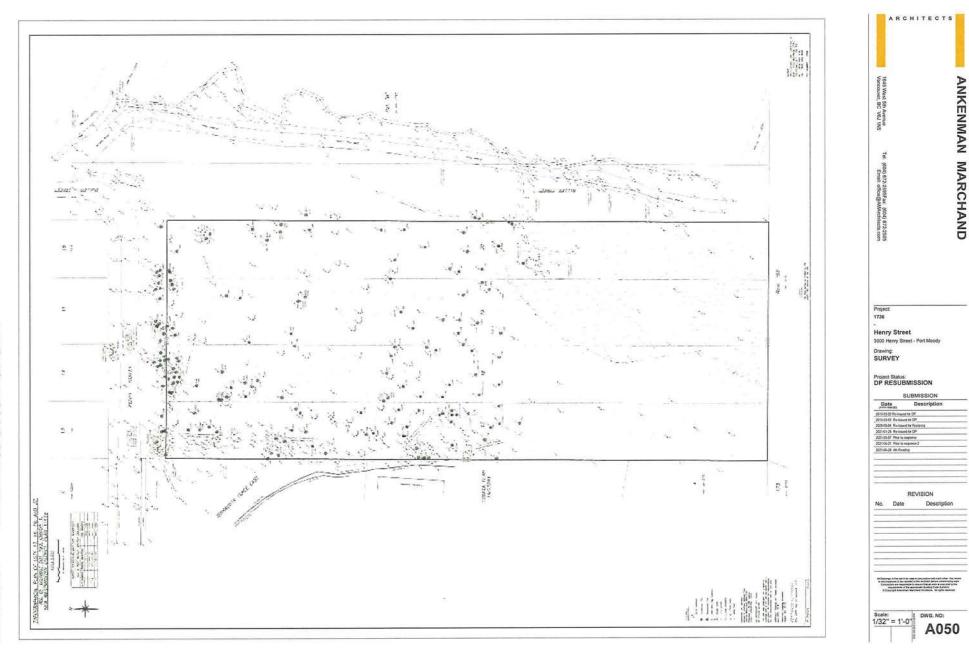


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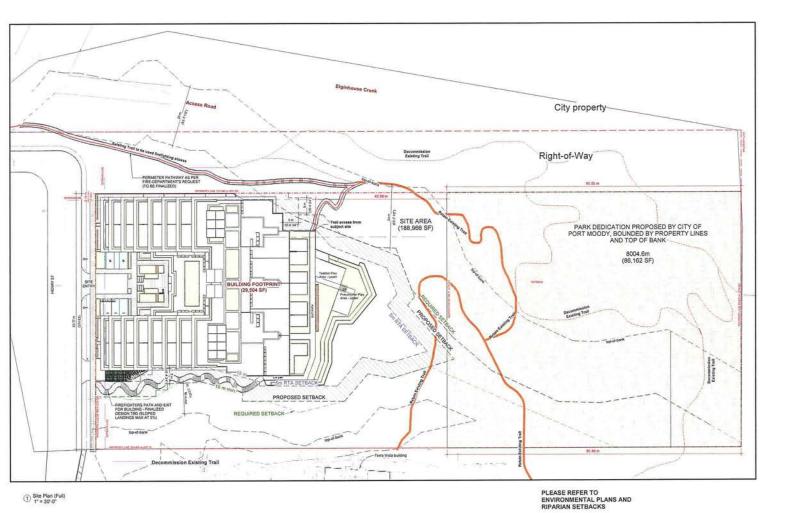
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1645 West 5th Avenue Vancouver, BC V6J 1N5

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(604) 872-2595Fax (604) 872-2505 Email: office@AMArchitects.com

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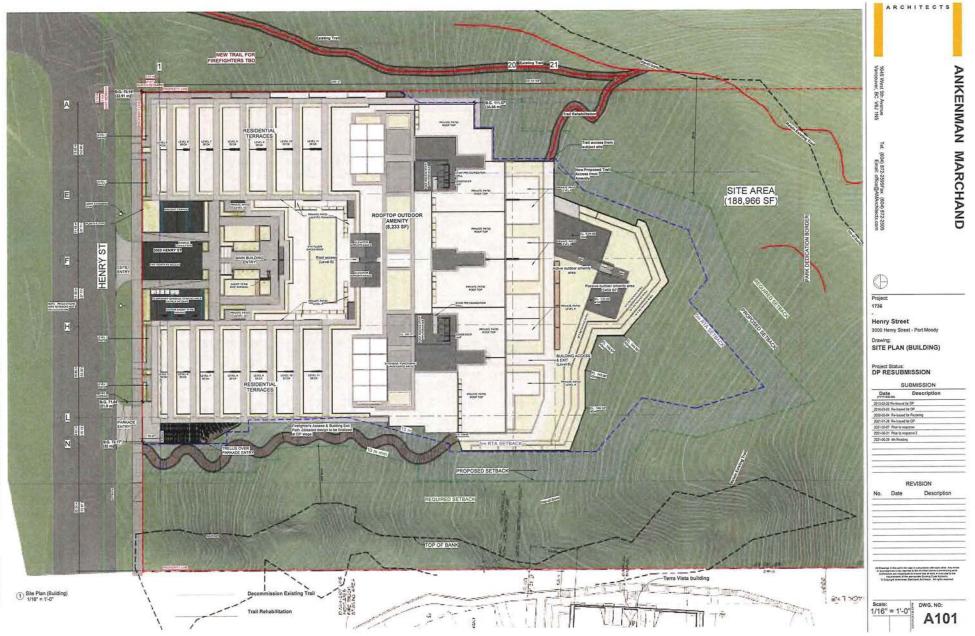
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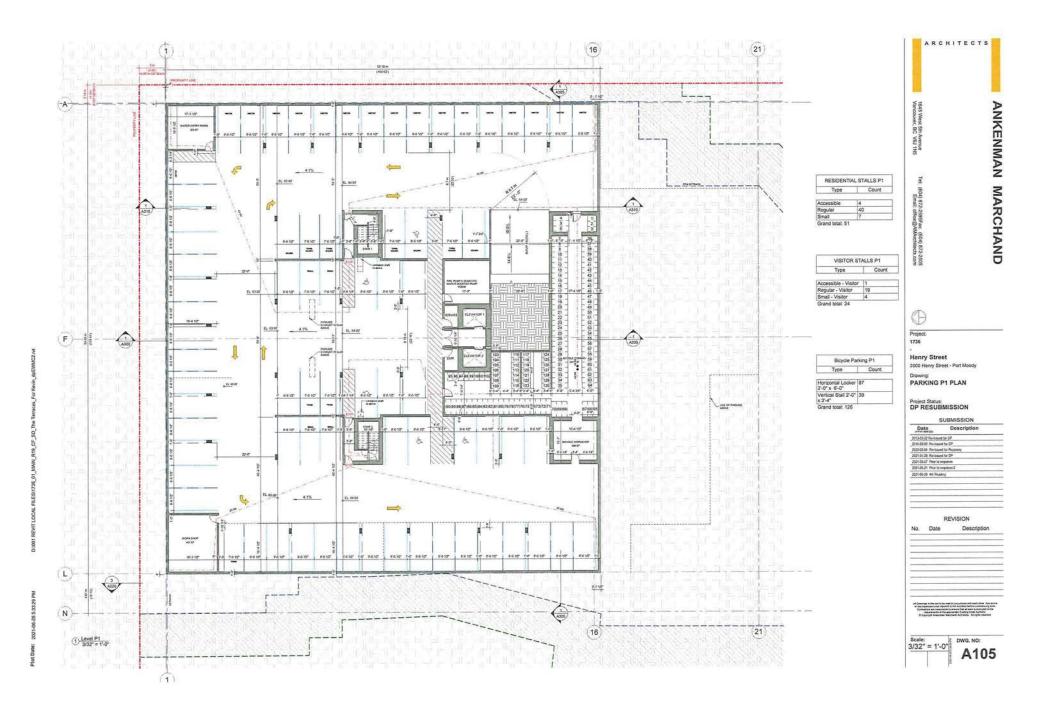
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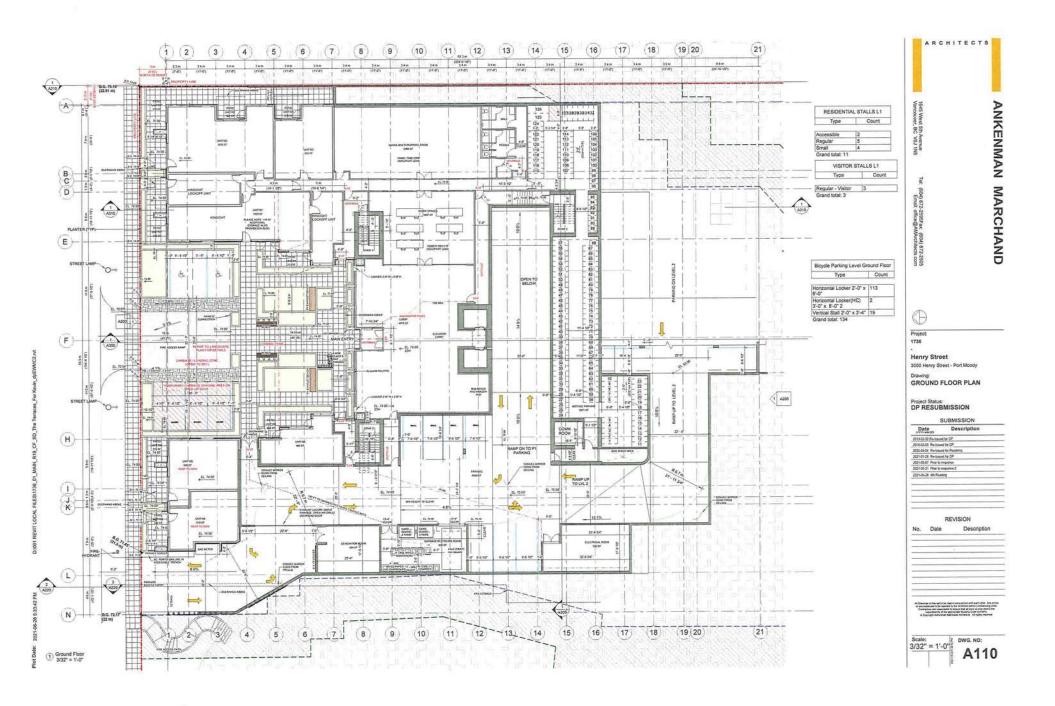
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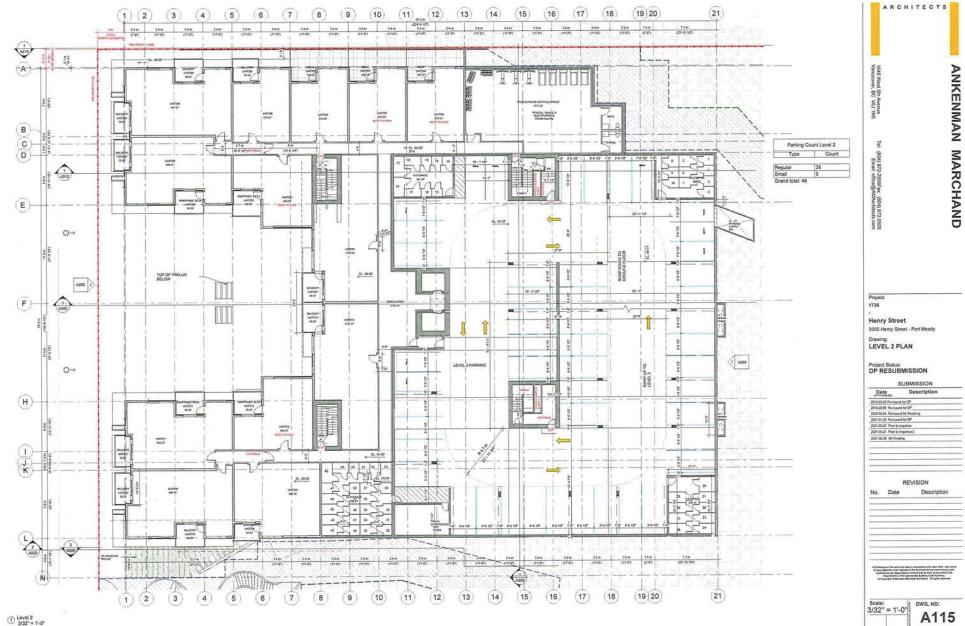


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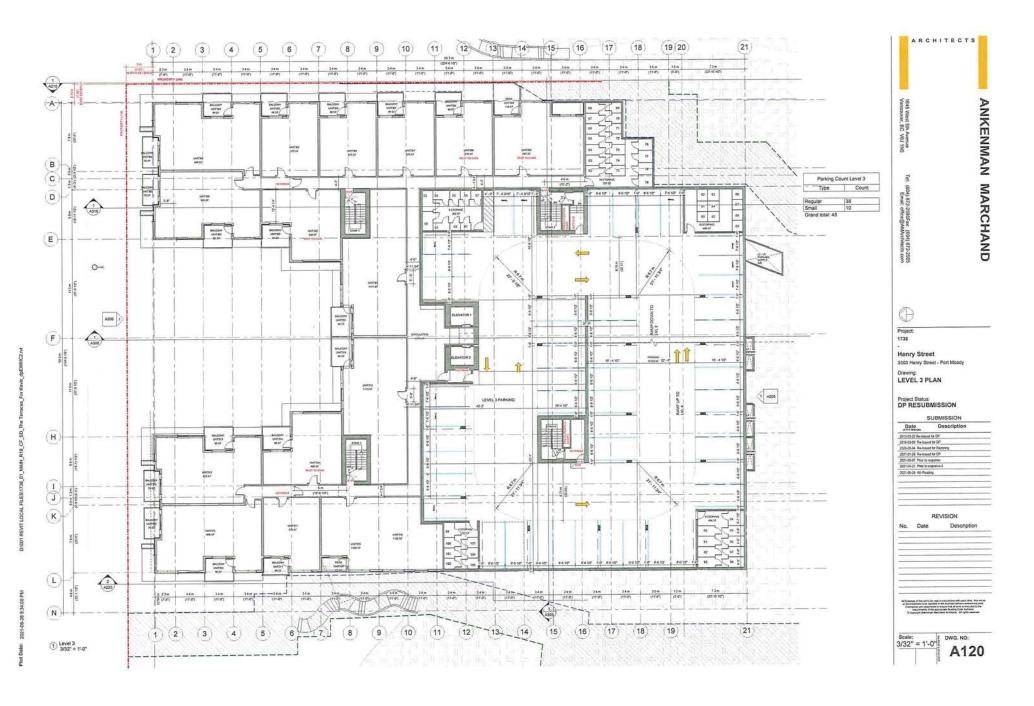






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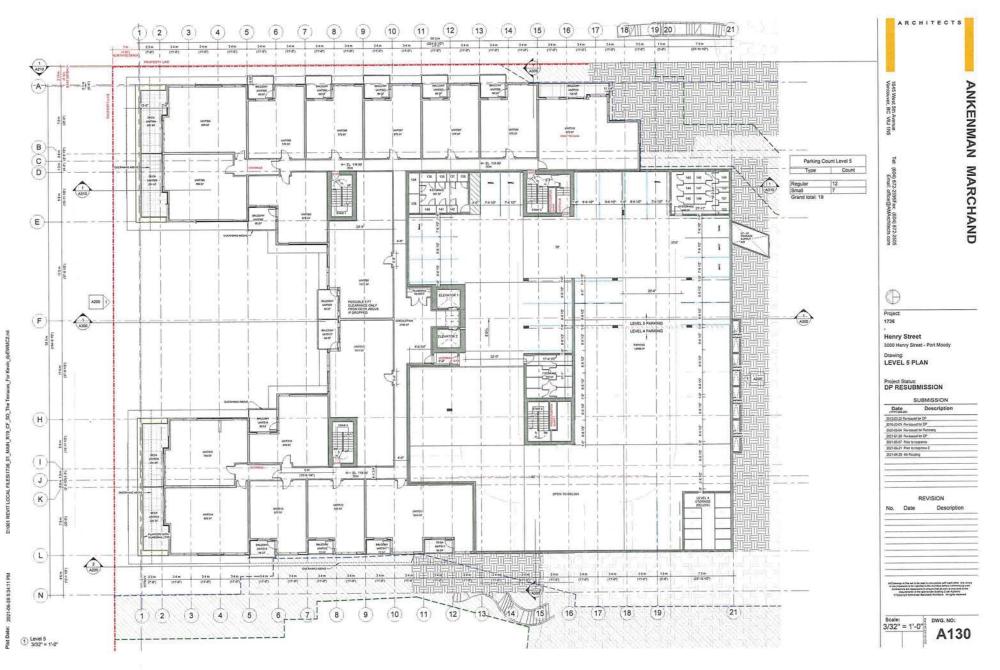
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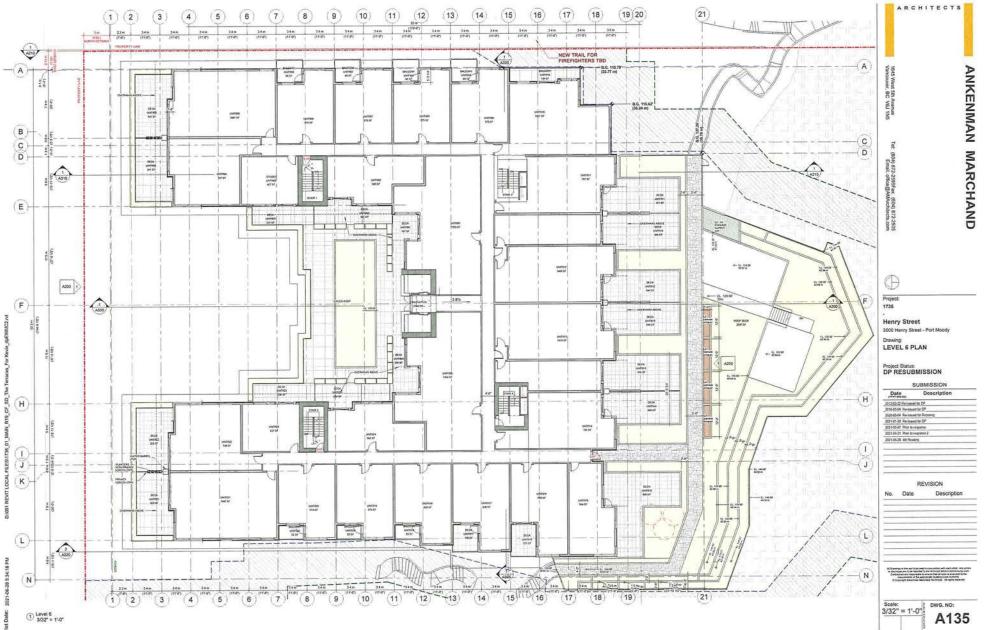


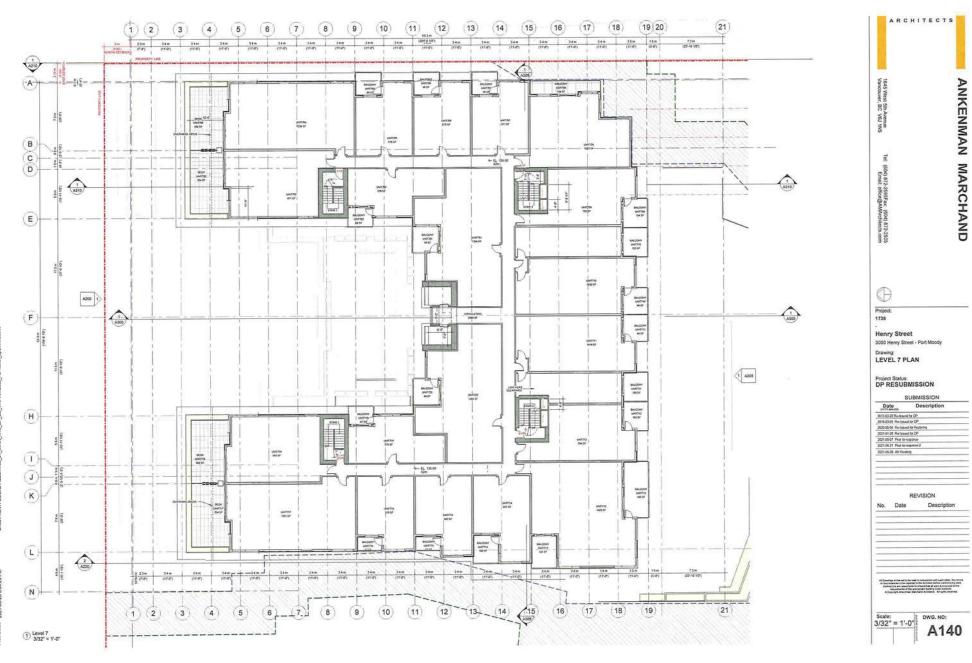


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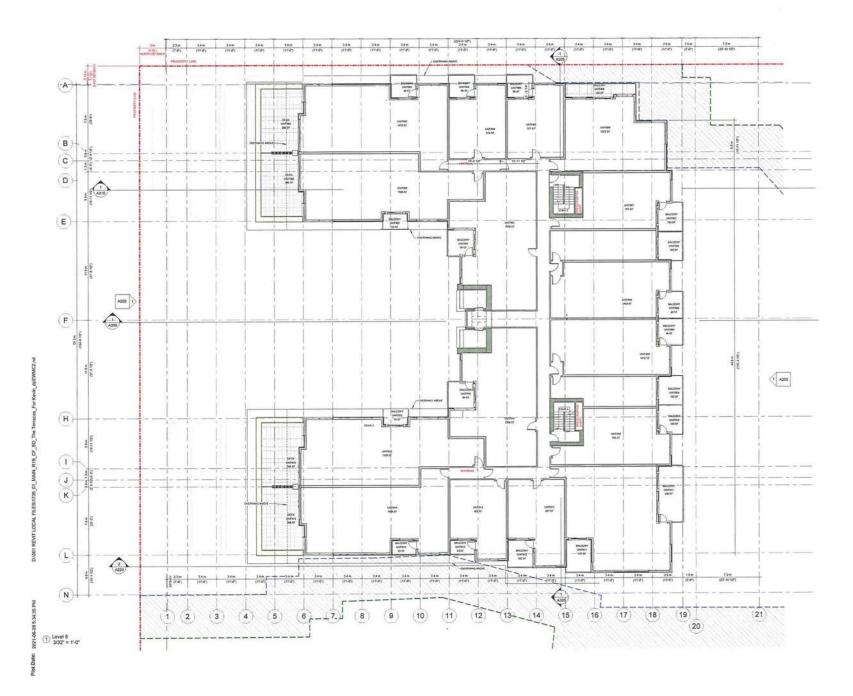
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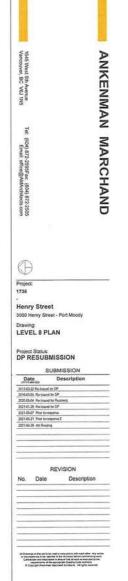




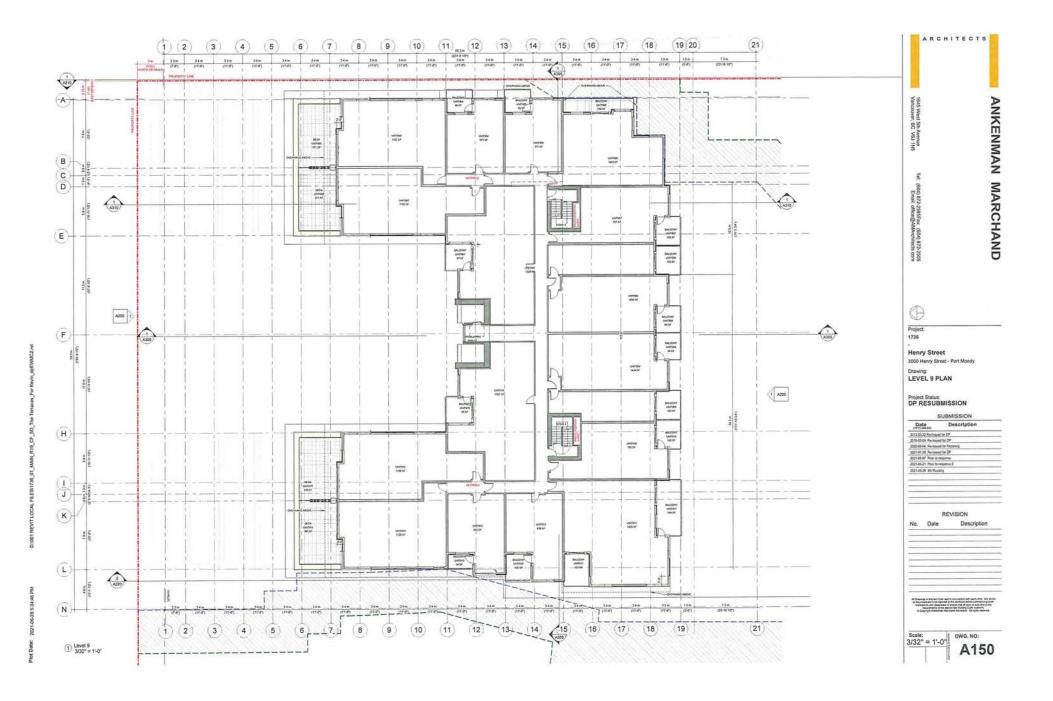


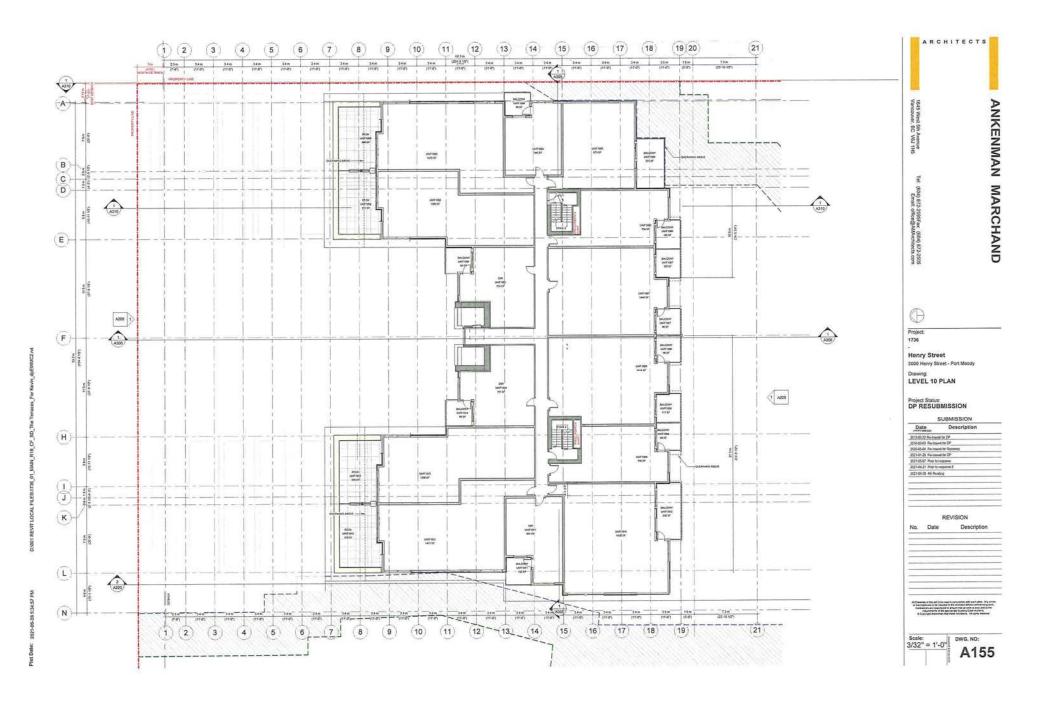
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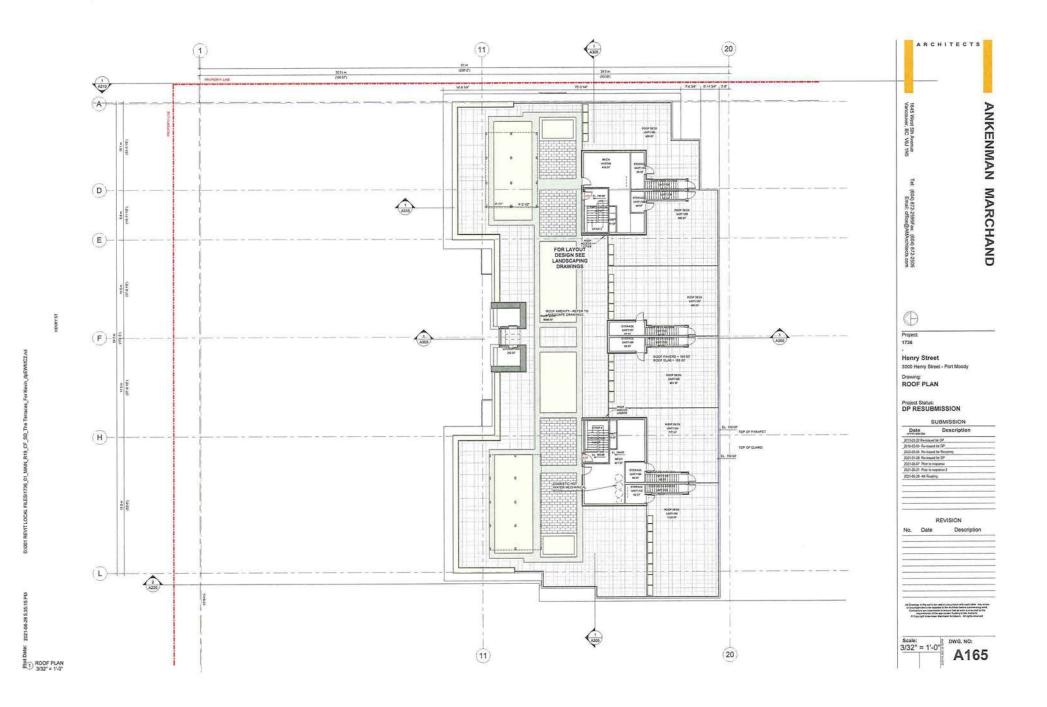


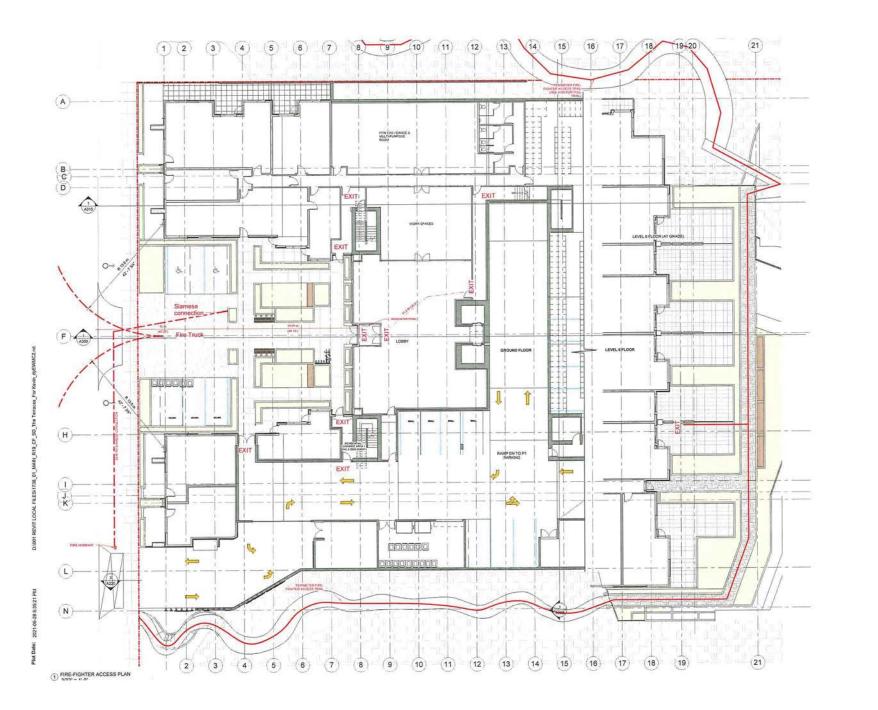
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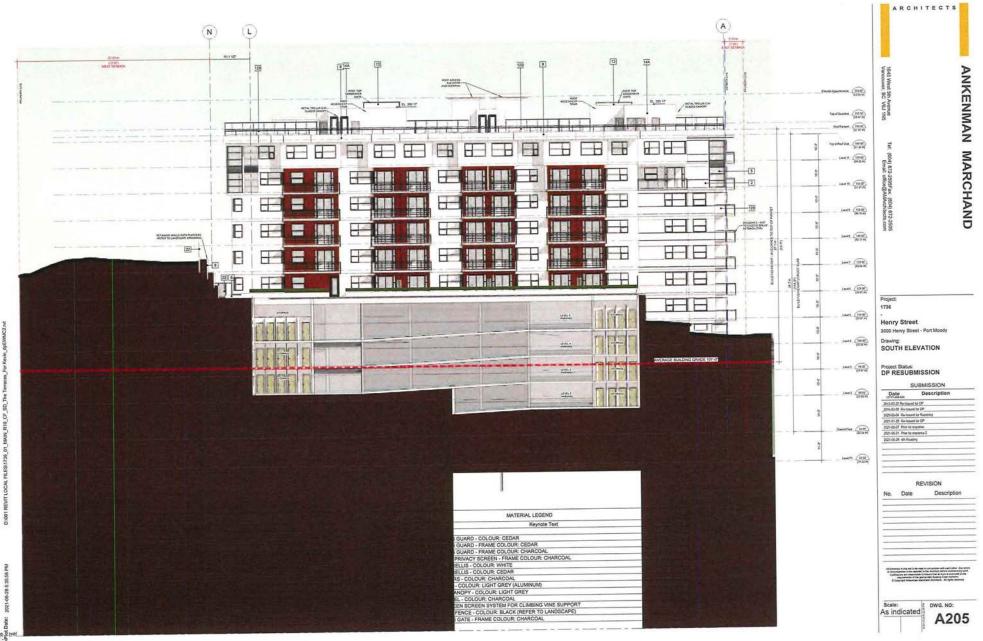






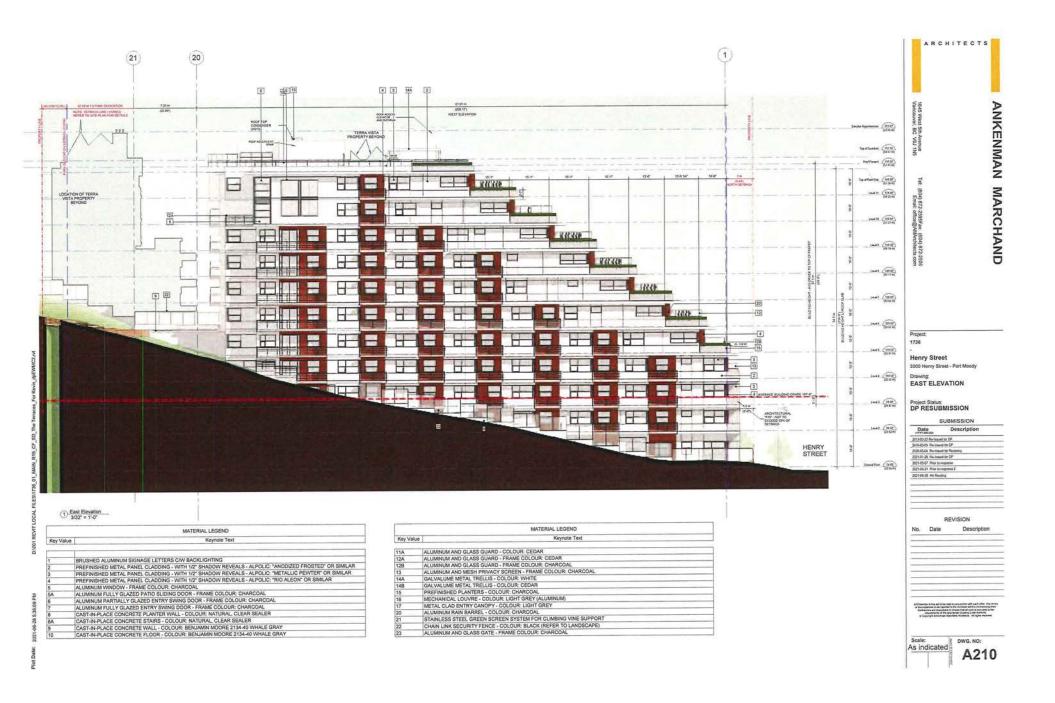


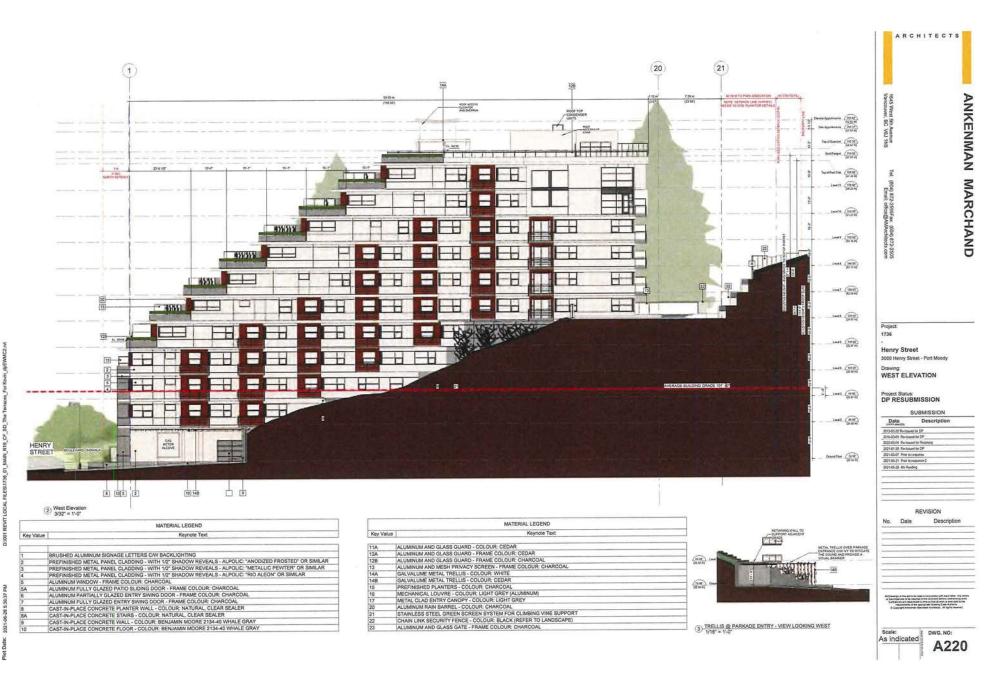
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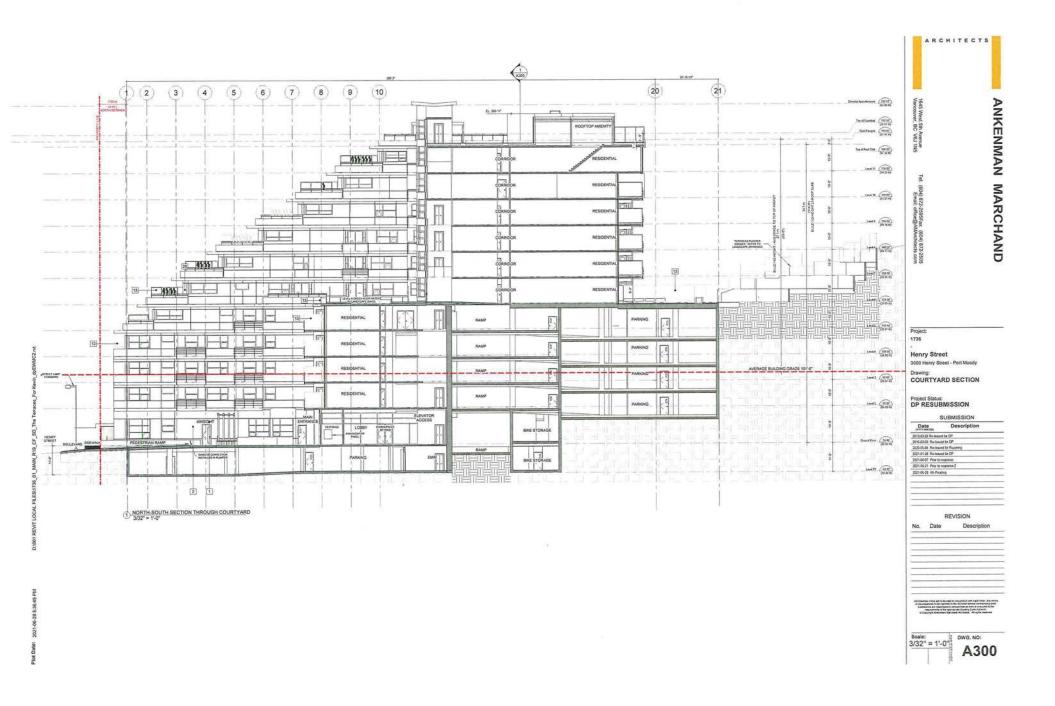
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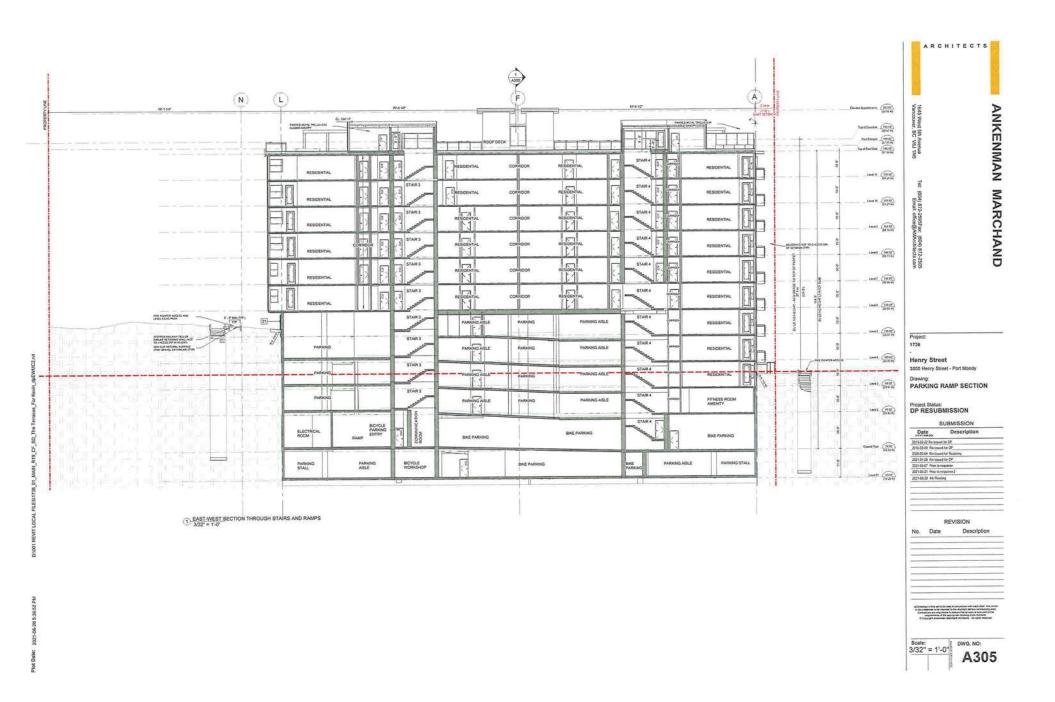


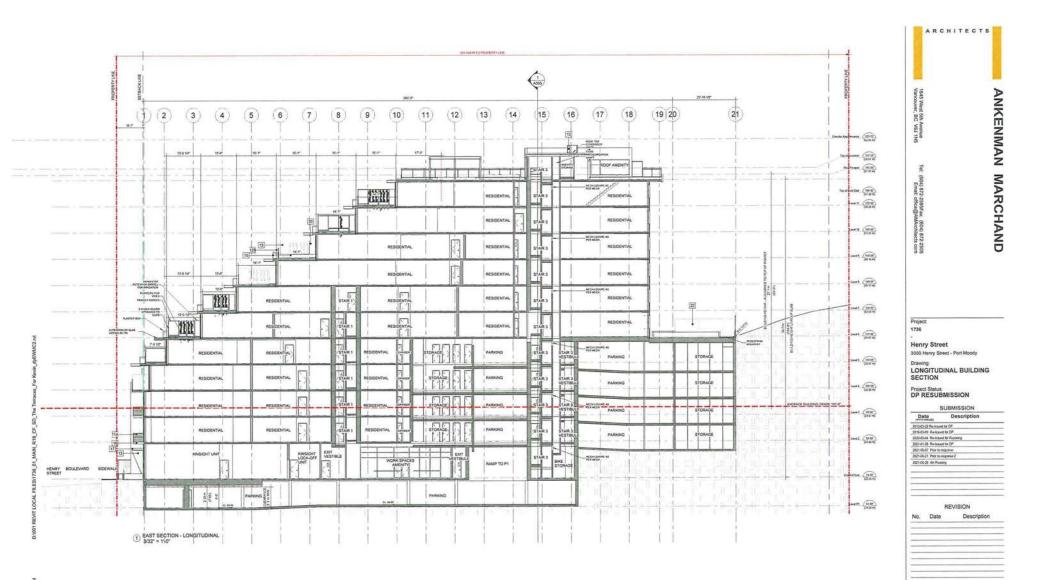


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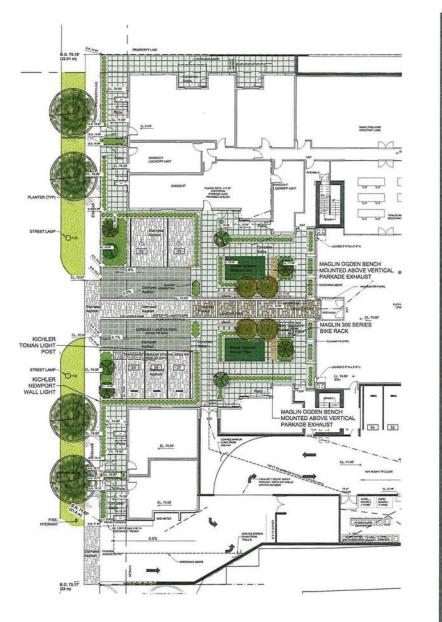








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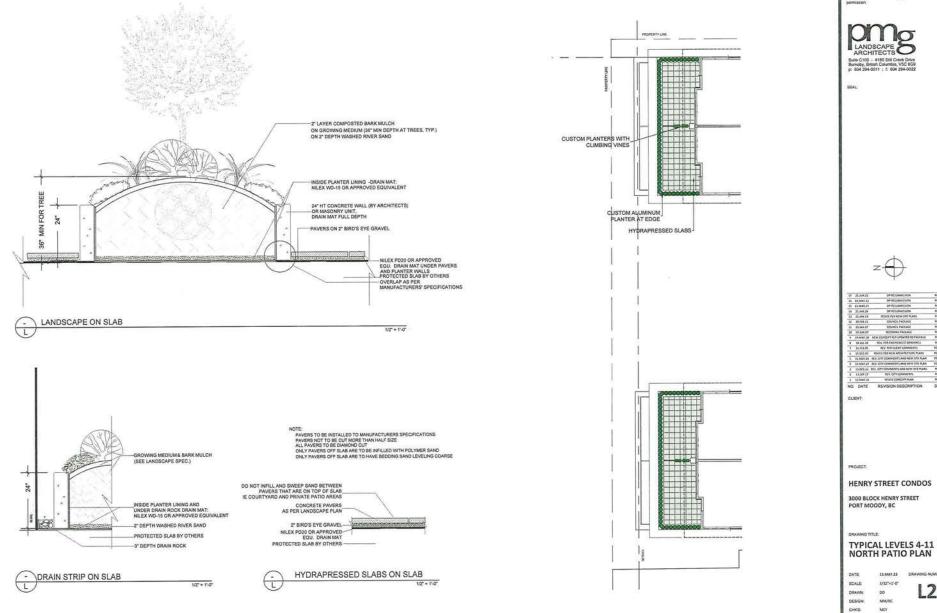
3000 BLOCK HENRY STREET PORT MOODY, BC

LANDSCAPE PLAN GROUND FLOOR



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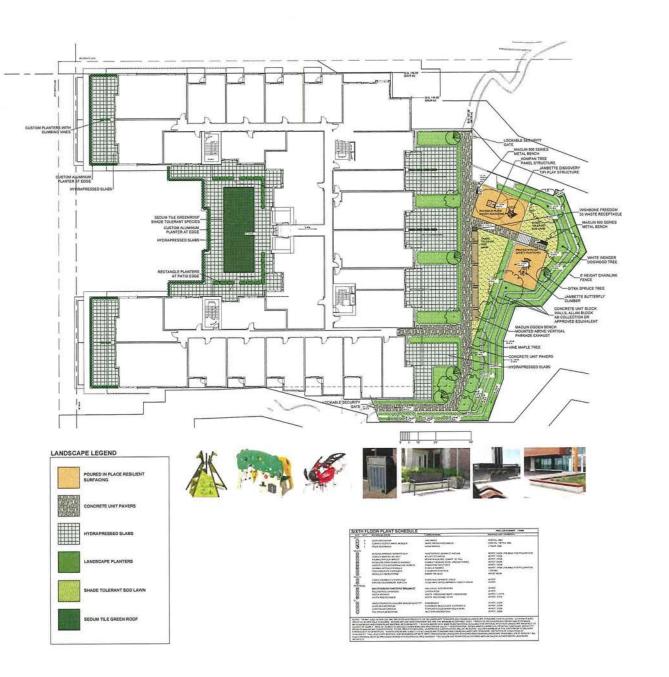


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Suite C100 + 4185 Still Creek Drive Burnaby, British Columbia, VSC 609 p: 604 294-0011 ; 1: 604 294-0022

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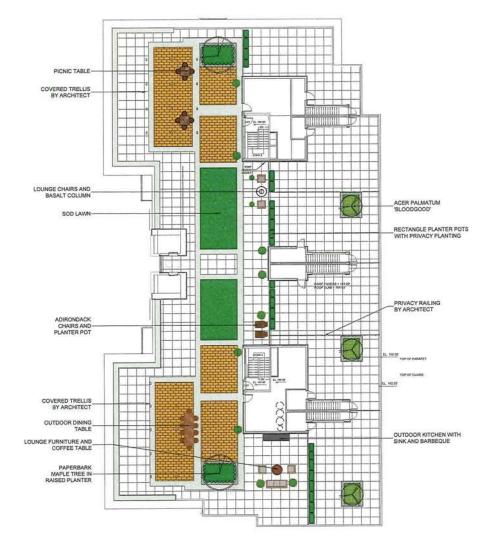
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Suite C100 - 4185 Still Creek Drive Burnaby, British Columbia, VSC 609 p: 604 294-0011 ; f: 604 294-0022









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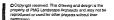
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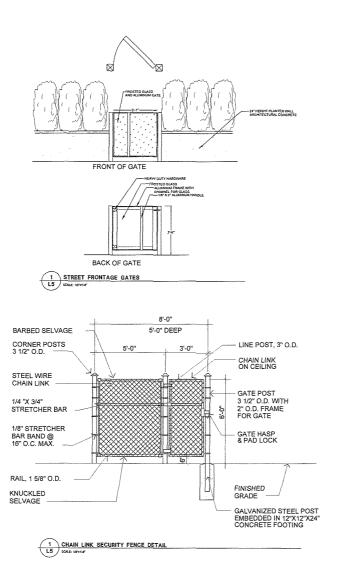
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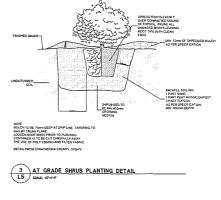
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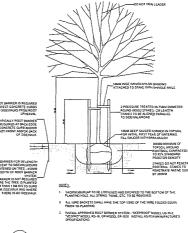




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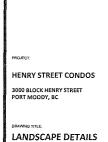




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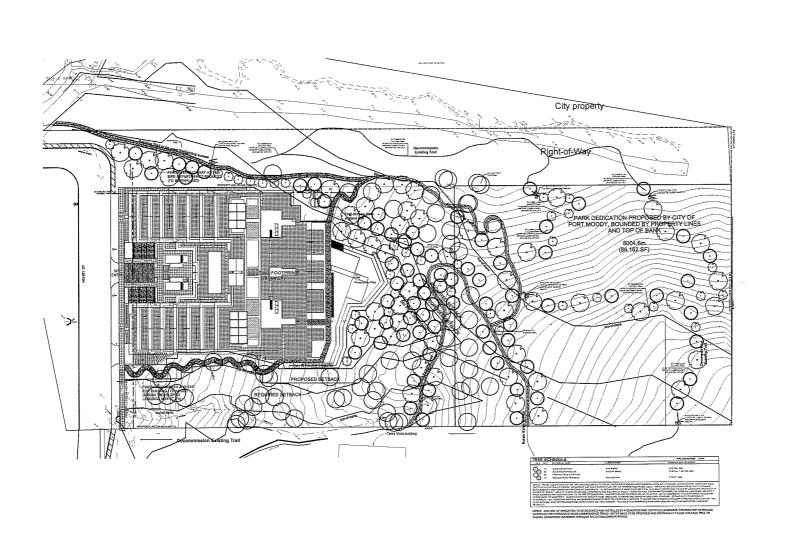
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Schedule B: Geotechnical Investigation Report and Hydrogeological Report



P (604) 439 0922 F (604) 439 9189 geopacific.ca 1779 West 75th Avenue Vancouver, BC V6P 6P2

3000 Henry Street Limited Partnership #1510 - 475 Howe Street Vancouver, B.C. V6C 2B3 April 16, 2021 File: 16218 Rev: 07

Attention: Amin Eskooch

Re: Geotechnical Investigation Report: Proposed Residential Development – The Terraces Lots 17-20, 3000 Block Henry Street, Port Moody, BC

1.0 INTRODUCTION

We understand it is intended to develop the above referenced property with a mixed residential development. Architectural drawings prepared by Ankenman Marchand Architects indicate the proposed development would include up to 11 levels of above grade residential development constructed into the hillside. Due to the sloped nature of the proposed development area, which slopes down from the south down towards the north, the above grade structure is intended to be terraced with the slope, all over one level below grade at the north, up to five buried levels in the middle portions of the development and four levels of below grade parking at the south of the development. The deepest portions of the parkade will be at Level 2 in the south and at the P1 Level in the north of the site, at elevations of 26.82 m and 19.20 m geodetic, respectively.

The following report summarizes the results of our supplementary geotechnical investigation and groundwater monitoring program to date, including additional soil logs and groundwater monitoring data collected between December 4, 2020 through to February 22, 2021. This report has been prepared for 3000 Henry Street Limited Partnership, for their use, and the use of others on their design team as well as for the City of Port Moody for use in the development and permitting process. No other use of this report is permitted without the written consent of GeoPacific.

2.0 SITE DESCRIPTION

The site is located near the north end of the Chines Escarpment in Port Moody. The site has an approximate area of 17,500 m2 and is bounded by Henry Street to the north, City of Port Moody property/Buller Street to the east, City of Coquitlam boundary to the south, and both private property and City of Port Moody property to the west. The site slopes significantly upwards from north to south with elevations of approximately 21 to 77 m within the property limits and 21 to 46 m within the proposed development area, according to the City of Port Moody GIS and the topographic survey completed by Papove Professional Land Surveying Inc.

The site is currently undeveloped and vegetated with large stands of trees and bushes. An environmentally protected channel with ephemeral flows is present near the west property line, and Elginhouse Creek is directly east of the Buller Street right of way to the east. A temporary access road, constructed of crushed rock and gravel, is located in the north-eastern quadrant of the site and was reinstated and further extended for drill access for the supplementary geotechnical and hydrogeological investigation completed in December of 2020.

The location of the site in relation to existing improvements and topographic features is shown on our site plan, Drawing No. 16218-01, following the text of this report.

Geotechnical Investigation Report - The Terraces - 3000 Block Henry Street, Port Moody, B.C.

3.0 FIELD INVESTIGATIONS

We understand a subsurface geotechnical site investigation was completed by others on January 21, 2013. A total of two auger test holes were completed to depths of up to 15 m below existing grades. To provide subsurface profiling, test holes were supplemented with Dynamic Cone Penetration Test (DCPT) soundings. To monitor groundwater, a PVC standpipe piezometer was installed in each of the auger holes. However, we understand the piezometers were rendered not useful due to installation procedures.

A secondary subsurface investigation was completed by others on October 7, 2015. A sonic drill rig was utilized to advance one borehole, SH15-1, to 27.3 m below existing grades. To provide subsurface profiling, the borehole was supplemented with Standard Penetration Test (SPT) soundings at regular intervals. In order to permit the collection of groundwater monitoring data from two different elevations, nested wells were installed at SH15-1. The shallow well (SH15-1S) was installed to a depth of 14.0 m and screened in the upper silt layer, while the deep well (SH15-1D) was installed to a depth of 26.5 m and screened in the lower silt layer however may intersect the medium to coarse sand seam noted directly above.

GeoPacific conducted a supplementary field investigation on December 2, 3 and 4, 2020. At this time, five additional test holes and monitoring wells were installed utilizing a sonic drill rig supplied and operated by BlueMax Drilling of Surrey, B.C. Due to the sloped nature of the site, TH20-01 through TH20-05 were installed to various depths ranging between 9.1 m and 21.3 m below existing grades. To provide subsurface profiling, select test holes were supplemented with Dynamic Cone Penetration Test (DCPT) soundings to refusal. The test holes were located, supervised and logged by a member of our technical team. Upon completion of drilling and well installation, data loggers with automated data collection capabilities were installed at all five well locations in order to record water level measurements every hour. The approximate location of the test holes and monitoring wells with respect to the existing site boundaries and buildings, are shown on our Drawing No. 16218-01.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Conditions

In general, the soil conditions noted from the surface downwards at test hole locations consist of a thin layer of forest litter and topsoil, underlain by a thin deposit of silty sand to sandy silt, underlain by dense to very dense glacial till, underlain by a basal layer of hard pre-glacial silt. At lower elevations, a localized deposit of stiff silt was encountered above the glacial till. A description of the soil conditions encountered is presented below.

FOREST LITTER/TOPSOIL

At all test hole locations, we observed a thin layer of forest litter and topsoil. This layer consists of dark brown sand and silt with variable organics, roots, and decomposing vegetation. The thickness of topsoil is expected to be variable throughout the site and increase in thickness in heavily vegetated or treed areas.

SILTY SAND TO SANDY SILT

The above noted soils are underlain by layer of brown, moist, loose to compact silty sand to sandy silt with trace gravel. At test hole locations throughout the sloping portion of the site, the silty sand to sandy silt deposit is ranges from 0.3 to 0.6 m thick throughout the sloping portion of the site and increases to 1.2 m thick at TH20-04 where the terrain flattens near the northeast corner of the

property.

POST-GLACIAL SILT

At TH20-04, the silty sand to sandy silt is underlain by a post-glacial deposit of grey, moist to wet, stiff silt, extending to a depth of 4.0 m below existing site grades. Our laboratory test results indicate that the moisture content value of a select sample obtained from this layer to be 26.4%.

GLACIAL TILL

The above noted soils are directly underlain by glacial till deposit consisting of grey, dense to very dense sandy silt to silty sand with trace to some gravel and occasional cobbles. The glacial till deposit increases in thickness towards the lower elevations of the site and is 1.2 m in thick at TH20-01, 4.0 m thick at TH20-02, 6.4 m thick TH20-03, and extends to the end of borehole at both TH20-04 and TH20-05. Our laboratory test results indicate that the moisture content values of the selected samples obtained from this layer range from 7.5 to 17.4%.

In our general experience the glacial till contains occasional boulders which may require splitting during the excavation processes and additional drilling and tooling during the shoring processes.

PRE-GLACIAL SILT

The glacial till is underlain by hard, grey, moist to wet pre-glacial silt. Our laboratory test results indicate that the moisture content values of the selected samples obtained from this layer range from 22.7 to 39.6%.

The silt was noted to include interbedded sand deposits which are 0.3 m to 1.2 m in thickness at TH20-03 and SH15-1. At TH20-02, thin sand lenses ranging between 0.03 m and 0.10 m in thickness were noted between 12.5 to 20.4 m depth. No sand deposits or sand lenses were observed at TH20-01. Based on the above, we infer the sand lenses are discret and discontinuous.

For a more detailed description of the subsurface soil conditions refer to the test hole logs in Appendix A.

The approximate locations of the test holes and cross-sections are also shown on our Drawing No. 16218 (G-S2), presented in Appendix B.

4.2 Groundwater Conditions and Monitoring

As part of our Hydrogeological Investigation, GeoPacific installed five standpipe piezometer monitoring wells at the locations of MW20-01 to MW20-05. As part of a previous geotechnical investigation by others, one standpipe piezometer with two nested wells was installed at the location SH15-01. GeoPacific introduced automated pressure transducers in all wells to assist in the evaluation and monitoring of groundwater levels, performed numerous slug tests to evaluate the hydraulic conductivity of the subsurface soils, and performed a seepage analysis. The static groundwater level was measured to be approximately 3 m below grade at MW20-01, 13 m below grade at MW20-02, 5 m below grade at MW20-03, near ground surface at MW 20-04 and MW20-05, and 3 to 4 m below grade at SH15-01.

Detailed description of groundwater conditions, monitoring, and analyses are presented in our Hydrogeological Investigation Report, dated April 16, 2021.

5.0 DISCUSSION

5.1 General

Architectural drawings, prepared by Ankenman Marchand Architects, indicate the proposed development would include up to 11 levels of above grade residential development. Due to the sloped nature of the proposed development area, which slopes down from the south down towards the north, the above grade structure is intended to be terraced with the slope, all over one level below grade at the north, up to five buried levels in the middle portions of the development and four levels of below grade parking at the south of the development. We expect the above and below grade development would be constructed with reinforced concrete so that loading would be relatively heavy.

The deepest portions of the parkade will be at Level 2 in the south and at the P1 Level in the north of the site, at elevations of 26.82 m and 19.20 m geodetic, respectively, exposing a subgrade of dense to very dense glacial till and/or hard pre-glacial silt. We expect conventional foundations can be supported directly on the undisturbed glacial and/or pre-glacial deposits. A discreet dense to very dense sand layer was encountered near the founding elevation at TH20-02, we expect this layer can be founded on as per above, or if required, the sand can be over-excavated to expose hard silt below and replaced with minimum 5 MPa lean mix concrete below foundation elements.

The development will be founded well below the static groundwater level. Due to the composition of the saturated soils, in conjunction with the groundwater levels observed and the depth of excavation, it is our opinion conventional shoring is not a suitable option for deep excavations due to pore water pressure and expected friction loss between the conventional shoring face and the retained soils. The site is surrounded with environmentally sensitive areas, and groundwater table draw down may affect the natural groundwater recharge of creeks and channels in the area. Furthermore, the sloping nature of the site induces additional pressures and potential ground movement.

A robust shoring system which acts as a groundwater cut-off wall will be required to aid in vertical excavation, groundwater management, and ground movement control. We expect an anchored secant pile wall can be utilized for deep excavations. This rigid system could also provide soil and hydrostatic pressure transfer to internal building slabs and provide permanent earth pressure relief at the south wall which will simplify the structural design of the building. We expect conventional shoring and/or sloping can be utilized for the shallow portions of the excavation.

We confirm, from a geotechnical point of view, that the proposed development is feasible provided the recommendations outlined in this report are incorporated into the overall design.

5.2 Seismic Considerations

It is generally accepted that loose to compact and saturated non-plastic silts and sands are prone to liquefaction or strain softening during cyclic loading caused by earthquakes. The strength reduction caused by soil liquefaction can cause foundations to punch. Furthermore, once liquefaction has been triggered, experience has shown that significant, permanent vertical and horizontal movements may be experienced.

The subsurface soils beneath the foundations are <u>not</u> prone to liquefaction or ground softening during the 1:2,475 years design earthquake, as outlined in the 2018 British Columbia Building Code (BCBC).

6.0 RECOMMENDATIONS

6.1 Site Preparation

Prior to the construction of foundations and grade supported slabs, all existing structures, pavements, organic materials, topsoil, fills, loose and/or otherwise disturbed soils must be removed from the construction area. Based on the contemplated foundation elevations, the stripping depth will generally be governed by the foundation depth rather than the quality of soils; however, due to the terracing of the structure and sloping nature of the site, some foundations may require over-excavation of surficial soils to expose undisturbed glacial soils. We expect foundations to be supported on dense to very dense glacial till and/or hard pre-glacial silt. Discreet interbedded sand deposits may be suitable to support conventional foundations, or they can over-excavated to expose hard silt and reinstated with minimum 5 MPa lean mix concrete. We expect grade supported slabs can be supported on compact to stiff native soils and/or engineered fill.

All subgrades are subject to disturbance from groundwater seepage, ponding, precipitation, and worker traffic; therefore, all slab on grade subgrades should be blinded with a minimum 150 mm of 19 mm clear crushed gravel blinding to protect the subgrade from disturbance, and all conventional pad and strip foundation subgrades should be blinded with minimum 5 MPa compressive strength lean-mix concrete.

Any loose, disturbed, or unsuitable material at the subgrade surface must be over-excavated and replaced. Reinstatement of subgrade at conventional pad and strip foundations should be completed using a minimum 5 MPa compressive strength lean-mix concrete. "Engineered Fill" can be used for general grade reinstatement below slab on-grade areas. In the context of this report, "Engineered Fill" is defined as sand to sand and gravel containing less than 5% fines (passing through #200 sieve), compacted in 300 mm loose lifts to a minimum of 98% Standard Proctor dry density (ASTM D698), at a moisture content that is within 2% of its optimum for compaction.

The subgrade soils must be reviewed by GeoPacific prior to placing blinding or engineered fill.

6.2 Conventional Foundations and Bearing Capacity

We expect conventional pad and strip foundations may be used to support the proposed structure. We recommend that conventional foundations are designed using a Serviceability Limit State (SLS) bearing pressure of 500 kPa based on support on dense to very dense glacial silt and/or glacial till. Factored Ultimate Limit State (ULS) bearing pressures can be taken as $1.5 \times$ SLS bearing pressure provided.

Irrespective of allowable bearing pressures, footings should not be less than 600 mm by 600 mm and strip footings should not be less than 450 mm in width. Footings should also be buried a minimum of 450 mm below the surface for frost protection. We estimate for foundations designed as per recommended, settlements will not exceed 25 mm total and 20 mm in 10 metres differential.

Adjacent conventional pad and strip foundations constructed at differing elevations should be offset from each other by a minimum distance of twice the difference in elevation, 2H:1V. Similarly, excavations adjacent to footings should be completed outside a 2H:1V slope from outside edge of bottom of footings, including excavations for utility trenches.

6.3 Seismic Design of Foundations

Structures constructed at the above referenced site, the Site Classification, as defined in Section 4.1.8.4 of the 2018 British Columbia Building Code (BCBC), should be assumed to be "Site Class C" in accordance with Table 4.1.8.4.A. This is based on foundations supported on dense to very dense glacial till. The soils underlying the foundations at the contemplated construction elevations, are <u>not</u> prone to liquefaction of ground softening at the design earthquake event.

6.4 Groundwater Cut Off Wall

A perimeter secant pile groundwater cut off wall is recommended to minimize temporary de-watering and long-term groundwater control. The cut off wall would need to be extended below the excavation into the dense to very dense glacial till and/or into the hard pre-glacial silt relatively impermeable layers and remain in-place for the lifespan of the development to facilitate normal drained cavity construction. The cut-off wall would act to retain the natural groundwater level off-site and mitigate flow from infiltrating towards the development to prevent subsequent groundwater drawdown. Excavation from inside the secant pile cut-off wall would not affect the natural groundwater level outside of the secant pile cut off wall. No portion of the groundwater cut-off wall can encroach onto City of Port Moody property.

The City of Port Moody has requested our review of the influence of our shoring and excavation design on the natural habitat, groundwater level, and adjacent properties at the above referenced site. Our proposed temporary/permanent shoring design and permanent groundwater cut-off system is discussed below.

The proposed shoring design is intended to act as both a temporary shoring system which will allow the below grade portion of the proposed development to be constructed and as a permanent groundwater cutoff wall which will retain the natural groundwater level around the development and protect adjacent habitats and structures from groundwater drawdown. The proposed shoring design will utilize three main components: secant pile cut-off wall, tie-back anchors installed with cased drilling methods or self-drilling hollow core methods, and bentonite water stops, chemical grout, or approved alternatives at anchor head locations. These components are discussed below.

Around the perimeter of the site, secant piles will be installed to form a vertical, interlocked, wall. The wall will extend from the existing grade, through the surficial sands and silts and be extended below the proposed excavation elevation. The secant piles will be socketed into the basal layer of dense to very dense glacial till and/or hard pre-glacial silt to form a groundwater cut-off and soil retention wall. The wall will act to retain the natural groundwater level, minimize potential for groundwater capture, and prevent subsequent groundwater drawdown.

Temporary and permanent tie-back anchors will be used in conjunction with the cut-off wall to resist the lateral earth pressures and hydrostatic pressures. Tie-back anchors will be installed with cased drilling methods or self-drilling hollow core anchors. A small anchor installation hole will be drilled in the wall at each anchor location which will permit anchor installation through the wall. Bentonite water stops, chemical grout, or approved alternatives will be placed at each anchor head location after installation and/or tensioning to mitigate groundwater infiltration at anchor head locations.

Temporary dewatering during construction is expected to be relatively light and can be handled using sumps and sump pumps. Normal perimeter foundation drainage will be required at the below grade development. Permanent dewatering is not expected to be required for this project.

The secant pile cut-off wall is intended to retain the natural groundwater level around the site and redirect natural groundwater flows around the outside perimeter of the cut-off wall. Based on our review of the soil and groundwater conditions, redirection of groundwater flows are not expected to increase the groundwater

elevation or flow at adjacent sites or at adjacent environmentally sensitive areas or creeks.

It is our opinion that the shoring and excavation works will not affect the structural integrity of adjacent utilities or structures, change the off-site groundwater elevations, and the shoring and excavation works will protect adjacent habitats and structures from groundwater drawdown or surcharge, provided that our recommendations and design specifications and are adhered to during construction.

6.5 Site and Foundation Drainage Systems

We recommend that a sub-drainage system be included in the mechanical design for the proposed building to prevent the development of water pressures on the foundation walls and the basement slabs. Provided a groundwater cut off approach is used in the design we expect typical perimeter drainage should be feasible to drain parkade walls and slab on grade. In conjunction with the groundwater cut-off wall and sealed anchors, flows should be light to moderate, at less than 50 litres/minute after construction. Flows should be confirmed by the mechanical consultant when the excavation reaches/nears target grades.

6.6 Slab-On-Grade Floors

Slab-on-grade floor loading is expected to be light at approximately 10 kPa. Undisturbed, compact, native, granular soil deposit or engineered fill soils can be used to support slab-on-grade floors. Floor slabs should be directly underlain by a minimum of 150 mm of a free draining granular material, such as 19 mm clear crushed gravel, and hydraulically connected to perimeter drainage. A moisture barrier should underlie the slab directly above the free draining granular material.

6.7 Temporary Excavations and Shoring

Due to depth of excavation, proximity of public and private structures, soil conditions, and presence of a high static groundwater table, a vertical secant pile wall should be used to permit vertical excavation and act as a cut-off wall. The secant pile wall will be internally reinforced and tied back with ground anchors to resist the earth pressure and water pressure forces generated on the shoring wall. Cased drilling or hollow core anchors should be anticipated, pre-production anchors would be utilized to confirm bond strength of soil, and some special provisions such as post-grout and pressure grouting may be required. Special seals and water stopping materials will be required at anchor locations to ensure retained water and sediment do not migrate into the site. Sumps should be located in the excavation to assist in collection and removal of groundwater.

Secant piles are installed in cased drilled holes and produce low vibrations. We do not expect any vibrations to affect retained soil integrity or adjacent structures. Vibration monitoring can be completed by GeoPacific during secant pile installation upon request. In conjunction with the perimeter cut-off wall, we envisage that groundwater inflows can generally be controlled with conventional sumps and sump pumps. Temporary groundwater flows from the excavation <u>during construction</u> are expected to be light to moderate (100 L/minute per site). These flows can be confirmed at the time of construction.

All excavations and trenches must conform to the latest Occupational Health and Safety Regulation supplied by the Work Safe BC. Any excavation in excess of 1.2 metres in depth requiring worker entry must be reviewed by a professional geotechnical engineer. Temporary excavations in the fill soils and native soils can be cut at a slope angle of 1H:1V above the water table. All slopes should be covered with poly sheeting.

GeoPacific may provide a shoring and excavation design upon request.

6.8 Earth Pressures on Foundation Walls

Earth pressures against the foundation walls are dependent on factors such as, available lateral restraint along the wall, surcharge loads, backfill materials, compaction of the backfill and drainage conditions. We assume that the backfill between foundation walls and shoring would be a free-draining granular material such as birds eye gravel. The foundation wall is expected to be partially yielding and fully restrained between the parkade floors. The foundation walls would be constructed against a temporary secant pile shoring system at the north, east, and west walls, (temporary soil anchors support) and the foundation walls would be constructed against a permanent secant pile shoring system at the south wall (permanent soil anchor support). Depending on temporary or permanent secant pile shoring, the pressure on the foundation wall.

6.8.1 Temporary Secant Pile Shoring

Our preliminary recommendations include that the foundation walls adjacent to secant pile shoring with <u>temporary</u> tie-back anchors can be designed to resist the following lateral pressures. <u>Temporary</u> tie-back anchors can be removed after below grade construction.

Static: Triangular soil pressure distribution of **4.5H** kPa (where H is equal to the total backfill height in metres) for static conditions to a depth of 3.0 metres, below which the earth pressure will become additive to the water pressure, increasing to **12.5H** kPa triangular to the maximum depth of excavation contemplated.

Based on the stiffness of the secant pile shoring system and drained conditions anticipated at the perimeter of the foundation wall, we expect that any hydrostatic pressure behind the shoring wall would be transferred to the floor slabs of the below grade parkade. Therefore, the foundation walls can be designed without considering hydrostatic pressure, though the forces induced by these pressures would need to be resisted by the floor diaphragms.

Seismic: Inverted triangular seismic surcharge of **3.0H** kPa (where H is equal to the total backfill height in metres). This seismic surcharge is based on the inclusion of a perimeter secant shoring wall with adequate stiffness to transfer transient loading to the basement floors.

Any additional surcharge loads located near the foundation walls <u>should be added to the earth pressures</u> provided above.

6.8.2 Permanent Secant Pilc Shoring (South Shoring Wall Only)

Our preliminary recommendations include that the foundation walls adjacent to secant pile shoring with <u>permanent</u> tie-back anchors can be designed to resist the following lateral pressures. <u>Permanent</u> tie-back anchors must remain must remain for the lifespan of the structure and would be placed within the site boundaries as to not encroach on City property or private property. Pre-production anchors would be utilized to confirm bond strength of soil, and some special provisions such as post-grout and pressure grouting may be required We expect the south shoring wall could be designed as a <u>permanent</u> shoring system. This will reduce long term earth pressure thrust to a nominal value of 10 kPa uniform.

Any additional surcharge loads located near the foundation walls <u>should be included in the permanent</u> <u>anchor design resistance</u>.

7.0 ENCROACHMENT ON CITY PROPERTY

The vertical secant pile shoring cut-off wall would remain in-place for the duration of the structure lifespan. No portion of the vertical cut-off wall would encroach onto City property. The structural foundation walls and suspended slabs would be designed to resist lateral earth pressures. Once the development is completed above grade, the temporary tie-back shoring anchors will no longer be required to support the retained soils and serve no function; however, the anchors would remain on City property.

The City of Port Moody requires any anchor within 3.0 m from grade on City property to be removed. The City of Port Moody typically requires all anchors to be de-tensioned on City property; however, it is our opinion that that de-tensioning of anchors from inside the excavation may negatively impact the bentonite seal which may affect the off-site groundwater levels; therefore, we do not recommend de-tensioning anchors.

Furthermore, since the anchors are designed as a temporary system on City property, we expect anchors will naturally de-tension over time. Based on our experience, there is no indication that anchors will rapidly de-tension or damage the permanent structure if left tensioned. The new foundation wall would be essentially abutted to the anchor head, and tension would be released slowly over time from the retained soil side, allowing the seal to retain or regenerate.

In the event anchors are exposed during excavation on City property after project completion, we expect the anchors can be removed by standard excavation methods (utilizing an excavator machine to shear the free length) and that anchor removal would not damage to the new foundation walls during removal.

8.0 LANDSLIDE HAZARD ASSESSMENT

We have completed a slope stability assessment for the proposed residential development at the above reference site. The slope stability assessment was completed under static and seismic conditions for predevelopment and post-development and in accordance with the 2018 BC Building Code (BCBC) and the APEGBC "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC" (Revised May 2010). Subsurface stratigraphy and soil strength parameters were interpreted based on geotechnical site investigation information provided to us. Furthermore, off-site stratigraphy was interpolated from public geotechnical reporting of the Chines Escarpment and previous investigations completed by others.

Architectural drawings and topographic site survey data were utilized to create sections through the slope and proposed structure to determine the critical failure section for the slope above the proposed development. The general slope above the proposed development has a slope angle of approximately 20 degrees. The site plan and sections for <u>pre-development</u> and <u>post-development</u> are presented in Appendix B which includes Drawings No. G-S2 (Site Plan) and G-S2A (Section A). The critical section was determined to be along the natural slope as shown on Section A. The stability assessment was carried out using the numerical modelling software program GeoStudio Slope/w (2018), which employs the Morgenstern-Price limit equilibrium method. A wide range of potential slip surfaces were calculated to determine the lowest factor of safety.

The guideline provides a pseudo-static limit equilibrium analysis procedure for the calculation of the horizontal earthquake acceleration coefficient k_{15} (Bray method), for use in the slope stability assessment under seismic conditions. A seismic analysis employing the k_{15} parameter and yielding a factor of safety of 1.0 or higher is considered acceptable for residential development in accordance with the guideline. The k_{15} for the proposed development site was computed to be 0.145 g using the spectral response acceleration of

0.628 g with a 2% probability of exceedance in 50 years.

The assessment results for static and seismic conditions indicate the minimum factor of safety of 2.10 and 1.35, respectively, for <u>pre-development</u> which exceed the acceptance criteria of the guideline. The assessment results for static and seismic conditions indicate the minimum factor of safety of 6.98 and 4.04, respectively, for <u>post-development</u> global stability which exceed the acceptance criteria of the guideline.

GeoPacific has investigated soils up-slope and south of the development at TH20-01. We observed soil to consist of a thin layer of surficial silty sand to sandy silt, underlain by dense to very dense glacial till, underlain by hard pre-glacial silt. Well vegetated, forested terrain with slope angles of generally 15 degrees, underlain with dense to very dense glacial till and/or hard pre-glacial silt are not conducive to global slope instability or landslides; therefore, we do not expect slope instability up-slope from the development, and we expect the <u>pre-development</u> assessment is suitable to be extrapolated up-slope. Furthermore, drawing No. G-S2 provides additional topographic overlay east of the development towards Elginhouse creek which indicates there are no significant sloping terrain in the east-west orientation, east of the development within at least 15 m of the proposed development; therefore, slope stability assessment was not considered necessary at this location.

Our slope stability assessment satisfies the 2018 BC Building Code (BCBC) and the APEGBC "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC" (Revised May 2010). The results of our slope stability assessment are presented in Appendix C. Based on our review of our slope stability assessment which has been coordinated with the recent GeoPacific geotechnical and hydrogeological investigation and coordinated with the most recent architectural drawings, as discussed herein, it is our opinion the site may be used safely for the intended use. GeoPacific has completed an *Appendix D: Landslide Assessment Assurance Statement* as part of the APEGBC "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC" (Revised May 2010). The assessment statement is presented in Appendix D.

9.0 DESIGN REVIEWS AND CONSTRUCTION INSPECTIONS

As required for Municipal "Letters of Assurance", GeoPacific Consultants Ltd. will carry out sufficient field reviews during construction to ensure that the Geotechnical Design recommendations contained within this report have been adequately communicated to the design team and to the contractors implementing the design. These field reviews are not carried out for the benefit of the contractors and therefore do not in any way effect the contractor's obligations to perform under the terms of his/her contract.

The preceding sections make recommendations for the design and construction of the proposed residential development. We have recommended the review of certain aspects of the design and construction in this report. In summary, geotechnical reviews are required for the aspects of work listed below.

1. Stripping/Excavation	Review of stripping, temporary cut slopes, and soil conditions
2. Shoring	Review of shoring and cut off wall installation
	Full-time review of permanent secant pile installation is required
3. Anchoring	Review of anchor installation, testing, and decommissioning
	Full-time review of permanent anchor testing is required
4. General Compaction	Review of compaction of engineered fill and clear crushed gravel
5. Foundation	Review of foundation subgrades
6. Slab on-grade	Review of subgrade, under-slab fill materials, and compaction.

It is important that these reviews are carried out to ensure that our intentions have been adequately

communicated. It is also important that the contractors working on the site review this document prior to commencing their work and notify GeoPacific at least 48 hrs in advance of the required field reviews.

10.0 CLOSURE

This report has been prepared exclusively for our client, for the purpose of providing geotechnical recommendations for the design and construction of the proposed development described herein. This report remains the property of GeoPacific Consultants Ltd. and unauthorized use of, or duplication of this report is prohibited.

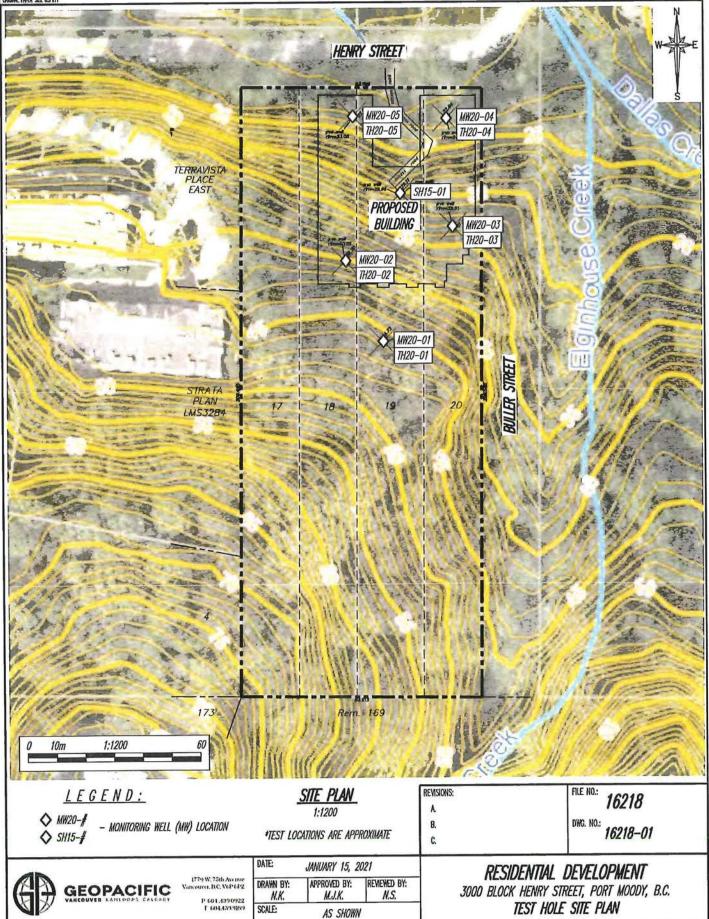
We are pleased to be of your assistance on this project and we trust that our recommendations are sufficient for your current purposes. If you would like further details or would like clarification of any of the above, please do not hesitate to contact the undersigned.

For: GeoPacific Consultants Ltd

Reviewed by:

Wyatt Johnson, B.Eng., EIT Project Engineer Matt Kokan, M.A.Sc., P.Eng Principal

ORIGINAL PHATE SZZE 8.5"x11"



APPENDIX A

Test Hole Logs

GeoPacific Investigation December 2020

.

Test Hole Log: TH20-01 (MW20-01)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax 604-139-910ປ

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	INFERRED PROFILE		(9			
Depth Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Ground Surface Sandy Silt silt, sandy, trace gravel, tan brown, oxidized, firm Sandy Silt Till silt, sandy, trace gravel till grey, very dense/stiff, moist Silt silt, trace, fine sand, grey, hard, moist to wet with depth, grey/brown from 3.0 to 6.1 m	44.7 0.0 44.1 0.6 42.9 1.8	18.2 28.9 25.9			Groundwater Level Depth Measured at 2.74 m on Jan 5, 2021
Logged: Method: Date: De						Ground Surface Number: A.01 of 2

Date: Dec 2 - 4, 2020

Page: 1 of 2



Test Hole Log: TH20-01 (MW20-01) GEOPACIFIC CONSULTANTS File: 16218 Project: The Terraces 1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax:604-439-9189 Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody **INFERRED PROFILE** Moisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol (blows per foot) 10 20 30 40 Depth 37411 381111 391111 401111 41111 30.1 42 13 43 1 13 44쿨 30.0 29.5 End of Borehole 54圭 55 17 56 75 85 95 60 61 22 63 64 65 66 78 68 69 70 71 71 Datum: Ground Surface Logged: NS Figure Number: A.01 Method: Sonic Date: Dec 2 - 4, 2020 Page: 2 of 2

Test Hole Log: TH20-02 (MW20-02)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

		INFERRED PROFILE		(9			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
oft m		Ground Surface	39.3		_	nn	
monopole		Ground Surface Silty Sand with Topsoll sand, silty, trace gravel with topsoil, tan brown, wet Silty Sand and Gravel Till silty sand and gravel till, fine sand, trace gravel, brown, compact, moist Sandy Silt and Gravel Till sandy silt, trace gravel till, grey, dense to very dense, moist Sil	39.3 0.0 37.8 1.5 35.0 4.3	17.4 27.8 26.7	5 21 36 >50 >50 >50 >50 >50		
29 military 30 military 31 military 32 military 33 military 33 military 34 military 35 military 36 military 36 military 36 military 36 military 37 military 38 military 39 military 30 military 31 military 31 military 31 military 32 military 33 military 34 military 34 military 35 military 36 military 36 military 37 military 37 military 38 military 39 military 39 military 30 mil							

Logged: NS

Method: Sonic

Date: Dec 2 - 4, 2020

Datum: Ground Surface Figure Number: A.02 Page: 1 of 2

GEOPACIFIC

CONSULTANTS

1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax 604-439-9169

Test Hole Log: TH20-02 (MW20-02)

File: 16218

Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody GEOPACIFIC

1779 W 75lh Avenue, Vancouver, BC, V6P 6P2 Tel, 604-439-0922 Fax:604-439-9189

		INFERRED PROFILE		(%		_	
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
37.83.93 44 42.43 44.45.66 67.65 55.56 55.66 66.66 66.66 66.67 77.72 12 13 14 15 16 17 18 19 20 21 21 13 14 15 16 17 18 19 20 21		End of Borehole	<u>18.0</u> 21.3	39.6 26.5 35.0 23.2 23.2 23.5			Groundwater Level Depth Measured at 13.3 m on Jan 5, 202
Logg Meth Date:	od: S						Ground Surface Number: A.02 ? of 2

Test Hole Log: TH20-03 (MW20-03)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody



1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax Fd(4–130-5169

		INFERRED PROFILE		(9			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) = 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		Ground Surface Silty Sand sand, sitly, trace gravel, tan brown, compact, moist, oxidized Silty Sand and Gravel Weathered Till sand, silty, some gravel till, brown, dense, moist Silty Sand/Sandy Silt and Gravel Till silty sand to sandy silt, some gravel till, grey, dense to very dense, dry from 2.1 to 3.0 m, moist from 3.0 to 7.0 m Silt silt, grey, hard, moist Silt, grey, hard, moist	31.4 0.0 30.8 0.6 1.8 29.6 1.8 29.6 1.8	7.5	7 17 20 34 37 43 >50 >50		Groundwater Level Depth Measured at 5.16 m on Jan 5, 2021
	ged: N						Ground Surface

Method: Sonic

Date: Dec 2 - 4, 2020

Datum: Ground Surface Figure Number: A.03 Page: 1 of 2

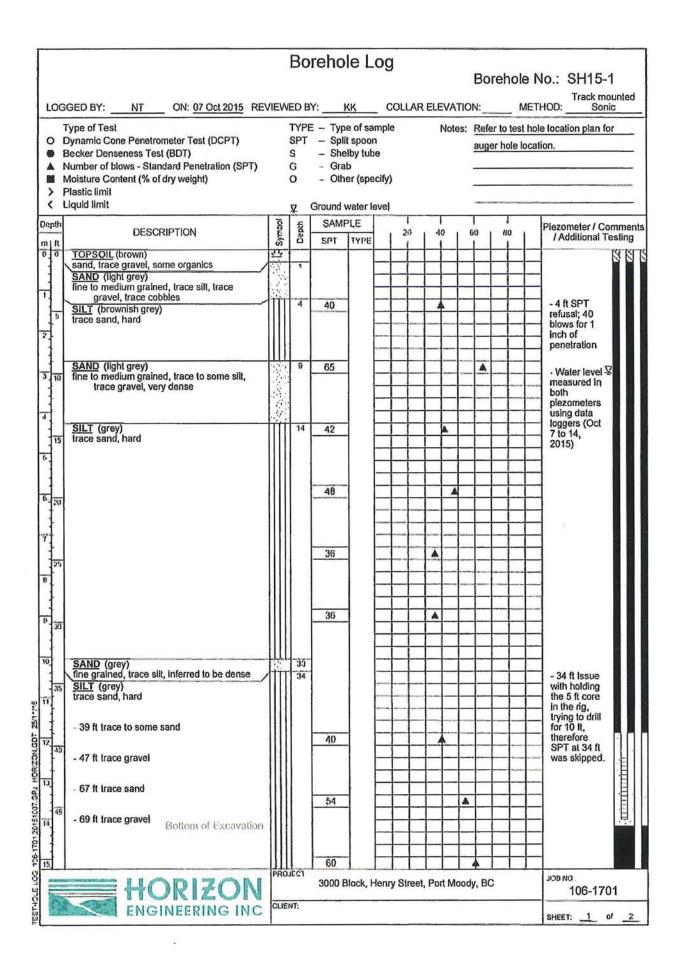
Test Hole Log: TH20-03 (MW20-03) GEOPACIFIC File: 16218 Project: The Terraces 1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 FAX 003-339-3195 Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody INFERRED PROFILE Moisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol Depth (blows per foot) 10 20 30 40 26.1 114: 1 19.2 Sand sand, brown, dense to very dense, 21.5 wet 18.0 111 Silt silt, grey, hard, moist, fine sand lens from 15.5 to 15.8 m 27.5 22.7 14.7 End of Borehole 58-1-59-1-18 60 mining 62 19 63 64 65 66 67 67 68 69 70 70 71를 72-Datum: Ground Surface Logged: NS Method: Sonic Figure Number: A.03 Date: Dec 2 - 4, 2020 Page: 2 of 2

Test Hole Log: TH20-04 (MW20-04) GEOPACIFIC CONSULTANTS File: 16218 Project: The Terraces 1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax:604-439-9189 Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody **INFERRED PROFILE** (%) Groundwater / Well Moisture Content (Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol (blows per foot) * 10 20 30 40 Depth E 0 1 2 3 4 5 6 7 8 9 10 11 12 22.8 0.0 Ground Surface Groundwater Level Sandy Silt Depth Measured at 0.05 22.2 silt, sandy, tan brown, soft, wet 2 m on Jan 5, 2021 0.6 3 Silty Sand 21.6 sand, silty, tan brown, soft, wet. 1.2 16 oxidized Silt silt, grey, stiff, moist to wet 26.4 9 9 12 13 14 15 16 17 18 19 20 1 18.9 11 12.3 Silty Sand and Gravel Till silty sand and gravel till, grey, dense to very dense, dry to moist 24 38 >50 >50 8.5 1 21 22 23 23 7 24를 26 27 28 28 8.2 29 9 30 9 9 31클 32. 10 33. 34 -35-36-Datum: Ground Surface Logged: NS Figure Number: A.04 Method: Sonic Page: 1 of 2 -Date: Dec 2 - 4, 2020

Test Hole Log: TH20-04 (MW20-04) GEOPACIFIC CD/100114/015 File: 16218 Project: The Terraces 1779 W 75th Avenue, Vancouver, BC, V6P 6P2 1/2 1/14-135-0022 Fax 604-438-9109 Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody INFERRED PROFILE Moisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol Depth • (blows per foot) • 10 20 30 40 9.1 10.6 12.2 End of Borehole 2 44 55 46 47 48 49 50 51 2 52 16 53 16 53 54 55 56 56 57 58 58 65 20 66 20 68 69 11 21 70 11 1 Logged: NS Datum: Ground Surface Figure Number: A.04 Method: Sonic Date: Dec 2 - 4, 2020 Page: 2 of 2

File: Proje Clien	16218 ct: T t: 30	ole Log: TH20-05 (MW20-0 he Terraces 00 Henry Street Limited Partnership ion: Lots 17-20, 3000 Henry Street, Po		dy	1779 W 75th Tel: 604-439	Avenue, Van	EOPACIFIC 5 DI LA DI S couver, BC, V8P 6P2 Fax 604-439-0189
		INFERRED PROFILE		(9)			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{c} m_{\rm D} & 1 & 2 \\ m_{\rm D} & 1 & 1 \\ m_{\rm D} & 1 \\ m_{\rm D} & 1 & 1 \\ m_{\rm D} & 1 \\ $		Ground Surface Silty Sand And Gravel with topsoil and organics, dark brown, loose, wet Silty Sand and Gravel Weathered Till silty sand to sandy silt with trace gravel till, tan brown, compact to dense with depth Silty Sand and Gravel Till silty sand, trace gravel till, grey, very dense, moist End of Borehole	22.0 0.0 20.2 1.8	9.9 9.9 11,9 7.4	14 29 50 50		Groundwater Level Depth Measured at +0.07 m on Jan 5, 202
Meth	ed: N od: So ; Dec						Ground Surface Number: A.05 of 1

Investigation by Others October 2015

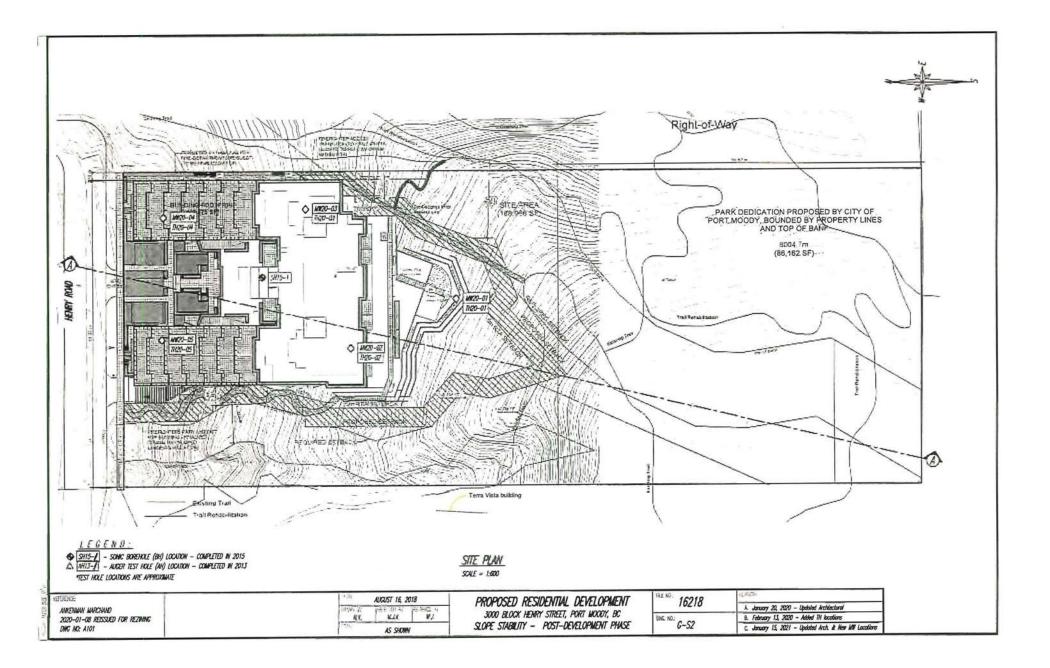


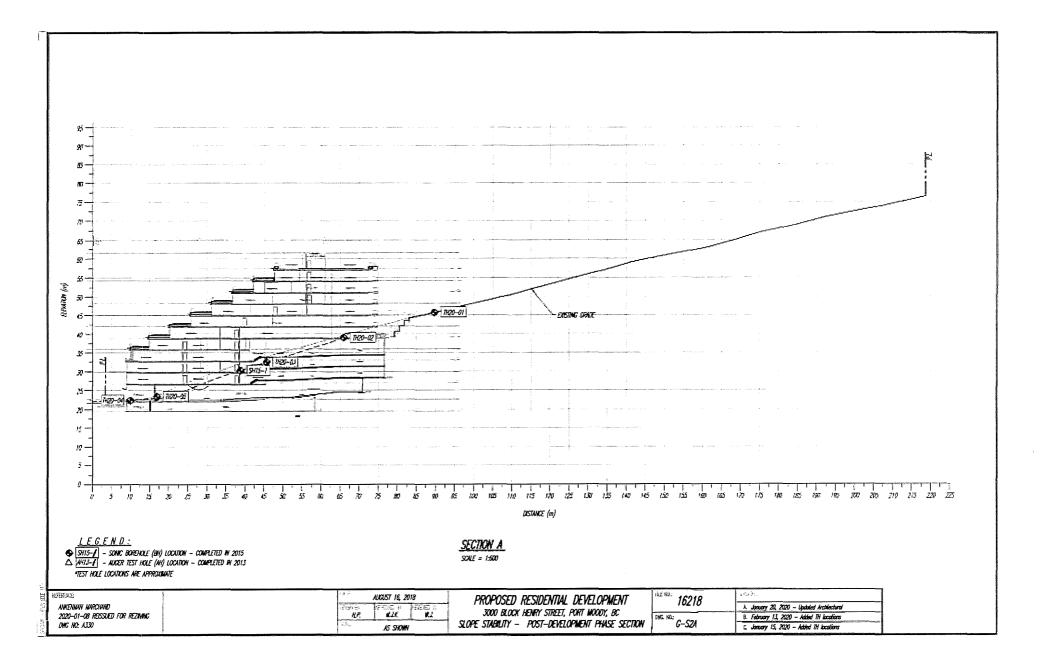
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BILT (grey) BILT (grey) Trace to some sand, trace gravel, hard		+			-	-				-		-						
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25 SILT (grey) trace to some sand, trace gravel, hard 82 26 85		1		-	1	-			_			E				silt,	medium to coarse grained, trace to some silt,	81
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APPENDIX B

Site Plan and Section

(Drawing No. 16218 G-S2 and G-S2A)

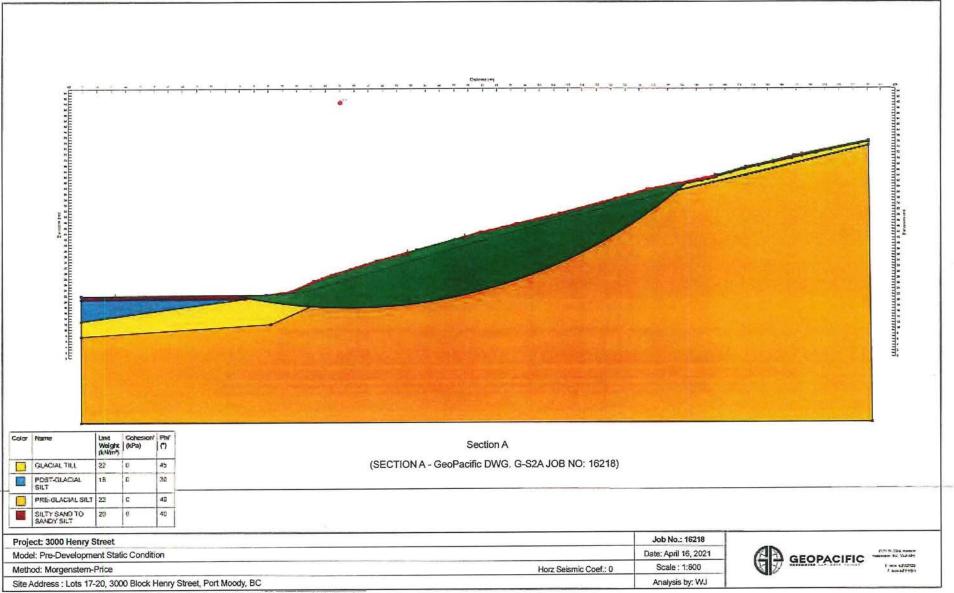




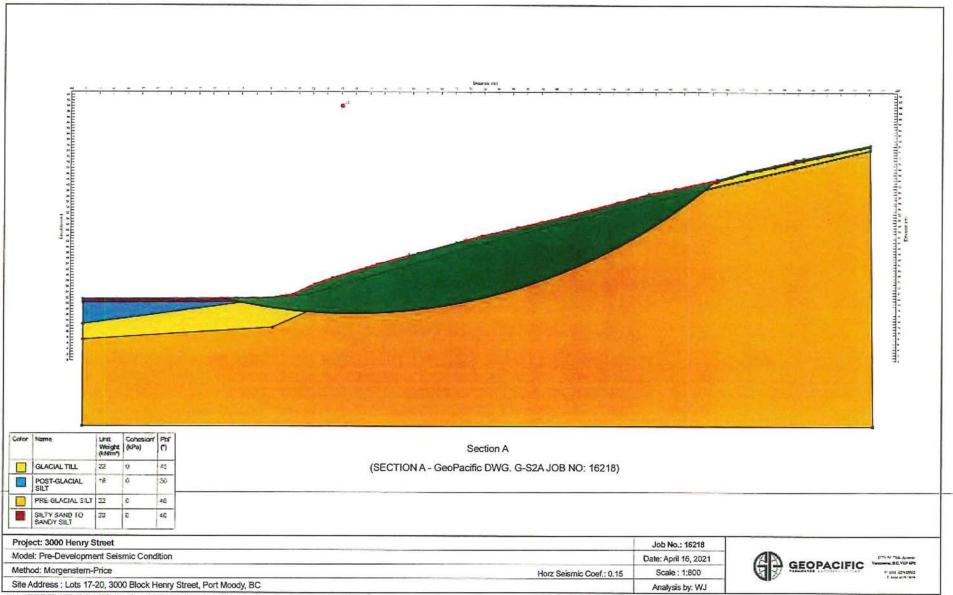
APPENDIX C

Slope Stability Assessment Results

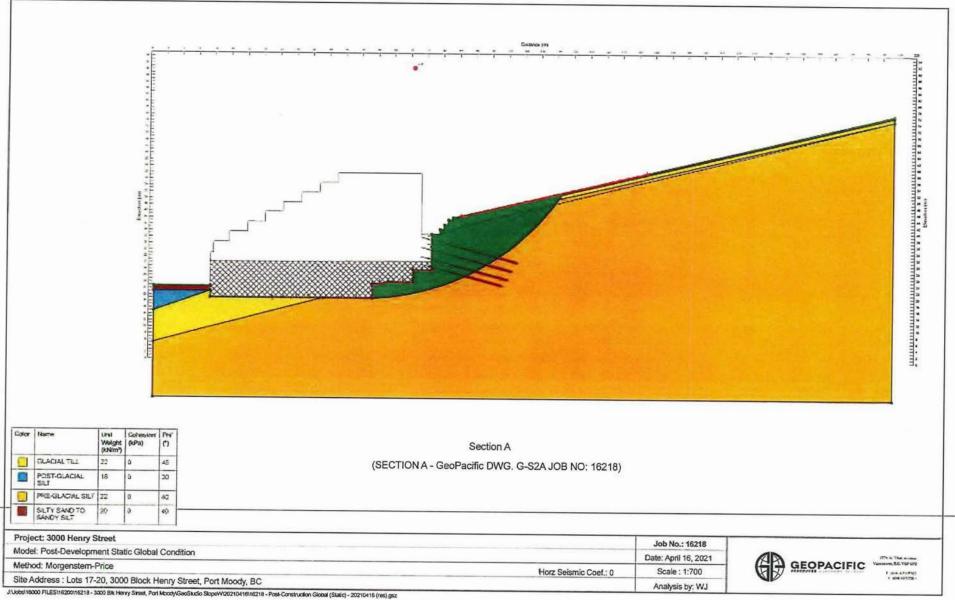
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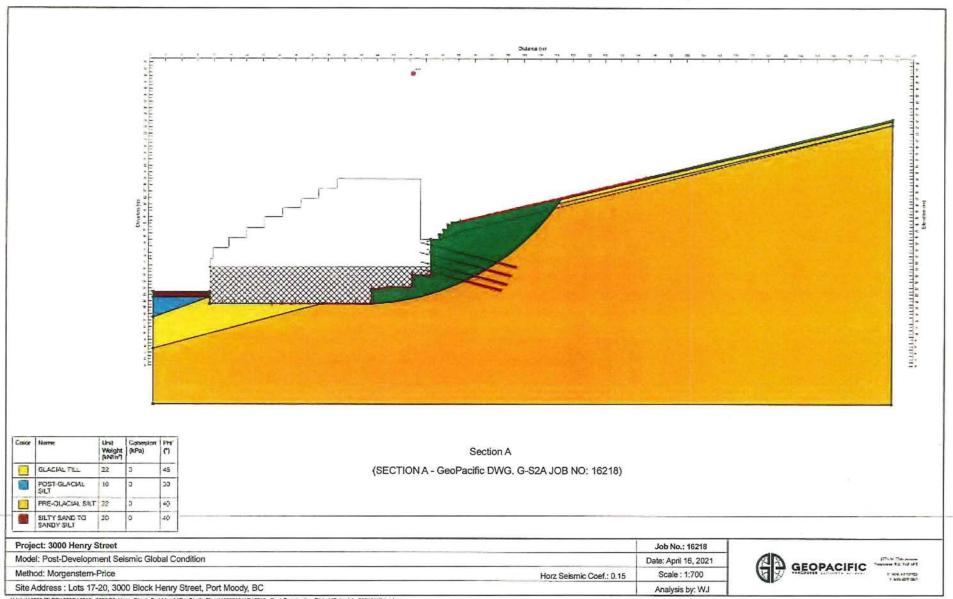


J:Uobs116000 FILES/16200116218 - 3000 Bik Henry Street, Port Mocdy/GeoSludio Slope/W20210416/16218 - Pre-Construction (State) - 20210416.gsz



J*Uobs116000 FILES116200/16218 - 3000 Bik Henry Streel, Port Moody/GaoStudio SopeM/20210416/16218 - Pre-Construction (Seismic) - 20210418 gsz





J:Uobs116000 FILES/18200116218 - 3000 Bik Henry Street, Port Moody/GeoStudio StopeW/20210416116218 - Post-Construction Global (Seismic) - 20210416 (res).gsz

APPENDIX D

Appendix D: Landslide Assessment Assurance Statement

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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: June 24, 2021

The City of Port Moody

100 Newport Drive, Port Moody, B.C., V3H 5C3

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:

LOTS 17, 18, 19 AND 20, DISTRICT LOT 190, GROUP 1 NWD, PLAN 11618 / 3000 BLOCK HENRY STREET 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

- 1. Collected and reviewed appropriate background information
- 2. Reviewed the proposed residential development on the Property
- 3. Conducted field work on and, if required, beyond the Property
- 4. Reported on the results of the field work on and, if required, beyond the Property
- ✓ 5. Considered any changed conditions on and, if required, beyond the Property
 - 6. For a landslide hazard analysis or landslide risk analysis | have:
 - 6.1 reviewed and characterized, if appropriate, any landslide that may affect the Property
 - 6.2 estimated the landslide hazard
 - 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
 - \checkmark 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:
 - ____7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
 - ____7.2 made a finding on the level of landslide safety on the Property based on the comparison
 - ____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:

- 2.8.1 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
- _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 <u>subdivision approval</u>, 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 <u>development permit</u>, 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 <u>building permit</u>, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"
 - Check one
 - if 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".

June 24, 2021

Mall Kokan, P. Eng.	
Name (print)	

Signature

Guidelines for Legislated Landslide Assessments 56 for Proposed Residential Development in Brilish Columbia

^{III} 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;

[&]quot;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 lermed '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"

1779 West 75th Avenue

Address

Vancouver BC

(604) 439-0922

Telephone

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

I am a member of the firm _____GeoPacific Consultants Ltd. and I sign this letter on behalf of the firm.

(Print name of firm)

ESSIO

M. J. KOKAN # 21364

AUN ST

(Affix Projessionalisesthere)

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P 604.439,0922 { 604.439,9189 geupacific.ca 1779 W 75th Ave. Vancouver, B.U. Canada V6P 6P2

3000 Henry Street Limited Partnership #1510 - 475 Howe Street Vancouver, BC V6C 2B3 April 16, 2021 File#: 16218 Rev 2

Attention: Amin Eskooch

Re: Hydrogeological Investigation Report: Proposed Residential Development – The Terraces Lots 17-20, 3000 Block Henry Street, Port Moody, BC

1.0 INTRODUCTION

We understand it is intended to develop the above referenced property with a mixed residential development. Architectural drawings prepared by Ankenman Marchand Architects, dated January 11, 2021, show the proposed development would include up to 11 levels of above grade residential development constructed into the hillside. Due to the sloped nature of the proposed development area, which slopes down from the south down towards the north, the above grade structure is intended to be terraced with the slope, all over one level below grade at the north, up to five buried levels in the middle portions of the development and four levels of below grade parking at the south of the development. The deepest portions of the parkade will be at Level 2 in the south and at the P1 Level in the north of the site, at elevations of 26.82 m and 19.20 m geodetic, respectively.

The following report summarizes the results of our supplementary geotechnical investigation and groundwater monitoring program to date, including additional soil logs and groundwater monitoring data collected between December 4, 2020 through to February 22, 2021. This report has been prepared exclusively for 3000 Henry Street Limited Partnership, for their use, and the use of others on their design team as well as for the City of Port Moody for use in the development and permitting process. No other use of this report is permitted without the written consent of GeoPacific.

2.0 SITE DESCRIPTION

The site is located near the north end of the Chines Escarpment in Port Moody. The site has an approximate area of 17,500 m² and is bounded by Henry Street to the north, City of Port Moody property/Buller Street to the east, City of Coquitlam boundary to the south, and both private property and City of Port Moody property to the west. The site slopes significantly upwards from north to south with elevations of approximately 21 to 77 m within the property limits and 21 to 46 m within the proposed development area, according to the City of Port Moody GIS and the topographic survey completed by Papove Professional Land Surveying Inc.

The site is currently undeveloped and vegetated with large stands of trees and bushes. An environmentally protected channel with ephemeral flows is present near the west property line, and Elginhouse Creek is directly east of the Buller Street right of way to the east. A temporary access road, constructed of crushed rock and gravel, is located in the north-eastern quadrant of the site and was reinstated and further extended for drill access for the current geotechnical and hydrogeological investigation. The location of the site in relation to existing improvements and topographic features is shown on our site plan, Drawing No. 16218-01, following the text of this report.

File #: 16218

3.0 FIELD INVESTIGATION

A subsurface geotechnical site investigation was completed by others on January 21, 2013. A total of two auger test holes were completed to depths of up to 15 m below existing grades. To provide subsurface profiling, test holes were supplemented with Dynamic Cone Penetration Test (DCPT) soundings. To monitor groundwater, a PVC standpipe piezometer was installed in each of the auger holes. However, we understand the piezometers were rendered not useful due to installation procedures.

A secondary subsurface investigation was completed by others on October 7, 2015. A sonic drill rig was utilized to advance one borehole, SH15-1, to 27.3 m below existing grades. To provide subsurface profiling, the borehole was supplemented with Standard Penetration Test (SPT) soundings at regular intervals. In order to permit the collection of groundwater monitoring data from two different elevations, nested wells were installed at SH15-1. The shallow well (SH15-1S) was installed to a depth of 14.0 m and screened in the upper silt layer, while the deep well (SH15-1D) was installed to a depth of 26.5 m and screened in the lower silt layer however may intersect the medium to coarse sand seam noted directly above.

GeoPacific conducted a supplementary field investigation on December 2, 3 and 4, 2020. At this time, five additional test holes and monitoring wells were installed utilizing a sonic drill rig supplied and operated by BlueMax Drilling of Surrey, B.C. Due to the sloped nature of the site, MW20-01 through MW20-05 were installed to various depths ranging between 9.1 m and 21.3 m below existing grades.

The 2020 monitoring wells were located, supervised and logged by a member of our technical team. Upon completion of drilling and well installation, data loggers with automated data collection capabilities were installed at all five well locations in order to record water level measurements every hour.

This investigation is being used to supplement our previous *Geotechnical Investigation Report* (dated February 20, 2020) for the site and is also addresses items within the geotechnical peer review completed by Thurber Engineering Ltd (dated July 3, 2020).

The approximate location of the test holes and monitoring wells with respect to the existing site boundaries and buildings, are shown on our Drawing No. 16218-01.

4.0 SOIL CONDITIONS

The soil conditions noted from the surface downwards consist of a thin layer of topsoil and forest litter, overlying up to 1.2 m of brown, loose to compact, silty sand to sandy silt with trace amounts of gravel at all test hole locations. At MW20-04, in the northeast of the site, the surficial deposits are directly underlain by moist to wet, stiff silt, extending to a depth of 4.0 m below existing site grades. At all other test hole locations, the surficial silty sand to sandy silt is underlain by glacial till deposits consisting of dense sandy silt to silty sand with trace to some gravel till and occasional cobbles. The glacial till deposits increase in thickness towards the lower elevations of the site and are 1.2 m in thickness at MW20-01, 4.0 m and 6.4 m thick at MW20-02 and MW20-03, respectively, and extend down to the final depth of the current investigation in the north of the site, at MW20-04 and MW20-05 (a depth of 12.2 and 9.1 m respectively). A hard, grey pre-glacial silt sequence was noted at MW20-01, MW20-02, MW20-03 and SH15-1. The silt was noted to include sand lenses which are 0.3 m to 1.2 m in thickness at MW20-03 and SH15-1. Minor sand lenses ranging between 0.03 m and 0.1 m in thickness were noted at MW20-02, and no such sand lenses were observed at MW20-01.

For a more detailed description of the subsurface soil conditions refer to the test hole logs from the 2020 field investigation provided in Appendix A. The soil log from the 2015 field investigation is presented in Appendix B.

A simplified cross-section of site stratigraphy and groundwater conditions is presented in Appendix C. The approximate locations of the test holes and cross-sections are also shown on our Drawing No. 16218 (G-GW1), following the text of this report.

5.0 GROUNDWATER CONDITIONS

5.1 General Comments

The site is located within the Elgin House Creek Watershed, on the northern facing slopes of the Moody Centre neighbourhood, towards the base of the Chines Escarpment in Port Moody, B.C. There is a decrease in elevation from the higher elevations of the Chines Escarpment of Coquitlam to the south, down to Elginhouse Creek to the east of the site and Slaughterhouse Creek to the north of the site. In general, the direction of near surface and deep groundwater flow is expected to follow topography which results in a north to north-westerly hydraulic gradient towards Slaughterhouse Creek which subsequently flows into the Port Moody Arm of the Burrard Inlet.

In general, the soils within the subgrade at the site consist of topsoil and silty sand to sandy silt post-glacial deposits at the surface, overlying sandy silt to silty sand and gravel glacial till deposits, over a hard, preglacial silt sequence. Based on the drilling completed at the site to date, the pre-glacial silt sequence includes sandy lenses which are between 0.03 m to 1.2 m in thickness however these sand layers appear to be somewhat limited in their extent, being observed at SH15-1 and MW20-03. Monitoring wells MW20-01 and MW20-02 were screened within the pre-glacial silt at depth, MW20-03 was screened in the sand lens noted within the pre-glacial silt deposits while MW20-04 and MW20-05 were screened within the silty sand and gravel till deposits.

5.2 Manual Water Level Measurements

Table 1 presents the manually measured water level depths as established by a handheld water level meter at the monitoring wells installed at the site in December 2020 and 2015. The manual measurements are intended to confirm and complement the automated data obtained from automated data loggers.

Well #	Ground Surface Elevation (m	Final Well Depth Below	Screened Material	Dec 9, 2020	Dec 18/21, 2020	Jan 5, 2021	Feb 22, 2021				
	geodetic)	Ground Surface (m)	materiar	Depth Below Ground Surface (m)							
MW20-01	44.73	12.2	Silt	2.94	2.94 2.80		2.86				
MW20-02	39.30	21.3	Silt with minor Sand Lenses	13.40	13.47	13.35	-				
MW20-03	31.42	13.7	Medium Sand	5.39	5.26	5.16	5.24				
MW20-04	22.84	12.2	Silty Sand and Gravel Till	0.25	0.10	0.05	0.29				
MW20-05	22.02	9.1	Silty Sand and Gravel Till	-0,07	-0.10	-,07	0.06				

Table	I: Manual	Groundwater	Measurements	from 2020	Wells
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File #: 16218

SH15-IS	29.11	14.0	Silt	-	-	2.95	3.12
SH15-1D	29.11	26.5	Silt/May intersect Medium to Coarse Saud	-2	-	3.60	3.78

Groundwater levels have been measured at SH15-1 using both manual and continuously automated methods since July 12, 2018. The average groundwater levels for the shallow and deep nested wells at SH15-1 were observed to be at 4 m and 3.4 m below current site grades, respectively.

5.3 Automated Water Level Measurements

Figure 1 shows variations in groundwater level elevations between December 4, 2020 and February 22, 2021, collected by the automated data loggers installed at SH15-1 and MW20-01 through MW20-05. As indicated previously, SH15-1S, SH15-1D, MW20-01 and MW20-02 are screened within the pre-glacial silt, MW20-03 is screened within a sand lens noted within the pre-glacial silt deposits and MW20-04 and MW20-05 within the silty sand and gravel till. The Level 2 slab elevation is shown to be 26.82 m geodetic while the Level P1 slab elevation is at 19.20 m geodetic and arc provided as a datum for comparison.

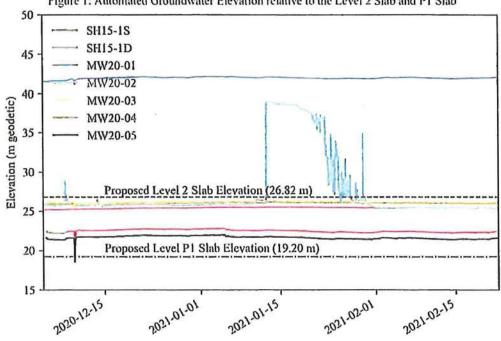


Figure 1: Automated Groundwater Elevation relative to the Level 2 Slab and P1 Slab

The data collected from the majority of the monitoring wells indicate that groundwater levels have been relatively stable during our monitoring period. The sudden increase in groundwater levels at MW20-02 on December 7, 2020 corresponds to the significant rainfall event on that day (64 mm in 24 hours based on the data from the Government of Canada "Port Moody Glenayre" Rain Gauge). There were additional significant rainfall events (20 + mm of precipitation on December 13, 16, 18, 19, 29, 30, 2020) that did not appear as large spikes in data. Therefore, we can assume that the well was likely screened, completed and installed appropriately until January 12, 2021.

File# 16218

Hydrogeological Investigation - The Terraces - Lots 17-20, 3000 Henry St. Port Moody, B.C.

Our site visit on February 22, 2021, found the monument at MW20-02 had fallen over, allowing surficial flow into the monitoring well. The monument at groundwater monitoring well MW20-02 was subsequently repaired on February 25, 2021 and a new data logger will be installed after the well has been re-developed.

At this time, we would consider the data collected at MW20-02 between January 12, 2021 and February 22, 2021 to be unreliable. This is due to water levels observed at the ground surface but the data logger indicating that water levels had returned to depths of greater than 13 m below existing grades.

The sudden decreases in groundwater levels on December 9, 2020 at MW20-01 and MW20-03 are due to well development conducted on that day. Well development at MW20-02, MW20-04 and MW20-05 was completed on December 14, 2020.

Groundwater levels at all monitoring well locations, with the exception of MW20-01, are currently between 0.5 m to 3.5 m below the Level 2 slab elevation. No artesian conditions were noted to exist at the site.

Further, groundwater levels at SH15-1S, SH15-1D, MW20-02 and MW20-03 are at elevations of about 25 to 26 m geodetic, or approximately 6 to 7 metres above the Level P1 slab-on-grade elevation. The data shows that groundwater levels at MW20-04 and MW20-05 are at elevations of \sim 22 to 23 m geodetic, or approximately 2.5 to 3.5 m above the Level P1 slab-on-grade elevation.

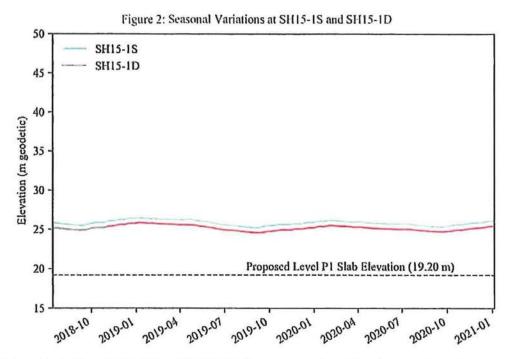
Although screened at different elevations and stratigraphic units, the groundwater elevations at SH15-1S, SH15-1D, MW20-02 and MW20-03 are generally consistent and are currently approximately 0.5 m below the top of the proposed Level 2 slab elevation. This indicates that the groundwater within the sand seam screened at MW20-03 is not pressurized and that there is no significant difference in the hydraulic gradient.

The data collected from MW20-01 indicates that groundwater levels further upslope, towards the south, appears to be approximately 15 m above the Level 2 slab. Based on the topography and the overall hydraulic gradient observed at the site, we would expect the static groundwater levels would be somewhat deeper to the south, where elevations increase and shallower to the north, where elevations decrease. Therefore, we infer that the data collected from MW20-01 is representative of localized zone of perched groundwater.

We further expect perched groundwater may be present in the surficial soils above the weathered silt. Perched groundwater levels may vary seasonally with generally higher levels in the wetter seasons.

5.4 Seasonal Variation in Groundwater Levels

Figure 2 presents the groundwater monitoring data obtained from the nested wells installed at SH15-1. Data denoted as SH15-1S and SH15-1D represent the shallow and deep wells, respectively. The proposed Level P1 slab-on-grade elevation of 19.20 m geodetic, as referenced in architectural drawings prepared by Ankenman Marchand Architects, (dated January 11, 2021) is included for reference.



The data collected from SH15-01S and SH15-1D shows seasonal variation in groundwater levels over the past 2.5 years of monitoring. High groundwater levels are generally found throughout the wetter winter months between January and February, while lower groundwater levels are experienced in September to November, following the drier summer months of July and August. Based on the data collected, the total amount of seasonal variation and total difference between the maximum and minimum groundwater levels at both monitoring wells is 1.36 m. Groundwater levels within the pre-glacial silt sequence are about 7.0 m above the expected Level P1 slab elevation.

5.5 Hydraulic Conductivity Testing

Well development is conducted prior to any hydraulic conductivity testing in order to remove any fine particles smeared along the well bore wall as a result of drilling processes.

On July 10, 2018, a member of the GeoPacific hydrogeological team developed the wells at SII15-1 in order to complete hydraulic conductivity testing. At that time, a weighted hand bailer was used at each well for approximately 30 minutes. During hand bailing, the wells were easily drawn down with slow recovery times. MW20-01 through MW20-05 were developed using either a weighted PVC hand bailer or a Waterra Hydra-Lift inertial pump on December 9 and 14, 2020. Three well volumes were bailed from all five well locations and groundwater levels were subsequently allowed to recover before slug testing was conducted.

Falling and rising head slug tests were conducted at SH15-1D on July 11, 2018 to determine the hydraulic conductivity of the screened soils.

Falling and rising head slug tests were also conducted at MW20-01 through MW20-05 on December 18 to December 21, 2020 in order to determine the hydraulic conductivity of the soils at depth. The automated data-loggers were changed to a 1 or 5 second sampling rate and initial water levels were recorded. In each case, to complete the falling head test, a weighted slug was dropped into the well to create an instantaneous change in hydraulic head. The slug was then rapidly pulled out of the well to complete a rising head slug test. Water levels were recorded using an electronic data-loggers and a manual water level meter and allowed to recover completely before an estimate of hydraulic conductivity was determined.

The results of the slug tests were analyzed with Aquifer Test Pro 8.0 and are presented in Appendix D. The hydraulic conductivity values evaluated are summarized in Table 2.

Analysis Name	Well	Screened Material	Hydraulic Conductivity K (m/s)
Falling Head 1	SH15-1	Silt	5.96 x 10 ⁻⁸
Falling Head 1			2.81 x 10 ^{.7}
Falling Head 2	- MW20-01		2.50 x 10 ⁻⁷
Rising Head I	- MW20-01	Silt	2.26 x 10 ⁻⁷
Rising Head 2			2.21 x 10 ^{.7}
MW20-01 Av	/erage		2.45 x 10 ⁻⁷
Falling Head 1			9.49 x 10 ⁻⁷
Falling Head 2	- MW20-02		5.62 x 10 ⁻⁷
Rising Head 1 Rising Head 2	¬ MW20-02	Silt with minor Sand Lenses	1.13 x 10 ⁻⁶
			4.37 x 10 ^{.7}
MW20-02 A	verage		7.70 x 10 ⁻⁷
Falling Head 1			9.83 x 10 ⁻⁷
Falling Head 2	- M₩20-03		2.56 x 10 ⁻⁶
Rising Head 1	- IVI W 20-03	Medium Sand	1.35 x 10 ⁻⁶
Rising Head 2			8.74 x 10 ⁻⁷
MW20-03 A	verage		1.44 x 10 ⁻⁶
Falling Head I	MW20-04		3.51 x 10 ⁻⁷
Rising Head 1	M1W20-04	Silty Sand and Gravel Till	3.36 x 10 ⁻⁷
MW20-04 A	verage		3.43 x 10 ⁻⁷
Falling Head 1	NUV20.05		4.06 x 10 ⁻⁶
Rising Head 1		Silty Sand and Gravel Till	9.09 x 10 ⁻⁶
MW20-05 A	verage		6.58 x 10 ^{.6}

Table 2: Hydraulic Conductivity Test Results

The average hydraulic conductivity of the pre-glacial silt layer was determined to be 2.45 x 10^{-7} m/s and 7.70 x 10^{-7} m/s at MW20-01 and MW20-02, respectively. The average hydraulic conductivity of the sand seam screened at MW20-03 was determined to be 1.44×10^{-6} m/s. The average hydraulic conductivity of the silty and gravel till deposits was determined to be 3.43×10^{-7} m/s and 6.58×10^{-6} m/s at MW20-04 and MW20-05, respectively.

Based on the results of our slug testing, the sand seam screened at MW20-03 does not appear to have a significantly higher hydraulic conductivity values than the surrounding silt till matrix.

6.0 GROUNDWATER SEEPAGE

A total of six groundwater monitoring wells have been installed at the site. The nested well at SH15-1 has been monitored continuously since July 12, 2018 while groundwater levels at the five monitoring wells installed during the 2020 drill investigation have been recorded continuously since December 4, 2020.

Based on the initial groundwater level measurements collected from the 2020 monitoring wells, GeoPacific completed a seepage analysis using a finite element computer program SEEP/W (GeoStudio 2020) to provide an initial estimate of groundwater inflows into the proposed excavation required to accommodate the below grade parking structure. Based on the subsurface soils and the expected geometry of the excavation, a simplified 2-dimensional scepage model was developed and our measured hydraulic conductivity for the soil layers was applied to the model.

The excavation was modelled in a north/south cross-section using data from all six monitoring well locations. Based on the selected subsurface model, our experience in the area and the onsite testing completed, the following assumptions were considered in the analysis:

- 1) The hydraulic conductivity of the silty sand to silty sand (near the ground surface) was assumed to be 1.0×10^{-6} m/s.
- The hydraulic conductivity of the silty sand and gravel till formation was assumed to be 6.58 x 10⁻⁶ m/s based on the higher average of the slug tests performed at MW20-04 and MW20-05.
- 3) The hydraulic conductivity of the pre-glacial silt sequence was assumed to be 7.70×10^{-7} m/s based on the highest average of the slug tests performed at SH15-1, MW20-01, MW20-02.
- 4) The hydraulic conductivity of the sceant pile cut-off wall was assumed to be 1.0×10^{-9} m/s.
- 5) As a conservative assumption, the groundwater levels measured during our site visit on January 5, 2021 at MW20-01 and MW20-05 were set as the constant head boundary conditions. Groundwater level elevations of 42.0 m and 22.1 m geodetic were measured in the south (MW20-01) and north (MW20-05), respectively.
- 6) Based on architectural drawings, the excavation for the site will have dimensions of about 67.8 m from north to south and \sim 55 m from east to west.
- 7) The Level 2 slab elevation in the southern portion of the site was set to 26.8 m geodetic, as per architectural drawings provided on January 11, 2021.
- 8) The Level P1 slab elevation in the northern portion of the site was set to 19.2 m geodetic, as per architectural drawings provided on January 11, 2021.
- 9) The calculated seepage volumes are based on inflows from subsurface groundwater only. Inflows as a result of precipitation are not included.

It is our expectation that a groundwater cut-off wall, in the form of a continuous secant pile wall, will be installed prior to excavation without the need for specialized dewatering equipment. At this time, we have assumed that the groundwater cut-off wall will be installed 3.7 m (12 ft) deeper than the deepest slab-on-grade elevation, around the entire perimeter of the proposed development.

Based on the assumption that a groundwater ent-off wall will be installed, groundwater inflow values will be in the range of 77 L/min. The results of our seepage analyses and the graphical representations of our seepage analysis results are included in Appendix E.

It should be noted that the seepage analysis has been undertaken based on some assumptions and in conjunction with the limitations of the software which include analysis in two-dimensional space with a somewhat simplified soil stratigraphy. Slight variations in elevations, soil conditions, and fluctuating groundwater levels will ultimately impact the actual flow volumes encountered in the excavation.

7.0 DISCUSSION

Architectural drawings, prepared by Ankenman Marchand Architects, indicate the proposed development would include up to 11 levels of above grade residential development. Due to topographic sloping through the proposed development area, which slopes down from south to north, the above grade structure is intended to be terraced with the slope, all over one level below grade at the north, up to five levels below grade in the middle sections and four levels of below grade parking at the south. The deepest portions of the parkade will be at Level 2 at the south and the P1 Level at the north, at elevations of 26.82 m and 19.20 m geodetic, respectively.

In addition to the nested well installed in 2015 (SH15-1), five supplementary groundwater monitoring wells were installed as part of a geotechnical field investigation completed in December 2020. The five groundwater monitoring wells installed in 2020 were reviewed in tandem with the nested groundwater wells installed by others at the site in 2015.

In general, the soils at the site consist of topsoil and silty sand to sandy silt post-glacial material at the surface, overlying sandy silt to silty sand and gravel till deposits, over a hard, pre-glacial silt sequence. Sand seams within the pre-glacial silt matrix are 0.3 m to 1.2 m in thickness and were noted at SH15-1 and MW20-03. Minor sand lenses ranging between 0.03 m and 0.1 m in thickness were noted at MW20-02, however no such sand lenses were observed at MW20-01. Based on our current understanding of the soils, we have inferred that this sandy seam extends from the vicinity of SH15-1 towards MW20-03 and the eastern margins of the property, but is somewhat limited in aerial extent.

Based on the soil logs from SH15-1, the two sand seams were noted at depths of 10 m and 24 m below current site grades. According to the site survey, the ground surface at SH15-1 is at an elevation of 29.11 m geodetic and therefore the sand seams are at elevations of 19 m and 5 m geodetic. Thurber's peer review of our geotechnical report, raised some concerns about the higher sand layer having the "potential to daylight in Elginhouse Creek.", however these sand seams have since been determined to be below the base of Elginhouse Creek, which is at elevations of 30 m geodetic at the south of the site and 22 m at the north of the site. Therefore, we do not expect the sand seams noted at SH15-1 to "daylight in Elginhouse Creek" and increase groundwater flows to the Creek.

Based on the initial 2 months of data collection, groundwater levels at MW20-02 through MW20-05 and SH15-1 are between 2.5 and 7 m above the top of the Level P1 slab elevation of 19.20 m geodetic, expected in the northern portion of the site.

Groundwater levels at all monitoring well locations, excluding MW20-01, are below the Level 2 slab elevation of 26.82 m geodetic. Based on the topography as well as the hydraulic gradient observed at the majority of the site, we would expect the groundwater levels would be somewhat deeper to the south, where elevations increase and shallower to the north, where elevations decrease. Therefore, at this stage we are of the opinion that the data collected from MW20-01 is representative of localised zone of perched groundwater.

Given the relatively high groundwater levels measured at the site, a permanent groundwater cut-off wall is required around the perimeter of the site, either penetrating into competent, hard pre-glacial silt or alternatively be installed deep enough to limit the flow of water into the excavation during temporary works. The cut-off wall along the perimeter of the parkade will allow excavation to progress below the static groundwater table present at the site.

Based on our groundwater level measurements and the results of our hydraulic conductivity testing at the site, a seepage analysis was completed in order to determine the expected groundwater inflow rates during the excavation. Based on the assumption that a groundwater cut-off wall will be installed, inflow values will be in the range of 77 L/min. GeoPacific recommends a groundwater cut-off due to soil conditions, as well as groundwater ingress.

Provided a robust and impermeable permanent cut-off wall system is installed around the below grade structures around the perimeter of the proposed development, it is our opinion that that pumped sumps will be a sufficient means to temporarily control groundwater inflows during excavation. A perimeter drainage system will be required for the below grade structure to prevent the development of water pressure on the foundation walls and the basement floor slabs under normal conditions. At this time, we recommend that mechanical systems be designed on the basis of preliminary groundwater inflows of 77 L/min, however this should be confirmed at the time of excavation.

We observed sand deposits and sand seams to be discrete and discontinuous, in addition to the relatively insignificant difference between the hydraulic conductivity of the silt and sand layers screened at the site; therefore, it is not expected that a secant pile cut-off wall will impede groundwater flows in water bearing sand seams immediately upslope from the development area, nor affect adjacent environments, properties or creeks. There were no sand seams observed within the silt deposits at the south of the site, at MW20-01 and no Quadra Sands observed at any of our test hole locations or field observations.

We currently maintain the opinion that the overall groundwater regime at the site will remain largely unchanged as a result of the groundwater cut-off wall and that the shoring and groundwater cut-off wall system will act to protect adjacent habitats and structures from groundwater drawdown. At this time, we do not expect that the installation of a groundwater cut-off wall would result in any noticeable increase to the groundwater table or an increase to the volume of groundwater flow to adjacent utilities or structures. There were no Quadra Sands noted during our drill investigation.

Finally, prior to the design or placement of stormwater amenities, we suggest the completion of infiltration testing to confirm the capacity of the in-situ soils at their proposed locations. Given the high groundwater levels at the lower elevations of the site, we would suggest infiltration tanks be located in more permeable soils at the higher elevations of the site.

8.0 CLOSURE

This report summarizes the results of our hydrogeological study completed to date at Lots 17-20, 3000 Block Henry Street in Port Moody. We are pleased to be of assistance to you on this project and trust that our comments and recommendations are both helpful and sufficient for your purposes at this time. If you require any further details or clarifications, please do not hesitate to contact the undersigned.

For: GeoPacific Consultants Ltd.

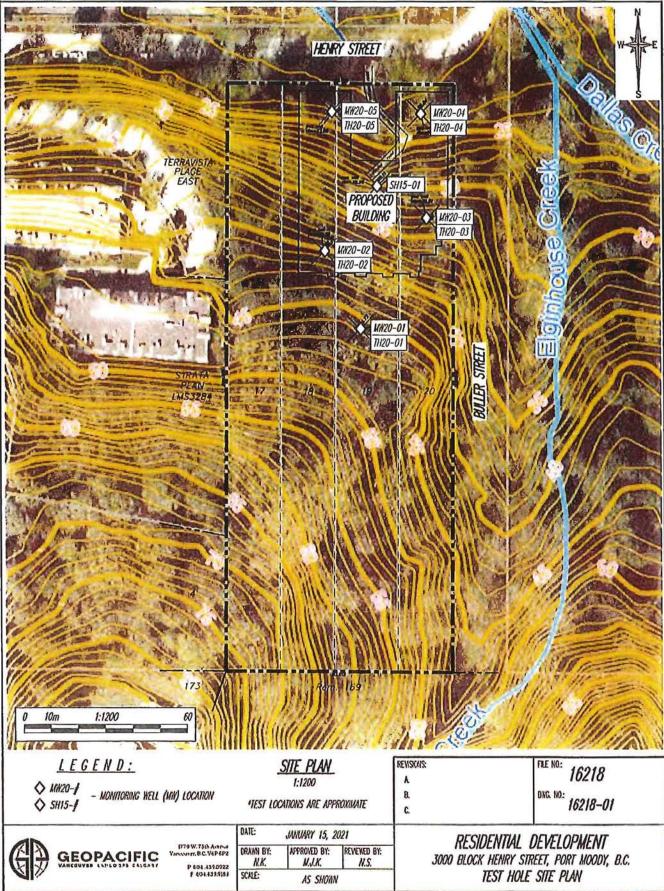
Reviewed B M. J. KOKAN # 21364 AITIEN L II M APR 1 6 2021 NGINE

Nathalie Sahakyan, B.Sc., GIT Hydrogeologist

Wyatt Johnson, B.Eng., E.I.T., Project Engineer Matt Kokan, M.Sc., P.Eng. Principal

Hydrogeological Investigation - The Terraces - Lots 17-20, 3000 Henry St. Port Moody, B.C.

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APPENDIX A

Test Hole Log: TH20-01 (MW20-01)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

		INFERRED PROFILE		(9			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{c} 0 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 2 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 10 \\ 11 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$		Ground Surface Sandy Silt silt, sandy, trace gravel, tan brown, oxidized, firm Sandy Silt Till silt, sandy, trace gravel till grey, very dense/stilf, moist Silt silt, trace, fine sand, grey, hard, moist to wet with depth, grey/brown from 3.0 to 6.1 m	44.7 0.0 44.1 0.6 42.9 1.8	18.2 28.9 25.9			Groundwater Level Depth Measured at 2.74 m on Jan 5, 2021
			L		·		

Logged: NS

ł

Method: Sonic

Date: Dec 2 - 4, 2020

Datum: Ground Surface Figure Number: A.01 Page: 1 of 2

GEOPACIFIC

CONSULTANTS

1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel: 604-439-0922 Fax 604-439-9169

Test Hole Log: TH20-01 (MW20-01)

File: 16218

Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody



1779 W 75th Avenus, Vancouver, BC, V6P 6P2 Tel 604-439-0922 Fax 604-439-9189

		INFERRED PROFILE				
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Remarks
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		End of Borehole	29.5 15.2	30.1		
Logge Methe Date:	od: Se					Ground Surface lumber: A.01 of 2

Test Hole Log: TH20-02 (MW20-02)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody



1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel 604-439-0922 Fax 604-439-9189

		INFERRED PROFILE		(9			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{c} \mathbb{E} \\ 0 & 1 & 2 \\ 0 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 1 \\ 0 &$		Ground Surface Silty Sand with Topsoil sand, silty, trace gravel with topsoil, tan brown, wet Silty Sand and Gravel Till silty sand and gravel till, fine sand, trace gravel, brown, compact, moist Sandy Silt and Gravel Till sandy silt, trace gravel till, grey, dense to very dense, moist Silt Silt silt, grey, hard, moist 0.03 m sand lens at 12.5, 18.9 and 20.1 m 0.10 m sand lens at 15.2, 19.5 and 20.4	39.3 0.0 37.8 1.5 35.0 4.3	26.7	5 21 36 >50 >50 >50 >50		
Meth	ed: N od: S						Ground Surface lumber: A.02

Date: Dec 2 - 4, 2020

Page: 1 of 2

Test Hole Log: TH20-02 (MW20-02)

Date: Dec 2 - 4, 2020

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody



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Page: 2 of 2

INFERRED PROFILE Moisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION Symbol DCPT Depth (blows per fool) . . 10 20 30 40 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 39.6 11111 Groundwater Level Depth Measured at 13.35 m on Jan 5, 2021 26.5 51 52 53 53 54 55 55 56 7 17 35.0 23.2 23.5 18.0 70 End of Borehole 72-Logged; NS Datum: Ground Surface Method: Sonic Figure Number: A.02

Test Hole Log: TH20-03 (MW20-03)

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1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel. 604-439-0922 Fax 604-439-9189

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

INFERRED PROFILE Moisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol Depth (blows per fool) . . 10 20 30 40 31.4 Ground Surface Silty Sand sand, sitly, trace gravel, tan brown, compact, moist, oxidized 30.8 20 0.6 34 37 Silty Sand and Gravel Weathered Till 5. 29.6 sand, silty, some gravel till, brown, 43 6-7 38 - 2 dense, molst >50 Silty Sand/Sandy Silt and Gravel 8->50 ٢ Till 9-3 10是3 silty sand to sandy silt, some gravel till, grey, dense to very dense, dry from 2.1 to 3.0 m, moist from 3.0 to 7.0 m -4 7.5 14章 16-17-- 5 17를 18를 Groundwater Level Depth Measured at 5.16 m on Jan 6, 2021 19-C 6 20-21-22-24.4 R 23-77 Sllt 24 25 silt, grey, hard, moist 26-1-8 27-1-1-8 28-1-31.5 29 1 9 30 1 9 31킄 32 adadadada 33 adadadada 34 adadadada 36-Logged: NS Datum: Ground Surface Figure Number: A.03 Method: Sonic

Date: Dec 2 - 4, 2020

Page: 1 of 2

Test Hole Log: TH20-03 (MW20-03)

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

		INFERRED PROFILE		(9)			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$\begin{array}{c} 3738 \\ 399 \\ 401 \\ 412 \\ 433 \\ 444 \\ 411 \\ 113 \\ 444 \\ 450 \\ 114 \\ 455 \\ 555 $		Sand sand, brown, dense to very dense, wet Silt silt, grey, hard, moist, fine sand lens from 15.5 to 15.8 m	19.2 12.2 18.0 13.4 14.7 16.8	26.1 21.5 27.5 22 7			1
Meth	ged: N nod: S a: Dec						: Ground Surface Number: A.03 2 of 2

1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel 604-439-0922 Fax 604-439-9189

GEOPACIFIC CONSULTANTS

Test Hole Log: TH20-04 (MW20-04)

Date: Dec 2 - 4, 2020

File: 16218 Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody

La contraction of the second s						
	INFERRED PROFILE		(9			
Depth Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per foot) • 10 20 30 40	Groundwater / Well	Remarks
$ \begin{array}{c} f_1 \\ 0 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$		22.8 0.0 22.2 0.6 21.6 1.2 13.9 4.0	26.4 12.3 8.5 8.2	1 2 3 7 16 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		Groundwater Level Depth Measured at 0.05 m on Jan 5, 2021
Logged: Method:						Ground Surface Number: A.04



1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel, 604-439-0922 Fax 604-439-9189

Page: 1 of 2

Test Hole Log: TH20-04 (MW20-04)

File: 16218

Project: The Terraces Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody



1779 W 75th Avenue, Vancouver, BC, V6P 6P2 Tel 604-439-0522 Fax 604-139-9109

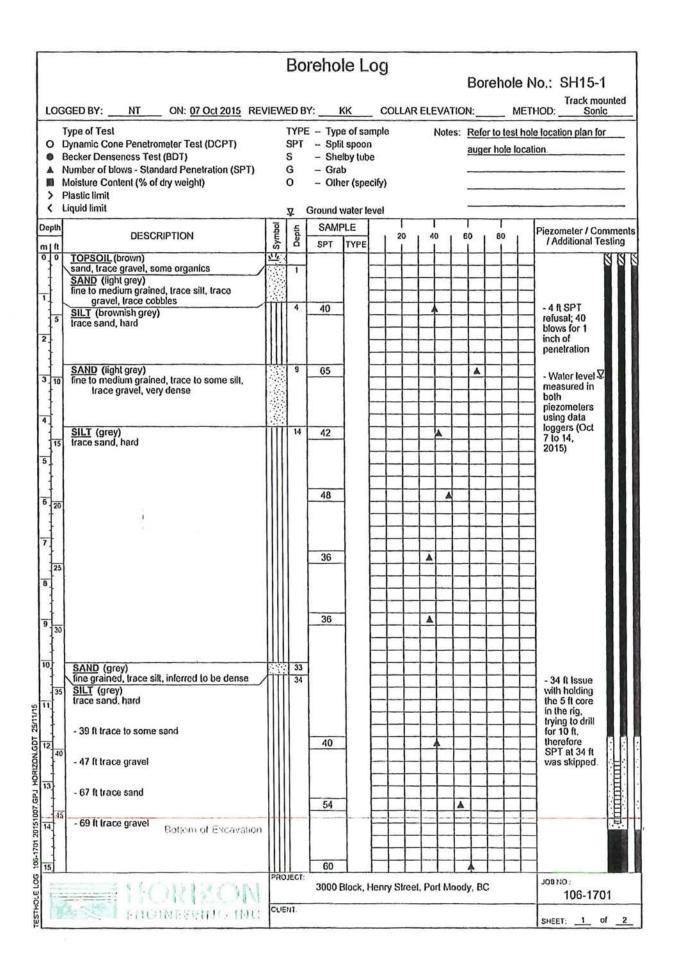
		INFERRED PROFILE		(9			
Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	DCPT • (blows per font) • 10 20 30 40	Groundwater / Well	Remarks
37 38 39 40 41 41		End of Borehole	10.6 12.2	9.1			
42 43 44 45 46 46 47 47 48							
49 15 50 15 51 15 52 16 53 16 53 16 54 16 55 16 56 16 57 16							
59 60 61 62 63 64 65 66 67 68 69 70 71 72 72 72 72 72 72 72 72 72 72							
Meth	ged: N hod: S a: Dac						Ground Surface Number: A.04 ? of 2

Test Hole Log: TH20-05 (MW20-05) GEOPACIFIC CONSULTANTS File: 16218 Project: The Terraces 1779 W 75th Avenue, Vancouver, BC, VoP 6P2 Tol: 604-439-0922 Fax 604-439-9189 Client: 3000 Henry Street Limited Partnership Site Location: Lots 17-20, 3000 Henry Street, Port Moody INFERRED PROFILE Vioisture Content (%) Groundwater / Well Depth/Elev (m) Remarks SOIL DESCRIPTION DCPT Symbol (blows per foot) • 10 20 30 40 Depth . oft mo 22.0 Ground Surface Groundwater Level 3 ~ Silty Sand/Topsoil Depth Measured at silty sand and gravel with topsoil and organics, dark brown, loose, wet A 23 +0.07 m on Jan 5, 2021 12 alphalalala 12.5 1 8 Silty Sand and Gravel 29 Weathered Till silty sand to sandy silt with trace gravel till, tan brown, compact to dense with depth 20.2 >50. 6 2 7 2 1.6 >50 8-Silty Sand and Gravel Till 9 silty sand, trace gravel till, grey, very - 3 10 dense, moist 11-12-13-- 4 14-15-9.9 16 5 18. 19-6 20-21-22-23-7 11.9 24-25 26. 18 27-7.4 28. 291 9 9 12.9 30手 9,1 End of Borehola 31클 32 33 34 34 35 36= Datum: Ground Surface Logged: NS Method: Sonic

Date: Dec 2 - 4, 2020

Figure Number: A.05 Page: 1 of 1

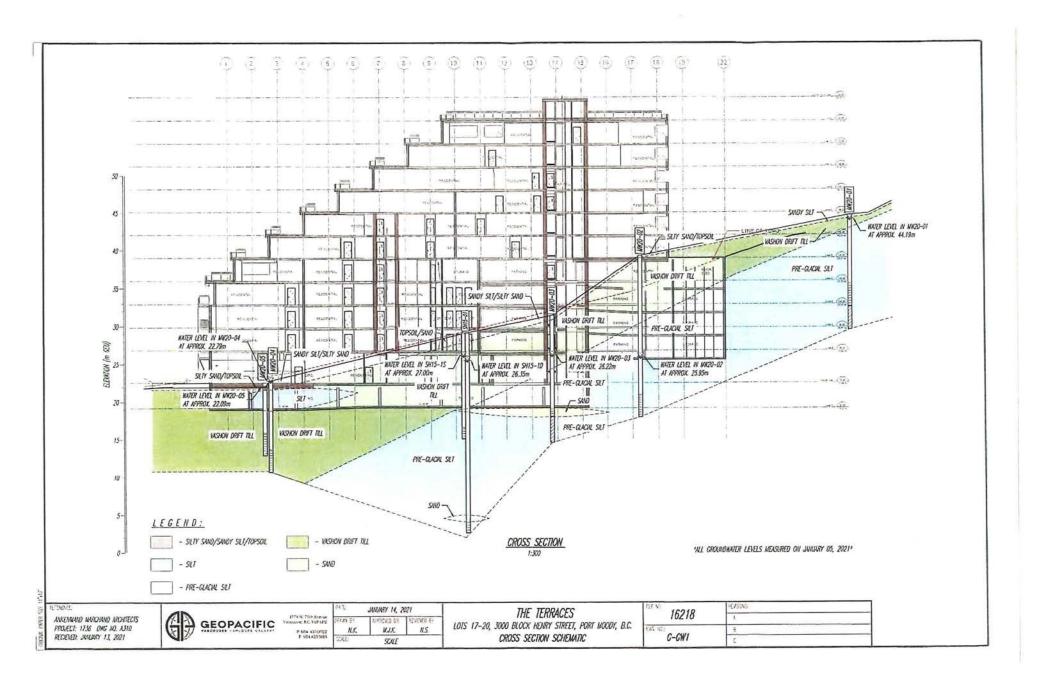
APPENDIX B



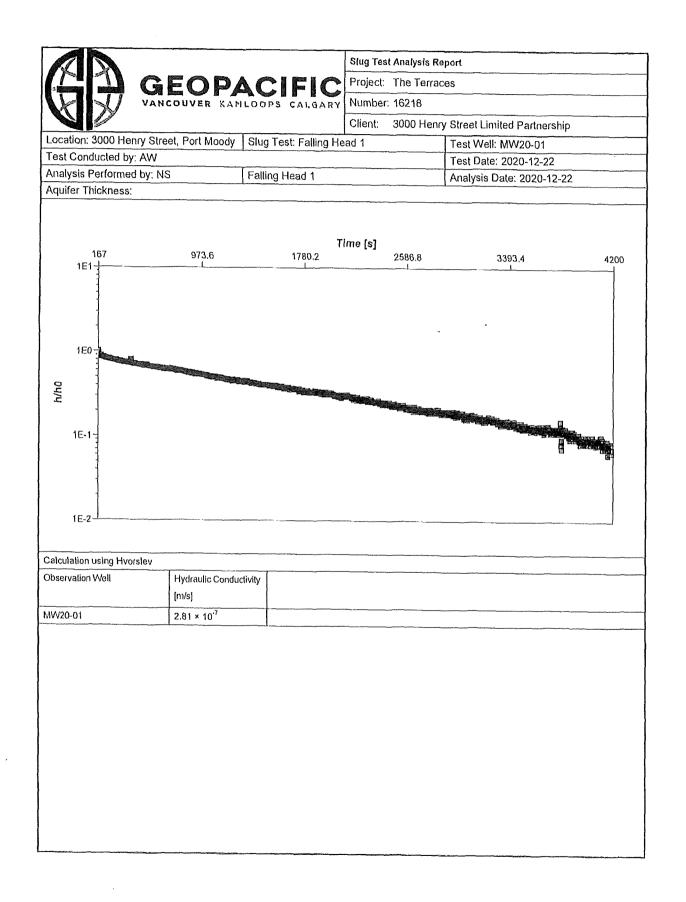
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Depth m ft		DESCR	RIPTION	Symbol	Depth	SAMP	LE	1	20	1	40	I	60	1 8			Piezometer / Comments / Additional Testing
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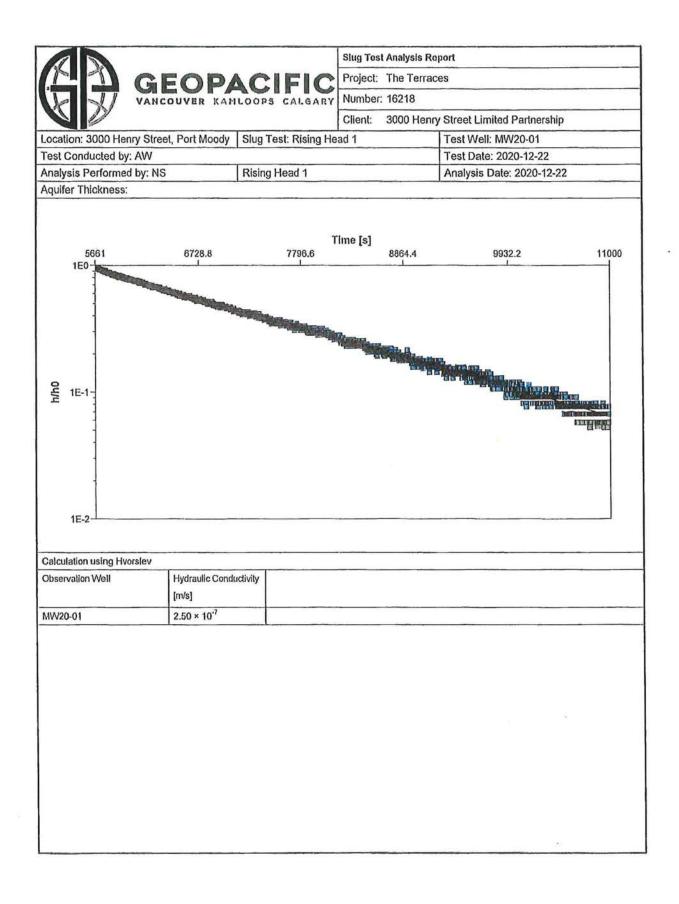
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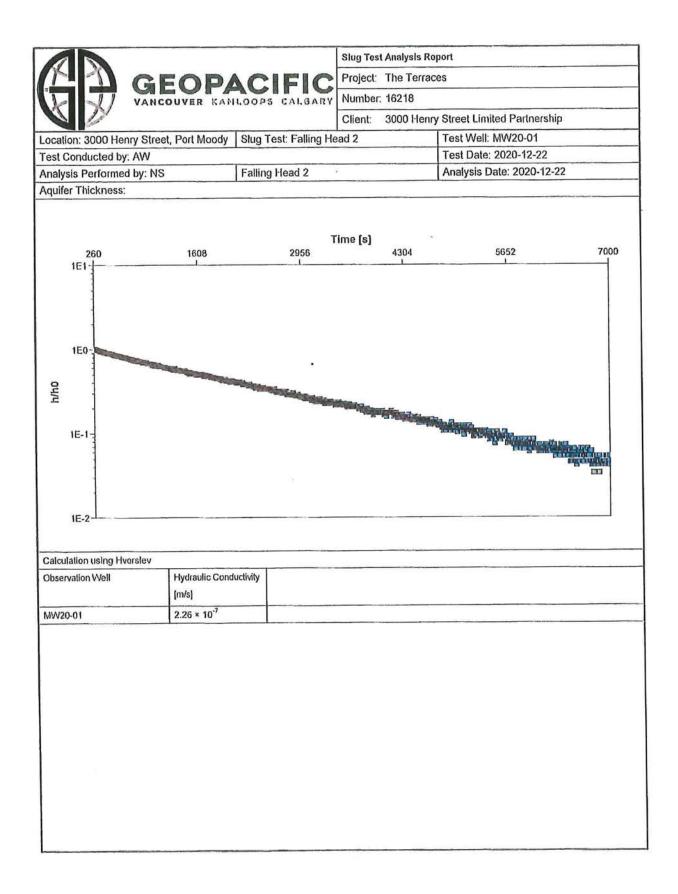
APPENDIX C

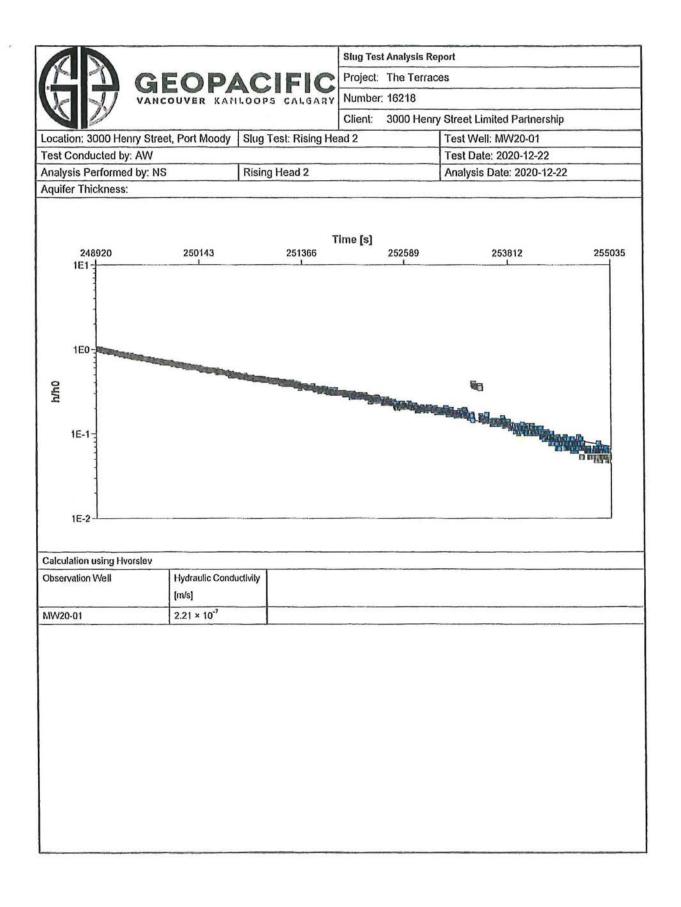


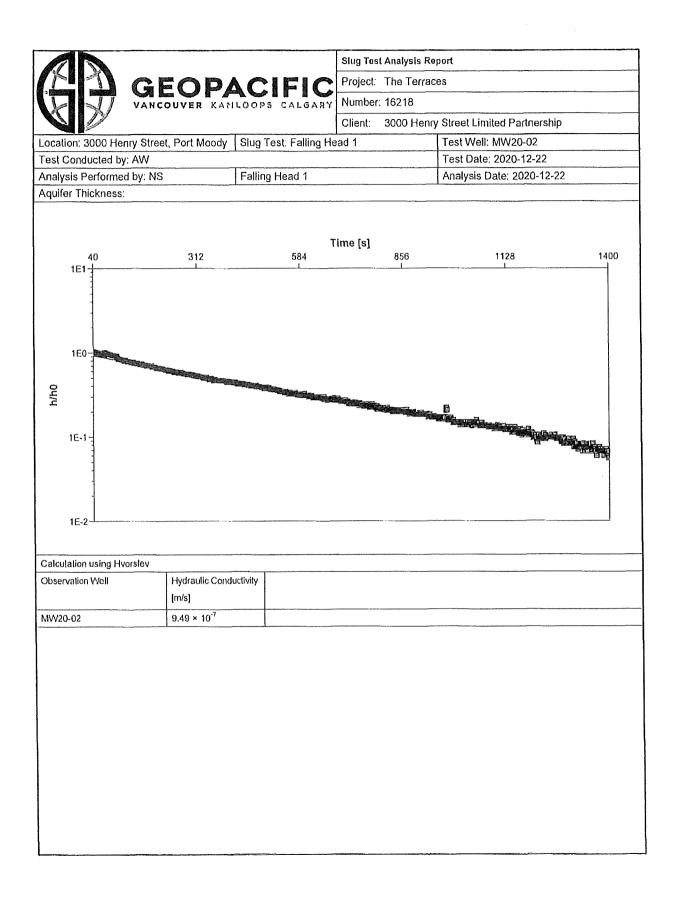
APPENDIX D

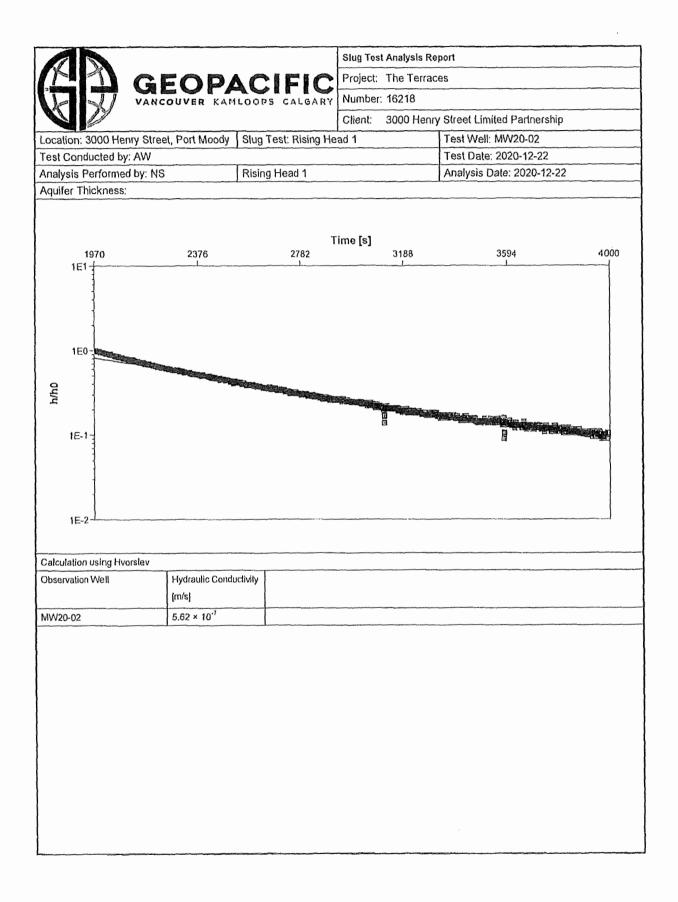


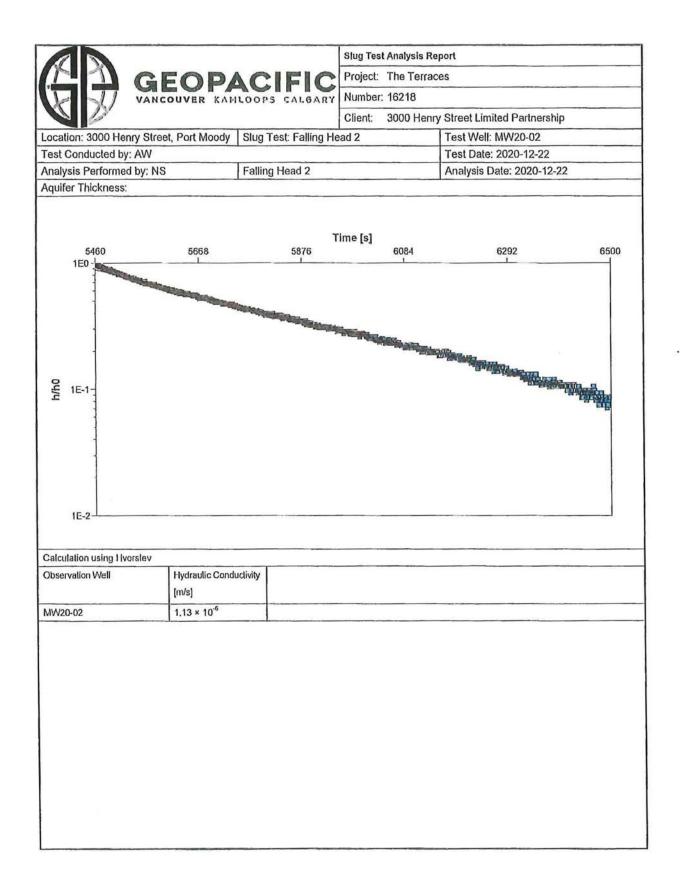


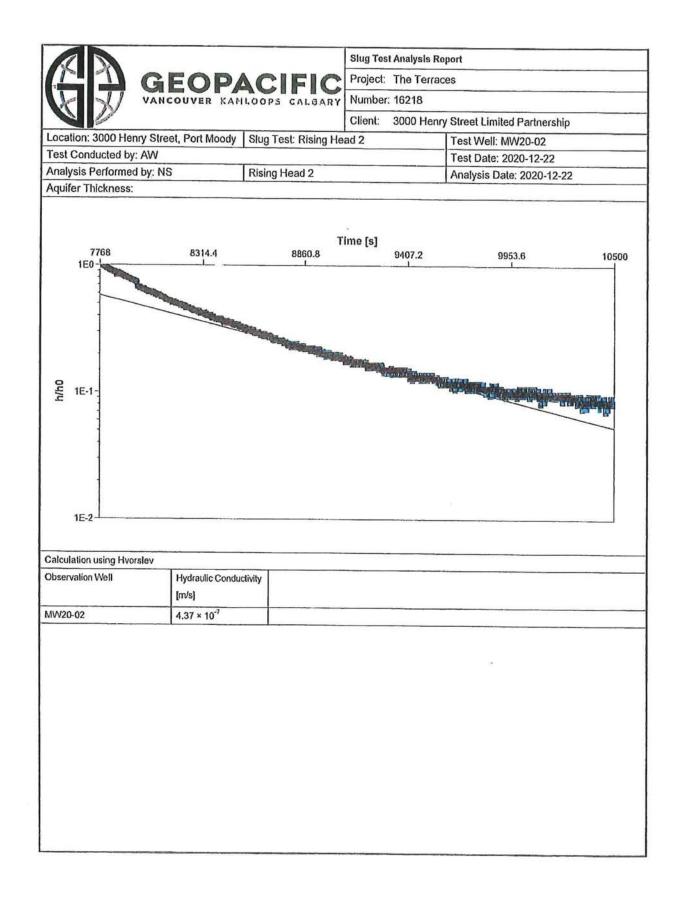


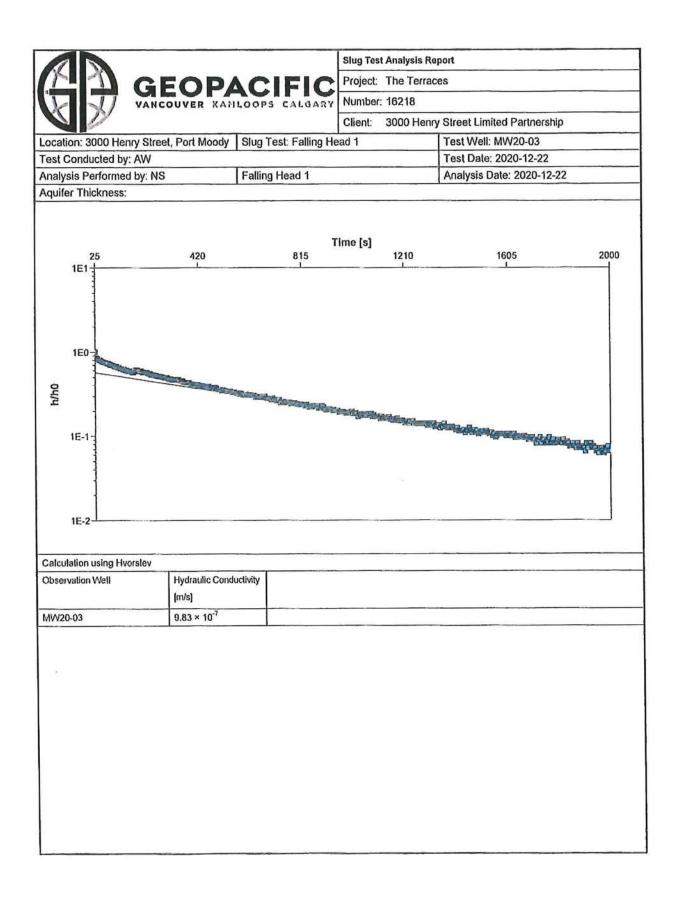


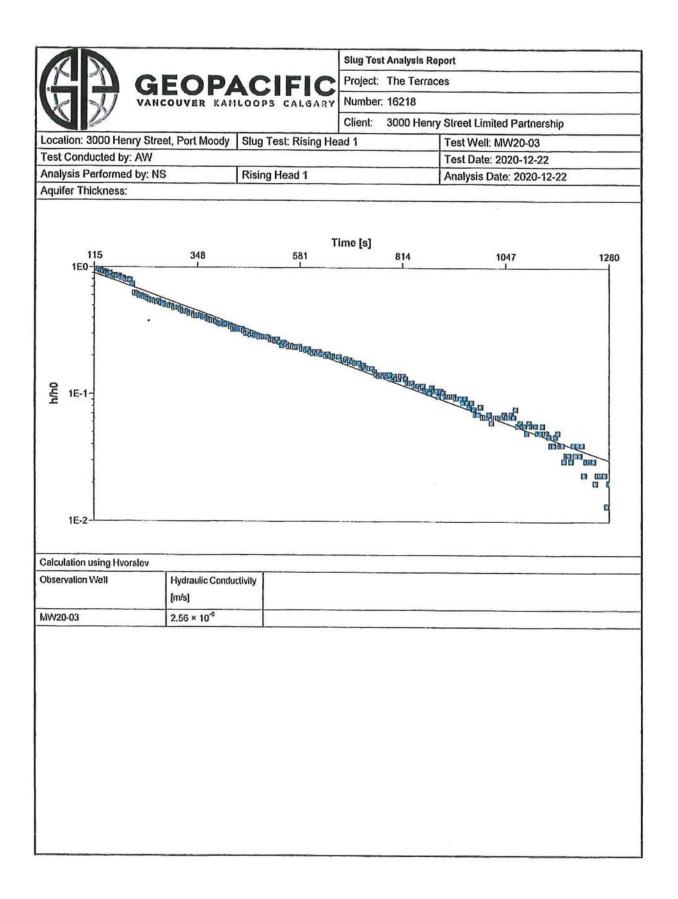


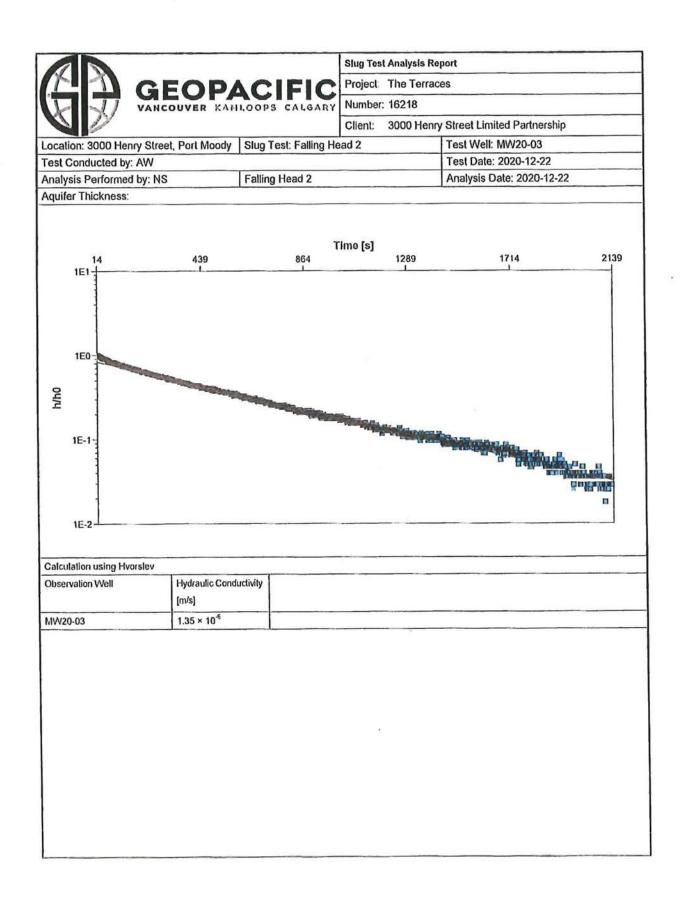


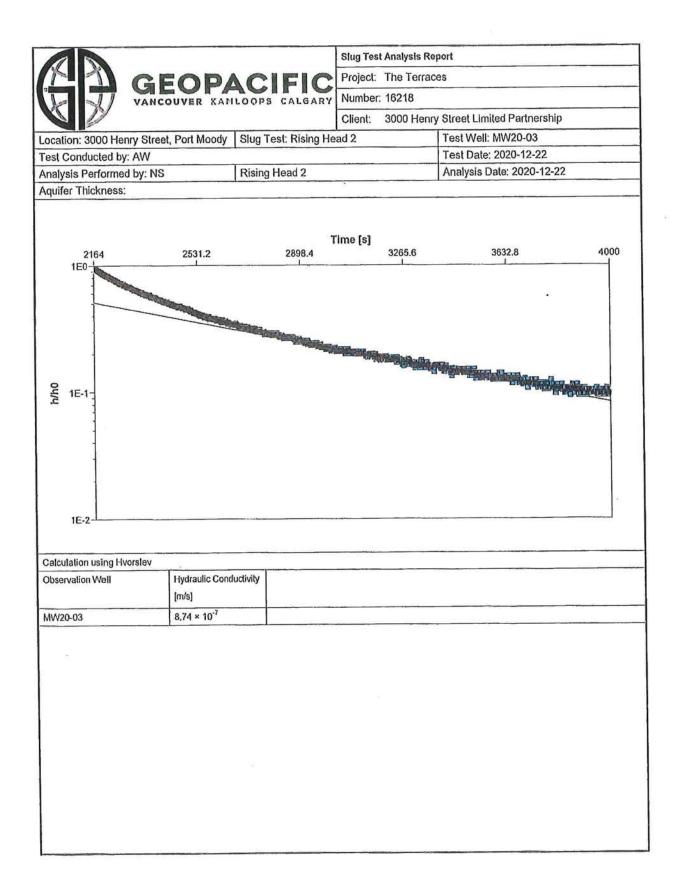


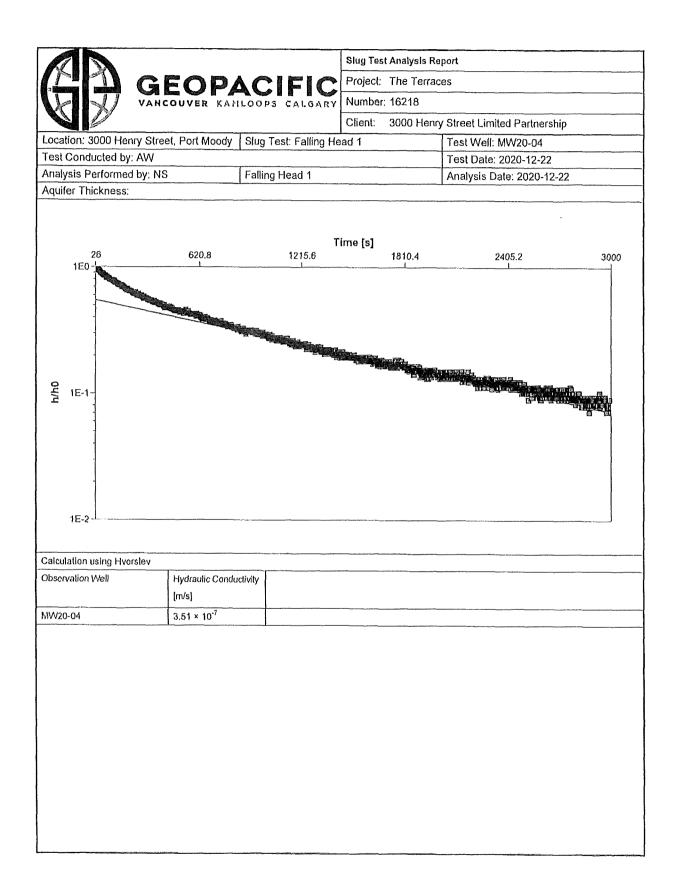


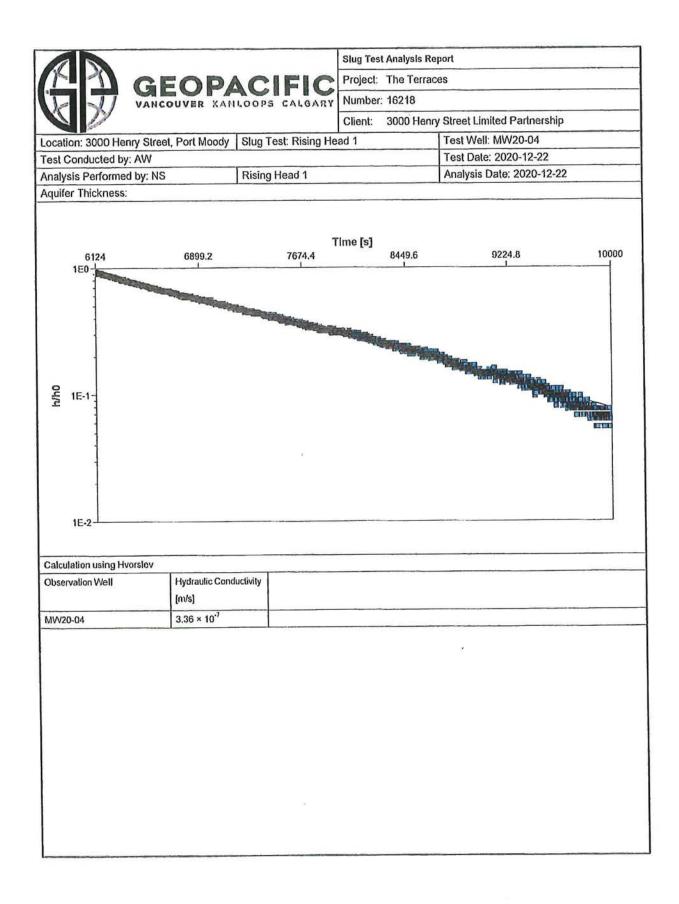


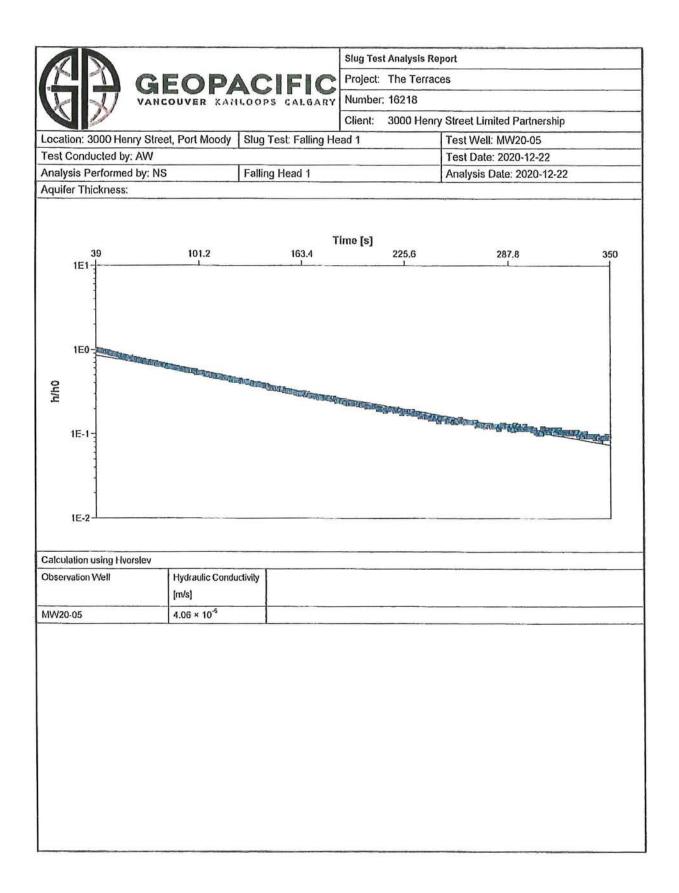








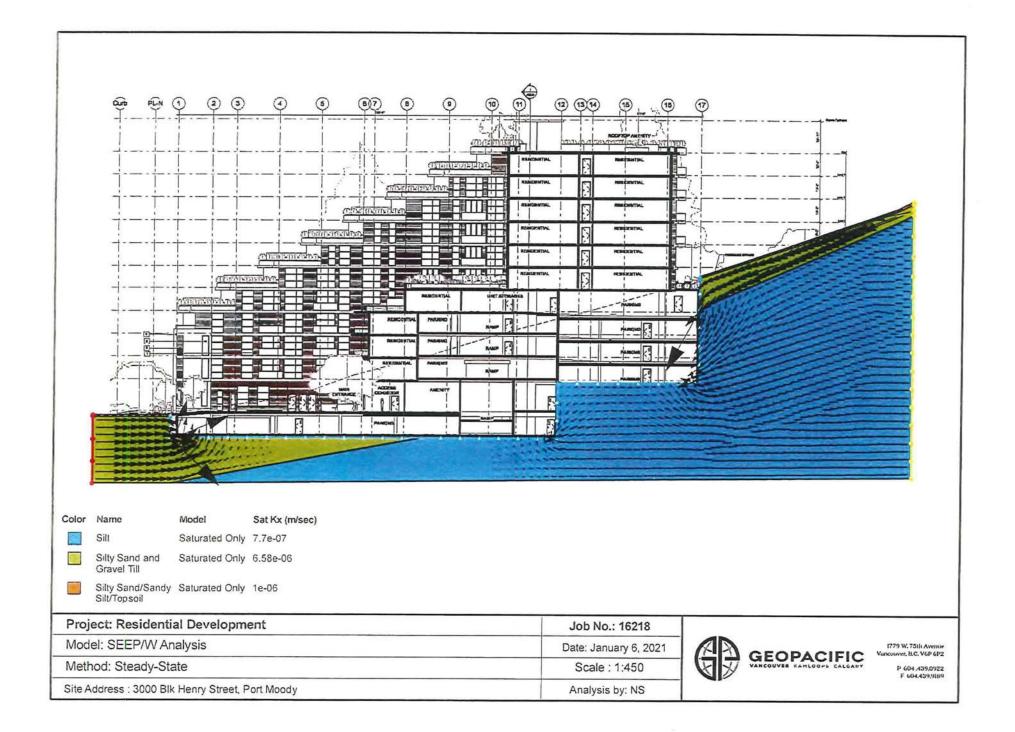




		Slug Test Analysis Report				
GEOPACIFIC			Project: The Terraces			
			Number: 16218			
			Client: 3000 Henry Street Limited Partnership			
Location: 3000 Henry Stre	et, Port Moody Slug	Test: Rising He	a contract of the second second second	Test Well: MW20-05	, 	
Test Conducted by: AW	······································	read riding rid		Test Date: 2020-12-22		
Analysis Performed by: N	S Risin	g Head 1		Analysis Date: 2020-12-22	2	
Aquifer Thickness:				11111,000 1010, 2010 12 2		
2197 1E0	2217.6	2238.2	ime [s] 2258.8 1	2279.4	2300	
-		Stand Bab	CITED COLORING			
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1E-2				1		
Calculation using Hvorslev		and the first state of the first	· · · · · · · ·			
Observation Well	Hydraulic Conductivity [m/s]					
MW20-05	9.09 × 10 ⁻⁶					

APPENDIX E

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Schedule C: Proposed Enhancement and Maintenance Plan for Covenant Area and Dedicated Park Area



envirowest consultants inc.

Suite 101 - 1515 Broadway Street Port Coquitlam, British Columbia Canada V3C 6M2 604-944-0502

June 25, 2021

Mr. Kevin Jones, Development Planner City of Port Moody 100 Newport Drive Port Moody, BC V3H 5C3

Dear Mr. Jones,

RE: PROPOSED ENHANCEMENT AND MAINTENANCE PLAN FOR COVENANT AREA Lots 17 – 20 Henry Street Port Moody

As a component of the proposed development on Lots 17 - 20 Henry Street (Property), a portion of the existing forested slopes and the prescribed Riparian Protection and Enhancement Area (RPEA) and Riparian Transition Area (RTA) for Elginhouse Creek and the West Channel will be protected by restrictive covenant (Covenant Area). The Covenant Area on the Property was assessed for the presence of existing anthropogenic disturbances and non-native invasive plant species, and opportunities for enhancement and remediation. Anthropogenic disturbances and non-native invasive plant species were documented using a handheld Garmin GPSMap 64s handheld GPS unit.

Existing Conditions

The Covenant Area is characterized by riparian vegetation and a forested slope, with several unauthorized trails constructed throughout.

The existing riparian habitat is characterized by western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), broadleaf maple (*Acer macrophyllum*), cascara (*Rhamnus purshiana*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), mountain ash (*Sorbus aucuparia*), oak species (*Quercus* sp.), paper birch (*Betula papyrifera*), vine maple (*Acer circinatum*), beaked hazelnut (*Corylus cornuta*), red huckleberry (*Vaccinium parvifolium*), salmonberry (*Rubus spectabilis*), thimbleberry (*R. parviflorus*), trailing blackberry (*R. ursinus*), sword fern (*Polystichum munitum*), deer fern (*Blechnum spicant*), salal (*Gaultheria shallon*), red elderberry (*Sambucus racemosa*), devil's club (*Oplopanax horridus*), Pacific bleeding heart (*Dicentra formosa*), false Solomon's seal (*Maianthemum racemosum*), western trillium (*Trillium ovatum*), piggyback plant (*Tolmiea menziesii*) and snags. Skunk cabbage (*Lysichiton americanus*) is also present in wet areas. Any hazardous trees on the Property will be felled or modified into wildlife trees (limbs removed, stem cut to approximately 3 to 5 meters in height) at the direction of the project arborist. Any trees that are removed or modified into wildlife trees will be replaced at a 2:1 ratio.

Isolated occurrences of English holly (*Ilex aquifolium*), English ivy (*Hedera helix*), field bindweed (*Convolvulus arvensis*), yellow archangel/lamium (*Lamium galeobdolon*), small flowered touch-me-not (*Impatiens parviflora*), laurel (*Prunus laurocerasus*) and Himalayan blackberry (*Rubus armeniacus*) were

observed within the Covenant Area in close proximity to previously disturbed areas (adjacent to Henry Street and the development to the west).

Previously documented wildlife on the Property, including in the Covenant Area, includes various bird species. In addition to bird species, other wildlife such as small and large mammals (black bear, deer, coyote, skunk, squirrel, mice, etc.), amphibians, reptiles, and gastropods likely utilize the Property for foraging, denning, or as a transportation corridor. Wildlife use of the Property is outlined in further detail in the Environmental Impact Assessment dated February 20, 2020, prepared by Envirowest.

Proposed Works within Covenant Area

Fish and wildlife habitat associated with the watercourses on (West Channel) and adjacent (Elginhouse Creek) to the Property will be retained by the application of the variable RPEA setbacks. The 10 m Zoning Bylaw setback for West Creek is maintained or exceeded. The 20 m Zoning Bylaw setback for Elginhouse Creek has been flexed in accordance with Section 5.4.3(c) of the Zoning Bylaw.

A component of the enhancement plan includes the removal of invasive, non-native plant species within the entire Covenant Area and the re-vegetation of those areas with native trees, shrubs and groundcover. The installation of additional native plants within the proposed RPEA setbacks will augment the existing riparian vegetation. Fruit bearing plant species are not prescribed, proposed plants will not be installed in conflict with the proposed trail, and proposed plants will be field fit as necessary. The Covenant Area enhancement plan is depicted within Envirowest Drawing No. 2615-01-05R02 and 2615-01-06R01 "Covenant Area Landscape Plan Details and Specifications" (Attachment A). The installation of replacement trees as compensation for removal or modification of existing trees is required and has been detailed by PMG Landscape Architects as depicted on PMG Drawing L6 "Trail Renovation" (Attachment B).

The Covenant Area, in conjunction with the dedicated Park Area, will contribute in mitigating potential impacts to wildlife and wildlife habitat associated with the Proposed Development by facilitating a transportation corridor for small and large mammals, a source of food for multiple species, nesting locations for birds, and refuges for small mammals.

Within the Covenant Area, and the dedicated Park Area, a public-use trail is proposed to provide connection to existing park space to the west and to the naturalized Chineside escarpment. The final trail alignment will be field fit in order to balance trail requirements and environmental requirements.

The trail location will be designed in order to minimize environmental impacts and habitat fragmentation by not exceeding 1.5 meters (m) in width; being constructed of permeable material such as clear crushed gravel; utilizing existing trails to minimize disturbance; will be field fit to avoid tree and understory vegetation loss; and, will be designed to avoid altering natural drainage patterns. The trail grade will not exceed 30 percent; alternate trail routing or stairs may be required where natural grades exceeding 30 percent are encountered. If required, a shallow swale will be constructed on the upslope side of the trail to proactively address drainage issues. Fencing and signage as required by the City of Port Moody will be installed to prevent people and pets from straying from the trail and encroaching into the Covenant

Proposed Remediation and Enhancement Opportunities

The Covenant Area was assessed to determine the presence and extent of any non-native invasive plant species, areas of anthropogenic disturbance, and any other areas that may require remediation or enhancement. Existing vegetation within the Covenant Area primarily consists of native species. The native vegetation is well established and dense throughout the majority of the Covenant Area. Several unauthorized trails have been established throughout the Covenant Area linking the Property to adjacent properties.

As per the Arborist report (submitted separately), a total of 95 trees on the Property will require removal or modification. Trees scheduled for removal or modification require replacement at a 2:1 ratio, therefore a total of 190 replacement trees are to be planted. A total of 29 replacement trees will be planted on site, and 166 replacement trees will be planted within the Covenant and Park areas. The replacement trees (sizes, numbers and species) are depicted on PMG's L6 drawing (Attachment B). Many of the replacement trees to be installed in the Covenant Area/Park Area will be installed along unauthorized trails that are slated for decommissioning; the replacement trees are to be field fit under the supervision of the project Environmental Consultant or Arborist. Hydroseeding of these areas will also be completed. Fencing and signage is proposed to be installed along the authorized public-use trail boundaries to prevent future encroachment into or disturbance of the Covenant Area. In addition to the native plant species specified, other Naturescape features have been incorporated such as large woody debris and boulders. Large woody debris and boulders will be installed at former unauthorized trailheads to deter future encroachment by the public while also providing habitat opportunities for wildlife.

Additionally, removal of invasive non-native plant species is proposed within the Covenant Area. Native vegetation should be retained or replanted where possible to preserve site characteristics. Removal of invasive plants may be accomplished via machinery in some locations, but hand-removal will be required in proximity to sensitive environmental features including existing native riparian vegetation and steep slopes. The restoration plan (Attachment A) includes the prescription for the native plants for areas where invasive non-native plant material is to be removed. Additional native plants to be installed are non-fruiting species, will not be installed in conflict with the proposed trail and will be field fit as necessary.

If any tree or vegetation removal is required to facilitate construction of the trail, disturbed areas are to be replanted with number 1 pot size sword fern at a density of 2 plants per square meter.

Maintenance and Monitoring of the Park Area

A 5-year maintenance and monitoring program is proposed for the Covenant Area. Maintenance is to include inspection for and removal of non-native invasive plant species within the Covenant Area as well as watering, selective weeding, selective pruning, and fertilizing of installed plant material as needed. A single-line irrigation system for plant material to be installed along the decommissioned trails and the use of gator bags on new trees have been prescribed by PMG Landscape Architects. Survivorship of installed plant material is to equal 100 percent at the end of the 5-year maintenance and monitoring period. The

maintenance plan is also to include the removal of anthropogenic debris (minimum twice per year). Due to the nature of the existing site conditions, plant material will need to be field fit amongst existing vegetation. A detailed maintenance plan reflective of the completed field fit planting works will be provided by PMG Landscape Architects at a later date.

An annual review of the trees within the Covenant Area is to be undertaken by the project arborist for the duration of the maintenance and monitoring period to identify any hazard trees. Should any hazard trees be identified and designated for removal, the planting of replacement trees will be prescribed. Maintenance and monitoring of the proposed public-use trail will also be required. During and after construction, the trail will be monitored for stability and signs of erosion and any safety concerns. Should any deficiencies be identified, remediation works will be prescribed immediately.

Annual summary reports will be prepared for the City of Port Moody for each year of the 5-year maintenance and monitoring period. Envirowest will inspect the Covenant Area in the spring of each year to identify any deficiencies. A follow up inspection will be completed in the fall of each year to ensure deficiencies have been corrected at which point the summary report will be prepared.

A cost estimate for the Covenant Area enhancement plan and monitoring and maintenance plan is included within Attachment C.

Please contact the undersigned at 604-944-0502 or blanchard@envirowest.ca should you have any questions or comments regarding this correspondence.

Sincerely, ENVIROWEST CONSULTANTS INC.

Kirsti Juurakko, B.A. Environmental Technician

Attachment A: Attachment B: Attachment C: Envirowest Drawing No. 2615-01-05R02 and 2615-01-06R01 "Covenant Area Landscape Plan Details and Specifications" PMG Drawing L6 "Trail Renovation" Cost Estimate – Envirowest Drawing No. 2615-01-05R02 and 2615-01-06R01 "Covenant Area Landscape Plan Details and Specifications"

Project Biologist

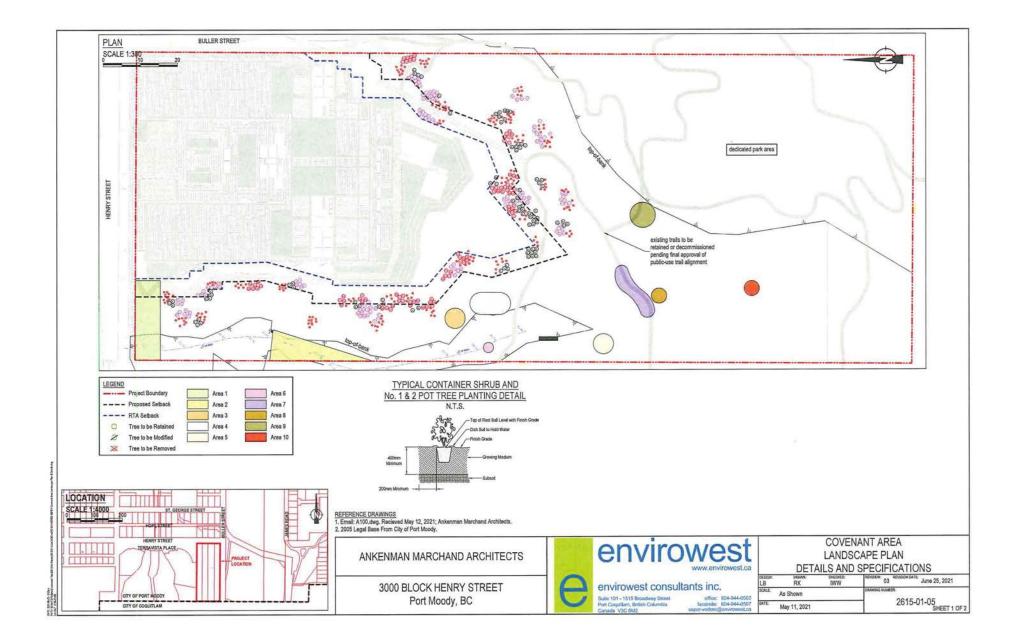
Lisa Blanchard, R.P.Bio.

isa Blanchard

Copy. Mr. Amin Eskooch, Aultrust Financial Mr. Timothy Ankenman, Ankenman Marchand Architects

ATTACHMENT A

Envirowest Drawing No. 2615-01-05R03 and 2615-01-06R01 "Covenant Area Landscape Plan Details and Specifications"



PLANT SPECIES LIST AND SPECIFICATIONS

For tree	replacement areas			
SYMBOL	COMMON NAME	LATIN NAME	NUMBER	COMMENTS
0	pacific rhododendron	mododension mecrophyllum	85	no, 2 pot; multi-stemmed; densely branched; well established
(6)	Noolka rose	Rose nutkana	121	no, 2 pot, multi-clommed,
\odot	vine maple	Acer circinatum	63	denskly branched, well established no, 2 pot, densely branched, well established
	sword lern	Polystichum munitum	211	no. 1 pot well established

GENERAL LANDSCAPE SPECIFICATIONS

- Plast material and the plasting of such material are to be in accordance with the Canadas Landscape Blandard (second edition) justing published by the Canadas Society of Landscape Architects and the Canadas Nervey Landscape Association. All works are to be canadasti in accordance with the sodemet canadasti furnishops of the Statusch and Beel Plastices for Instrument Work? (Mentry of Ware, Land A AP Protection, 2004). All plant materials in to be inspected and genored by Bankmeeter plants in beinlatedow. Comeng modern is to be inserved and genored by Bankmeeter plants in beinlatedow. All plant materials in the Inserved and and the Status of Canadasti Architecture Dammed Bankmeeter All plant materials in the Inserved and and the Status of Canadasti Architecture Dammed Bankmeeter All plant materials and adm plant (of Status T. Ganward and in to be insellatedow. All plant materials and adm plant (of Status T. Ganward) and the Inserved Arm of Bankmeeter All plant materials and adm plant (of Status T. Ganward) in the Inserved Arm dameter, brands All plant materials and adm plant (of Status T. Ganward) in the Inserved Arm dameter, brands All plant materials and adm plant (of Status T. Ganward) in the Inserved Arm dameter. And Arm of the Inserved Arm and Arm Arman admitesting operations and the Inserved Arm and Arman admitest And Arman model in the Inserved Arman admitestication admitestication admitestication be accordance with all And Arman admitestication admitestin admitestication admitestication admitestication admitestication
- All opens and/or access training in the anticopy operations of a low operation and upper and
- Environment, All watcher includual (Tapp picata) must be of native stock any caliform, such as T, pilotati var, escelar, are not to be planted. 5. The contraduct is beyond ben (5) years of plant mathematica. Mark mathematics is to include watching, calectine prunity and calering of blocking, Species surveying is is equal co-hardwell (10) provide file (years to inplating), explosionment of deal doub may be required to fall this capacitacion. Replacement attoch allos native to con-handwell (100) parment contradiction (100) prevent the fallers).

AREA 1

Himalayan blackberry tendrils to be hand removed; Native plants to be planted in and around area where blackberry is removed and/or trees to be removed. SYMBOL COMMON NAME LATIN NAME NUMBER COMMENTS 🕢 wine maple Acer circinatum 10 no. 2 pot; densely branched, well established

0	deer form	Blechnum spicant	5	no, 1 pot; well established	
0	sword tern	Polystichum munitum	5	no. 1 pol; well established	

1054.0

SYMBOL	COMMON NAME	LATIN NAME	NUMBER	COMMENTS
\odot	vine maple	Aper circlinatum	10	no. 2 pot; densely branshed; woll established
15-	Nootka rose	Rosa nutkana	150	no, 2 pot; multi-stammed; dansely branched; well established
	hardhack	Spiraea dougtaali	20	no. 2 pot; densely branched; well established
0	deer fam	Blechoum spicent	35	no. 1 pot; well established
0	sword fam	Polyzóchum munitum	35	no, 1 pot; well established
AREA	43			
English	holy to be removed by h	hand and area to replanted with	h:	
SYMBOL	COMMON NAME	LATIN NAME	NUMBER	COMMENTS
0	vine maple	Aper circinatum	з	no, 2 pot; densely branched, well established
ARE	44			
English	ivy to be removed by ha	and English holy to be removed	i by hand and a	rea to replanted with:
SYMBOL	COMMON NAME	LATIN NAME	NUMBER	COMMENTS
0	sword lem	Polystetum munitum	5	no. 1 pot, well established

AREA 5 Small patch of English ivy and English holy to be removed by hand; no replanting required. AREA 6 English ivy to be removed by hand and area to replanted with: SYMBOL COMMON NAME LATIN NAME NUMBER COMMENTS Vine maple Acer circlnatum no. 2 pot; densely branched; well established AREA 7 English holly, Laurel & Himalayan blackberry to be removed by hand and area replanted with: SYMBOL COMMON NAME LATIN NAME NUMBER COMMENTS (Ac) vine maple Acer circinatum 10 no. 2 pol; densely branched; well established nd, 1 pol; well established G sword fam Polystichum munitum 5 AREA 8 English lvy to be removed by hand and area replanted with: SYMBOL COMMON NAME UATIN NAME NUMBER COMMENTS G sword fem Polyetictum munitum 7 no, 1 pot, woll established AREA 9 Small flowered touch-me-not to be removed by hand and area to replanted with: SYMBOL COMMON NAME LATIN NAME NUMBER COMMENTS 7 no. 1 pot; well established O sword form Polysöchun musitum AREA 10 Smell flowered touch-me-not to be removed by hand and area to be replanted with: SYMBOL COMMON NAME LATIN NAME NUMBER COMMENTS

0	sword fem	Polysochum musikum	5	no. 1 pot; well established



3000 BLOCK HENRY STREET



office: 604-944-0502 facsimile: 604-944-0507 taper-vedere@envirowest.ca

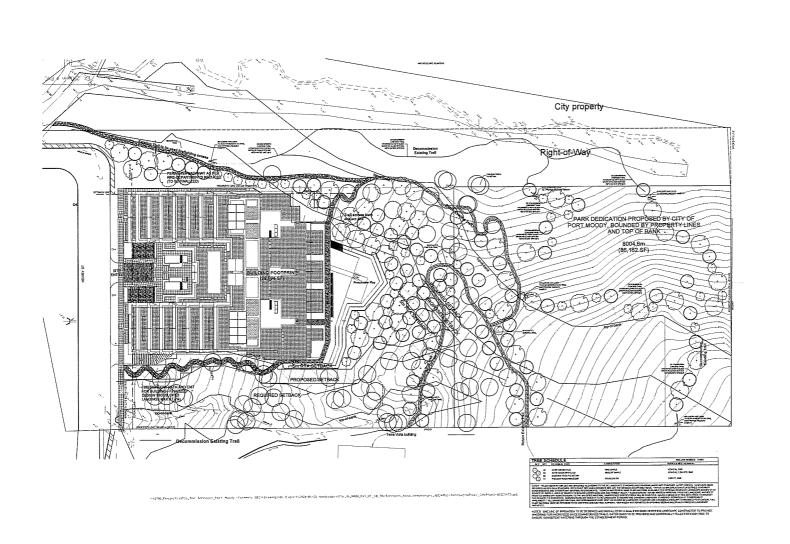
Suile 101 - 1515 Broadway Street Port Coquillam, British Columbia Canada V3C 6M2

			IANT AREA SPECIFICATIONS
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22	As Shown	_	2615-01-06
MTE	May 11, 2021		2010-01-00 SHEET 2 OF 2

Port Moody, BC

ATTACHMENT B PMG Drawing L6 "Trail Renovation"

1





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armission





PROJECT: HENRY STREET CONDOS 3000 BLOCK HENRY STREET PORT MOODY, BC

TRAIL RENOVATION

DATE: 13.MAY.23 DRAWING NUMBER SCALE: 1/33*-11-0* DRAWN: DO LG DESIGN: MM/RC CHKD: MCY

13054-17.20 PMG PROJECT NUMBER:

13-054

ATTACHMENT C: Cost Estimate – Envirowest Drawing No. 2615-01-05R01 and 2615-01-06R01 "Covenant Area Landscape Plan Details and Specifications"

Project Number: Project Site: 3000 Block, Henry Street, Port Moody 2615-01 Date: 6/24/2021 Quantity Unit Price Unit Total 1 Trees Caliper & 2.5 m to 3.0 m 0.0 \$55.00 \$0.00 2.0 m B&B or No. 7 Pot 0.0 \$55.00 \$0.00 Number 5 Pot 0.0 \$22.00 \$0.00 \$18.00 Number 3 Pot 0.0 \$0.00 \$8.50 \$1,079.50 Number 2 Pot 127.0 \$0.00 Number 1 Pot 0.0 \$6.00 Liner/Plug 0.0 \$1.35 \$0.00 2 Shrubs \$22.00 \$0.00 Number 5 Pot 0.0 Number 2 Pot 396.0 \$8.50 \$3,366.00 Number 1 Pot \$6.00 \$0.00 Liner/Plug 0.0 \$1,35 \$0.00 3 Ferns, Groundcovers, Aquatic Number 2 Pot 0.0 \$8.50 \$0.00 Number 1 Pot 320.0 \$6.00 \$1,920.00 Liner/Plug \$1.35 \$0.00 \$6,365.50 **Plant Total Cost** 4 Labour (Plant installation) Labour Total Cost \$6,365.50 \$12,731.00 **Total Plants and Labour Cost** 5 Boulders (500-700 mm ø) (installed per pc.) 0.0 \$100.00 \$0.00 \$75.00 \$0.00 6 Placed Anglar Rock (200mm ø)(m³ x \$ per/m³) 7 Placed Coho gravel (linear metres x \$ per/m³)(150mm depth) \$75.00 \$0.00 \$75.00 \$0.00 8 Fencing (\$ linear metre) (w/ page wire and posts) 9 Placed wood debris (installed per pc.) \$125.00 \$0.00 \$10.00 10 Misc. (stakes, string, etc.) 0.0 \$0.00 11 Placed Soil (m³ x \$ per/m³) \$75.00 \$0.00 12 Placed Sand Gravel Mix (m³ x \$ per/m³) \$75.00 \$0.00 \$0.00 Sub Total Cost including PST (where required) \$0.00 \$1,000.00 13 Initial Invasive Species Removal (lump sum) 1.0 \$1,000.00 14 Invasive Species Management Plan (5 Years) 5.0 \$1,000.00 \$5,000.00 15 Landscape Maintenance (per/yr) 5.0 \$1,500.00 \$7,500.00 \$12,500.00 **Sub Total Cost** 5.0 \$1,800.00 \$9,000.00 16 Management-Environmental Monitoring **PROJECT TOTAL** \$34,231.00

Covenant Area Landscaping Cost Estimate



envirowest consultants inc.

Suite 101 - 1515 Broadway Street Port Coquitlam, British Columbia Canada V3C 6M2 604-944-0502

June 25, 2021

Mr. Kevin Jones, Development Planner City of Port Moody 100 Newport Drive Port Moody, BC V3H 5C3

Dear Mr. Jones,

RE: PROPOSED REMEDIATION AND MAINTENANCE PLAN FOR DEDICATED PARK AREA Lots 17 – 20 Henry Street Port Moody

As a component of the proposed development on Lots 17 - 20 Henry Street (Property), a dedicated park area, inclusive of the prescribed streamside setback area of the tributary to Elginhouse Creek on the Property (Park Area), is to be established on the southern portion of the Property. The Park Area on the Property was assessed for the presence of existing anthropogenic disturbances and invasive species, and opportunities for remediation on May 7, 2021. Anthropogenic disturbances and non-native invasive plant species were documented using a Garmin GPSMap 64s handheld GPS unit and are depicted on Envirowest Drawing No. 2615-01-04R01 "Dedicated Park Enhancement Areas".

Existing Conditions

The existing Park Area is characterized by a forested slope with several unauthorized trails constructed throughout. The existing canopy layer consists of western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), broadleaf maple (*Acer macrophyllum*), cascara (*Rhamnus purshiana*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), and paper birch (*Betula papyrifera*). Understory species include salmonberry (*Rubus spectabilis*), thimbleberry (*R. parviflorus*), trailing blackberry (*R. ursinus*), sword fern (*Polystichum munitum*), lady fern (*Athyrium filix-femina*), salal (*Gaultheria shallon*), red elderberry (*Sambucus racemosa*), devil's club (*Oplopanax horridus*), and Pacific bleeding heart (*Dicentra formosa*), with skunk cabbage (*Lysichiton americanus*) also present in wet areas. Any hazardous trees on the Property will be felled or modified into wildlife trees (limbs removed, stem cut to approximately 3 to 5 meters in height) at the direction of the project arborist. Any trees that are removed or modified into wildlife trees will be replaced at a 2:1 ratio.

Previously documented wildlife on the Property, including in the Park Area, includes various bird species. In addition to bird species, other wildlife such as small and large mammals (black bear, deer, coyote, skunk, squirrel, mice, etc.), amphibians, reptiles, and gastropods likely utilize the Property for foraging, denning, or as a transportation corridor. Wildlife use of the Property is outlined in further detail in the Environmental Impact Assessment dated February 20, 2020, prepared by Envirowest.

Proposed Works within Dedicated Park Area

The dedicated Park Area is proposed to be retained in its natural state and will contribute to mitigating potential adverse effects to wildlife and wildlife habitat associated with the proposed development within the northern portion of the Property. The Park Area will provide food sources for various species of birds and other wildlife, nesting locations for birds, refuges for small mammals, and a transportation corridor for small and large species.

Within the dedicated Park Area, a public use trail is proposed to provide connection to existing park space to the west and to the naturalized Chineside escarpment. The final trail alignment will be field fit in order to balance trail requirements and environmental requirements.

The trail location will be designed in order to minimize environmental impacts and habitat fragmentation by not exceeding 1.5 meters (m) in width; being constructed of permeable material such as clear crushed gravel; utilizing existing trails to minimize disturbance; will be field fit to avoid tree and understory vegetation loss; and, will be designed to avoid altering natural drainage patterns. The trail grade will not exceed 30 percent; alternate trail routing or stairs may be required where natural grades exceeding 30 percent are encountered. If required, a shallow swale will be constructed on the upslope side of the trail to proactively address drainage issues. Fencing and signage as required by the City of Port Moody will be installed to prevent people and pets from straying from the trail and encroaching into the Park Area. Neighbouring property owners (School District 43 and a Strata Corporation) will be consulted during the design process for the trail alignment in the Park Area.

Proposed Enhancement Opportunities

The Park Area was assessed on May 7, 2021 to determine the presence and extent of any non-native invasive plant species, areas of anthropogenic disturbance, and any other areas that may require remediation. Existing vegetation within the Park Area primarily consists of native species. The native vegetation is well established and dense throughout the majority of the Park Area. Several unauthorized trails have been established throughout the Park Area linking the park to adjacent properties.

Isolated occurrences of English holly (*Ilex aquifolium*), English ivy (*Hedera helix*), small flowered touchme-not (*Impatiens parviflora*), and laurel (*Prunus laurocerasus*) were observed in the Park Area, generally in close proximity to existing pathways.

Anthropogenic structures were also observed within the Park Area. Bicycle jumps/ramps were observed on some of the trails; a makeshift ladder, handle, and tie-down strap were observed attached to a broadleaf maple tree; and, an abandoned campsite and garbage were also observed.

Non-native invasive plant species and anthropogenic structures are proposed to be removed from the Park Area and disturbed areas enhanced. Prescribed enhancements correspond to Envirowest Drawing No. 2615-1-04 "Dedicated Park Enhancement Areas" (Attachment A) and are as follows:

- Point 94 abandoned camp and garbage
 - o Remove garbage and camp materials and dispose of appropriately offsite
 - o Install 15 salmonberry (no. 1 pot), 5 sword fern (no. 1 pot), and 5 thimbleberry (no. 1 pot)
- Point 93 English holly and small flowered touch-me-not
 - Remove English holly and small flowered touch-me-not and dispose of appropriately offsite
 - o Install 10 salmonberry (no. 1 pot)
- Point 63 anthropogenic materials in broadleaf maple tree
 - Remove anthropogenic materials from tree and monitor tree health for duration of maintenance and monitoring period

Fruiting plant species will not be installed near the proposed public use trail or structures; proposed plants will not be installed in conflict with the proposed trail and will be field fit as necessary.

A public use trail is proposed and will largely utilize existing trails in the area. A number of other existing trails have been identified to be decommissioned, as shown on Envirowest Drawing No. 2615-01-04R01 "Dedicated Park Enhancement Areas," included as Attachment A. As per the Arborist report completed for the Property (submitted separately), a total of 95 trees on the Property will require removal or modification. Trees scheduled for removal or modification require replacement at a 2:1 ratio, therefore a total of 190 replacement trees are to be planted. A total of 29 replacement trees will be planted on site, and 166 replacement trees will be planted within the Covenant and Park areas. The replacement trees (sizes, numbers and species) are depicted on PMG Landscape Architecture's L6 drawing, included as Attachment B. Many of the replacement trees to be installed in the Covenant Area and Park Area will be installed along unauthorized trails that are slated for decommissioning and are to be field fit under the supervision of the project Environmental Consultant or Arborist. Hydroseeding of exposed soils in these areas will also be completed and a single-line irrigation system will be installed. Fencing and signage is proposed to be installed along the authorized public-use trail boundaries to prevent future encroachment into or disturbance of the Covenant Area. In addition to the native plant species specified, other Naturescape features have been incorporated such as large woody debris and boulders. Large woody debris and boulders will be installed at former unauthorized trailheads to deter future encroachment by the public while also providing habitat opportunities for wildlife.

If any vegetation removal is required to facilitate construction of the trail, disturbed areas are to be replanted with number 1 pot size sword fern at a density of 2 plants per square meter; fruit bearing plant species are not to be planted adjacent to the proposed pathway.

Maintenance and Monitoring of the Park Area

A 5-year maintenance and monitoring program is proposed for the Park Area. Maintenance is to include inspection for and removal of non-native invasive plant species within the Park Area as well as watering, selective weeding, selective pruning, and fertilizing of installed plant material as needed. A single-line irrigation system for plant material to be installed along the decommissioned trails and the use of gator bags on new trees have been prescribed by PMG Landscape Architects. Survivorship of installed plant material is to equal 100 percent at the end of the 5-year maintenance and monitoring period. Due to the nature of the existing site conditions, plant material will need to be field fit amongst existing vegetation.

A detailed maintenance plan reflective of the completed field fit planting works will be provided by PMG Landscape Architects at a later date.

An annual review of the trees within the Park Area is to be undertaken by the project arborist for the duration of the maintenance and monitoring period to identify any hazard trees. Should any hazard trees be identified and designated for removal or modification, the planting of replacement trees at a 2:1 ratio will be prescribed. Maintenance and monitoring of the proposed constructed trail will also be required. During and after construction, the trail will be monitored for stability, any signs of erosion and any safety concerns. Should any deficiencies be identified, remediation works will be prescribed immediately.

Annual summary reports will be prepared for the City of Port Moody for each year of the 5-year maintenance and monitoring period. Envirowest will inspect the Park Area in the spring of each year to identify any deficiencies. A follow up inspection will be completed in the fall of each year to ensure deficiencies have been corrected at which point the summary report will be prepared.

Please contact the undersigned at 604-944-0502 or juurakko@envirowest.ca should you have any questions or comments regarding this correspondence.

Sincerely, ENVIROWEST CONSULTANTS INC.

Kirsti Juurakko, B.A. Environmental Technician

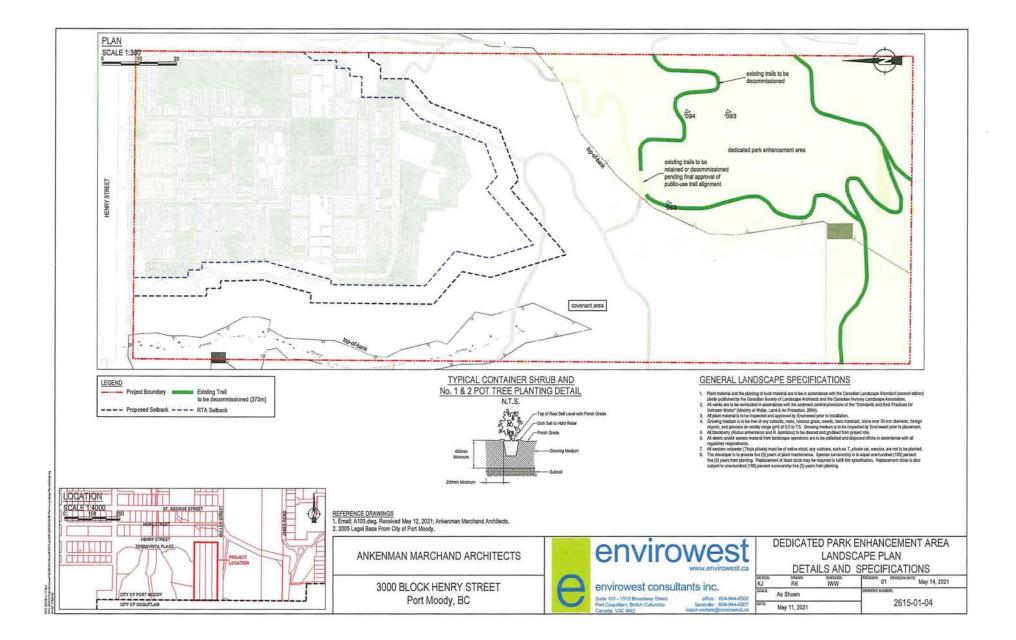
Attachment A: Attachment B: Attachment C: Lisa Blanchard

Lisa Blanchard, R.P.Bio., A.Sc.T. Project Biologist

Envirowest Drawing No. 2615-01-04R01 "Dedicated Park Enhancement Areas" PMG Drawing L6 "Trail Renovation" Cost Estimate – Envirowest Drawing No. 2615-01-04R01 "Dedicated Park Enhancement Areas"

Copy. Mr. Amin Eskooch, Aultrust Financial Mr. Timothy Ankenman, Ankenman Marchand Architects ATTACHMENT A Envirowest Drawing No. 2615-01-04R01 "Dedicated Park Enhancement Areas"

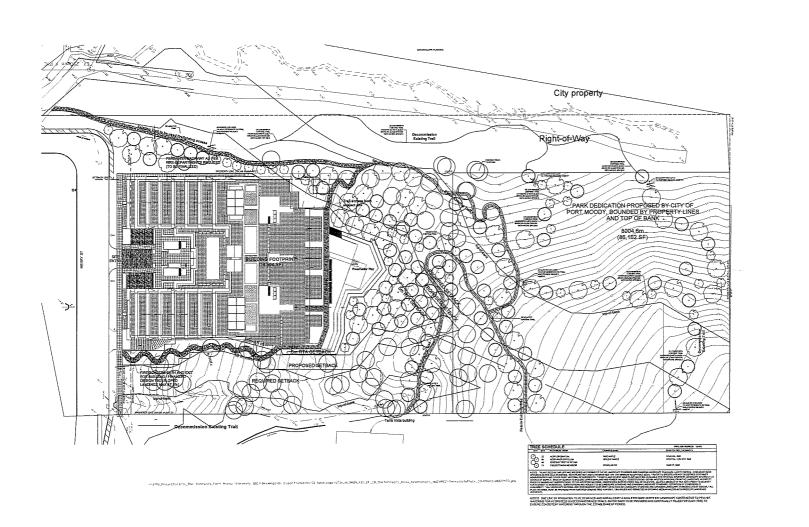
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ATTACHMENT B PMG Drawing L6 "Trail Renovation"

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SCALE: 1/12**1*0* DRAWN: D0 DESIGN: MM/RC CHKD: MCY

13054-17.2P PMG PROJECT NUMBER:

13-054

ATTACHMENT C: Cost Estimate – Envirowest Drawing No. 2615-01-04 "Dedicated Park Enhancement Areas"

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	Dedicated Park Area Kemediat			
	Project Site:	Project Nu	mber:	
	3000 Block, Henry Street, Port Moody	2615-01		
	Date:	0	Il alt Dates	11-10 7-4-1
	6/24/2021	Quantity	Unit Price	Unit Total
1	Trees	0.0	6FF 00	£0.00
	Caliper & 2.5 m to 3.0 m	0.0	\$55.00	\$0.00
	2.0 m B&B or No. 7 Pot	0.0	\$55.00	\$0.00
	Number 5 Pot	0.0	\$22.00	\$0.00
	Number 3 Pot	0.0	\$18.00	\$0.00
	Number 2 Pot	0.0	\$8.50	\$0.00
	Number 1 Pot	0.0	\$6.00	\$0.00
	Liner/Plug	0.0	\$1.35	\$0.00
2	Shrubs	0.0	622.00	¢0.00
	Number 5 Pot	0.0	\$22.00	\$0.00
	Number 2 Pot	0.0	\$8.50	\$0.00
	Number 1 Pot	30.0	\$6.00	\$180.00
	Liner/Plug	0.0	\$1.35	\$0.00
3	Ferns, Groundcovers, Aquatic		40.50	40.00
	Number 2 Pot	0.0	\$8.50	\$0.00
	Number 1 Pot	0.0	\$6.00	\$0.00
	Liner/Plug		\$1.35	\$0.00
	Plant Total Co	st		\$180.00
4	Labour (Plant installation)	2240		4400.00
	Labour Total Co			\$180.00
	Total Plants and Labour Co		6400 00	\$360.00
	Boulders (500-700 mm ø) (installed per pc.)	0.0	\$100.00	\$0.00
	Placed Anglar Rock (200mm ø)(m ³ x \$ per/m ³)		\$75.00	\$0.00
	Placed Coho gravel (linear metres x \$ per/m ³)(15		\$75.00	\$0.00
	Fencing (\$ linear metre) (w/ page wire and posts)	Ŋ.	\$75.00	\$0.00
	Placed wood debris (installed per pc.)		\$125.00	\$0.00
	Misc. (stakes, string, etc.)	0.0	\$10.00	\$0.00
	Placed Soil (m ³ x \$ per/m ³)		\$75.00	\$0.00
12	Placed Sand Gravel Mix (m ³ x \$ per/m ³)		\$75.00	\$0.00
	c. I. T. I. I. C. I. I. I. I. DET (. I.	a alla		¢0.00
	Sub Total Cost including PST (where requir		6750.00	\$0.00
	Invasive Species and Debris Removal (Initial)	1.0	\$750.00	\$750.00
	Invasive Species Management Plan (5 Years)	5.0	\$750.00	\$3,750.00
10	Landscape Maintenance (per/yr)	5.0	\$1,500.00	\$7,500.00
17	Sub Total Co		¢1 000 00	\$8,250.00
1/	Management-Environmental Monitoring	5.0	\$1,800.00	\$9,000.00
	PROJECT TOTA	L.		\$17,610.00

Dedicated Park Area Remediation Cost Estimate