October 10, 2024

FOI No: 2024-13
Additional Information Provided Following 3rd Party Release

Redacted S.21

Email: Redacted S.21

Dear S. 21

Re: Request for Records
Freedom of Information and Protection of Privacy Act

The City of White Rock has reviewed your request for access to the following records pursuant to the Freedom of Information and Protection of Privacy Act (the "Act"):

1. *Major Development Permit Application (Ravine and Significant Stand of Trees), if any, from 2019 to today,*
2. *Minor Development Permit Application (Ravine and Significant Stand of Trees), if any, from 2019 to today,*
3. *Any amendments or alterations to the application for the project received since third reading including:*
   - *a) Arborist reports, if any, after January 1, 2024*
   - *b) Site Surveys*
   - *c) Tree Assessment Report (as that term is used in the Tree Bylaw, if any)*
   - *d) Geotechnical reports*
   - *e) erosion and sediment control plan*
   - *f) Construction management plans, if any*
   - *g) Shoring plans*
4. *All documents, correspondence, and meeting notes (both internal and external) concerning:*
   - *a) shoring for the project*
   - *b) Alternative solutions and all discussions of compliance with BC Building Code*
   - *c) ~~the proposed cistern as described to the public hearing by Ms Berry (~~following clarification)*

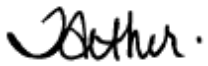
Access to these records was provided September 6, 2024 however, there were some additional records that required the City to seek third party notice. Attached please find the remaining records It is noted there are statement of imitation and copyright pages within provided in accordance with the request, which have been included with this response. These pages include drawings released subject to the Federal *Copyright Act* and in accordance with the *Freedom of Information and Protection of Privacy Act*, and further copies must not be made without permission of the holder of the copyright.

Please note the noted records were removed from the package provided in September and held until this time.

Thank you for your patience as we worked through this file.

Please contact me if you have any questions or concerns.

Sincerely,



Tracey Arthur
Director of Corporate Administration
Att.

If you believe that the City of White Rock has been unreasonable in its handling of your request, you may ask the Information and Privacy Commissioner to review our response. You have 30 days from receipt of this notice to request a review by writing to:

Office of the Information and Privacy Commissioner for British Columbia
PO Box 9038 Stn. Prov. Govt.
Victoria BC, V8W 9A4

Telephone 250-387-5629
E-mail: info@oipc.bc.ca

Should you decide to request a review, please provide the Commissioner's office with:

1. your name, address and telephone number;
2. a copy of this letter;
3. a copy of your original request sent to the City of White Rock; and
4. the reasons or grounds upon which you are requesting the review.

GEOPACIFIC
CONSULTANTS

P (604) 439 0922
geopacific.ca
1779 West 75th Avenue
Vancouver, B.C. V6P 6P2

WS Vidal Properties LP
315 – 13338 Central Avenue
Surrey, B.C.
V3T 0M3

January 10, 2024
File: 15514

Attention: Krista Baronian

Re: Geotechnical Investigation Report – Vidal St Project
1441-1465 Vidal Street and 14937 Thrift Avenue, White Rock, B.C.

1.0 INTRODUCTION

We understand that a residential development is proposed for the above referenced site. Based on the Architectural Drawings prepared by Keystone Architecture & Planning Ltd., dated July 4, 2023, the proposed development will consist of a 6 storey, wood framed, residential building with a rooftop amenity deck over up to 4 levels of below grade, reinforced concrete parking structure. The below grade portion of the development is to be constructed in close proximity to property lines. Foundation depths are expected to extend up to 14 m below grade at the northern extent.

This report provides the results of our field investigation and makes geotechnical recommendations for the design and construction of the proposed development. This report was prepared exclusively for WS Vidal Properties LP, for their use and for the use of others on their development team but remains the property of GeoPacific Consultants Ltd.

2.0 SITE DESCRIPTION

The proposed site consists of 4 adjoining residential lots located northwest of the intersection of Vidal Street and Thrift Avenue in White Rock, BC. The site is bounded by Vidal Street to the east, Thrift Avenue to the south and residential lots in all other directions.

Based on a surveyed topographical plan provided by Target Land Surveying issued on April 4, 2018, the site slopes from north to south with elevation differential of about 9 m.

The northern lot, 1465 Vidal Street, was cleared of all pre-existing improvements and is covered with trees and vegetation. The remaining lots are occupied with single family dwellings, paved/graveled driveways, grass, vegetation and fenced backyards. The location of the site relative to existing properties is shown on our Drawing No. 15514-01, following the text of this report.

3.0 FIELD INVESTIGATION

3.1 Site Investigation

GeoPacific initially investigated the site on October 25, 2017. Due to limited access to the majority of the lots, the initial investigation was carried out solely on 1465 Vidal Street. At that time, a total of 3 auger test holes (TH17-01 to TH17-03) were drilled to depths between 9.1 and 10.7 m below pre-existing grades and were supplemented with 1 Dynamic Cone Penetration Test (DCPT) sounding completed to approximately 1.5 m below pre-existing grade.

GeoPacific completed a supplementary investigation for the current development scope on October 26, 2023, to confirm soil conditions below the proposed foundation depths which are expected to extend up to 14 m below grade. At that time, 2 sonic test holes (TH23-01 and TH23-02), complete with one monitoring (standpipe piezometer, were conducted using a sonic drill rig supplied and operated by Blue Max Drilling Inc. of Surrey, BC. The test hole was terminated approximately 18.3 m below existing site grades. The monitoring well, installed at TH23-01, was screened between 15.3 and 18.3 m below existing site grades.

Prior to our investigations, a BC one call was placed, and the test hole locations were cleared of buried services. All test holes were backfilled and sealed in accordance with provincial abandonment requirements following classification, sampling, and logging of the soils in the field by our geotechnical staff. Our test hole logs are presented in Appendix A.

The approximate locations of the test holes are shown on our Drawing No. 15514-01.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Profile

According to the Geological Survey of Canada Surficial Geology Map 1484A the subject site is underlain by Capilano Sediments consisting of raised marine, deltaic, fluvial deposit, marine and glaciomarine stony and stoneless silts (till like) to clay loam with minor sand and silt. Glacial till typically underlies these deposits at depth. A general description of the soils encountered is provided below. For specific subsurface soil descriptions at the test hole locations refer to the test hole logs provided in Appendix A

Sand and Gravel (Fill)

Sand and gravel fill was identified in all our test holes. The sand and gravel contained trace to some silt and appears to be compact. The fill extends to depths of 0.3 m to 1.8 m below grade.

Silty Sand (Glacial Till)

The sand and gravel fill is underlain by very dense glacial till comprised of silty sand, some gravel. The moisture content ranges from 6.8% to 10.5%. The till extended beyond the maximum extent of our investigation, approximately 18.3 m below existing grade. Cobbles and boulders are also commonly encountered within the till like soils. The fines contents of the till encountered typically ranged from 26.8% to 32%, with a higher fines content noted approximately 10.9 m below existing grade within a silty layer at TH23-01.

4.2 Groundwater Conditions

The static groundwater table was not encountered during our investigation. No water was present in the monitoring well as of November 1st, 2023. Based on our site investigation, well logs and our experience within the surrounding area, we expect that the static groundwater depth is significantly below the proposed excavation grades.

Perched groundwater seepage from silty soils are expected to be light to moderate. Perched water may also be encountered in the surficial fills. We expect that the presence of perched ground water to vary seasonally with generally higher levels in the wetter months of the year.

5.0 DISCUSSION

5.1 General Comments

As noted in Section 1.0, we understand that a residential development is proposed for the above referenced site. Based on the Architectural Drawings prepared by Keystone Architecture & Planning Ltd., dated July 4, 2023, the proposed development will consist of a 6 storey, wood framed, residential building with a rooftop amenity deck over up to 4 levels of below grade, reinforced concrete parking structure. The below grade portion of the development is to be constructed in close proximity to property lines. Foundation depths are expected to extend up to 14 m below grade at the northern extent.

Based on the results of our geotechnical investigations and the anticipated foundation depths, we expect that the development will be founded on very dense glacial till. We expect that these soils will provide adequate support for conventional pad and strip footings.

Shoring will be required to facilitate excavation and support neighbouring properties, structures or utilities given that the proposed below grade structure is to be constructed in close proximity to the property lines. Our design recommendations for temporary excavations are provided in Section 6.7.

The subsurface soils are not considered prone to liquefaction or other forms of ground softening under the design earthquake defined under the 2018 British Columbia Building Code.

We envision that some perched groundwater will be encountered while excavating and will need to be controlled. A graded excavation with sumps at low points should be adequate to control seepage. Based on the site investigations completed it is not anticipated that the static groundwater tale will be encountered during excavation works.

We confirm, from a geotechnical point of view, that the proposed building development is feasible provided the recommendations outlined in Sections 6.0 are incorporated into the overall design.

6.0 RECOMMENDATIONS

6.1 Site Preparation

Prior to construction of foundations and floor slabs, all unsuitable materials including vegetation, topsoil, fill, organic material, debris, and loose or otherwise disturbed soils must be removed to expose a subgrade of dense to very dense silty sand. However, as the development is to be constructed with a below grade component, we expect that the excavation depth will be driven by the architectural design rather than the soils encountered. Suitable bearing soils are expected at the proposed foundation elevations. Crushed gravel or engineered fill can be placed beneath the slab-on-grade only.

"Engineered Fill" is generally defined as clean sand to sand and gravel containing silt less than 5% by weight, compacted in 300 mm loose lifts to a minimum of 95% of the ASTM D1557 (ModifiedProctor) maximum dry density at a moisture content that is within 2% of optimum for compaction.

It is very important that the stripped subgrade be protected by lean mix concrete to preserve its bearing qualities and that it remain dry and free of ponded water prior to pouring concrete for footings. Any softened, disturbed subgrade should be removed under the review of GeoPacific and replaced with lean mix (5.0 MPa) concrete beneath the foundations.

GeoPacific shall be contacted for the review of foundation grade reinstatement, and engineered fill placement and compaction.

6.2 Foundations

Footings which are founded on very dense glacial till, as described in Section 4.1, can be designed on the basis of a serviceability limit state (SLS) bearing pressure of 500 kPa for strip or pad footings.

Factored ultimate limit state (ULS) bearing pressures, for transient loads such as those induced by wind and earthquakes, may be taken as 1.5 x the SLS bearing pressures provided above.

We estimate for foundations designed as recommended, settlements will not exceed 25 mm total and 2 mm per metre differential.

Irrespective of the allowable bearing pressures given, pad 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.

Adjacent footings should achieve a maximum elevation difference equal to half of their horizontal distance to avoid superimposing the upper foundation loading to the lower foundation.

Foundation subgrades of all buildings must be reviewed by GeoPacific prior to blinding and footing construction.

6.3 Seismic Design of Foundations

We did not encounter any soils considered to be prone to liquefaction or strain softening during cyclic loading caused by the design earthquake as defined in the 2018 British Columbia Building Code. The subgrade conditions underlying this site may be classified as Site Class C as defined in Table 4.1.8.4.A of the 2018 British Columbia Building Code.

6.4 Lateral Pressures on Foundation Walls

The earth pressures on the basement walls depends upon a number of factors including the backfill material, surcharge loads, backfill slope, drainage, rigidity of the basement wall and method of construction including sequence and degree of compaction. For a fully restrained basement wall designed for static pressures a pressure distribution of 8 H (kPa) triangular, where H is the height of the restrained soil in meters, should be employed. For an unrestrained basement wall a static pressure distribution of 5 H (kPa) triangular may be used.

Dynamic loading induced by the 2018 BCBC design earthquake should be added to the static loads and should be taken as 2.5 H (kPa) inverted triangular.

Restrained versus unrestrained conditions depend upon the degree of wall movement. A flexible, or unrestrained wall, is allowed to move 0.002H outwards at the top of the wall, where H is the height of the wall. A restrained or rigid wall is prevented from rotating out at the top of the wall either by intervening walls or floors which prevent deflection of the wall. Partial movements of the wall may result in pressures somewhat less than the restrained condition, but it is not possible to predict intermediate cases with any degree of certainty.

We have assumed that a free draining granular backfill will be used behind the basement walls and that a perimeter drainage system will also be employed to collect any water from behind the walls. Therefore, our wall loading scenarios presented above assume that no water pressure will be generated behind the walls.

All earth pressures are based upon no surcharges or slopes above the walls. All soil parameters and loads are assumed to be unfactored.

GeoPacific shall be contacted for the review of all backfill materials and procedures.

6.5 Slab-On-Grade Floors

In order to provide suitable support for slab-on-grade floors we recommend that any fill placed under the slab should be granular and essentially "clean" with not more than 5% passing the #200 sieve. In addition, this granular fill must be compacted to a minimum of 98% Standard Proctor (ASTM D698) maximum dry density with water content within 2% of optimum for compaction.

Floor slabs should be directly underlain by a minimum of 150 mm of a free draining granular material, such as 19 mm clear crushed rock. A moisture barrier should underlie the slab directly above the free draining granular material.

Compaction of the slab-on-grade fill must be reviewed by GeoPacific.

6.6 Foundation Drainage

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. Groundwater flows are expected to be relatively light to moderate, likely in the range of 30 to 50 liters/minute for the entire excavation. These flow rates should be confirmed at the time of construction.

6.7 Excavation and Shoring

The proposed development is to include up to 4 levels of below grade construction. Shoring will be required to facilitate excavation and support neighbouring properties, structures or utilities given that the proposed below grade structure is to be constructed in close proximity to the property lines. Partial open cuts above the shoring wall may be feasible where the building is offset from the property lines.

Vertical cuts may be supported with the use of a shotcrete membrane tied back with post-tensioned soil anchors. In areas where sand layers within the till like soils are encountered, hollow core (HBO) anchors may be required where a drilled anchor hole will not remain open to allow the installation of a conventional anchor bar.

We expect that the perimeter excavation would be sloped where sufficient space is available as it is more economical to do so. We would expect that slopes cut of 3H:4V (3 Horizontal to 4 Vertical) can be constructed

in the dense to very dense silty sand and 1H:1V in the surficial fills. Above any shoring walls, 1H:1V slope cuts would be feasible.

Our experience in this area indicates that cobbles and boulders may be present within the till like soils. Cobbles and small boulders can typically be removed with conventional excavation equipment. However, large boulders may require splitting/blasting to facilitate their removal from the site.

Some seepage into excavations from surficial fills and the till like soils should be expected. We envisage that groundwater inflows can generally be controlled with conventional sumps and sump pumps. Some face-saving measures may be required where seepage occurs at the shoring face.

6.8 Utilities

Site utilities will be required beneath the grade supported slab. The design of these systems must consider the location and the depth of the foundations. The service trenches and excavations required for the installation of underground vaults and/or manholes should be outside of a 1H:1V slope measured downward and outward from the underside of foundations.

Backfilling of trenches and excavations should be done with 19 mm clear crush gravel following the required pipe bedding.

All excavations and trenches must conform to the latest Occupational Health and Safety Regulation supplied by the Workers Compensation Board of British Columbia.

Temporary cut slopes in excess of 1.2 m in height must be covered in polyethylene sheeting and require review by a professional engineer in accordance with WorkSafe BC guidelines, prior to worker entry.

6.9 Onsite Pavement Structures

Following the recommended site preparations outlined in Section 6.1, the stripped road subgrade should be proof rolled to locate any loose or soft zones. Any areas which have become loosened and cannot be recompacted to a minimum of 95% Modified Proctor (ASTM D1557) maximum dry density must be excavated and replaced with engineered fill.

Provided that the subgrade consists of stiff to very stiff silt, or engineered fill, it is our opinion that our recommended pavement structure, given in Table 1 below, is sufficient to carry the anticipated vehicle loads in on-site parking areas and drive aisles.

Table 1: Recommended Minimum Pavement Structure for On Site Pavement

MATERIAL	THICKNESS (mm)
Asphaltic Concrete	85
19 mm minus crushed gravel base course	150
Clean Sand and Gravel subbase course	200

The thickness of asphalt may be decreased to 65 mm in parking areas to be occupied solely by automobiles and light trucks. All base and sub-base fills should conform to municipal standards and be compacted to a minimum

of 95% Modified Proctor Maximum Dry Density (ASTM D1557) with a moisture content within 2% of optimum for compaction.

Density testing should be conducted on these materials and the results forwarded to GeoPacific for review.

6.10 Re-Use of Native Soils

Excavated soils derived from the site are expected to be silt predominant. Therefore, they are not considered suitable for re-use as engineered fill.

7.0 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 contractors' obligations to perform under the terms of his/her contract.

It is the contractors' responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Field reviews are normally required at the time of the following activities:

1.	Excavation	Review of temporary cut slopes.
2.	Shoring	Review of shotcrete shoring construction, anchor installation and testing, anchor de-tensioning and removal, and shotcrete removal.
3.	Foundation	Review of foundation subgrade.
4.	Slab-on-grade	Review of subgrade and under-slab fill materials and compaction.
5.	Backfill	Review of backfill materials and compaction against foundation walls.
6.	Engineered Fill	Review of fill materials and compaction.

It is critical that these reviews are carried out to ensure that our intentions have been adequately communicated. It is also critical that contractors working on the site view this document in advance of any work being carried out so that they become familiar with the sensitive aspects of the works proposed. It is the responsibility of the developer to notify GeoPacific Consultants Ltd. when conditions or situations not outlined within this document are encountered.

8.0 CLOSURE

This report has been prepared exclusively for Weststone Group for the purpose of providing geotechnical recommendations for the design and construction of the proposed building, temporary excavations and related earthworks. The 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 assistance to you on this project and we trust that our comments and recommendations are both helpful and 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 call.

For:
GeoPacific Consultants Ltd.

Revised

Permit to Practice
EGBC
1000782

JAN 16 2024

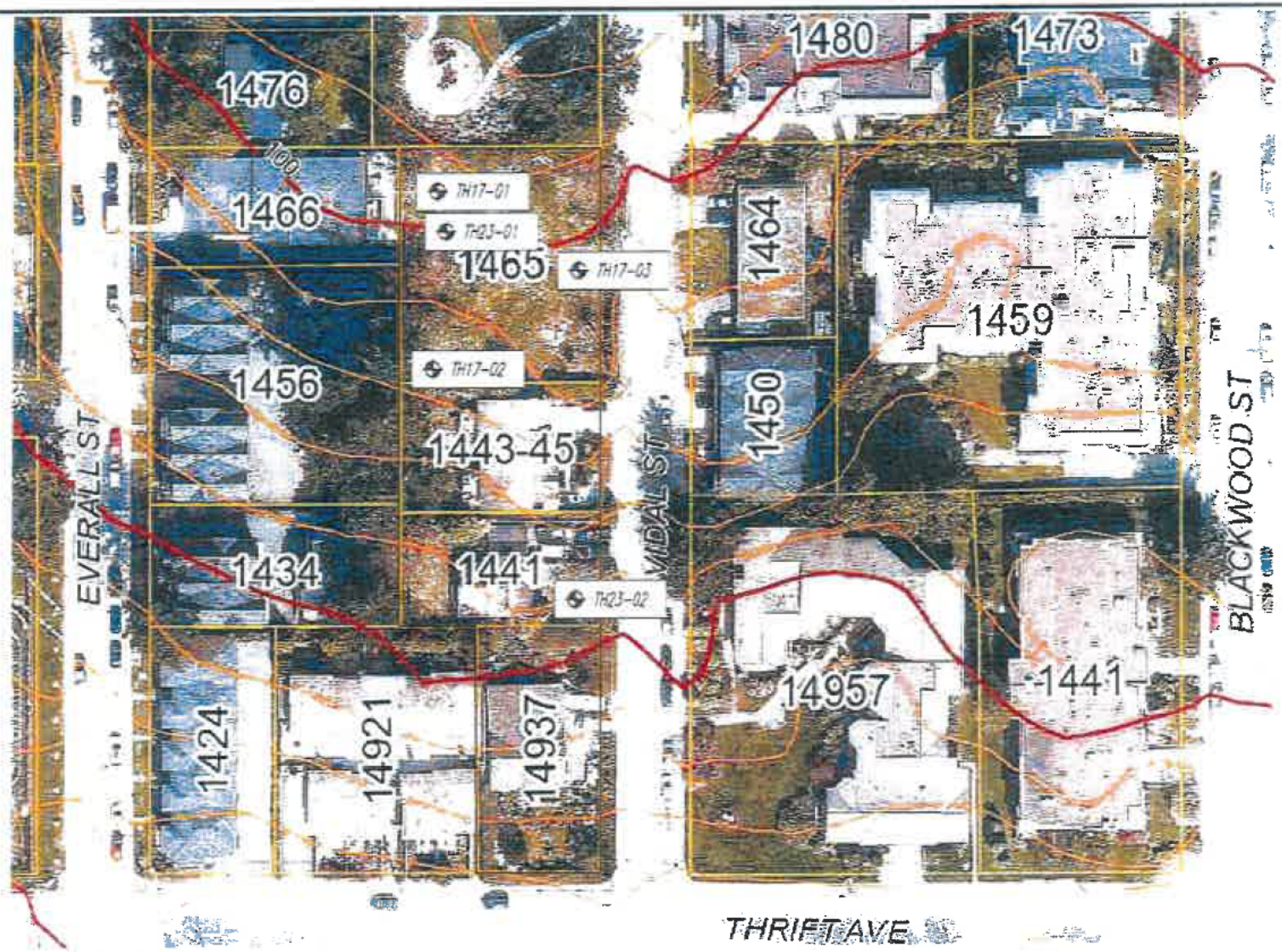
Helen McGhee, M.Eng., E.I.T.
Geotechnical E.I.T.

Kevin Bodnar, M.Eng., P.Eng.
Principal

Bobby Sandhu, B.Eng., E.I.T.
Geotechnical E.I.T.

Appendix A

Test Hole Logs



LEGEND:

- TH17-# - 2017 TEST HOLE (TH) LOCATIONS
- TH23-# - 2023 TEST HOLE (TH) LOCATIONS
- APPPOXIMATE SITE BOUNDARY

SITE PLAN
SCALE = NTS

WROMS - 2023-10-18

GEOPACIFIC VANCOUVER
1779 W. 75th Avenue
Vancouver, BC V6P 6P2
P 604 439 9922
F 604 439 9189

NOVEMBER 3, 2023

BSS	ZO	BSS
SEE ABOVE		

PROPOSED RESIDENTIAL DEVELOPMENT
14397 THRIFT AVE, 1441-1465 VIDAL ST, WHITE ROCK, BC
TEST HOLE LOCATIONS

15514

15514-01

Test Hole Log: TH23-01

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C.

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

INFERRED PROFILE

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
0	0		Ground Surface				
1–3	1		***SAND AND GRAVEL (FILL)*** SAND, SOME SILT and GRAVEL. Loose to compact, sand is fine grained, gravel is subangular, brown, wet.	0.00			
4–7	2		***WEATHERED GLACIAL TILL*** SAND and GRAVEL w/ COBBLES. Compact, sand is fine grained, gravel is subangular, grey brown, dry.	1.83			Root fragments throughout, drier with depth
8–11	3			3.05			
12–16	4		***GLACIAL TILL*** SAND, SILTY and GRAVELLY w/ COBBLES. Compact to dense, gravel uniformly graded, grey, dry. (Profile inferred 10-12ft)	4.57	9.9		Moisture content changes to moist Cobble content increases with depth
17–20	5–6		***GLACIAL TILL*** SAND, SILTY w/ some GRAVEL. Compact to dense, sand is fine grained, gravel is subangular, grey brown, moist. (Profile inferred 15-16ft)				Increase in gravel content with depth
21–27	7–8				7.1		
28–31	9			9.14			
32–33	10				13.1		

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.4.

Test Hole Log: TH23-01

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C.

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

INFERRED PROFILE

Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
34						
35						
36	11	**GLACIAL TILL** SAND, SILTY w/ some GRAVEL and COBBLE. Loose to compact, sand is fine grained, gravel is subangular, grey brown, moist to wet. (Profile inferred 30-32ft)		9.4		MC changes to wet Fines 40.4% Increase in gravels and cobbles
37						
38			11.58			
39	12					Increase in fine sand content
40			12.19			
41		**GLACIAL TILL** SILTY SAND w/ some GRAVEL and COBBLES. Compact, sand is fine grained, gravel is subangular, grey brown, moist.				
42						
43	13					Increase in moisture content
44						
45						
46	14	**GLACIAL TILL** SAND and GRAVEL, some SILT w/ COBBLES. Loose to compact, sand is fine grained, gravel is subangular, grey, dry becoming wet. (profile inferred 40-43ft)		7.1		Fines 27.4%
47						
48						
49	15					Increase in sand fines with depth
50						
51						Decrease in cobble content
52						
53	16					
54						
55						
56	17					
57						
58				6.8		
59	18					
60						GW recorded November 1st 2023. No Groundwater recorded
61		End of Borehole	18.29			
62	19					
63						
64						
65						
66	20					

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.4.

Test Hole Log: TH23-02

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: (604) 439-0922 Fax: (604) 439-9189

Depth (ft)	Depth (m)	Symbol	INFERRED PROFILE: SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
0	0		**Ground Surface**				
1			***FILL*** SILTY SAND. Loose, sand is fine to medium grained, Brown, dry	0.00			
3	1		***SANDY SILT*** SANDY SILT w/ GRAVEL and some cobbles. Loose to compact, sand is medium grained, gravel is subanglular, dark brown, dry.	0.91			
5				1.52			Many Gravels>10mm
7	2			2.13			
9			***WEATHERED GLACIAL TILL*** SAND and GRAVEL. Compact, sand is fine to medium grained, gravel is subangular, brown, moist.	3.05			
10	3						
13	4		***GLACIAL TILL*** SILTY SAND and GRAVEL. Dense, sand is fine to medium grained,brown,moist.		10.5		
16	5						
17			***GLACIAL TILL*** SILTY SAND and GRAVEL. Dense to very dense, sand is fine grained, light brown, moist.				
20	6						
23	7						Becoming Moist with Depth
26	8		***SAND AND GRAVEL*** SAND AND GRAVEL. Compact, fine to medium grained sand, gravel is subangular, grey, dry to moist.	7.62			
29	9						Some Gravels<10mm
33	10						

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.5.

Test Hole Log: TH23-02

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C

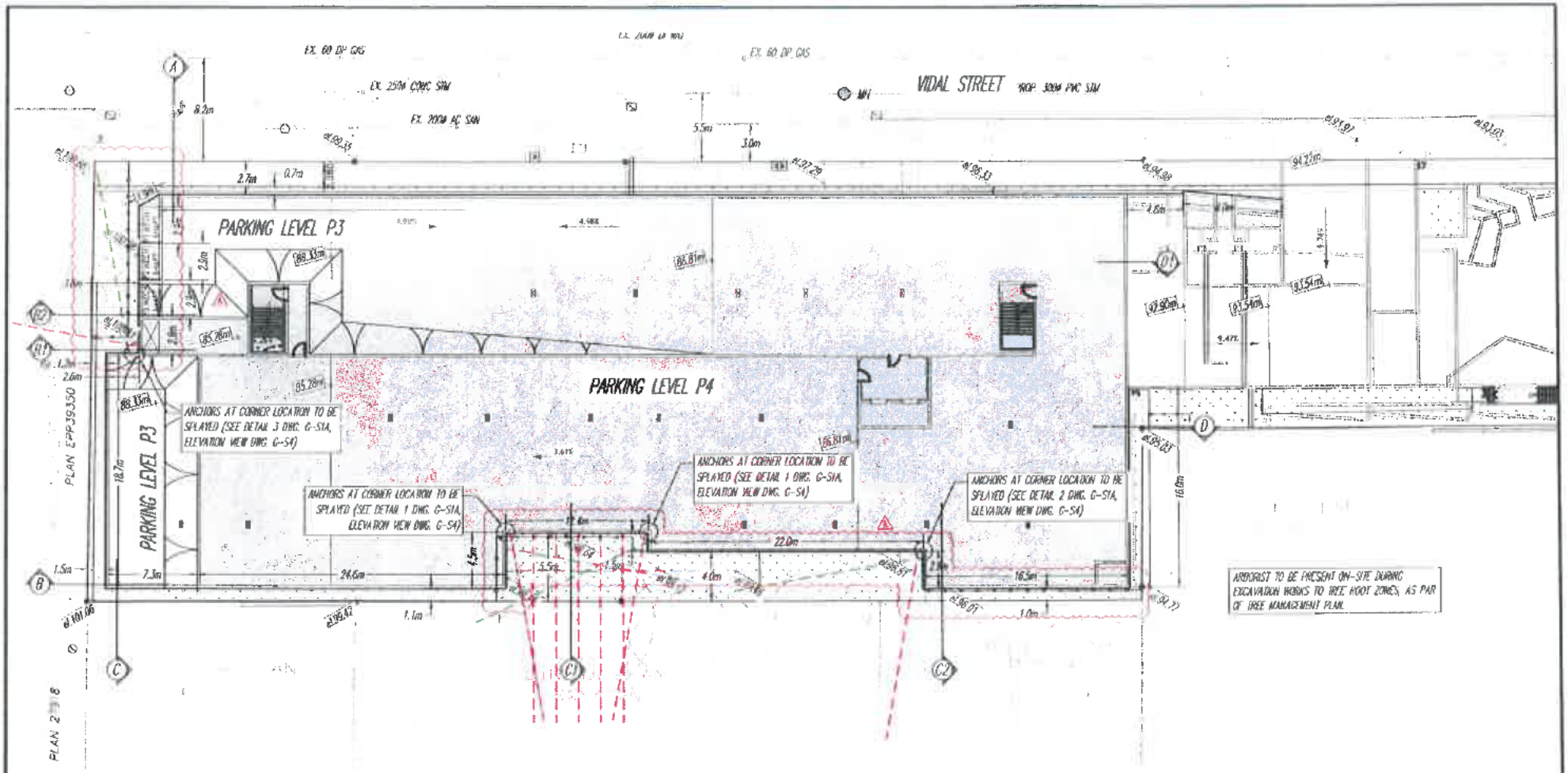
GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax: 604-439-0189

INFERRED PROFILE

Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
34						
35						
36	11	**GLACIAL TILL** SILTY SAND and GRAVEL. Dense to very dense, sand is fine grained, gravel is subangular, grey, moist.	10.67			
37						
38						
39	12			7.8		Fines 32.0%
40						
41						
42						Gravels increase with depth
43	13					
44						
45						
46	14	**SAND AND GRAVEL** SAND AND GRAVEL, some SILT. Dense to very dense, sand is medium grained, grey, moist.	13.72			
47						
48						
49	15			6.4		
50						
51						
52	16					
53						
54						
55						Increase in Gravel content
56	17	**SAND AND GRAVEL** SAND AND GRAVEL. Dense to very dense, sand is medium grained, grey, moist.	16.76			
57						
58						Fines 26.8%
59	18			9.1		
60						
61		End of Borehole	18.29			
62	19					
63						
64						
65						
66	20					

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.5.



LEGEND:

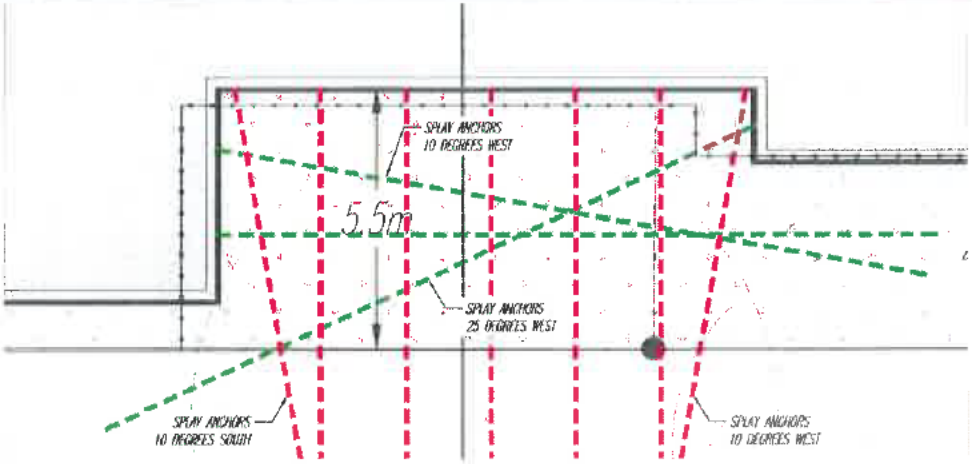
- (GUIDE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. - NOMINAL EXCAVATION LEVEL AT PERIMETER = SLAB EL.-0.6m OR AS SHOWN

Permit to Practice
EGBC
1000782

K. L. BOONAERT
17015
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA

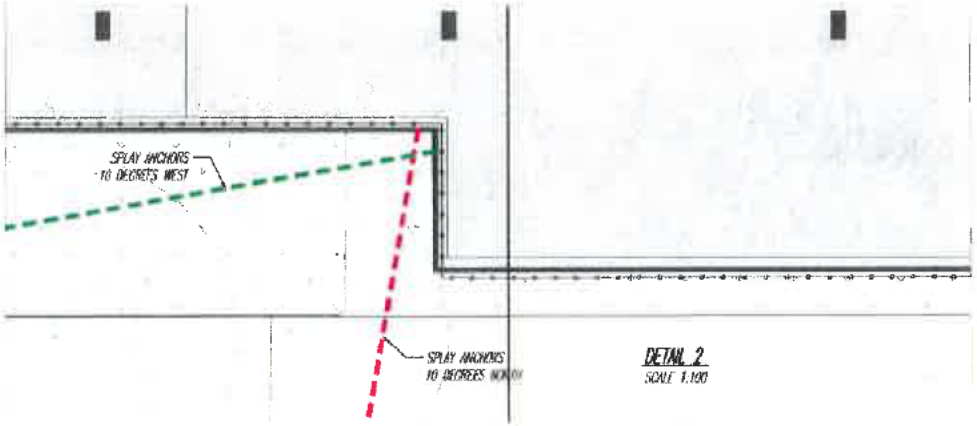
JUN 2 0 2024

GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. SHORING - SITE PLAN	15514 G-S1
	M.S. K.P. Z.D. AS SHOWN		JUNE 25, 2024 - Tree protection fence



DETAIL 1
SCALE 1:100

DETAIL 3
SCALE 1:100



DETAIL 2
SCALE 1:100

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K. L. BOONA
PROVINCE OF BRITISH COLUMBIA
ENGINEER

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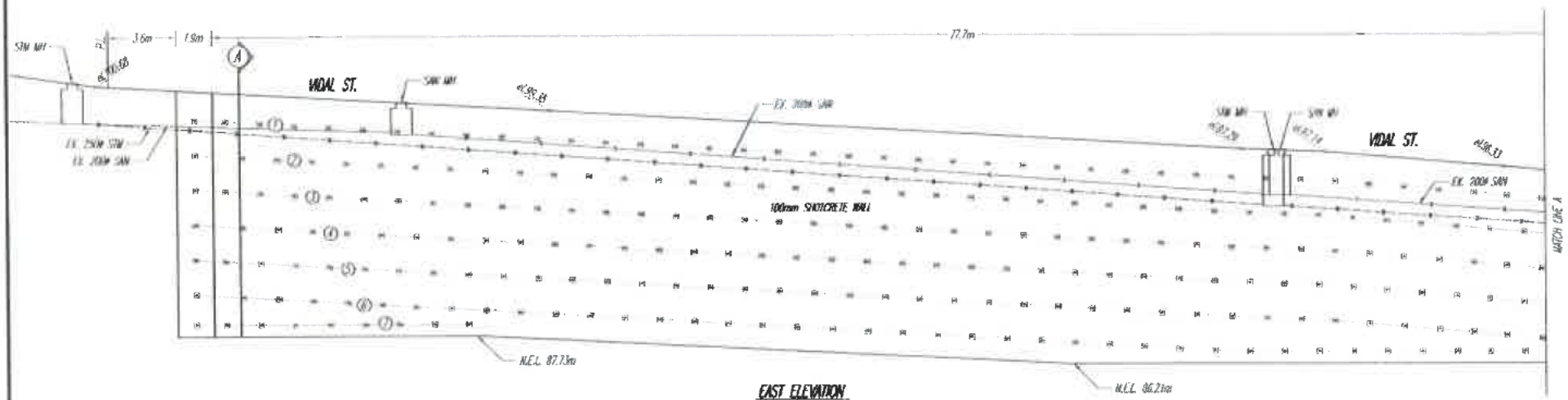
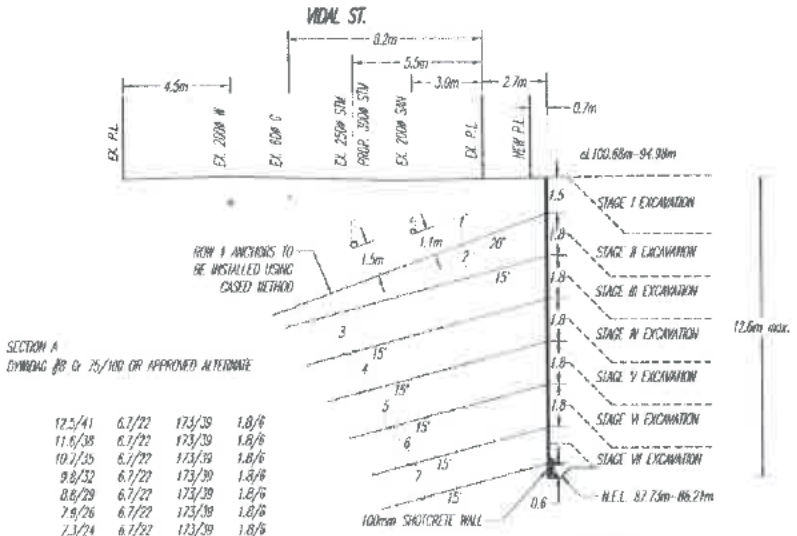
GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023 M.S. | K.B. | J.O. AS SHOWN	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. SHORING – SITE PLAN DETAILS	15514 G-S1A	JUNE 25, 2024 - tree protection fence	



EAST ELEVATION
SCALE 1:200

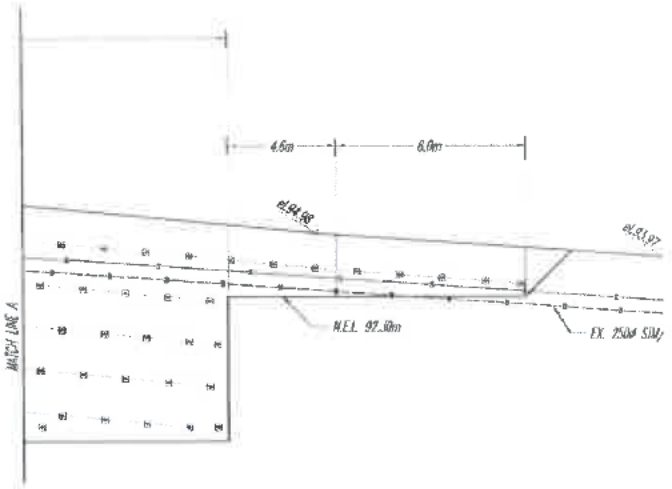


SECTION A
DYWIDAG ϕ18 Gr. 75/100 OR APPROVED ALTERNATE

12.5/41	6.7/22	173/39	1.8/6
11.6/38	6.7/22	173/39	1.8/6
10.7/35	6.7/22	173/39	1.8/6
9.8/32	6.7/22	173/39	1.8/6
8.8/29	6.7/22	173/39	1.8/6
7.9/26	6.7/22	173/39	1.8/6
7.3/24	6.7/22	173/39	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

SECTION A
SCALE 1:200



L E G E N D :

- GRADE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. - NOMINAL EXCAVATION LEVEL AT PERIMETER = SLAB EL. -0.6m OR AS SHOWN

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K. [illegible]
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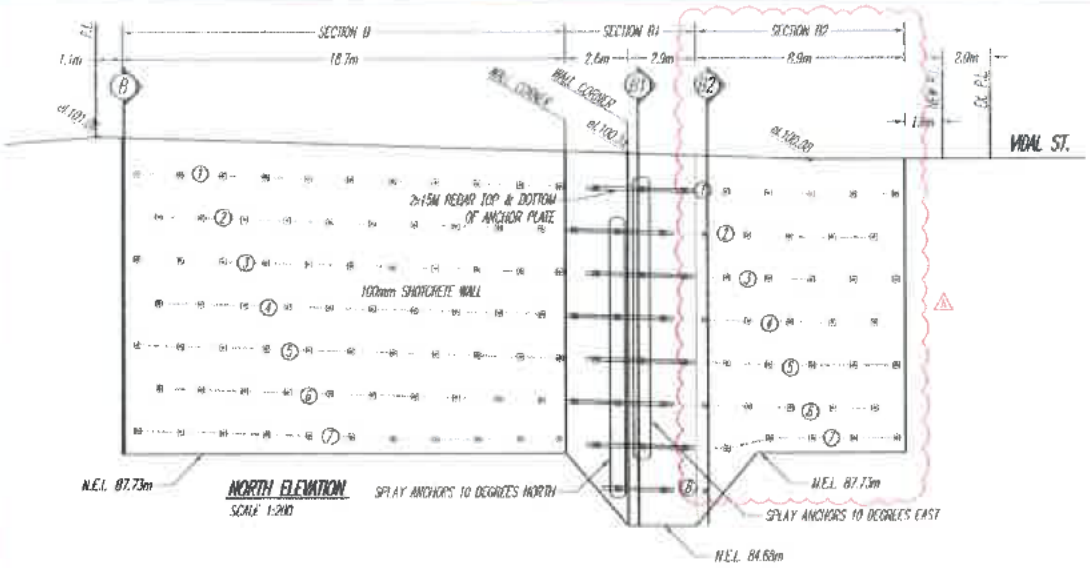
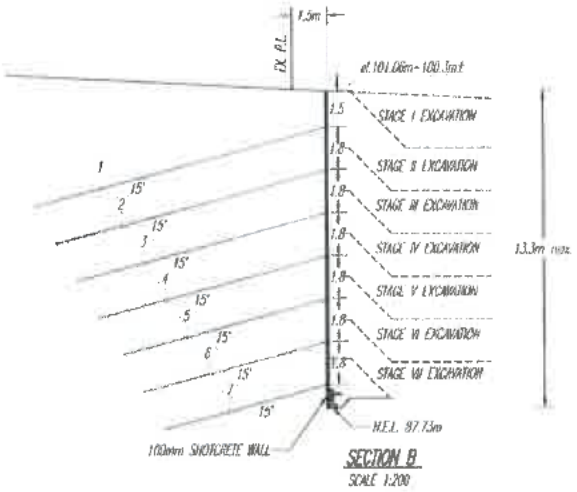
GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. SHORING - EAST ELEVATION, SECTION A	15514 G-S2	JUNE 25, 2024 - tree protection fence
	M.S. K.B. J.O. AS SHOWN			





SECTION B
DRAWING #B Gr. 75/100 OR APPROVED ALTERNATE

12.9/42	6.7/22	173/39	1.8/6
11.9/39	6.7/22	173/39	1.8/6
11.6/38	6.7/22	173/39	1.8/6
10.1/33	6.7/22	173/39	1.8/6
9.1/30	6.7/22	173/39	1.8/6
8.2/27	6.7/22	173/39	1.8/6
7.3/24	6.7/22	173/39	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

LEGEND:

- GRADE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. - NOMINAL EXCAVATION LEVEL AT PERIMETER = SLAB EL.-0.6m OR AS SHOWN

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PROFESSIONAL ENGINEER K.M. BOGNAR BRITISH COLUMBIA

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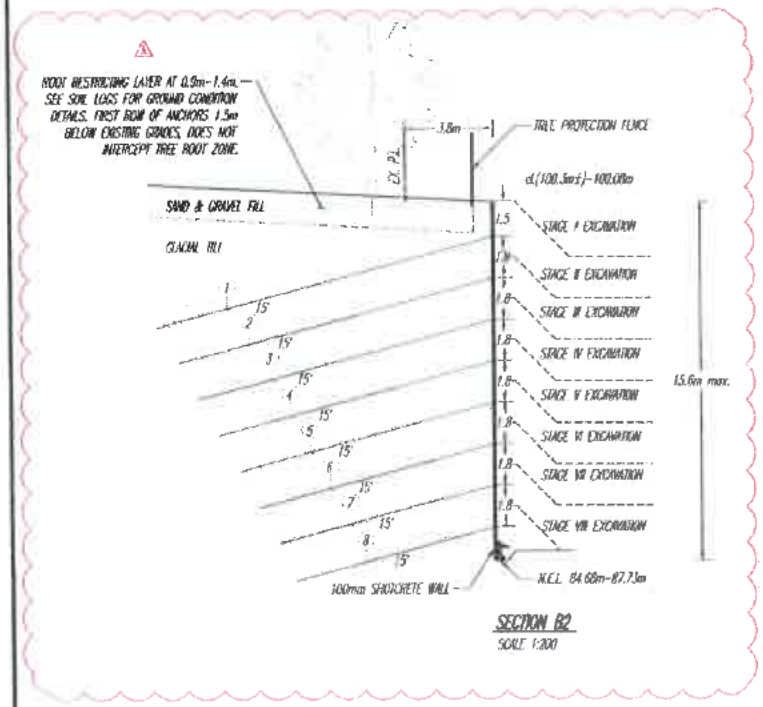
GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT	15514
	M.S. / K.B. / J.O.	VIDAL STREET, WHITE ROCK, B.C.	
	AS SHOWN	SHORING - NORTH ELEVATION, SECTION B	G-S3A
		JUNE 25, 2024 - tree protection fence	

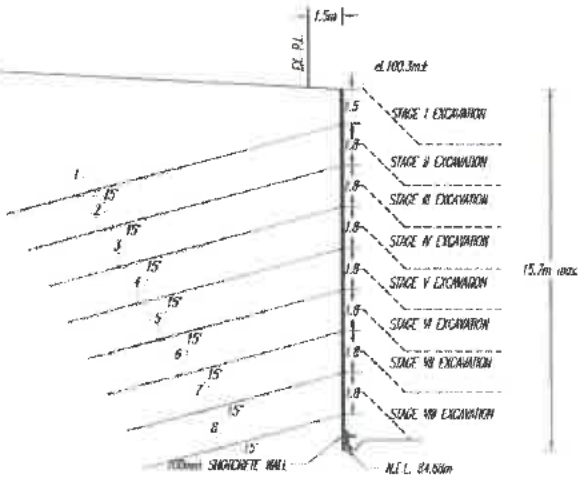


SECTION B2
SCALE 1:200

SECTION B2
DRAINAGE 1" Gr 120/150 OR APPROVED ALTERNATE

15.2/50	7.9/26	200/45	1.8/6
14.3/47	7.9/26	200/45	1.8/6
13.4/44	7.9/26	200/45	1.8/6
12.5/41	7.9/26	200/45	1.8/6
11.6/38	7.9/26	200/45	1.8/6
10.7/35	7.9/26	200/45	1.8/6
9.8/32	7.9/26	200/45	1.8/6
9.1/30	7.9/26	200/45	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES



SECTION B1
SCALE 1:200

SECTION B1
DRAINAGE 1" Gr 120/150 OR APPROVED ALTERNATE

15.2/50	7.9/26	200/45	1.8/6
14.3/47	7.9/26	200/45	1.8/6
13.4/44	7.9/26	200/45	1.8/6
12.5/41	7.9/26	200/45	1.8/6
11.6/38	7.9/26	200/45	1.8/6
10.7/35	7.9/26	200/45	1.8/6
9.8/32	7.9/26	200/45	1.8/6
9.1/30	7.9/26	200/45	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

LEGEND:

- GRADE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. – MINIMUM EXCAVATION LEVEL AT PERIMETER = SLAB EL.-0.6m OR AS SHOWN

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DECEMBER 12, 2023		
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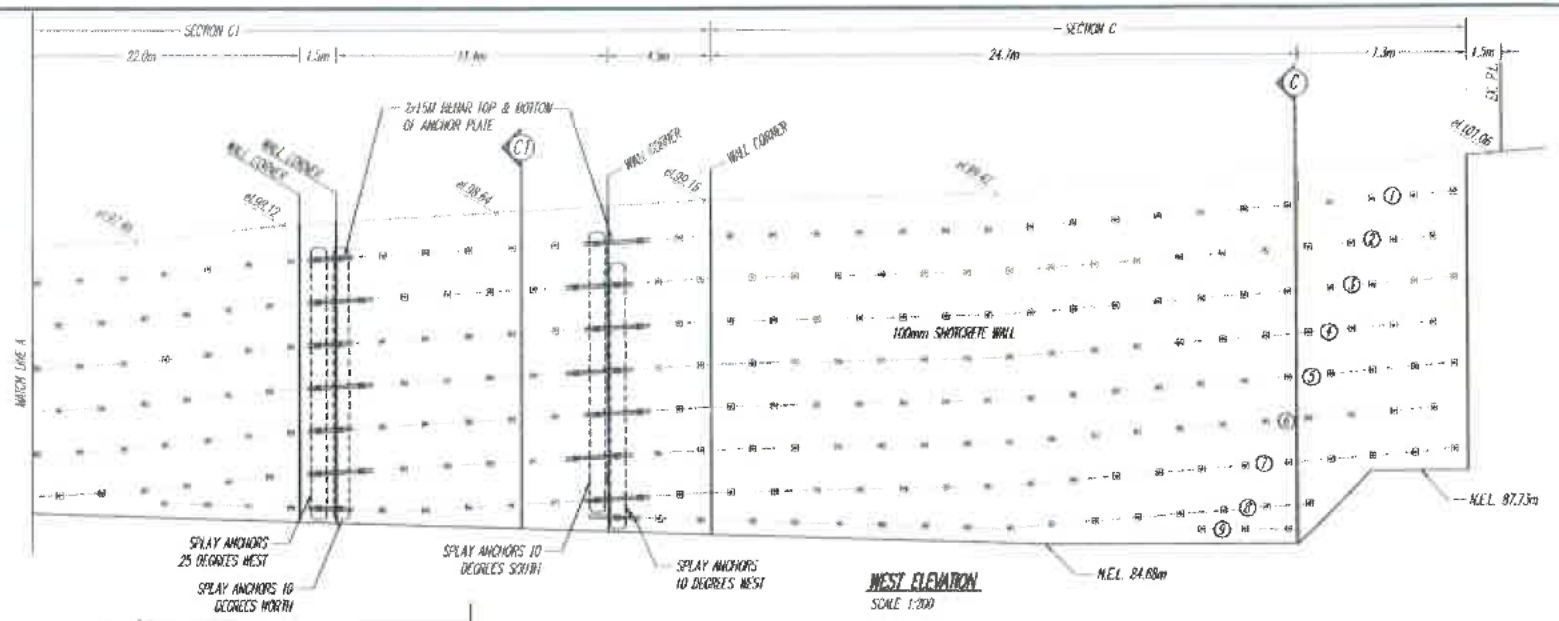
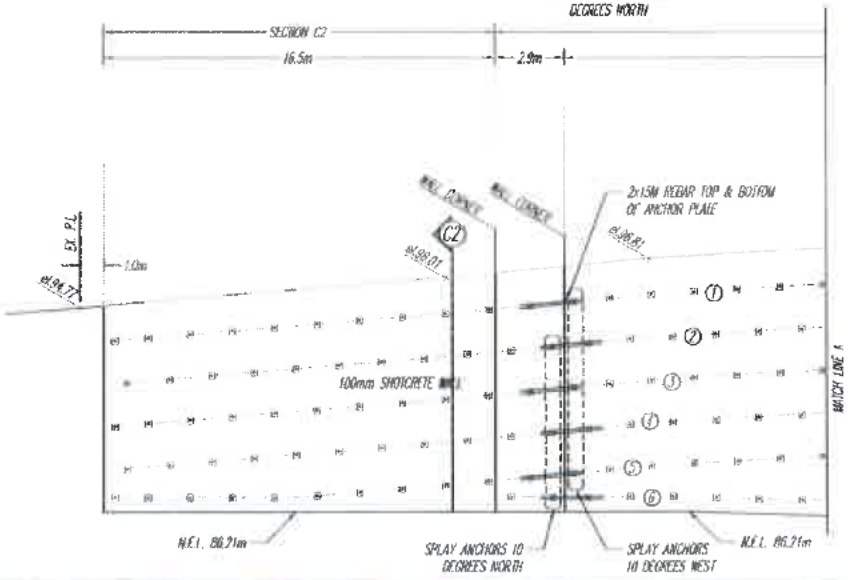
PROPOSED RESIDENTIAL DEVELOPMENT
VIDAL STREET, WHITE ROCK, B.C.
SHORING – SECTIONS B, B1

15514
G-538

JUNE 25, 2024 – tree protection fence





LEGEND

- GRADE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. – NOMINAL EXCAVATION LEVEL AT PERIMETER = SLAB EL. -0.6m OR AS SHOWN

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PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K. L. BODNER

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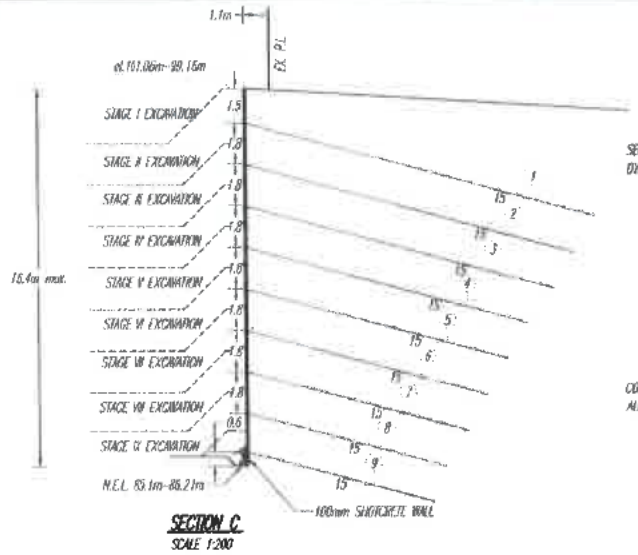
GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. SHORING – WEST ELEVATION	15514 G-S4A
	M.S. K.B. Z.D. AS SHOWN		JUNE 25, 2024 – tree protection fence

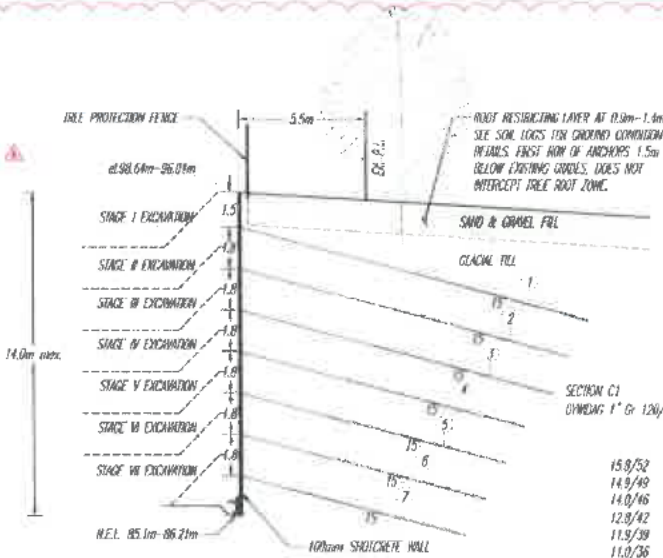


SECTION C
SCALE 1:200

SECTION C
DOWELS 1" Gr 170/150 OR APPROVED ALTERNATE

15.8/52	7.9/26	200/45	1.8/6
14.9/49	7.9/26	200/45	1.8/6
14.0/46	7.9/26	200/45	1.8/6
12.8/42	7.9/26	200/45	1.8/6
11.9/39	7.9/26	200/45	1.8/6
11.0/36	7.9/26	200/45	1.8/6
10.1/33	7.9/26	200/45	1.8/6
9.1/30	7.9/26	200/45	1.8/6
8.5/28	7.9/26	200/45	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES



SECTION C1
SCALE 1:200

SECTION C1
DOWELS 1" Gr 120/150 OR APPROVED ALTERNATE

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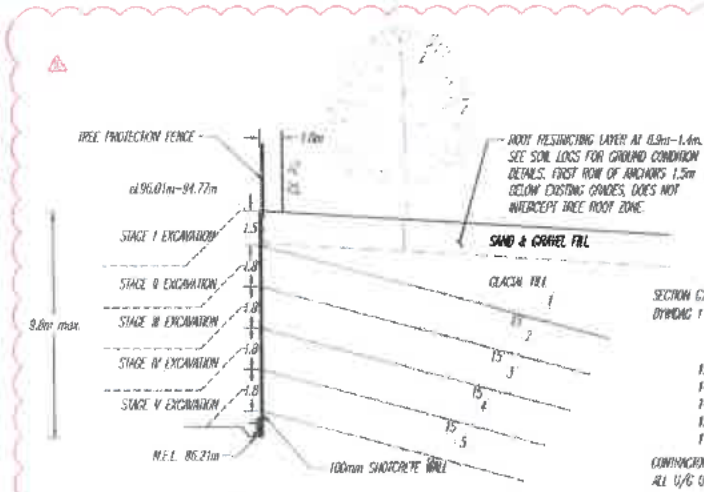
14.9/49	7.9/26	200/45	1.8/6
14.0/46	7.9/26	200/45	1.8/6
12.8/42	7.9/26	200/45	1.8/6
11.9/39	7.9/26	200/45	1.8/6
11.0/36	7.9/26	200/45	1.8/6
10.1/33	7.9/26	200/45	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES



SECTION C2
SCALE 1:200

SECTION C2
DOWELS 1" Gr 120/150 OR APPROVED ALTERNATE

15.8/52	7.9/26	200/45	1.8/6
14.9/49	7.9/26	200/45	1.8/6
14.0/46	7.9/26	200/45	1.8/6
12.8/42	7.9/26	200/45	1.8/6
11.9/39	7.9/26	200/45	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

LEGEND

- el.xx.xxm – GRADE ELEVATION
- el.xx.xxm – PROPOSED SLAB ELEVATION
- M.E.L. – MINIMUM EXCAVATION LEVEL AT PERIMETER = SLAB EL. -0.6m OR AS SHOWN

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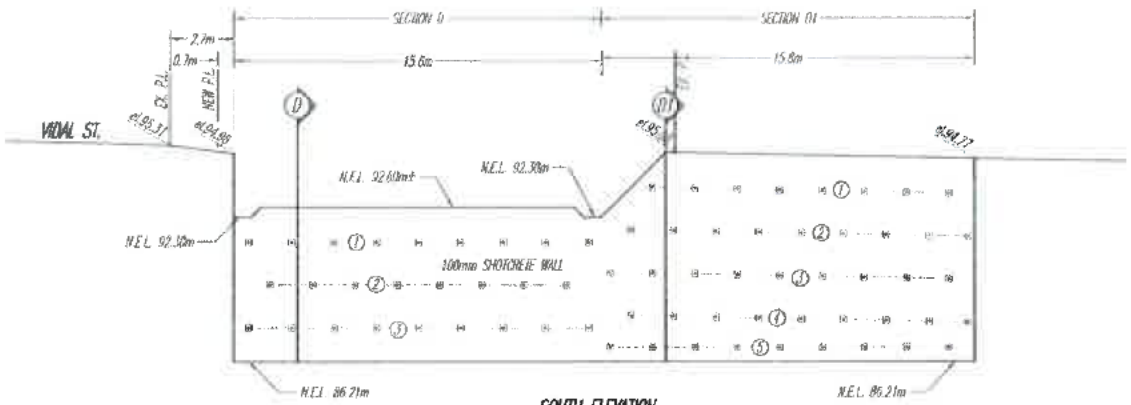
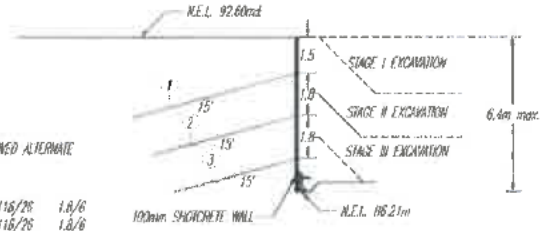
PROPOSED RESIDENTIAL DEVELOPMENT
VIDAL STREET, WHITE ROCK, B.C.
SHORING – SECTIONS C, C1, C2

15514
G-S4B

JUNE 25, 2024 – tree protection fence



SOUTH ELEVATION
SCALE 1:200

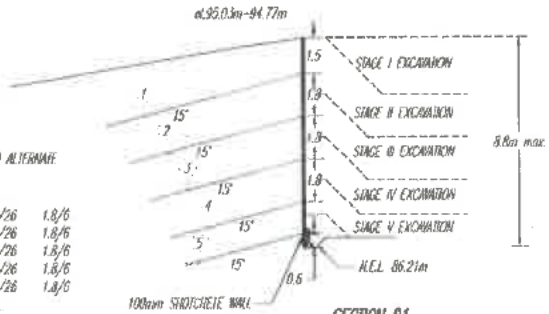


SECTION D:
LYNDAG #7 Gr 75/100 OR APPROVED ALTERNATE

7.3/24	4.8/15	116/26	1.8/6
6.4/21	4.8/15	116/26	1.8/6
5.5/18	4.6/15	116/26	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

SECTION D
SCALE 1:200



SECTION D1:
LYNDAG #7 Gr 75/100 OR APPROVED ALTERNATE

8.6/28	4.6/15	116/26	1.8/6
7.6/25	4.6/15	116/26	1.8/6
6.7/22	4.6/15	116/26	1.8/6
5.8/19	4.6/15	116/26	1.8/6
5.2/17	4.6/15	116/26	1.8/6

CONTRACTOR TO CONFIRM LOCATION OF ALL U/G UTILITIES

SECTION D1
SCALE 1:200

LEGEND:

- GRADE ELEVATION
- PROPOSED SLAB ELEVATION
- N.E.L. – NOMINAL EXCAVATION LEVEL AT PERIMETER = SLAB EL.-0.6m OR AS SHOWN

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DECEMBER 12, 2023		
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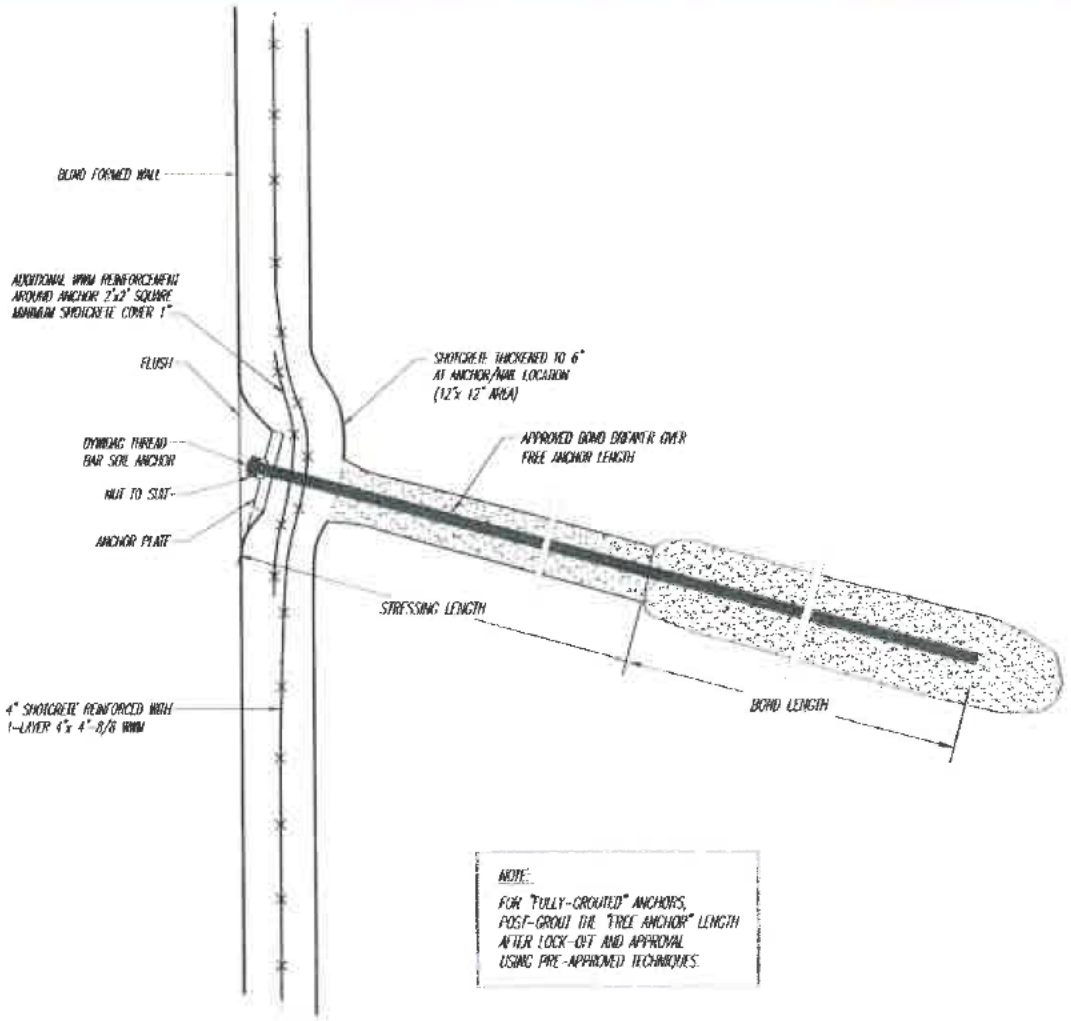
PROPOSED RESIDENTIAL DEVELOPMENT
VIDAL STREET, WHITE ROCK, B.C.
SHORING – SOUTH ELEVATION, SECTION D, D1

15514

G-S5

JUNE 25, 2024 - Tree protection fence



NOTE:
FOR "FULLY-GROUTED" ANCHORS, POST-GROUT THE "FREE ANCHOR" LENGTH AFTER LOCK-OFF AND APPROVAL USING PRE-APPROVED TECHNIQUES.

ANCHORED SHOTCRETE DETAIL

N.T.S.

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GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT	15514
	M.S. | K.B. | Z.D.	VIDAL STREET, WHITE ROCK, B.C.	C-1
	AS SHOWN	SHORING - ANCHORED SHOTCRETE WALL DETAIL	JUNE 25, 2024 - tree protection fence

1.0 GENERAL

1.1 In these Notes, the Engineer is GeoPacific Consultants Ltd.

1.2 These Notes must be read in conjunction with the design Drawings.

1.3 The work described and shown involves near vertical excavated slopes or structure using a combination of shotcrete and ground anchors. All slopes shall be covered with secured polyethylene sheeting to prevent erosion.

1.4 The anchors will be installed in ground around the site and the actual soil and groundwater conditions must be assumed.

1.5 The grouted anchor lengths required to resist the design loads are based on the assumed conditions. The capacity of the anchors will be confirmed at the beginning of the contract and may be lengthened or shortened.

1.6 Some utilities, foundations and structures which may affect the installation procedures and techniques are noted on the Drawings.The Contractor shall confirm the locations and condition of ALL man-made elements which may be damaged because of the anchored shotcrete operations. It is the Contractor's responsibility to install the anchored shotcrete in the actual site conditions encountered.

Elements which may, in the opinion of the Contractor, be damaged by the anchored shotcrete operations must be reported to the Engineer well in advance of the work to take place.

1.7 These documents are based on architectural, structural and survey Drawings provided. It is the Contractor's responsibility to verify all dimensions and report discrepancies to the Engineer.

1.8 The Contractor shall schedule and co-ordinate the work to satisfy the reasonable requirements of adjacent Owners and Tenants who shall be given sufficient Notice before carrying out work which may affect their property.

1.9 The Contractor shall erect and maintain a secure closed hoarding around the site for the safety of all persons in the vicinity of the site.

1.10 The Contractor shall inspect the slopes and the support to the slopes and structures daily and shall immediately report any potentially damaging movement or deterioration to the Engineer by telephoning 604-439-0922.

2.0 MATERIALS

2.1 ANCHOR BAR:

The anchors shall be installed in minimum 75 mm (3 inch) diameter holes which shall be drilled, unless otherwise approved in advance by the Engineer. Anchor capacity is dependant upon installation techniques and the drilling equipment and methods shall be subject to the Engineer's approval.

Drilling techniques shall produce a hole which is free of debris and ensure continuous support of the hole and shall not erode or disturb soil around the hole.

2.2 Anchor tendons shall be Dywidag threadbar as specified in the drawings.

Anchorage equipment couplings and any necessary wedges washers and plates shall be in accordance with the tendon manufacturer's specifications and requirements.

Minimum anchorage length ("fixed" length) and stressing length ("free" length) are shown on the Drawings.

2.3 Grout in the anchorage shall be a prior-approved non-shrink cementitious material mixed with a minimum compressive strength of 5 MPa in 24 hours and 35 MPa in 28 days.

2.4 Shotcrete shall be reinforced with 102 x 102 MW13.3/13.3 (4"x4"-8/8) welded wire mesh as shown on the Drawings. Steel shall have a minimum yield strength of 450 MPa (65 ksi) and shall be in accordance with ASTM A497.

2.5 All shotcreting shall be carried out in accordance with ACI 506 : "Specifications for Materials Proportioning and Application of Shotcrete"

2.6 Shotcrete shall have a minimum compressive strength of 5 MPa in 24 hours and 30 MPa in 28 days. The Engineer may require test panels to be prepared by the Contractor so they can be cored by others to confirm the shotcrete strength. The Contractor shall co-operate with the independent testing laboratory appointed by the Owner for this purpose.

3.0 INSTALLATION

3.1 Hollow Core Bar installation (if required)

Set the bit on an appropriate drill rig. Start pumping the grout to assure that grout will exit drill bit.

Proceed with rotary drilling and flushing approx. three feet per min (depending on ground condition). Rotation speed should be approx. 60 to 120 RPM. To achieve higher friction values, advance and retract the bars several times for each 3.0 m (10 foot) length of bar installed in the bond zone.

The grout should be applied CONTINUOUSLY during drilling. A grout pump with at least 60 l/min volume and minimum 2 MPa (300 psi) pressure capacity (preferably 10 MPa, 1500 psi) should be used.

Refer to the manufacture's specifications and recommendations for more detail.

3.2 Anchors and shotcrete shall be installed in sequence and stages to maintain stability of the excavation. Excavation of soil from the site shall also take place in stages. Stages shall not exceed 1.8 m (6 feet) vertical.

The Contractor may remove all soil within any mass excavation Stage before anchors in that Stage are installed but further excavation shall not take place until all anchored shotcrete in that Stage is installed and approved by the Engineer.

The mass excavation for any Stage does not include a perimeter berm with a minimum top width of one metre and a side slope of 1 horizontal to 1 vertical.

Ground conditions may locally require a wider berm, flatter slopes and/or other slope protection measures including covering or short-term temporary support.

The perimeter beams in any stage shall be excavated in staggered panels. THE MAXIMUM WIDTH OF A PANEL SHALL BE THE HORIZONTAL SPACING OF THE ANCHOR PLUS 0.6 M (2 FEET). This panel width may be INCREASED OR DECREASED by the Engineer's agreement, in writing, BEFORE increasing the panel width.

No adjacent panels shall be excavated concurrently and no more than 1/3 of the panels shall be excavated concurrently. In addition no panel shall be excavated into the berm until at least 24 hours after that panel anchor has been grouted.

Anchors and shotcrete may be installed concurrently in different panels. Anchors shall be installed at right angles to the property lines on plan and within 2.5 degrees of the declination shown on the Drawings except with the prior approval of the Engineer.

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PROFESSIONAL ENGINEER
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K. L. BOOTH

JUN 28 2024

GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. GENERAL NOTES	15514	JUNE 25, 2024 - Tree protection fence	
	M.S. K.B. Z.D. AS SHOWN		G-2 (sheet 1 of 2)		

3.3 Immediately following excavation of the soil berm in a panel the excavated face shall be trimmed back to the required line and mesh reinforcement shall be fixed to the soil to ensure the minimum specified shotcrete cover. Shotcrete shall be applied without delay to thicknesses shown on the Drawings.

Shotcrete panels shall be kept moist to aid curing by spraying with water and covering with sacking or polyethylene sheeting.

Sufficient wire mesh reinforcement shall be installed to provide a full strength overlap with adjacent panels. This overlap shall not be less than 200 mm (8 inch).

The end surfaces of panels shall be thoroughly cleaned with compressed air to ensure a full strength bond when adjacent panels are shotcreted.

3.4 Drains to relieve groundwater pressure shall be installed through the shotcrete. Drains shall be a minimum of 50 mm (2 inches) diameter and at normal 3.0 m (10 feet) centres horizontally and 1.5 m (5 feet) centres vertically. The Contractor shall install filters in drains as lines are being removed with the water.

Additional special drains may be required where water seeps are noted. This special drains shall consist of minimum 50 mm (2 inches) diameter perforated ABS pipe installed within 75 mm (3 inches) diameters holes drilled 5 degrees UPWARDS from the 3 metres (10 feet) measured from the face of the shotcrete. These special drains may be required to be filtered with fine sand or gravel or filter fabrics.

3.5 Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Anchors shall be tensioned and tested as follows:

3.5.1 Apply a proof load of 1.33 times the lock-off load for two minutes. Monitor the load in the anchor. If the reduction in load is less than 2.5 percent of proof load reduce the load to lock-off load and lock the working load into the anchor.

3.5.2 If the anchor does not hold at least 1.33 percent of lock-off load for two minutes the Engineer must be informed. Further testing in the presence of the Engineer will required as follows:

Load the anchor in 22 kN (5 kip) increments to 130.5 percent of lock-off load. Hold each increment for 5 minutes except at maximum load when the load shall be maintained for 100 minutes. The increase in length of the anchor shall be measure at the start and end of each load increment except at maximum load when the extension shall be measured at 5 minutes intervals.

This information shall be utilized by the Engineer to deduce the utilized anchor length and to assess the creep characteristics.

Anchors which creep more than 2 mm (0.08 inch) per log cycle of time will not be accepted. The Contractor shall install replacement anchors at the Contractor's expense.

4.0 SHOTCRETE REMOVAL/ANCHOR DETENSIONING

4.1 All excavation and support works within the CITY OF WHITE ROCK shall be in strict accordance with the City's requirements.

4.2 Anchor rods within 1.5m of the surface or within 1.0m of any underground utility are to be removed. Anchors rods not removed to be detensioned or fully grouted when no longer required in the opinion of the Engineer.

4.3 Shotcrete placed on Municipal rights-of-way to be removed to depth of 1.5m below the surface or within 1.5m of any utility removed to 1.0m below the utility.

5.0 BACKFILLING ON AND ADJACENT TO CITY PROPERTY

5.1 Backfill material and placing within Municipal rights-of-way to meet City specifications.

6.0 REQUIRED INSPECTIONS

6.1 The following are the MINIMUM inspections which are required by the Geotechnical Engineer. The Contractor is responsible for informing the Geotechnical Engineer that the Work is ready for these inspections. The Contractor shall be liable for any loss caused by failure to inform the Geotechnical Engineer that the Work is ready for inspection.

1. 2 days before work commences on site.
2. 1 day before the anchors are detensioned.
3. 2 days before backfilling commences.
4. 1 day before shotcrete removal.

6.2 Daily inspection is required during installation of anchors, and full time inspection is required during anchor testing.

7.0 CONTRACTOR QUALIFICATION

7.1 Temporary works and shoring installation is highly sensitive to processes including sequence of installation, quality and quantity of materials used, monitoring of the works and other factors. Consequently a high degree of skill and professionalism is required for its successful implementation. As a result, all contractors considered for tender of the shoring work described in the Design Drawings must be approved by the Engineer in advance of tender. The work must be carried out only by a shoring contractor with experience and expertise in shoring construction. The contractors experience and expertise must be with projects of similar size and scope to that shown in the Design Drawings. The following shoring contractors are permitted to undertake the work:

- Morcon Canada
- Bel Pacific Excavation & Shoring
- Vancouver Shotcrete
- Power Shotcrete Shoring Ltd.
- Weinkrod Excavation & Shoring ltd.
- Terra Contracting Ltd.
- Foundations West Construction ULC
- B&B Contracting Group

7.2 The preceding list does not express or imply any guarantee or warranty of the contractor's performance. It is the responsibility of the contractor to undertake the work shown on the Design Drawings.

7.3 Shoring contractors other than those listed above may be considered by the Engineer only with submission of references and qualifications for at least 10 projects of similar size and scope. GeoPacific reserves the right to accept or reject the qualifications of any shoring contractor.

NOTES:

1. The excavation support design is based on the locations of adjacent structures and utilities which have been supplied. The Contractor shall confirm the locations and elevations of all foundations and utilities which may be affected by the work and report any discrepancies to GeoPacific Consultants Ltd. (Tel: 4.19-1977)
2. All slopes shall be covered with secured polyethylene sheeting to prevent erosion.
3. The extent of the excavation shall be based on the Architectural and Structural Drawings. The Contractor shall confirm the size of the excavation required by the basement and report any discrepancy with these Drawings to GeoPacific Consultants Ltd.
4. The Contractor must obtain prior permission in writing to carry out any work on adjacent private property.
5. The Contractor shall inform GeoPacific Consultants Ltd. of any surcharge loads which will be within half the height of the excavation from the top of the excavation so that the support system can be modified to support the additional loads. The Contractor shall also inform GeoPacific if and when any groundwater seepages occur which may require additional special drains as outlined in Note 3.4, Drawing G-2.
6. The ground conditions must be confirmed by GeoPacific Consultants Ltd. when the excavation is 4 feet deep. The Contractor is responsible for ensuring that GeoPacific personnel inspect the site.

DRAWING LIST:

Permit to Pr...
EGBC
LOA0378?

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K.J. BODTKER

JUN 2 8 2024

GEOPACIFIC CONSULTANTS	DECEMBER 12, 2023 M.S / K.M / Z.O AS SHOWN	PROPOSED RESIDENTIAL DEVELOPMENT VIDAL STREET, WHITE ROCK, B.C. GENERAL NOTES	15514 G-2 (sheet 2 of 2)	JUNE 25, 2024 – Tree protection fence

GEOPACIFIC
CONSULTANTS

P (604) 439 0922
geopacific.ca
1779 West 75th Avenue
Vancouver, B.C. V6P 6P2

WS Vidal Properties LP
315 – 13338 Central Avenue
Surrey, B.C.
V3T 0M3

November 9, 2023
File: 15514

Attention: Krista Baronian

Re: Geotechnical Investigation Report – Vidal St Project
1441-1465 Vidal Street and 14937 Thrift Avenue, White Rock, B.C.

1.0 INTRODUCTION

We understand that a residential development is proposed for the above referenced site. Based on the Architectural Drawings prepared by Keystone Architecture & Planning Ltd., dated July 4, 2023, the proposed development will consist of a 6 storey, wood framed, residential building with a rooftop amenity deck over up to 4 levels of below grade, reinforced concrete parking structure. The below grade portion of the development is to be constructed in close proximity to property lines. Foundation depths are expected to extend up to 14 m below grade at the northern extent.

This report provides the results of our field investigation and makes geotechnical recommendations for the design and construction of the proposed development. This report was prepared exclusively for WS Vidal Properties LP, for their use and for the use of others on their development team but remains the property of GeoPacific Consultants Ltd.

2.0 SITE DESCRIPTION

The proposed site consists of 4 adjoining residential lots located northwest of the intersection of Vidal Street and Thrift Avenue in White Rock, BC. The site is bounded by Vidal Street to the east, Thrift Avenue to the south and residential lots in all other directions.

Based on a surveyed topographical plan provided by Target Land Surveying issued on April 4, 2018, the site slopes from north to south with elevation differential of about 9 m.

The northern lot, 1465 Vidal Street, was cleared of all pre-existing improvements and is covered with trees and vegetation. The remaining lots are occupied with single family dwellings, paved/graveled driveways, grass, vegetation and fenced backyards. The location of the site relative to existing properties is shown on our Drawing No. 15514-01, following the text of this report.

3.0 FIELD INVESTIGATION

3.1 Site Investigation

GeoPacific initially investigated the site on October 25, 2017. Due to limited access to the majority of the lots, the initial investigation was carried out solely on 1465 Vidal Street. At that time, a total of 3 auger test holes (TH17-01 to TH17-03) were drilled to depths between 9.1 and 10.7 m below pre-existing grades and were supplemented with 1 Dynamic Cone Penetration Test (DCPT) sounding completed to approximately 1.5 m below pre-existing grade.

GeoPacific completed a supplementary investigation for the current development scope on October 26, 2023, to confirm soil conditions below the proposed foundation depths which are expected to extend up to 14 m below grade. At that time, 2 sonic test holes (TH23-01 and TH23-02), complete with one monitoring (standpipe piezometer, were conducted using a sonic drill rig supplied and operated by Blue Max Drilling Inc. of Surrey, BC. The test hole was terminated approximately 18.3 m below existing site grades. The monitoring well, installed at TH23-01, was screened between 15.3 and 18.3 m below existing site grades.

Prior to our investigations, a BC one call was placed, and the test hole locations were cleared of buried services. All test holes were backfilled and sealed in accordance with provincial abandonment requirements following classification, sampling, and logging of the soils in the field by our geotechnical staff. Our test hole logs are presented in Appendix A.

The approximate locations of the test holes are shown on our Drawing No. 15514-01.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Profile

According to the Geological Survey of Canada Surficial Geology Map 1484A the subject site is underlain by Capilano Sediments consisting of raised marine, deltaic, fluvial deposit, marine and glaciomarine stony and stoneless silts (till like) to clay loam with minor sand and silt. Glacial till typically underlies these deposits at depth. A general description of the soils encountered is provided below. For specific subsurface soil descriptions at the test hole locations refer to the test hole logs provided in Appendix A

Sand and Gravel (Fill)

Sand and gravel fill was identified in all our test holes. The sand and gravel contained trace to some silt and appears to be compact. The fill extends to depths of 0.3 m to 1.8 m below grade.

Silty Sand (Glacial Till)

The sand and gravel fill is underlain by very dense glacial till comprised of silty sand, some gravel. The moisture content ranges from 6.8% to 10.5%. The till extended beyond the maximum extent of our investigation, approximately 18.3 m below existing grade. Cobbles and boulders are also commonly encountered within the till like soils. The fines contents of the till encountered typically ranged from 26.8% to 32%, with a higher fines content noted approximately 10.9 m below existing grade within a silty layer at TH23-01.

4.2 Groundwater Conditions

The static groundwater table was not encountered during our investigation. No water was present in the monitoring well as of November 1st, 2023. Based on our site investigation, well logs and our experience within the surrounding area, we expect that the static groundwater depth is significantly below the proposed excavation grades.

Perched groundwater seepage from silty soils are expected to be light to moderate. Perched water may also be encountered in the surficial fills. We expect that the presence of perched ground water to vary seasonally with generally higher levels in the wetter months of the year.

5.0 DISCUSSION

5.1 General Comments

As noted in Section 1.0, we understand that a residential development is proposed for the above referenced site. Based on the Architectural Drawings prepared by Keystone Architecture & Planning Ltd., dated July 4, 2023, the proposed development will consist of a 6 storey, wood framed, residential building with a rooftop amenity deck over up to 4 levels of below grade, reinforced concrete parking structure. The below grade portion of the development is to be constructed in close proximity to property lines. Foundation depths are expected to extend up to 14 m below grade at the northern extent.

Based on the results of our geotechnical investigations and the anticipated foundation depths, we expect that the development will be founded on very dense glacial till. We expect that these soils will provide adequate support for conventional pad and strip footings.

Shoring will be required to facilitate excavation and support neighbouring properties, structures or utilities given that the proposed below grade structure is to be constructed in close proximity to the property lines. Our design recommendations for temporary excavations are provided in Section 6.7.

The subsurface soils are not considered prone to liquefaction or other forms of ground softening under the design earthquake defined under the 2018 British Columbia Building Code.

We envision that some perched groundwater will be encountered while excavating and will need to be controlled. A graded excavation with sumps at low points should be adequate to control seepage. Based on the site investigations completed it is not anticipated that the static groundwater tale will be encountered during excavation works.

We confirm, from a geotechnical point of view, that the proposed building development is feasible provided the recommendations outlined in Sections 6.0 are incorporated into the overall design.

6.0 RECOMMENDATIONS

6.1 Site Preparation

Prior to construction of foundations and floor slabs, all unsuitable materials including vegetation, topsoil, fill, organic material, debris, and loose or otherwise disturbed soils must be removed to expose a subgrade of dense to very dense silty sand. However, as the development is to be constructed with a below grade component, we expect that the excavation depth will be driven by the architectural design rather than the soils encountered. Suitable bearing soils are expected at the proposed foundation elevations. Crushed gravel or engineered fill can be placed beneath the slab-on-grade only.

"Engineered Fill" is generally defined as clean sand to sand and gravel containing silt less than 5% by weight, compacted in 300 mm loose lifts to a minimum of 95% of the ASTM D1557 (ModifiedProctor) maximum dry density at a moisture content that is within 2% of optimum for compaction.

It is very important that the stripped subgrade be protected by lean mix concrete to preserve its bearing qualities and that it remain dry and free of ponded water prior to pouring concrete for footings. Any softened, disturbed subgrade should be removed under the review of GeoPacific and replaced with lean mix (5.0 MPa) concrete beneath the foundations.

GeoPacific shall be contacted for the review of foundation grade reinstatement, and engineered fill placement and compaction.

6.2 Foundations

Footings which are founded on very dense glacial till, as described in Section 4.1, can be designed on the basis of a serviceability limit state (SLS) bearing pressure of 500 kPa for strip or pad footings.

Factored ultimate limit state (ULS) bearing pressures, for transient loads such as those induced by wind and earthquakes, may be taken as 1.5 x the SLS bearing pressures provided above.

We estimate for foundations designed as recommended, settlements will not exceed 25 mm total and 2 mm per metre differential.

Irrespective of the allowable bearing pressures given, pad 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.

Adjacent footings should achieve a maximum elevation difference equal to half of their horizontal distance to avoid superimposing the upper foundation loading to the lower foundation.

Foundation subgrades of all buildings must be reviewed by GeoPacific prior to blinding and footing construction.

6.3 Seismic Design of Foundations

We did not encounter any soils considered to be prone to liquefaction or strain softening during cyclic loading caused by the design earthquake as defined in the 2018 British Columbia Building Code. The subgrade conditions underlying this site may be classified as Site Class C as defined in Table 4.1.8.4.A of the 2018 British Columbia Building Code.

6.4 Lateral Pressures on Foundation Walls

The earth pressures on the basement walls depends upon a number of factors including the backfill material, surcharge loads, backfill slope, drainage, rigidity of the basement wall and method of construction including sequence and degree of compaction. For a fully restrained basement wall designed for static pressures a pressure distribution of 8 H (kPa) triangular, where H is the height of the restrained soil in meters, should be employed. For an unrestrained basement wall a static pressure distribution of 5 H (kPa) triangular may be used.

Dynamic loading induced by the 2018 BCBC design earthquake should be added to the static loads and should be taken as 2.5 H (kPa) inverted triangular.

Restrained versus unrestrained conditions depend upon the degree of wall movement. A flexible, or unrestrained wall, is allowed to move 0.002H outwards at the top of the wall, where H is the height of the wall. A restrained or rigid wall is prevented from rotating out at the top of the wall either by intervening walls or floors which prevent deflection of the wall. Partial movements of the wall may result in pressures somewhat less than the restrained condition, but it is not possible to predict intermediate cases with any degree of certainty.

We have assumed that a free draining granular backfill will be used behind the basement walls and that a perimeter drainage system will also be employed to collect any water from behind the walls. Therefore, our wall loading scenarios presented above assume that no water pressure will be generated behind the walls.

All earth pressures are based upon no surcharges or slopes above the walls. All soil parameters and loads are assumed to be unfactored.

GeoPacific shall be contacted for the review of all backfill materials and procedures.

6.5 Slab-On-Grade Floors

In order to provide suitable support for slab-on-grade floors we recommend that any fill placed under the slab should be granular and essentially "clean" with not more than 5% passing the #200 sieve. In addition, this granular fill must be compacted to a minimum of 98% Standard Proctor (ASTM D698) maximum dry density with water content within 2% of optimum for compaction.

Floor slabs should be directly underlain by a minimum of 150 mm of a free draining granular material, such as 19 mm clear crushed rock. A moisture barrier should underlie the slab directly above the free draining granular material.

Compaction of the slab-on-grade fill must be reviewed by GeoPacific.

6.6 Foundation Drainage

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. Groundwater flows are expected to be relatively light to moderate, likely in the range of 30 to 50 liters/minute for the entire excavation. These flow rates should be confirmed at the time of construction.

6.7 Excavation and Shoring

The proposed development is to include up to 4 levels of below grade construction. Shoring will be required to facilitate excavation and support neighbouring properties, structures or utilities given that the proposed below grade structure is to be constructed in close proximity to the property lines. Partial open cuts above the shoring wall may be feasible where the building is offset from the property lines.

Vertical cuts may be supported with the use of a shotcrete membrane tied back with post-tensioned soil anchors. In areas where sand layers within the till like soils are encountered, hollow core (IBO) anchors may be required where a drilled anchor hole will not remain open to allow the installation of a conventional anchor bar.

We expect that the perimeter excavation would be sloped where sufficient space is available as it is more economical to do so. We would expect that slopes cut of 3H:4V (3 Horizontal to 4 Vertical) can be constructed

in the dense to very dense silty sand and 1H:1V in the surficial fills. Above any shoring walls, 1H:1V slope cuts would be feasible.

Our experience in this area indicates that cobbles and boulders may be present within the till like soils. Cobbles and small boulders can typically be removed with conventional excavation equipment. However, large boulders may require splitting/blasting to facilitate their removal from the site.

Some seepage into excavations from surficial fills and the till like soils should be expected. We envisage that groundwater inflows can generally be controlled with conventional sumps and sump pumps. Some face-saving measures may be required where seepage occurs at the shoring face.

6.8 Utilities

Site utilities will be required beneath the grade supported slab. The design of these systems must consider the location and the depth of the foundations. The service trenches and excavations required for the installation of underground vaults and/or manholes should be outside of a 1H:1V slope measured downward and outward from the underside of foundations.

Backfilling of trenches and excavations should be done with 19 mm clear crush gravel following the required pipe bedding.

All excavations and trenches must conform to the latest Occupational Health and Safety Regulation supplied by the Workers Compensation Board of British Columbia.

Temporary cut slopes in excess of 1.2 m in height must be covered in polyethylene sheeting and require review by a professional engineer in accordance with WorkSafe BC guidelines, prior to worker entry.

6.9 Re-Use of Native Soils

Excavated soils derived from the site are expected to be silt predominant. Therefore, they are not considered suitable for re-use as engineered fill.

7.0 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 contractors' obligations to perform under the terms of his/her contract.

It is the contractors' responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Field reviews are normally required at the time of the following activities:

1.	Excavation	Review of temporary cut slopes.
2.	Shoring	Review of shotcrete shoring construction, anchor installation and testing, anchor de-tensioning and removal, and shotcrete removal.
3.	Foundation	Review of foundation subgrade.
4.	Slab-on-grade	Review of subgrade and under-slab fill materials and compaction.
5.	Backfill	Review of backfill materials and compaction against foundation walls.
6.	Engineered Fill	Review of fill materials and compaction.

It is critical that these reviews are carried out to ensure that our intentions have been adequately communicated. It is also critical that contractors working on the site view this document in advance of any work being carried out so that they become familiar with the sensitive aspects of the works proposed. It is the responsibility of the developer to notify GeoPacific Consultants Ltd. when conditions or situations not outlined within this document are encountered.

8.0 CLOSURE

This report has been prepared exclusively for Weststone Group for the purpose of providing geotechnical recommendations for the design and construction of the proposed building, temporary excavations and related earthworks. The 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 assistance to you on this project and we trust that our comments and recommendations are both helpful and 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 call.

For:
GeoPacific Consultants Ltd.

Reviewed By:

Helen McGhee, M.Eng., E.I.T.
Geotechnical E.I.T.

Kevin Bodnar, M.Eng., P.Eng.
Principal

Bobby Sandhu, B.Eng., E.I.T.
Geotechnical E.I.T.

Appendix A

Test Hole Logs

LEGEND:

- TH17-# - 2017 TEST HOLE (TH) LOCATIONS
- TH23-# - 2023 TEST HOLE (TH) LOCATIONS
- APPROXIMATE SITE BOUNDARY

SITE PLAN
SCALE = NTS

WRDMS - 2023-10-18

GEOPACIFIC VANCOUVER

NOVEMBER 3, 2023

BSS	20	BSS

SEE ABOVE

PROPOSED RESIDENTIAL DEVELOPMENT
14397 THRIFT AVE, 1441-1465 VIDAL ST, WHITE ROCK, BC
TEST HOLE LOCATIONS

15514

15514-01

Test Hole Log: TH23-01

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave. White Rock, B.C.

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC V6P 6P2
Tel: 604-439-0922 Fax: 604-439-9189

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
0	0		Ground Surface				
1			***SAND AND GRAVEL (FILL)***	0.00			
2			SAND, SOME SILT and GRAVEL. Loose to *compact*, sand is *fine* grained, gravel is subangular, brown, wet.				
3	1						
4							
5							
6							Root fragments throughout, drier with depth
7	2		***WEATHERED GLACIAL TILL***	1.83			
8			SAND and GRAVEL w/ COBBLES. Compact, sand is fine grained, gravel is subangular, grey brown, dry.				
9							
10	3			3.05			
11			***GLACIAL TILL***				
12			SAND, SILTY and GRAVELLY w/ COBBLES.				
13	4						
14			Compact to dense, gravel uniformly graded, grey, dry. (Profile inferred 10-12ft)				
15				4.57			
16							
17	5				9.9		Moisture content changes to moist
18							Cobble content increases with depth
19			***GLACIAL TILL***				
20	6		*SAND, SILTY w/ some GRAVEL.* Compact to dense, sand is fine grained, gravel is subangular, grey brown, moist. (Profile inferred 15-16ft)				Increase in gravel content with depth
21							
22							
23	7						
24							
25							
26	8						
27					7.1		
28							
29							
30	9						
31				9.14			
32							
33	10				13.1		

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.4.

Test Hole Log: TH23-01

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C.

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC V6P 6P2
Tel: 604-439-9922 Fax: 604-439-9189

Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
34						
35						MC changes to wet
36	11	**GLACIAL TILL** SAND, SILTY w/ some GRAVEL and COBBLE. Loose to compact, *sand is fine grained, gravel is* subangular, grey brown, moist to wet.		9.4		Fines 40.4%
37						Increase in gravels and cobbles
38						
39			11.58			
40	12	(Profile inferred 30-32ft)				Increase in fine sand content
41		**GLACIAL TILL**	12.19			
42		SILTY SAND w/ some GRAVEL and COBBLES. Compact, sand is				
43	13	fine grained, gravel is subangular,				
44		grey brown, moist.				
45						Increase in moisture content
46	14	**GLACIAL TILL**				
47		SAND and GRAVEL, some SILT w/ COBBLES.		7.1		Fines 27.4%
48						
49	15	Loose to compact, sand is fine grained, gravel is subangular, grey,				Increase in sand fines with depth
50		dry becoming wet.				
51						Decrease in cobble content
52		(profile inferred 40-43ft)				
53	16					
54						
55						
56	17					
57						
58				6.8		
59	18					
60						
61		End of Borehole	18.29			GW recorded November 1st 2023. No Groundwater recorded
62	19					
63						
64						
65						
66	20					

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.4.
Page: 2 of 2

Test Hole Log: TH23-02

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC V6P 6P2
Tel: 604-439-0922 Fax: 604-439-9189

INFERRED PROFILE

Depth (ft)	Depth (m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
0	0		Ground Surface				
0			***FILL*** SILTY SAND. Loose, sand is fine to medium grained, Brown, dry	0.00			
3	1		***SANDY SILT*** SANDY SILT w/ GRAVEL and some cobbles. Loose to compact, sand is medium grained, gravel is subanglular, dark brown, dry.	0.91			
5				1.52			Many Gravels>10mm
7	2		***WEATHERED GLACIAL TILL*** SAND and GRAVEL. Compact, sand is fine to medium grained, gravel is subangular, brown, moist.	2.13			
10	3		***GLACIAL TILL*** SILTY SAND and GRAVEL. Dense, sand is fine to medium grained,brown,moist.	3.05			
13	4						
16	5		***GLACIAL TILL*** SILTY SAND and GRAVEL. Dense to very dense, sand is fine grained, light brown, moist.		10.5		
20	6						
23	7						Becoming Moist with Depth
25			***SAND AND GRAVEL*** SAND AND GRAVEL. Compact, fine to medium grained sand, gravel is subangular, grey, dry to moist.	7.62			
26	8						
30	9						Some Gravels<10mm
33	10						

Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.5.

Test Hole Log: TH23-02

File: 15514
Project: Vidal St Project
Client: WS Vidal Properties LP
Site Location: 1441-1465 Vidal St and 14937 Thrift Ave, White Rock, B.C

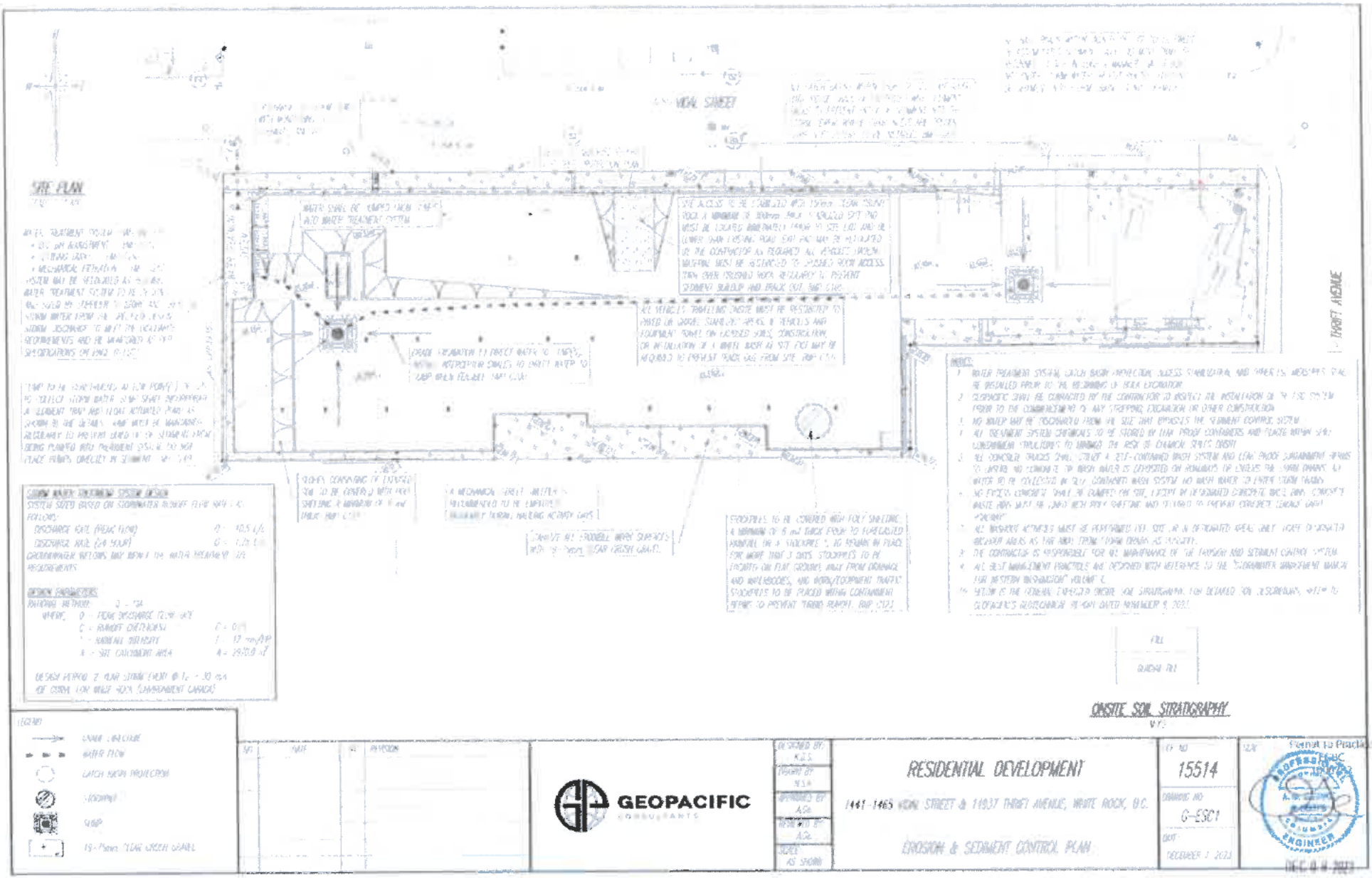
GEOPACIFIC CONSULTANTS
1779 West 75th Avenue Vancouver BC V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

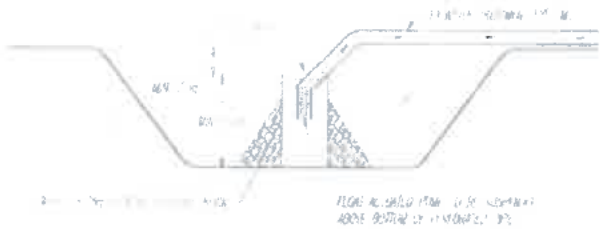
INFERRED PROFILE

Depth	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater / Well	Remarks
11		***GLACIAL TILL*** SILTY SAND and GRAVEL. Dense to very dense, sand is fine grained, gravel is subangular, grey, moist.	10.67	7.8		Fines 32.0%
12						
13						Gravels increase with depth
14		***SAND AND GRAVEL*** SAND AND GRAVEL, some SILT. Dense to very dense, sand is medium grained, grey, moist.	13.72			
15				6.4		
16						
17		***SAND AND GRAVEL*** SAND AND GRAVEL. Dense to very dense, sand is medium grained, grey, moist.	16.76			Increase in Gravel content
18				9.1		Fines 26.8%
		End of Borehole	18.29			
19						
20						

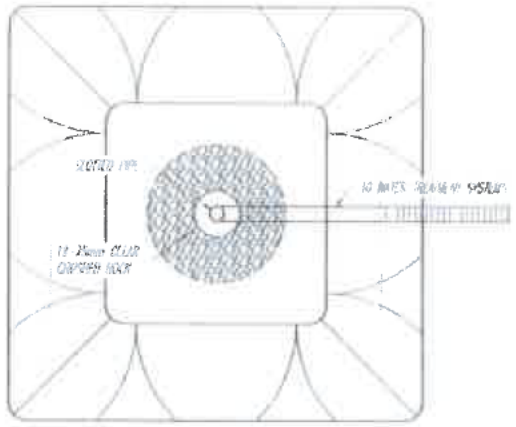
Logged: HMG
Method: Sonic
Date: 27-10-2023

Datum: Ground Surface
Figure Number: A.5.


VIEW STREET
THRIFT AVENUE
SITE PLAN
ONSITE SOIL STRATIGRAPHY
LEGEND
GEOPACIFIC CONSULTANTS
RESIDENTIAL DEVELOPMENT
1461 - 1465 VIEW STREET & 11937 THRIFT AVENUE, WHITE ROCK, B.C.
EROSION & SEDIMENT CONTROL PLAN
15514
G-ESC1
DECEMBER 7, 2023
DESIGNED BY: K.S.S.
DRAWN BY: K.S.S.
APPROVED BY: A.G.
REVIEWED BY: A.G.
SCALE: AS SHOWN
DEC 8 8 2023



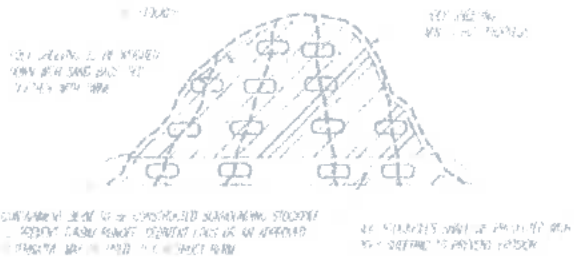
TYPICAL CROSS SECTION



TYPICAL PLAN VIEW

SUMP WITH SEDIMENT TRAP DETAIL – BMP C240

1:50



PLASTIC SHEETING – BMP C123

N.T.S.

ACCEPTABLE SEPARATION SIEVES

GRAB TENSILE STRENGTH (ASTM D4751)	200lbs MIN.
GRAB TENSILE ELONGATION (ASTM D4632)	15% MAX
MULLEN BURST STRENGTH (ASTM D3786 - 80A)	470psi MIN
AVERAGE OPENING SIZE (ASTM D4751)	20 - 45 (U.S. STANDARD SIZE)

STABILIZED CONSTRUCTION ACCESS DETAIL – BMP C105

1:50

Permit to Practice

NO.	DATE	BY	REVISION

GEOPACIFIC CONSULTANTS

DESIGNED BY:	K.D.S.
DRAWN BY:	S.S.E.
APPROVED BY:	K.Ge
PROJECT MGR:	K.Ge
SCALE:	AS SHOWN

RESIDENTIAL DEVELOPMENT

1441-1465 VIDAL STREET & 14937 THRIFT AVENUE, WHITE ROCK, B.C.

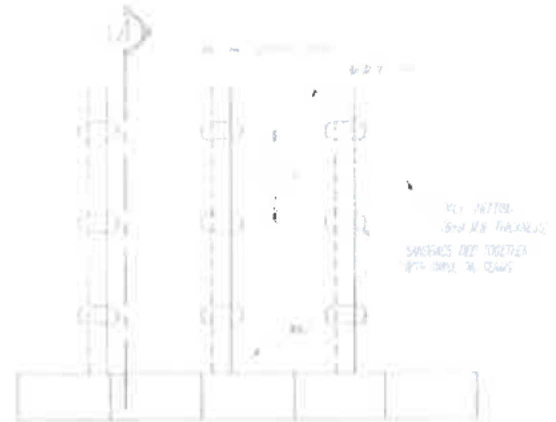
EROSION & SEDIMENT CONTROL DETAILS (1 OF 2)

FILE NO.	15514
DRAWING NO.	G-ESC2A
DATE:	DECEMBER 7, 2023

SEAL:

PROFESSIONAL ENGINEER

DEC 8 H 2023



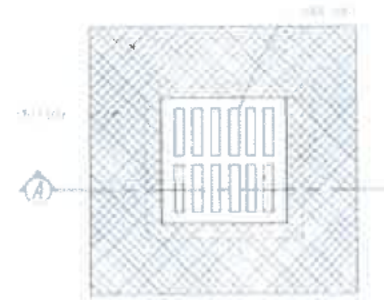
SLOPE PLAN VIEW

SLOPE SECTION A

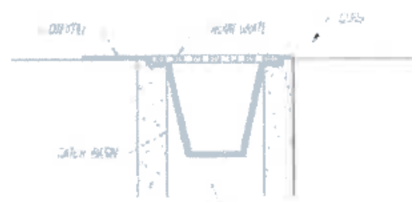
PLASTIC COVERING – BMP C123

N.T.S.

NOTE:
1. POLYETHYLENE SHEETING WITH A MINIMUM THICKNESS OF 6mil TO BE USED.
2. SHEETING TO BE PLACED PARALLEL TO THE SLOPE WITH A MINIMUM 300mm OVERLAP BETWEEN SHEETS.
3. TRENCH TO BE EXCAVATED AT THE HEAD OF THE SLOPE TO ALLOW SHEETING TO BE SECURED UNDER COMPACTED SOIL.
4. TRENCH TO BE EXCAVATED AT THE TOE OF THE SLOPE, TO A DEPTH OF 300mm, WHICH WILL ACT AS A SWALE.
5. BURLAP OR GEOTEXTILE BAGS FILLED WITH SAND TO BE PLACED AT 1.0m TO 2.0m INTERVALS ALONG SEAMS. BAGS TO BE TIED TOGETHER WITH TWINE TO HOLD IN PLACE.
6. REGULAR INSPECTION OF THE SHEETING IS REQUIRED. TORN SHEETS MUST BE REPLACED AND OPEN SEAMS MUST BE SEALED.



PLAN VIEW

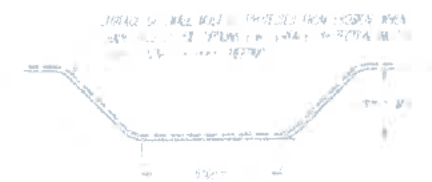


STORE SPARE CATCH BASIN PROTECTION ONSITE AT ALL TIMES.
INSPECT CATCH BASIN PROTECTION WEEKLY, AND DAILY DURING STORM EVENTS.
CLEAN OR REPLACE WHEN ⅓ FULL, CLOGGED, OR SIGNS OF WEAR OCCUR.
CATCH BASIN PROTECTION TO BE USED ON ALL CATCH BASINS WITHIN 150m OF SITE EXIT ALONG HAUL ROUTE.

SECTION A

CATCH BASIN SEDIMENT SACK DETAIL – BMP C220

N.T.S.



INTERCEPTOR SWALE DETAIL – BMP C200

SPACING OF CHECK DAMS BASED ON SLOPE OF SWALE

SLOPE	SPACING OF CHECK DAMS
0.5%	EVERY 50m
1.0%	EVERY 35m
1.5%	EVERY 20m
2.0%	EVERY 15m
2.5%	EVERY 12m
3.0%	EVERY 10m

NOTE:
DRAINAGE SWALE TO BE CONSTRUCTED WITH MIN. SLOPE TO FACILITATE FLOW. SMALL SWALES SHALL DIRECT WATER INTO DRAINAGE SWALE.

DURING AND PERIODS OR DURING TIMES OF HIGH TRAFFIC OVER EXPOSED SOILS USE NATURAL OR ARTIFICIAL WIND BREAKS OR SCREEN.
SPRINKLE WATER ON SITE UNTIL SURFACE SOILS ARE WETTED.
SPRAY EXPOSED SOIL WITH DUST PALLIATIVE FOLLOWING MANUFACTURER'S INSTRUCTION.

DUST CONTROL – BMP C140

Permit to Practice
EGBC
1000???

LEGEND	NO.	DATE	REVISION

GEOPACIFIC CONSULTANTS

DESIGNED BY	A.B.S.
DRAWN BY	H.S.K.
APPROVED BY	A.Ge.
REVIEWED BY	A.Ge.
SCALE	AS SHOWN

RESIDENTIAL DEVELOPMENT
1441-1465 VIDAL STREET & 14937 THRIFT AVENUE, WHITE ROCK, B.C.
EROSION & SEDIMENT CONTROL DETAILS (2 OF 2)

FILE NO.	15514
DRAWING NO.	G-ESC2B
DATE	DECEMBER 7, 2023

SEAL:
PROFESSIONAL ENGINEER — BRITISH COLUMBIA
DEC 08 2023

Permit to Practice

LEGEND		GEOPACIFIC CONSULTANTS	DESIGNED: K.S.B. DRAWN: K.S.B. CHECKED: K.S.C. APPROVED: K.S.B. SCALE: AS SHOWN	RESIDENTIAL DEVELOPMENT 1441-1465 MAIN STREET & 14937 THRIFT AVENUE, WHITE ROCK, B.C. EROSION & SEDIMENT CONTROL SPECIFICATIONS	15514 DRAWING NO: G-ESC3 REVISION 1 ISSUED

PROFESSIONAL ENGINEER

DEC 8 3 2023

KERR WOOD LEIDAL
consulting engineers

Greater Vancouver
200 - 4185A Still Creek Drive
Burnaby, BC V5C 6G9
T 604 294 2088
F 604 294 2090

Technical Memorandum

DATE: April 10, 2015

TO: Gary Martens, EPCOR White Rock Water

FROM: Rose Sinnott, Kerr Wood Leidal Associates Ltd.

RE: **PRELIMINARY WATER SERVICING REVIEW**
Proposed Development at 1467-1519 Vidal Street
Our File 102.083-489

1. Purpose of Review

EPCOR White Rock Water (EWR) is the water utility for White Rock. The City of White Rock (the City) requires that EWR confirm that proposed developments can be serviced with water prior to the issuance of a building permit. This review evaluates the servicing concept and provides the following:

- The expected change in water demands due to the development;
- Confirmation the property is acceptably close to a suitable water main with adequate supply pressure, including adequate supply pressure for fire sprinkler protection;
- Confirmation the development is within the required distance of a fire hydrant with adequate available fire flow; and
- Confirmation the proposed servicing plan conforms with EWR's installation requirements.

Results provided are solely for EWR's use in assessing the serviceability of the proposed building. Pressures and fire flows provided in this review are based on output from EWR's hydraulic model of the water system instead of actual flow testing. Where sprinkler flows are substantial, a hydrant flow test may be required at the developer's expense. Results are expected values (i.e., no safety factors applied). The conclusions in this memo are considered valid for a maximum of two years, after which a new servicing review application is required.

The developer should refer to section 5 of this report for conclusions and next steps.

2. Description of Development

2.1 Development Details

The proposed development consists of one building with a total of ninety (90) residential units. Based on the serviceability application and drawings provided by the developer, the development's characteristics are as follows:

- Twelve-storey building;
- Residential use only, total floor area is 14,100 m^2 (1.41 ha); and
- Total lot area of 4,962 m^2 (0.4962 ha).

2.2 Location

The proposed development is located on Vidal Street, between Vine Avenue and Thrift Avenue. The development site is located in the 143 m High Pressure Zone. According to records provided by EWR, there is a 150 mm (6 inch) diameter ductile iron water main 11.6 m east of the property on Vidal Street.

2.3 Proposed Water Servicing

The drawings (by Reinbold Engineering Group) provided by the developer are attached for reference and indicate a 150 mm (6 inch) diameter combined fire and domestic service connection to a Water Entry room in the proposed development with access via the utility area inside the parkade.

2.4 Proposed Indoor Sprinklering

The developer specified a 32 L/s (500 US gpm) indoor sprinklering requirement.

3. Design Criteria

Design criteria are from EPCOR Design and Construction Standards (January 2013), unless otherwise noted.

3.1 Water Quality and Reliability

Typical municipal standards for potable water require looping for mains longer than 85 m, or 150 m for temporary mains. This requirement is in place to ensure:

- Amount of stagnant water is minimized to maintain water quality; and
- System reliability is not compromised by a single pipe break.

3.2 Water Demands

The maximum day demand (MDD) for the development was calculated to be 101,500 L/day (1.17 L/s), based on:

- Design population of 248 ca (2.75 ca/unit)[1];
- Residential base demand of 350 L/ca/day[2];
- Residential Seasonal demand of 30,000 L/ha/d, based on gross lot area[3]; and
- Total lot area of 4,962 m^2 (0.4962 ha).

Existing MDD for the lot for current use is estimated at 28,400 L/day based on the existing 14 unit strata development and 4,962 m^2 of total lot area. Estimated increase in demand is therefore 73,100 L/day.

[1] Suggested design value. 2011 Census indicates an average of 1.84 people per household
[2] Suggested design value. From 2010 Water System Master Plan actual observed value for base demand is 234 L/capita/day.
[3] Suggested design value. From 2010 Water System Master Plan actual observed value for season demand is 23,662 L/ha/day.

3.3 Pressure

The required system water pressures are summarized in the following table:

Table 3-1: Pressure Design Criteria

Description	Required Pressure kPa (psi)
Minimum pressure at peak hour demand	300 (44)
Minimum pressure coinciding with fire flow and MDD	150 (22)

3.4 Indoor Sprinklering

The City of White Rock requires an approved fire sprinkler system to be installed in all new buildings within the City of White Rock[4]. An approved fire sprinkler system is a fire sprinkler system that meets the applicable National Fire Protection Association (NFPA) standard for the specified occupancy.

For residential occupancies up to and including four stories in height, NFPA 13R or NFPA 13 standards apply. For residential buildings five stories in height or greater, NFPA 13R does not apply (instead refer to Section 8.4.5 of NFPA 13 for residential sprinklers).

The information provided by the developer did not indicate if that the building will be sprinkled according to NFPA 13 standards.

The developer is to confirm that sprinklering to the required standard will be provided.

3.5 Fire Flows

Hydrant fire flow adequacy is determined by comparing the available fire flow supply capacity from the water model to the required fire flow using FUS (Fire Underwriter's Survey) guidelines[5].

A 200 L/s fire flow requirement was provided by the developer (attached). The calculation is subject to the following requirements:

- Total building area reduced 6,690 m^2 through the use of appropriately rated fire walls according to FUS standards;
- Non-combustible construction type;
- Non-combustible contents;
- Complete automatic sprinkler protection to the required NFPA standard; and
- Adjacent building exposures are 9 m north, 24 m east, 38 m south, and 8 m west.

3.6 Hydrant Locations

EPCOR Design Standards require a maximum spacing of 150 m for hydrants in single-family residential areas and 90 m in all other areas. FUS guidelines also require 90 m spacing for all uses other than single-family residences. The maximum distance from a hydrant to a lot would therefore be 75 m for single-family residences and 45 m for all others.

[4] The Corporation of the City of White Rock Bylaw No.1683.
[5] Insurer's Advisory Organization Inc., Fire Underwriter's Survey Water Supply for Public Fire Protection, 1999.

The 2006 BC Building Code (section 3.2.5.16) requires that a hydrant be no more than 45 m from the fire department connection to automatic sprinkler system should such a connection be required, as determined by the Developer's Professional Engineer.

FUS guidelines require hydrants to be located at intersections, in the middle of long blocks, and at the end of dead-end streets. One hydrant is typically capable of delivering up to 100 L/s. To provide a fire flow greater than 100 L/s, multiple hydrants are required.

4. Assessment

The following limitations apply to this servicing review:

- The assessment is based on development data provided by the applicant (attached).
- Available system pressures and fire flows are based on output from EWR's hydraulic model of the water system, not actual flow or pressure testing;
- Assessment results are expected values (i.e. no safety factors applied). Sprinkler system design should include safety factors as deemed appropriate by the sprinkler system designer.

4.1 Water Quality and Reliability

The 150 mm (6 inch) diameter water main on Vidal Street is looped, which is necessary for adequate water quality and system reliability.

4.2 Pressures

The following table shows the calculated model results for maximum and minimum pressures in the 150 mm (6 inch) diameter water main on Vidal Street. Results correspond to a ground elevation of 104 m.

Table 4-1: Distribution System Pressures at the Development (Model Results)

Description	Required Pressure kPa (psi)	Modelled Pressure kPa (psi)	HGL (m)	Requirement Satisfied
Maximum static pressure (night)	N/A	407 (59)	145	N/A
Minimum pressure at peak hour demand	>300 (44)	317 (46)	136	Yes
Minimum pressure during sprinkler flow (PHD + 32 L/s)	N/A	310 (44)	135	N/A
Minimum pressure coinciding with available fire flow and max. day demand	>150 (22)	150 (22)	119	Yes

Regular operating pressure at the proposed development ranges from 59 psi to 46 psi. During sprinkler flow, the pressure in the distribution main drops approximately 2 psi, yielding a peak hour demand pressure of 44 psi (at elev. 104 m). Pressures meet the design criteria.

The pressure results provided correspond to an elevation of 104 m (ground elevation). Upper floors of the proposed building will require a booster pump system to provide adequate pressures for domestic and fire sprinkling as is typical for buildings of this height.

4.3 Available Fire Flow

The maximum available fire flow due to system storage capacity is 212 L/s.

The estimated available fire flow shown in the following table is derived from the modelled available system fire flow.

Table 4-2: Estimated Available Fire Flow in the Distribution System at the Development

Hydrant Fire Protection	Hydrant Number	Distance to Property	Estimated Available Fire Flow[6]
Nearest hydrant	# 150	20 m	188 L/s
Alternate hydrant #1	# 146	40 m	201 L/s
Alternate hydrant #2	# 170	150 m	>250 L/s

Hydrant proximity is adequate to service the site based on FUS guidelines. System storage capacity and modelled available fire flow meet the provided fire flow requirement of 200 L/s.

As available fire flows are within 10% of requirement, completion of a hydrant flow test by the developer and coordinated by EPCOR is required (at hydrant #146) with residual pressure measured at hydrant #254. Test results should be provided to KWL for confirmation of the model results.

Fire protection is subject to the approval of the City of White Rock.

4.4 Proposed Water Servicing

Requirements for meter installation and backflow prevention are provided in the attached guide. The water meter and backflow preventers are to be installed in a utility or mechanical room with service access separate from dwelling units.

The drawings provided by the developer (attached) indicate the following:

- One 150 mm (6 inch) diameter combined fire and domestic service connection to a Water Entry Room; and
- Access to the Water Entry Room via the utility area inside the parkade.

A key must be provided to EPCOR to allow access to the meter for reading and maintenance. Access to the Water Entry Room shall be granted to EPCOR when necessary.

The developer is required to confirm servicing requirements in final plan to be reviewed and accepted by EWR.

[6] Modelled available fire flow (in water main) at 22 psi residual/zone pressure. Actual flow capability of hydrant and hydrant lead may limit flow capacity in many situations. Hydrant flow is usually limited by the lesser of 100 L/s +/- (typical hydrant flow capacity) or available fire flow as provided in this table.

5. Summary and Recommendations

Based on current information, the proposed development can be serviced from the existing EWR water system without system modifications, subject to the following:

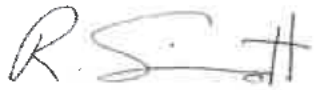
1. A hydrant flow test is completed as discussed in Section 4.3. Results of the flow test should be provided to KWL for confirmation of the model results.
2. Approval from the City of White Rock Fire Department regarding acceptability of hydrant protection for the proposed development.
3. The building is to be constructed as indicated in the developer's FUS fire flow calculations as discussed in Section 3.5 including non-combustible construction type, appropriately rated fire walls to reduce the building area to 6,690m^2, and complete automatic sprinklering protection to NFPA 13 standards;
4. Upper floors of the building will require a booster pump system to provide adequate pressures.
5. The increase in maximum day demand due to this development is estimated to be 73,100 L/day. This increase should be considered when deriving development cost charges, if applicable.
6. Service access to the Water Entry Room with the water meter must be separate from the dwelling units. A key must be provided to EPCOR to allow access to the meter for reading and maintenance. Access to the Water Entry Room shall be granted to EPCOR when necessary. The developer is required to confirm servicing requirements in a final plan to be reviewed and accepted by EWR.
7. A copy of the plumbing inspection report from the City of White Rock is required by EWR before water can be turned on at the development.
8. Proof of satisfactory bacteriological sample results from a qualified lab for the customer service line (from property line) is provided to EWR.
9. Confirmation of the next steps with EWR, as there may be other requirements to be met before water servicing is scheduled and implemented. Please discuss with EWR before proceeding further with the proposed development. Until all these requirements are fulfilled the proposed development cannot be serviced with water.

Please contact the undersigned should you have any questions.

KERR WOOD LEIDAL ASSOCIATES LTD.

Prepared by:

Reviewed by:



Rose Sinnott, EIT
Project Engineer

Eric Morris, M.A.Sc., P.Eng.
Project Manager

AL/rs
Attachment: Indoor Meter Installation Guide, Information from Developer

Statement of Limitations

Revision History

Revision #	Date	Status	Revision Description	Author
0	March 30, 2015	Draft		AL / RS
1	April 10, 2015	Final	Incorporate comments from EWR and finalize.	RS

OQM | Organizational Quality Management Program

KERR WOOD LEIDAL
consulting engineers

Vancouver Island
400 – 844 Courtney Street
Victoria, BC V8W 1C4
T 250 595 4223

Technical Memorandum

DATE: July 15, 2024

TO: Brian Keith Regehr
WS Vidal Properties LP

FROM: Rose Sinnott, P.Eng.

RE: **WS VIDAL PROPERTIES LP**
Water Servicing Review for Proposed Development at 1441 Vidal Street
Our File 4510.001-300

1. Introduction

WS Vidal Properties LP retained Kerr Wood Leidal Associates Ltd. (KWL) to complete a water servicing review for the proposed residential development located at Vidal Street and Thrift Avenue in White Rock, British Columbia.

The scope of this water servicing review includes:

- estimating water demands (domestic and seasonal) for the proposed development;
- estimating the expected change in water demands for the existing lot due to the development;
- water modelling to determine peak hour pressure and available fire flow using the City of White Rock's hydraulic model;
- reviewing existing hydrant coverage; and
- comparing analysis results to City of White Rock (City) design criteria and recommending upgrades to the water distribution system if needed.

2. Description of Development

2.1 Development Details

The proposed development's characteristics were provided by the developer (Attachment 1) and are summarized as follows:

- 139 residential units;
- 3,875 m^2 lot area; and
- 1,626.5 m^2 of irrigated and landscaped area[1]

[1] Email from Van Der Zalm and Associates (Stephen Heller) on June 11, 2024.

2.2 Location

The proposed development is located on Vidal Street between Thrift Avenue and Vine Avenue, set on 3 lots on Vidal Street (1441 to 1465 Vidal Street) and 1 lot on Thrift Avenue (14937 Thrift Avenue). The development site is in the 142 m High Pressure Zone. Local existing water infrastructure includes a 150 mm diameter ductile iron water main on Vidal Street and a 200 mm diameter ductile iron water main on Thrift Avenue.

2.3 Proposed Water Servicing

According to the drawing Waterworks – Vidal Street provided by Wedler Engineering (Attachment 2), the proposed water service is 150 mm diameter connected to an upgraded 200 mm diameter ductile iron water main on Vidal Street. This proposed water main is located approximately 11.6 m offset from the east property line on Vidal Street.

2.4 Required Fire Flow

Hydrant fire flow adequacy is determined by comparing the available fire flow capacity from the water model to the required fire flow.

This development is comprised of one building across four lots. The developer has provided the required fire flow for the building based on Fire Underwriters Survey (FUS) guidelines[2] (Attachment 3). The input parameter for the development is summarized in the table below. As shown, the fire flow requirement is 212 L/s.

Table 1: Required Fire Flow Input Parameters and Results

Fire Area (m^2)	Construction Type Coefficient	Contents Rating	Automatic Sprinkler Protection Credit	Total Exposure Charge	Fire Flow Required (L/s)
9,477.5	Ordinary Construction (1.0)	Limited Combustible Contents (15%)	50%	N - 14 m E - 30.1m+ S - 30.1m+ W - 14m Total = 20%	212

2.5 Proposed Indoor Sprinklering

The developer has indicated that the indoor sprinklering flow requirement for the development is 47 L/s (750 USgpm)[3].

[2] Fire Underwriters Survey, Water Supply for Fire Protection, 2020.
[3] Email from BMAC Technologies & Consulting (Farzad Hemmati) on June 11, 2024.

3. Assessment

The following limitations apply to this servicing review:

1. The assessment is based on the information provided (Attachment 4). This information has not been independently verified by KWL.
2. Available system pressures and fire flows are based on output from the City's hydraulic model of the water system, not actual flow, or pressure testing. The model was updated as part of the 2024 Water Master Plan[4]. Model runs are conducted for:
   a. Existing conditions.
   b. Proposed conditions with local improvements including the proposed 200 mm diameter main on Vidal Street.
   c. Future conditions reflective of full development in accordance with the 2021 City of White Rock Official Community Plan[5]. The future model scenario includes water system upgrades as recommended in the 2024 Water Master Plan Update. A 200 mm diameter water main upgrade on Vidal Street between Thrift and Park Avenue was recommended as part of the 2024 Water Master Plan Update.
3. Assessment results are expected values (i.e., no safety factors applied). Sprinkler system design should include safety factors as deemed appropriate by the sprinkler system designer.

3.1 Demand Estimate

The Maximum Day Demand (MDD) is estimated using the following parameters developed as part of the City of White Rock's 2024 Water Master Plan Update:

- residential base demand of 190 L per capita per day and 1.5 capita per multi-family unit; and
- seasonal demand of 53,700 L/ha/day based on irrigated area.

The MDD for the proposed development is estimated to be 48,350 L/day (0.56 L/s).

Two of the existing lots at 1441 Vidal Street and 14937 Thrift Avenue include single-family residential units. One of the proposed development lots, at 1443-45 Vidal Street is a duplex, and is estimated as two single-family residential units. The estimated existing water demand of the 4 existing single-family lots is 9,800 L/day; therefore, the increase in demand due to the proposed development is 38,550 L/day.

3.2 Water Servicing

As previously outlined, the proposed development will be serviced from the proposed 200 mm diameter water main on Vidal Street.

The location of the water meter and backflow preventer have not been provided by the developer.

Note that the City typically requires exterior service access to the area with the meter and backflow preventer and exterior remote read capabilities. It is recommended that the developer submit a plan to the City showing proposed servicing details including the location of the water meter(s) and backflow prevention for review and approval.

[4] Kerr Wood Leidal Associates Ltd, *Water Master Plan Update*, 2024.
[5] City of White Rock, *Official Community Plan*, July 2021.

3.3 Available Fire Flow and Hydrant Coverage

MMCD design guidelines[6] indicate that fire hydrants should be located not more than 150 m apart nor more than 90 m from a building. FUS guidelines[7] recommend 90 m spacing for all land uses other than single-family residences. Based on these guidelines, the maximum distance from a hydrant to a lot would therefore be 90 m for single-family residences and 45 m for all others.

Existing and proposed hydrants near the proposed development site with 45 m radius coverage areas are shown on Figure 1.

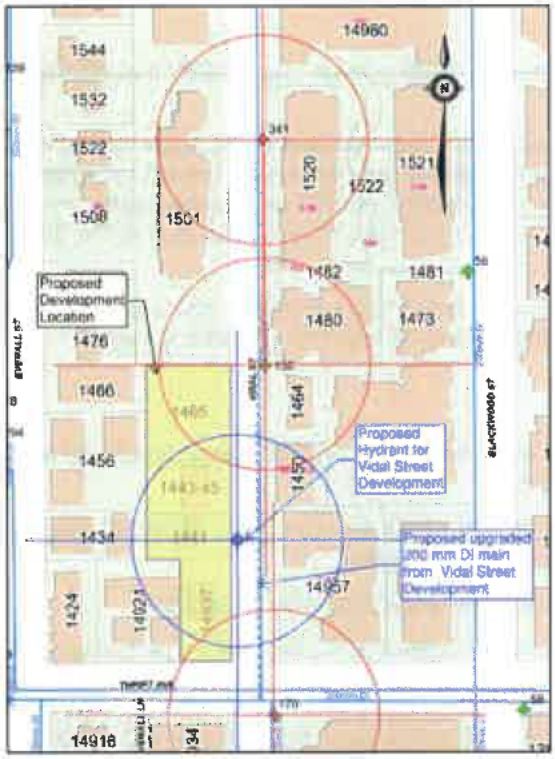


Figure 1: Existing and Proposed Hydrant Coverage Areas

Table 2 provides a summary of the available fire flow in the water system network in the vicinity of the development for existing and future conditions. The estimated available fire flow shown in the table is derived from the modelled available system fire flow[8]. These available fire flows are based on the pressure in the water main and do not account for headlosses in the hydrant lead or hydrant.

[6] Master Municipal Construction Documents Association, *MMCD Design Guidelines*, 2022.

[7] Fire Underwriters Survey, Water Supply for Public Fire Protection, 2020.

[8] Modelled available fire flow (in the water main) at 150 kPa (22 psi) residual pressure. Actual flow capability of hydrant and hydrant lead may limit flow capacity in many situations.

The available fire flow has been capped at the maximum available fire flow that the City's water distribution system can deliver (212 L/s); this maximum fire flow is based on reservoir storage capacity.

Table 2: Estimated Available Fire Flow in the Distribution System

Hydrant Location	Hydrant Number	Estimated Available Fire Flow (L/s)		
		Existing Conditions	Proposed Conditions	Future Conditions
Proposed Hydrant at 1441 Vidal Street	N/A	N/A	212	212
Thrift Avenue and Vidal Street	170	212	212	212
1464 Vidal Street	150	193	212	212
1520 Vidal Street	341	190	212	212

Modelling results indicate that there is not adequate available fire flow in the water system network surrounding the proposed development to meet the fire flow requirement (212 L/s) under existing conditions; however, when the section of main is upgraded on Vidal Street (proposed and future conditions), the available fire flow is adequate.

As shown on Figure 1, there is an existing hydrant (#150) and a proposed hydrant at 1441 Vidal Street that are within 45 m of the development site. The proposed hydrant coverage is adequate (i.e., meets FUS spacing requirements). Please note that review of hydrant coverage and approval from the City of White Rock and the Fire Department is required.

3.4 System Pressure

MMCD design guidelines recommend a minimum system pressure (i.e., coincident with peak hour demand) of 300 kPa (44 psi).

Table 3 shows the calculated model results for maximum and minimum pressures at the proposed servicing location on Vidal Street for the existing, proposed, and future conditions. Results correspond to an elevation of 96.5 m referenced to geodetic datum (GD), and do not account for losses beyond the proposed connection location.

Table 3: System Pressure Model Results at the Proposed Service Connection Location

Description	Required Pressure (kPa (psi))	Existing Conditions		Proposed Conditions		Future Conditions	
		Modelled Pressure (kPa (psi))	HGL (m)	Modelled Pressure (kPa (psi))	HGL (m)	Modelled Pressure (kPa (psi))	HGL (m)
Maximum Static Pressure (night)	N/A	449 (65)	142	449 (65)	142	475 (69)	145
Minimum Pressure at Peak Hour Demand (PHD)	300 (44)	439 (64)	141	440 (64)	141	467 (68)	144
Minimum Pressure with Sprinkler Flow (PHD plus 47 L/s)	N/A	418 (61)	139	427 (62)	140	450 (65)	142

For existing conditions, modelling indicates that the peak hour pressure available in the existing 150 mm diameter main on Vidal Street at the proposed service connection location is 64 psi. With sprinkler flow, the pressure in the distribution main drops approximately 3 psi, yielding an estimated pressure of 61 psi.

For proposed conditions, modelling indicates that the peak hour pressure available in the proposed 200 mm diameter main on Vidal Street at the proposed service connection location is 64 psi. With sprinkler flow, the pressure in the distribution main drops approximately 2 psi, yielding an estimated pressure of 62 psi.

For future conditions, modelling indicates that the peak hour pressure available in the proposed 200 mm diameter main on Vidal Street at the proposed service connection location is 68 psi. With sprinkler flow, the pressure in the distribution main drops approximately 3 psi, yielding an estimated pressure of 65 psi.

4. Conclusions and Recommendations

The proposed multi-family development at 1441 Vidal Steet includes 139 residential units and 1,626.5 m^2 of irrigated outdoor area. The estimated maximum day demand for the proposed development is 48,350 L/day (0.56 L/s).

The proposed development will be serviced from a proposed 200 mm ductile iron diameter water main on Vidal Street. The location of water meter(s) and backflow prevention have not been included in the developer's information. The servicing plan should be submitted for review and approval by the City.

System storage capacity and modelled available fire flow in the water system network meet the fire flow requirement of 212 L/s for proposed and future conditions. It is noted that the available fire flow is not sufficient in the existing system (i.e. the upgrade on Vidal Street is required). The development includes a proposed hydrant approximately 50 m North of Thrift Avenue on Vidal Steet. The proposed hydrant coverage along Vidal Steet appears adequate as it meets FUS spacing requirements. Please note that review and approval of hydrant coverage by the City of White Rock and the Fire Department is required.

Please contact the undersigned should you have any questions.

KERR WOOD LEIDAL ASSOCIATES LTD.

Prepared by:

Rose Sinnott, P.Eng.
Project Manager

Reviewed by:

Mike Miller, P.Eng.
Technical Reviewer

ACK/aah

Encl.: Attachment 1: Development Information
Attachment 2: Waterworks Drawing
Attachment 3: FUS Calculations
Attachment 4: Indoor Sprinkler Flow Requirements

Statement of Limitations

This document has been prepared by Kerr Wood Leidal Associates Ltd. (KWL) for the exclusive use and benefit of the intended recipient. No other party is entitled to rely on any of the conclusions, data, opinions, or any other information contained in this document.

This document represents KWL's best professional judgement based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practising under similar conditions. No warranty, express or implied, is made.

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Revision History

Revision #	Date	Status	Revision Description	Author
0	July 15, 2024	Final		ACK
A	July 2, 2023	Draft		ACK

KERR WOOD LEIDAL
consulting engineers

Attachment 1

Development Information

0.1. project data

PROJECT:	VIDAL STREET (RESIDENTIAL APARTMENT BUILDING)
EXISTING ZONING:	RS-1, RT-2, CD
PROPOSED ZONING:	CD (COMPREHENSIVE DEVELOPMENT ZONE)
CIVIC ADDRESS:	VIDAL STREET, WHITE ROCK, B.C.
LEGAL DESCRIPTION:	LOT 1 PLAN EPP95879;LOT 8 PLAN 13584, AND STRATA PLAN NWS2236, ALL OF SEC 10 TP 1 NWD
VARIANCES APPLIED FOR:	
BYLAW EXEMPTIONS:	
MAXIMUM BUILDING HEIGHT:	
MINIMUM BUILDING ELEVATION:	
SITE AREA:	41,714 S.F. (3,875.4 S.M.) (0.958 ACRES)
BUILDING AREA:	16,512 S.F.
FAR:	102,015 S.F. (GROSS FLOOR AREA) / 42,714 S.F. = 2.45
LOT COVERAGE:	16,512 S.F. / 41,714 S.F. = 39.6%
BUILDING HEIGHT:	123.08m - 96.66m = 26.42m (T.O. ROOF ELEV. - OVERALL AVERAGE NATURAL GRADE = BLDG. HEIGHT)
AVERAGE NATURAL GRADE:	NORTH: 100.25M, EAST: 97.14M, SOUTH: 92.25M, WEST: 96.99M OVERALL: 96.66M
EFFICIENCY:	85,327 S.F. / 102,015 S.F. = 83.6%
RESIDENTIAL FLOOR AREA:	85,327 S.F.
CIRCULATION AREA:	14,762 S.F.

NOTE: 1. NI = NOT INCLUDED IN TOTALS 2. INC = INCLUDING

NOTE: "GRADE, AVERAGE NATURAL" MEANS THE AVERAGE THAT IS DETERMINED BY MEASURING AT THE MIDPOINTS OF THE WALLS OF THE FOUR SIDES OF THE BUILDING OR STRUCTURE.

0.2. building floor area summary

LEVEL	AREA
P4 LEVEL	23182 SF
P3 LEVEL	26864 SF
P2 LEVEL	28648 SF
P1 LEVEL	21572 SF
	99266 SF
GROSS FLOOR AREA	
P1 LEVEL	1474 SF
1st LEVEL	16426 SF
2nd LEVEL	16160 SF
3rd LEVEL	16405 SF
4th LEVEL	16405 SF
5th LEVEL	16405 SF
6th LEVEL	16403 SF
T/O ROOF	815 SF
	100498 SF
INDOOR AMENITY	
P1 LEVEL	1517 SF
	1517 SF
OUTDOOR AMENITY	
T/O ROOF	12672 SF
	12672 SF

NOTE: "GROSS FLOOR AREA" MEANS THE SUM TOTAL OF FLOOR AREAS OF EACH STOREY IN A BUILDING, INCLUSIVE OF EXTERIOR WALLS. GROSS FLOOR AREA SHALL EXCLUDE COMMUNITY AMENITY SPACE.

0.3. circulation area summary

UNIT	AREA	COUNT	LEVEL	TYPE	TOTAL AREA
COMMON AREA	288 SF	1	P1 LEVEL	CIRCULATION	288 SF
COMMON AREA	1186 SF	1	P1 LEVEL	CIRCULATION	1,186 SF
COMMON AREA	2632 SF	1	1st LEVEL	CIRCULATION	2,632 SF
COMMON AREA	2097 SF	1	2nd LEVEL	CIRCULATION	2,097 SF
COMMON AREA	1979 SF	1	3rd LEVEL	CIRCULATION	1,979 SF
COMMON AREA	1979 SF	1	4th LEVEL	CIRCULATION	1,979 SF
COMMON AREA	1979 SF	1	5th LEVEL	CIRCULATION	1,979 SF
COMMON AREA	1979 SF	1	6th LEVEL	CIRCULATION	1,979 SF
COMMON AREA	215 SF	1	T/O ROOF	CIRCULATION	486 SF
COMMON AREA	375 SF	1	T/O ROOF	CIRCULATION	379 SF
COMMON AREA: 11					14,934 SF

0.4. unit floor area summary

UNIT	UNIT AREA	COUNT	LEVEL	TYPE	TOTAL UNIT AREA
UNIT A	323 SF	2	1st LEVEL	STUDIO	645 SF
UNIT A	323 SF	2	2nd LEVEL	STUDIO	645 SF
UNIT A	323 SF	2	3rd LEVEL	STUDIO	645 SF
UNIT A	323 SF	2	4th LEVEL	STUDIO	646 SF
UNIT A	323 SF	2	5th LEVEL	STUDIO	646 SF
UNIT A	323 SF	2	6th LEVEL	STUDIO	646 SF
UNIT A: 12					3,874 SF
UNIT A2	377 SF	1	3rd LEVEL	STUDIO	377 SF
UNIT A2	377 SF	1	4th LEVEL	STUDIO	377 SF
UNIT A2	377 SF	1	5th LEVEL	STUDIO	377 SF
UNIT A2	377 SF	1	6th LEVEL	STUDIO	377 SF
UNIT A2: 4					1,507 SF
UNIT A3	[illegible]	1	1st LEVEL	STUDIO	404 SF
UNIT A3: 1					404 SF
UNIT B	460 SF	5	1st LEVEL	1 BEDROOM	2,301 SF
UNIT B	460 SF	5	2nd LEVEL	1 BEDROOM	2,301 SF
UNIT B	460 SF	5	3rd LEVEL	1 BEDROOM	2,301 SF
UNIT B	460 SF	4	4th LEVEL	1 BEDROOM	1,840 SF
UNIT B	460 SF	4	5th LEVEL	1 BEDROOM	1,840 SF
UNIT B	460 SF	4	6th LEVEL	1 BEDROOM	1,840 SF
UNIT B: 27					12,826 SF
UNIT B1.1	453 SF	2	1st LEVEL	1 BEDROOM	906 SF
UNIT B1.1	453 SF	2	2nd LEVEL	1 BEDROOM	906 SF
UNIT B1.1	453 SF	3	3rd LEVEL	1 BEDROOM	1,359 SF
UNIT B1.1	453 SF	3	4th LEVEL	1 BEDROOM	1,359 SF
UNIT B1.1	453 SF	3	5th LEVEL	1 BEDROOM	1,359 SF
UNIT B1.1	453 SF	3	6th LEVEL	1 BEDROOM	1,359 SF
UNIT B1.1: 16					7,247 SF
UNIT B2	483 SF	2	1st LEVEL	1 BEDROOM	966 SF
UNIT B2	488 SF	1	2nd LEVEL	1 BEDROOM	483 SF
UNIT B2: 3					1,450 SF
UNIT B3	573 SF	1	2nd LEVEL	1 BEDROOM	573 SF
UNIT B3: 1					573 SF
UNIT B4	519 SF	1	1st LEVEL	1 BEDROOM	519 SF
UNIT B4	519 SF	1	2nd LEVEL	1 BEDROOM	519 SF
UNIT B4	519 SF	1	3rd LEVEL	1 BEDROOM	519 SF
UNIT B4	519 SF	1	4th LEVEL	1 BEDROOM	519 SF
UNIT B4	519 SF	1	5th LEVEL	1 BEDROOM	519 SF
UNIT B4	519 SF	1	6th LEVEL	1 BEDROOM	519 SF
UNIT B4: 6					3,116 SF
UNIT B4.1	486 SF	1	1st LEVEL	1 BEDROOM	486 SF
UNIT B4.1	486 SF	1	2nd LEVEL	1 BEDROOM	486 SF
UNIT B4.1	486 SF	1	3rd LEVEL	1 BEDROOM	486 SF
UNIT B4.1	486 SF	1	4th LEVEL	1 BEDROOM	486 SF
UNIT B4.1	486 SF	1	5th LEVEL	1 BEDROOM	486 SF
UNIT B4.1	486 SF	1	6th LEVEL	1 BEDROOM	486 SF
UNIT B4.1: 6					2,913 SF
UNIT B5	569 SF	1	1st LEVEL	1 BEDROOM	569 SF
UNIT B5	569 SF	1	2nd LEVEL	1 BEDROOM	569 SF
UNIT B5	569 SF	1	3rd LEVEL	1 BEDROOM	569 SF
UNIT B5	569 SF	1	4th LEVEL	1 BEDROOM	569 SF
UNIT B5	569 SF	1	5th LEVEL	1 BEDROOM	569 SF
UNIT B5	569 SF	1	6th LEVEL	1 BEDROOM	569 SF
UNIT B5: 6					3,414 SF
UNIT B6	518 SF	1	1st LEVEL	1 BEDROOM	518 SF
UNIT B6	518 SF	1	2nd LEVEL	1 BEDROOM	518 SF
UNIT B6	518 SF	1	3rd LEVEL	1 BEDROOM	518 SF
UNIT B6: 3					1,555 SF
UNIT C	745 SF	1	1st LEVEL	2 BEDROOM	745 SF
UNIT C	745 SF	1	2nd LEVEL	2 BEDROOM	745 SF
UNIT C	745 SF	1	3rd LEVEL	2 BEDROOM	745 SF

0.4. unit floor area summary

UNIT	UNIT AREA	COUNT	LEVEL	TYPE	TOTAL UNIT AREA
UNIT C	745 SF	1	4th LEVEL	2 BEDROOM	745 SF
UNIT C	745 SF	1	5th LEVEL	2 BEDROOM	745 SF
UNIT C	745 SF	1	6th LEVEL	2 BEDROOM	745 SF
UNIT C: 6					4,467 SF
UNIT C1	783 SF	1	1st LEVEL	2 BEDROOM	783 SF
UNIT C1	783 SF	1	2nd LEVEL	2 BEDROOM	783 SF
UNIT C1	783 SF	1	3rd LEVEL	2 BEDROOM	783 SF
UNIT C1	783 SF	1	4th LEVEL	2 BEDROOM	783 SF
UNIT C1	783 SF	1	5th LEVEL	2 BEDROOM	783 SF
UNIT C1	783 SF	1	6th LEVEL	2 BEDROOM	783 SF
UNIT C1: 6					4,697 SF
UNIT C3	794 SF	1	1st LEVEL	2 BEDROOM	794 SF
UNIT C3	794 SF	1	2nd LEVEL	2 BEDROOM	794 SF
UNIT C3	794 SF	1	3rd LEVEL	2 BEDROOM	794 SF
UNIT C3	794 SF	1	4th LEVEL	2 BEDROOM	794 SF
UNIT C3	794 SF	1	5th LEVEL	2 BEDROOM	794 SF
UNIT C3	794 SF	1	6th LEVEL	2 BEDROOM	794 SF
UNIT C3: 6					4,765 SF
UNIT C4	584 SF	1	2nd LEVEL	2 BEDROOM	584 SF
UNIT C4	584 SF	1	3rd LEVEL	2 BEDROOM	584 SF
UNIT C4	592 SF	1	3rd LEVEL	2 BEDROOM	592 SF
UNIT C4	584 SF	1	4th LEVEL	2 BEDROOM	584 SF
UNIT C4	592 SF	1	4th LEVEL	2 BEDROOM	592 SF
UNIT C4	584 SF	1	5th LEVEL	2 BEDROOM	584 SF
UNIT C4	592 SF	1	5th LEVEL	2 BEDROOM	592 SF
UNIT C4	584 SF	1	6th LEVEL	2 BEDROOM	584 SF
UNIT C4	592 SF	1	6th LEVEL	2 BEDROOM	592 SF
UNIT C4: 9					5,261 SF
UNIT D	1046 SF	1	1st LEVEL	3 BEDROOM	1,046 SF
UNIT D	1051 SF	1	1st LEVEL	3 BEDROOM	1,051 SF
UNIT D	1046 SF	1	2nd LEVEL	3 BEDROOM	1,046 SF
UNIT D	1051 SF	1	2nd LEVEL	3 BEDROOM	1,051 SF
UNIT D	1046 SF	1	3rd LEVEL	3 BEDROOM	1,046 SF
UNIT D	1047 SF	1	3rd LEVEL	3 BEDROOM	1,047 SF
UNIT D	1046 SF	1	4th LEVEL	3 BEDROOM	1,046 SF
UNIT D	1047 SF	1	4th LEVEL	3 BEDROOM	1,047 SF
UNIT D	1046 SF	1	5th LEVEL	3 BEDROOM	1,046 SF
UNIT D	1047 SF	1	5th LEVEL	3 BEDROOM	1,047 SF
UNIT D	1046 SF	1	6th LEVEL	3 BEDROOM	1,046 SF
UNIT D	1047 SF	1	6th LEVEL	3 BEDROOM	1,047 SF
UNIT D: 12					12,569 SF
UNIT D2	978 SF	1	4th LEVEL	3 BEDROOM	978 SF
UNIT D2	978 SF	1	5th LEVEL	3 BEDROOM	978 SF
UNIT D2	978 SF	1	6th LEVEL	3 BEDROOM	978 SF
UNIT D2: 3					2,935 SF
UNIT D3	882 SF	1	1st LEVEL	3 BEDROOM	882 SF
UNIT D3	882 SF	1	2nd LEVEL	3 BEDROOM	882 SF
UNIT D3	882 SF	1	3rd LEVEL	3 BEDROOM	882 SF
UNIT D3	882 SF	1	4th LEVEL	3 BEDROOM	882 SF
UNIT D3	882 SF	1	5th LEVEL	3 BEDROOM	882 SF
UNIT D3	882 SF	1	6th LEVEL	3 BEDROOM	882 SF
UNIT D3: 6					5,295 SF
UNIT D4	1110 SF	1	1st LEVEL	3 BEDROOM	1,110 SF
UNIT D4	1110 SF	1	2nd LEVEL	3 BEDROOM	1,110 SF
UNIT D4	1110 SF	1	3rd LEVEL	3 BEDROOM	1,110 SF
UNIT D4	1110 SF	1	4th LEVEL	3 BEDROOM	1,110 SF
UNIT D4	1110 SF	1	5th LEVEL	3 BEDROOM	1,110 SF
UNIT D4	[illegible] SF	1	[illegible]	3 BEDROOM	1,110 SF
UNIT D4: 6					6,658 SF
UNIT TOTALS: 139					85,154 SF

0.5. parking

REQUIRED (BYLAW REQUIREMENT)				TOTALS
	UNITS	FACTOR	TOTAL	
DWELLING UNIT	139	*1.2	167	
VISITOR	139	*0.3	42	
BARRIER FREE (DWELLING UNITS)	167 STALLS	2 VAN / 2 STANDARD		
BARRIER FREE (VISITOR)	42 STALLS	1 VAN-ACCESSIBLE		
TOTAL STALLS			209	209 REQUIRED
ELECTRIC STALLS	209 STALLS	[illegible]	21	21 EV
OFF STREET LOADING				1 REQUIRED

PROVIDED	SMALL CAR	BARRIER FREE	EV	TOTAL
TENANT (P3 FLOOR)	6	1 VAN-ACCESSIBLE	0	15
TENANT (P2 FLOOR)	15	1 VAN-ACCESSIBLE	20	37
TENANT (P3 FLOOR)	22	1 VAN/1 STANDARD	0	60
TENANT (P4 FLOOR)	12	0	0	51
VISITOR (P1 FLOOR)	8	0	0	17
VISITOR (P2 FLOOR)	11	1 VAN-ACCESSIBLE	5	25 (INC. 2 CO-OP)
TOTAL STALLS	71	5	25	209 PROVIDED
OFF STREET LOADING				1 PROVIDED

BIKE PARKING REQUIRED (BYLAW REQUIREMENT)	UNITS	FACTOR	TOTAL	
BIKE STALLS CLASS I	139	*1	139	
BIKE STALLS CLASS II	139	*0.2	28	
TOTAL STALLS			167	167 REQUIRED
BIKE PARKING PROVIDED				
BIKE STALLS CLASS I	(10.8% ADDITIONAL STALLS)		153	
BIKE STALLS CLASS II	(7.1% ADDITIONAL STALLS)		30	
TOTAL STALLS	(10.2% ADDITIONAL STALLS)		183	183 PROVIDED

NOTE 1: NI = NOT INCLUDED IN TOTALS

0.6. unit count

RESIDENTIAL	UNIT #	UNIT %
1 BED	68	49%
2 BED	27	19%
3 BED	12	9%
3 BED (ADAPTABLE)	15	11%
STUDIO	17	12%
UNIT TOTALS: 139		

NOTES:
- NO CURRENT STEP CODE REQUIREMENTS FOR CITY OF WHITE ROCK
- INTENT FOR PROPOSED CONSTRUCTION TO MEET STEP 2 EQUIVALENCY
- WOOD FRAME THERMAL PERFORMANCE BETTER THAN STEEL OR CONCRETE
- DEVELOPER IS AWARE OF THE IMPORTANCE OF ENERGY EFFICIENCY IN THE CURRENT MARKET

DP 2018-59 VIDAL STREET		
SOFTSCAPE AREAS		
SHRUB PLANTING		
	ON SLAB (sq-m)	OFF SLAB (sq-m)
LEVEL P1	89 (planters)	11.5
LEVEL P2	135 (planters)	43
MAIN FLOOR	355	21
LEVEL 6	173	N/A
TOTAL (IRRIGATED)	752 m2	75.5 m2
SOD		
	ON SLAB (sq-m)	OFF SLAB (sq-m)
LEVEL P1	N/A	68
LEVEL P2	N/A	68
MAIN FLOOR	N/A	341
LEVEL 6	322 (Green roof)	N/A
TOTAL (IRRIGATED)	322 m2	477 m2

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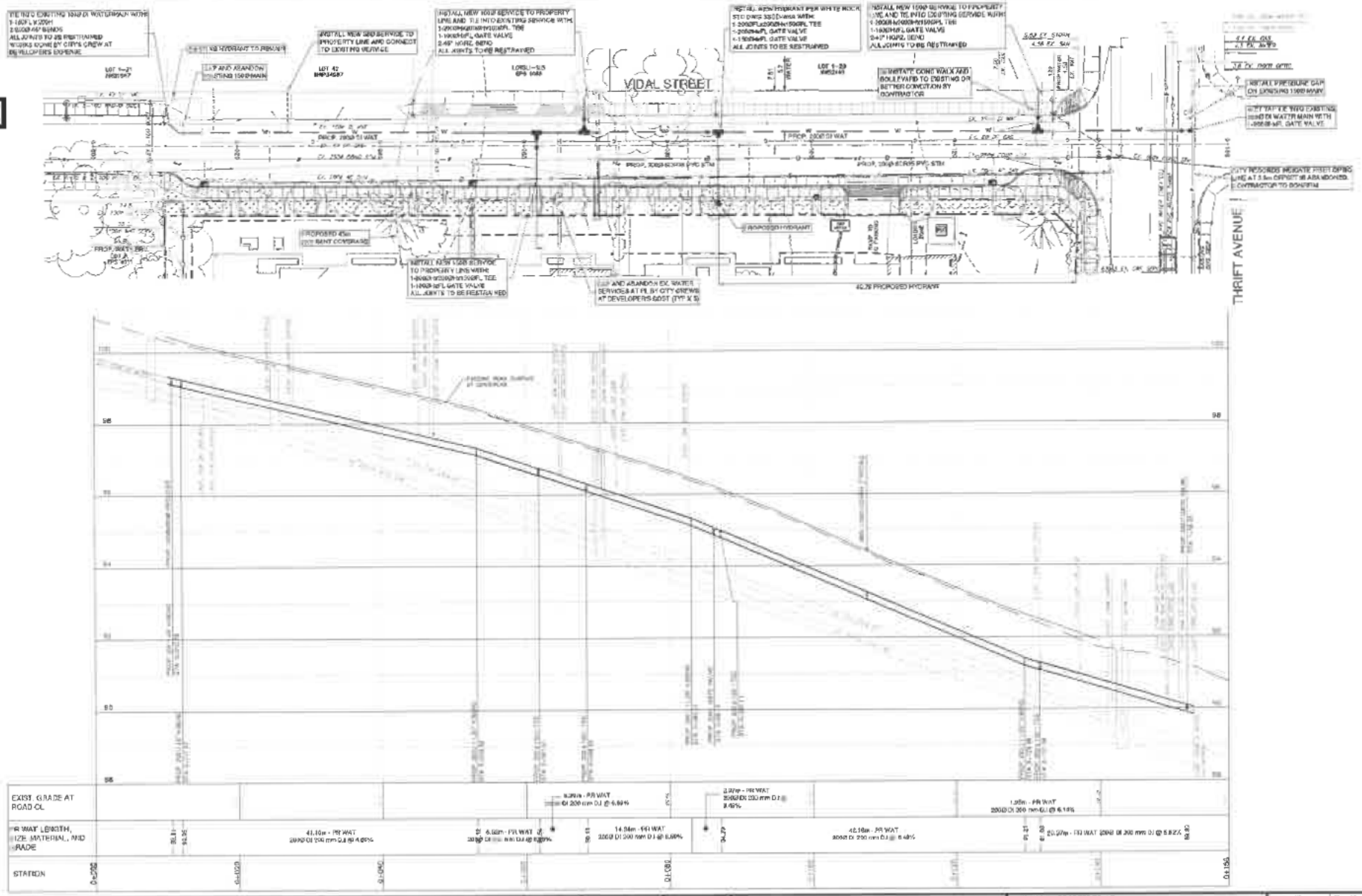
Attachment 2

Waterworks Drawing



LEGAL: LOT 1 PLAN EPP 46679 LOT 5 PLAN 13684 LOT 41 PLAN 35379 STRATA PLAN NWS [redacted] ALL OF SEC 19 TP 1 NWD	A	ISSUED FOR REVIEW	2024-04-10	WEDLER ENGINEERING	WS VIDAL PROPERTIES LP	S19-0280/A-06
GRID TRUE ELEVS ARE GEODETIC (m) HUB BENCH ELEV 91.149m SE CORNER OF VIDAL / THRIFT	B	REVISED PER CITY COMMENTS	2024-05-23		VIDAL – RESIDENTIAL BUILDING 1441, 1443-45, 1455 VIDAL ST AND 14321 THRIFT AVE, WHITE ROCK	
	REV	DESCRIPTION	[redacted]		WATERWORKS – VIDAL STREET	PHASE 9

DETAILED DESIGN ISSUE

PROGRESS PRINT - NOT FOR CONSTRUCTION

KERR WOOD LEIDAL
consulting engineers

Attachment 3

FUS Calculations

BMAC
TECHNOLOGIES & CONSULTING

File #	PO-76824-A-ME
Date:	April 22, 2024
Project Address:	Vidal Street, White Rock

Type of Construction:		Type III - Ordinary
Co-efficient (C):		1
Total Floor Area (A):	102,015 ft^2	9,477.5 m^2

Fire Flow From Formula: RFF = 220 C A^0.5	**21,418 L/min**	(a)

Type of Occupancy:	Residential - Limited Combustible Construction				
Hazard Allowance:	-15%	x	(a)	**-3,213 L/min**	(b)
	Subtotal (a + b)			**18,205 L/min**	(c)
Sprinkler System:	Yes - NFPA 13 (2019), Standard Water Supply, Supervised System				
Sprinkler Allowance:	50%	x	(c)	**9,102 L/min**	(d)

0m-3m	20%
3.1m-10m	15%
10.1m-20m	10%
20.1m-30m	5%
30.1m +	0%

	[m]	Exposure
North:	14m	10%
East:	30.1m+	0%
South:	30.1m+	0%
West:	14m	10%

South and West exposures are reduced to zero based on length-height factor.

Exposure Allowance:	20%	x	(c)	**3,641 L/min**	(e)
Wood Shake Charge	No			**0 L/min**	
Total Fire Flow Required (c - d + e):				**12,743 L/min @ 20 psi**	

Total Fire Flow Required:	**212 L/s @ 20psi**

Calculations Based on "Water Supply for Public Fire Protection", Fire Underwriters Survey, 2020.

Prepared by:
BMAC Technologies and Consulting Inc.
EGBC Permit: 1000535

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
F. HEMMATI
45972

2024-04-23
EGBC PTP#1000535

Farzad Hemmati, PhD, Peng, CP
Principal
Farzadh@bmactc.com

Rose Sinnott

From: Farzad Hemmati <farzadh@bmactc.com>
Sent: June 11, 2024 12:11 PM
To: Rose Sinnott; Navraj
Cc: Krista Baronian; Jay Lin; Sean De Beer
Subject: RE: 4510.001: KWL Retainer Invoice

Hello Rose,

If you need the exact number, we have to design the system; otherwise, approximately it will be 750 USgpm.
Let me know if you need more clarifications.

Regards,

Farzad Hemmati, Ph.D., P.Eng., C.P.
Principal
T. 604.544.7564 | C. 604.649.4574
FarzadH@bmactc.com | www.bmactc.com
213-3993 Henning Drive
Burnaby, B.C. V5C 6P7
BMAC
TECHNOLOGIES & CONSULTING

From: Rose Sinnott <RSinnott@kwl.ca>
Sent: Tuesday, June 11, 2024 12:04 PM
To: Navraj <nav@wsgroup.ca>; Farzad Hemmati <farzadh@bmactc.com>
Cc: Krista Baronian <krista@wsgroup.ca>; Jay Lin <jay@wsgroup.ca>; Sean De Beer <sean@wsgroup.ca>
Subject: RE: 4510.001: KWL Retainer Invoice

Hi Nav,

Just to clarify: We have the FUS calculation. We need the indoor sprinklering flow (per NFPA 13) for the development.

Many thanks,
Rose

KWL File # 4510.001

Rose Sinnott PEng | Project Engineer | KWL
+1 (250) 294-8022 | +1 (250) 661-8502 |

From: Navraj <nav@wsgroup.ca>
Sent: Tuesday, June 11, 2024 10:04 AM
To: Farzad Hemmati <farzadh@bmactc.com>
Cc: Krista Baronian <krista@wsgroup.ca>; Jay Lin <jay@wsgroup.ca>; Rose Sinnott <RSinnott@kwl.ca>; Sean De Beer <sean@wsgroup.ca>