Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Noise and Vibration Studies

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Groundwater Impact Assessment

Proposed Residential Building
1185 Beaverwood Road
Ottawa, Ontario

Prepared For

Ark Construction Ltd.

July 4, 2022

Report PH4499-REP.01

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1.0 INTRODUCTION

Paterson Group (Paterson) was commissioned by Ark Construction Ltd. to complete a groundwater impact assessment for the proposed residential building to be located at 1185 Beaverwood Road in the City of Ottawa, Ontario (Refer to Drawing PH4499-1 - Site Plan attached to the current report).

The following report has been prepared specifically and solely for the aforementioned project described herein. It contains a hydrogeological review and assessments pertaining to the proposed development as it is understood by Paterson at the time of writing this report.

1.1 Proposed Development

Based on available design plans, it is understood that the proposed development will consist of a multi-storey residential building with a partial below-grade level which will daylight to the east. At finished grades, the proposed building will be surrounded by landscaped areas, asphalt-paved access lanes and parking areas. It is anticipated the proposed development will be municipally serviced.

2.0 Background Information

The field program for the geotechnical investigation was carried out on March 1, 2022. At that time, a total of four (4) boreholes were advanced across the site to a maximum depth of 4.5 m below ground surface (bgs) using a track mounted drill rig. The test hole locations were distributed in a manner to provide general coverage of the subject site. The approximate locations of the test holes are presented on drawing PG6160 - 1 - Test Hole Location Plan included in Appendix 2.

3.0 SITE CONDITIONS

At the time of the geotechnical field investigation, the subject site consisted of an approximately 0.6 acre property bounded by a residential property to the north, Scharfield Road to the east, Beaverwood Road to the south, and a vacant property to the west. The ground surface across the site slopes downward toward the east side of the property from approximate geodetic elevations of 94.5 to 90.5 m.

The western half of the subject site is occupied by an existing residential dwelling and detached garage structure which are surrounded on all sides by mature trees. The eastern half of the site is vacant and grass covered.

3.1 Geology

Generally, the soil profile at the borehole locations consists of topsoil or asphaltic concrete overlying fill material which is underlain by brown, stiff to very stiff silty clay. The silty clay was further underlain by a glacial till deposit consisting of a silty sand to sandy silt matrix with gravel, cobbles and boulders. Practical refusal to augering was encountered at each test hole location at depths ranging from approximately 0.2 to 4.5 m bgs. Specific details of the soil profile at each test hole location are presented on the borehole logs included in Appendix 2.

Based on surficial mapping prepared by the Ontario Geological Survey, the subject site is located in an area where surficial geology predominately consists of marine deposited clay and silt as well as drumlinized glacial till. This information is consistent with the results of Paterson's field investigation.

Fill

Fill material consisting of a silty sand to silty clay with trace amounts of gravel was observed underlying the topsoil or asphaltic concrete and extended to a maximum depth of 1.2 m bgs.

Silty Clay

A hard to very stiff brown silty clay was encountered underlying the fill material at all borehole locations with the exception of BH 2-22 and extended to a maximum depth of 3.4 m bgs.

Glacial Till

A compact glacial till deposit comprised of a brown silty sand to sandy silt matrix with various amounts of gravel, cobbles, and boulders was encountered underlying the silty clay layer at all test hole locations with the exception of borehole BH 2-22. This layer extended a maximum depth of 4.5 m bgs.

Bedrock

Based on available geological mapping provided by the Ontario Geological Survey (OGS), bedrock consists of dolomite from the Oxford formation with an overburden drift thickness of approximately 5 to 10 m depth.

Karst Features

The term “karst” refers to a geologic formation characterized by the dissolution of carbonate bedrock, such as limestone or dolostone. In order for karstification to occur, precipitation must be allowed to infiltrate the top of the bedrock to dissolutionally enlarge previously existing joints and bedding planes. Based on available mapping by the Ontario Geological Survey, there is no inferred, potential or known karstification in the subject area.

3.2 Hydrogeology

Existing Aquifer Systems

Aquifer systems may be defined as a geological media, either overburden soils or fractured bedrock, which permit the movement of groundwater under hydraulic gradients. Although groundwater has been observed within the overburden material at the subject site, the overburden aquifer does not allow for the development of significant water supply wells. Water supply wells in the vicinity are instead likely found in the bedrock aquifer.

Bedrock aquifer mapping, provided by Natural Resources Canada Urban Geology of the National Capital Region mapping, was reviewed as part of this assessment. Using this tool, it was found that the subject site is situated entirely on the Oxford formation aquifer system.

Wells completed in the Oxford formation within a 500 m radius of the subject site encountered water-bearing fractures at depths typically ranging from 12 m to 49 m bgs.

Groundwater Levels

Groundwater was observed in the piezometers and monitoring well installed in the overburden at the borehole locations. Based on a review of water well records, groundwater is also present in the bedrock at depth.

Water levels at the subject site were observed to vary from 1.3 to 3.1 m bgs at the time of the geotechnical field investigation. It should be noted that water can become trapped in backfilled boreholes completed in low permeability materials resulting in an artificially elevated water table, and that groundwater levels can fluctuate both seasonally and in conjunction with precipitation events. As such, water levels may vary at the time of construction.

Hydraulic Gradients

Vertical hydraulic gradients were not measured at the subject site as the previous studies completed did not warrant the installation of monitoring well nests.

Based on groundwater measurements taken from the piezometers and monitoring wells at the time of the time of the field investigation, an approximate horizontal hydraulic gradient and direction was calculated in the overburden material. The horizontal hydraulic gradient between any 2 points is the slope of the hydraulic head between those points:

$$i=(h2-h1)/L$$

Where: i=horizontal hydraulic gradient
h=water level (m asl)
L=horizontal distance between test hole locations

Using the above noted formula, the horizontal hydraulic gradient has been calculated to range from approximately 0.04 to 0.05 in an eastern direction. Shallow groundwater flow in the vicinity of the subject site is expected to reflect local topography. Regional groundwater flow is considered to be in a eastern direction towards the nearby Rideau River.

Hydraulic Conductivity

The hydraulic conductivity values were conservatively estimated based upon previous experience at similar sites in the area and typical published values for similar stratigraphy. The hydraulic conductivity values are interpreted to range from approximately 1×10^{-7} to 1×10^{-9} m/sec for stiff silty clay and are dependent on the moisture level and consistency of the deposit. The hydraulic conductivity values are interpreted to range from approximately 1×10^{-6} to 1×10^{-10} m/sec for glacial till and is dependent on the ratios of the various materials in the deposit.

Based on the available drawings for the subject site, the maximum depth of footing excavation is expected to be approximately 5.5 m, while the maximum depth of foundation excavation is expected to be approximately 3.5 m bgs. Given the observed groundwater infiltration levels in the test holes and approximate excavation depths, it is conservatively estimated that a maximum saturated depth of excavation of 4 m could be expected during the foundation excavation at the time of construction.

Groundwater Recharge and Discharge

In general, groundwater will follow the path of least resistance from areas of higher hydraulic head to areas of lower hydraulic head. While upward and downward hydraulic gradients may be indicative of discharge and recharge respectively, other factors must be considered.

Based on the hydraulic conductivity estimates obtained from published literature, the glacial till with a silty sand matrix is considered to have a higher hydraulic conductivity than the silty clay overburden soil, which is generally considered to act as a confining layer. It is expected that the majority of surface water will either flow down-gradient as perched water within the fill material or as sheet drainage where silty clay is present. Isolated areas were identified with only a thin layer of silty clay where recharge may be occurring through the till deposit. However given the intermittent nature of the surficial higher permeability soils, the volume of recharge within the site boundaries is expected to be minimal.

With regards to discharge zones, neither the topographical or geological conditions are suitable for discharge to be occurring on a large scale at the subject site, with only limited discharge potential in the drainage ditches located in the surrounding area.

4.0 Potential Impacts

4.1 Adverse Effects on Adjacent Structures

The overburden in the area generally consists of topsoil or asphaltic concrete overlying fill material which is further underlain by silty clay an glacial till. Practical refusal to augering was encountered at each test hole location at depths ranging from 0.2 m to 4.5 m bgs. The potential dewatering volumes due to groundwater infiltration into the excavation footprint is anticipated to be low to moderate depending on variations in the majority composition of the overburden material. It is anticipated that pumping from open sumps will be sufficient to control the groundwater influx through the sides of the excavations. Additionally, given the nature of the development (residential multi-storey building with one basement level), the duration of the excavation on site is expected to be short term in duration. Furthermore, the radius of influence expected to develop as a result of dewatering during construction will be minimal. As such, any effects related to ground surface settlement due to the water taking activities during construction are expected to be negligible.

4.2 Adverse Effects on Neighbouring Water Wells

A search of the Ontario Water Well Records database indicates there are several wells within 500 m of the site as depicted on drawing PH4499-2 - MECP Water Well Location Plan. The wells that are currently in use were noted to be screened in the bedrock aquifer system with sufficient vertical and horizontal separation between the maximum potential depth of excavation and the depth of the wells. Furthermore, water takings at the subject site are expected to be short term in duration, given the nature of the proposed development. Due to the vertical/horizontal separation between the maximum potential depth of excavation, the short term nature of the water takings and the limited radius of influence expected to develop as a result of dewatering activities, it is not expected that any of the water takings will negatively affect the water quantity and/or quality of nearby well users. It is worth noting that specific construction methodologies were unknown at the time of report preparation. It is understood that no bedrock excavation is anticipated to be required as part of the foundation excavation. However, should blasting be required for rock removal, the radius of inclusion in the down-gradient direction for the baseline sampling program discussed below will be revised as needed in coordination with City of Ottawa staff.

A series of calculations were carried out on theoretical radii of influence for a maximum building excavation of 6 m deep and withdrawing water from the upper 3.0 m to 4.0 m of the saturated zone. These calculations were completed based on Sichardt (1992) using the equation:

$$R = r_e + 3000*\Delta h(k^{0.5})$$

- R = radius of influence (m)
- r_e = equivalent radius of excavation (m)
- Δh = thickness of drawdown within the aquifer (m)
- k = hydraulic conductivity (m/sec)

For the purposes of completing the calculations, the following assumptions were made:

- ❏ r_e = 20.1 m
- ❏ $k = 1 \times 10^{-6}$ m/s for glacial till
- ❏ Δh = 3.0 m to 5.0 m, to review potential minimum/maximum variable conditions.

Using the above equation and assumptions, a radius of influence of approximately 9 to 15 m will develop as a steady state condition, extending from the edge of the excavation, in the area of the subject site.

Given the hydrogeological characteristics of the subject site, the theoretical radii of influence for the potential excavation related to the development and the depth of water supply wells within 500 m, a long-term groundwater monitoring program is not required to be implemented based on our review.

However, a baseline water quality sampling program has been recommended to be completed prior to commencing construction on site and is currently underway at the time of report preparation. The premise of the program is to obtain groundwater quality information from the water supply wells in the vicinity of the proposed development prior to the project commencing. This ensures that all parties involved (developer, homeowners, and City of Ottawa) are protected should a concern arise during or after construction.

Baseline Water Sampling Program

As noted above, the theoretical radius of influence for the proposed development is expected to range from 9 to 15 m dependant on the depth of excavation and elevation of the water table at the time of construction. Additionally, the domestic wells in the area are assumed to be screened within a bedrock aquifer. Furthermore, no bedrock excavation is anticipated as part of the proposed development. Therefore, a conservative radius for the baseline water sampling program of 100 m was agreed upon as a result of pre-consultation undertaken with City of Ottawa staff. Based on the water service mapping provided by the City of Ottawa, a total of eight (8) potential unserviced lots have been identified within 100 m of the subject site.

Municipal addresses on Beaverwood Road that are to be contacted are: 1191. Municipal addresses on Maple Avenue that are to be contacted are: 1186, 1190, 1194, 1195, and 1198. Municipal addresses on Colony Heights Road that are to be contacted are: 5533 and 5534.

The homeowners of the aforementioned properties have been presented with a registered letter delivered by Canada Post. Interested homeowners are being interviewed for the purpose of obtaining baseline water quality and quantity information followed by raw water sample.

The parameters that are being analyzed as part of the sampling program consist of the "Subdivision Water Quality Package" offered by Eurofins Environmental Testing Canada Inc. This package includes; alkalinity, bacteria, colour, conductivity, pH, hardness, IC anions, NH3, TKN, DOC, phenols, sulphide, metals, Tannin & Lignin, TDS and turbidity.

A draft copy of the registered letter has been submitted to the City of Ottawa for review and approval prior to distribution and commencing the baseline water quality sampling program outlined above.

4.3 Soil, Surface Water, and Groundwater

A search of the MECP Brownfields Environmental Site Registry was conducted as part of the assessment of the site, neighbouring properties, and the general vicinity of the property. No recorded Brownfield sites were identified within 500 m of the subject site.

It is anticipated that the material on site will be disposed of or re-used as per the MECP policy (Management of Excess Soil - A Guide for Best Management Practices dated January, 2014.)

With respect to surface water features, there are none located within the theoretical radius of influence for the subject site. The nearest surface water feature is the Rideau River, located approximately 500 m east of the site.

It is expected that a multi-barrier approach (such as hay bales, geosocks, silt fencing, etc.) to a non-frozen, well vegetated area will be utilized in order to promote re-infiltration of discharge water prior to reaching the adjacent surface water features noted above. In addition, the turbidity of the water shall not exceed 8 NTU above background levels when discharging within 30 m of a watercourse. Therefore, adverse effects to surface water features resulting from dewatering activities at the subject site are expected to be negligible.

The groundwater that is pumped from the excavations must be managed in an appropriate manner. The contractor may be required to implement a water management and treatment program to dispose of the pumped water. It is expected the groundwater will be discharged to overland. Further treatment may be required should the discharge not meet the required guidelines

4.4 Adjacent Permits to Take Water

A search of the MECP Permit to Take Water (PTTW) database provided no active PTTW within 500 m of the subject site. A search of the MECP Environmental Activity and Sector Registry (EASR) database provided no water taking permits within 500 m of the subject site.

4.5 Existing Servicing

There are no wells known to exist at the residential dwelling. If any wells are encountered, they will be required to be properly decommissioned by a licensed well contractor as per O.Reg. 903 prior to construction.

5.0 Recommendations

Further testing and site preparation is recommended for the detailed Groundwater Impact Assessment. The following aspects of the program should be performed prior to commencing construction for the proposed residential development:

- ❑ All existing wells within the proposed residential development should be properly decommissioned as per *O.Reg. 903* and prior to construction.

- ❑ In the interest of public perception, a baseline water sampling program is recommended prior to commencing construction on site.

- ❑ Prior to and during site development, it is recommended that construction best management practices with respect to fuels and chemical handling, spill prevention, and erosion and sediment control be followed.

- ❑ For any water taking of volumes greater than 50,000 L/day, either an Environmental Activity and Sector Registration (EASR) or a Permit To Take Water (PTTW) is required from the MECP, dependant on dewatering requirements.

6.0 STATEMENT OF LIMITATIONS

The recommendations provided in this report are in accordance with our present understanding of the project.

A hydrogeological review of this nature is a limited sampling of a site. The recommendations are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around the test locations. Should any conditions at the site be encountered which differ from those at the test locations, we request notification immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Ark Construction Ltd. or their agent(s) is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Kevin A. Pickard, EIT

Michael Laflamme, P.Geo.

APPENDIX 1

Drawing PH4499 - 1 - Site Plan

Drawing PH4499 - 2 - MECP Water Well Location Plan

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154 Colonnade Road South
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Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

ARK CONSTRUCTION

GROUNDWATER IMPACT ASSESSMENT
1185 BEAVERWOOD ROAD

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:500	Date: 05/2022
Drawn by: YA	Report No.: PH4499-1
Checked by: KP	Dwg. No.: PH4499-1
Approved by: ML	Revision No.:

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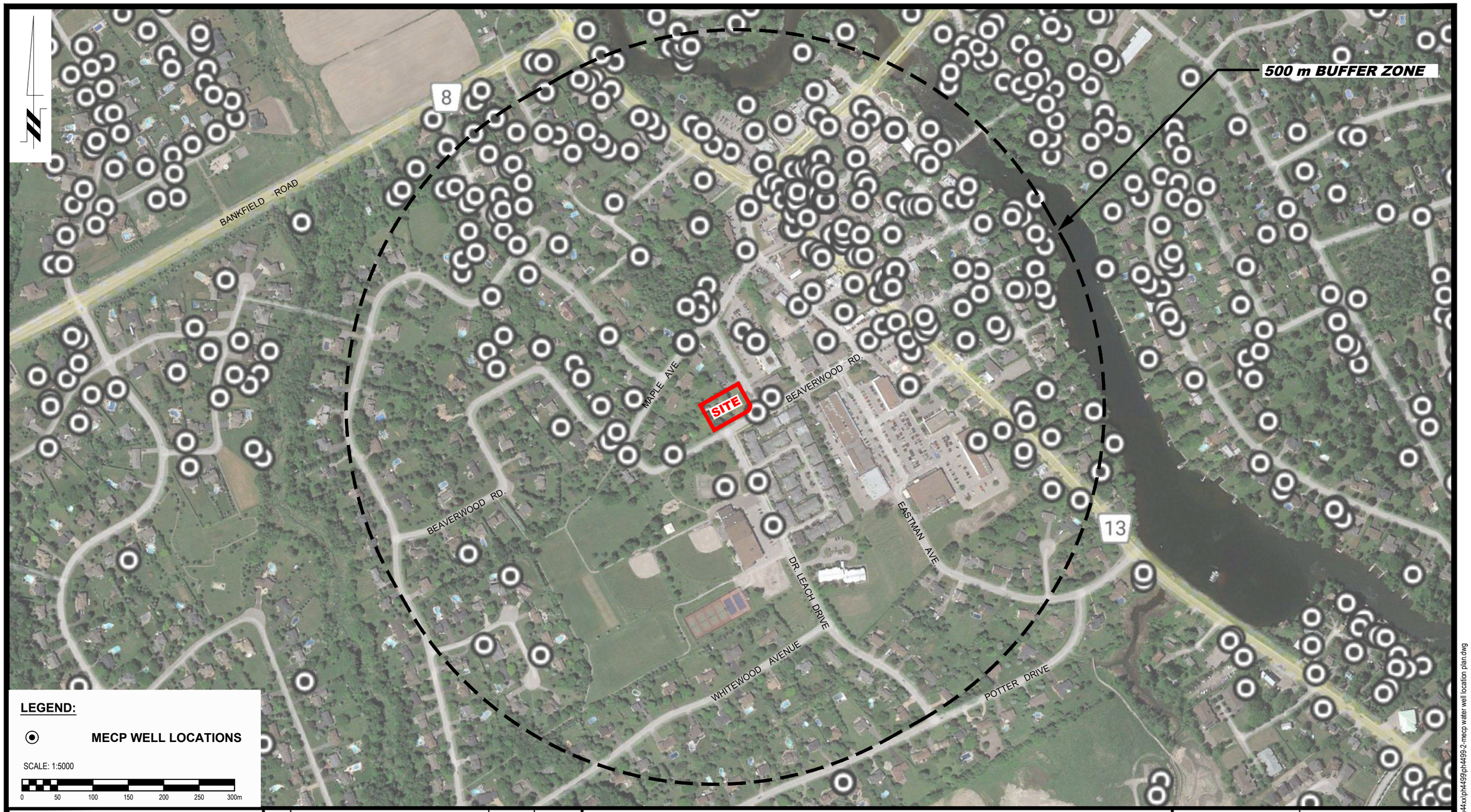

LEGEND:

MECP WELL LOCATIONS

SCALE: 1:5000

0 50 100 150 200 250 300m

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NO.	REVISIONS	DATE	INITIAL

ARK CONSTRUCTION

GROUNDWATER IMPACT ASSESSMENT
1185 BEAVERWOOD ROAD

OTTAWA, ONTARIO

Title:

MECP WATER WELL LOCATION PLAN

Scale: 1:5000	Date: 05/2022
Drawn by: YA	Report No.: PH4499-1
Checked by: KP	Dwg. No.: PH4499-2
Approved by: ML	Revision No.:

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APPENDIX 2

Borehole Logs

Drawing PG6160 - 1 - Test Hole Location Plan

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG6160

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	94.24
Asphalt 0.05							
FILL: Brown silty sand trace gravel and topsoil		AU	1				
0.69							
Very stiff brown **SILTY CLAY** trace sand and gravel		SS	2	50	6	1	93.24
1.52							
GLACIAL TILL: Compact brown silty sand to sandy silt with gravel, cobbles trace clay and boulders		SS	3	56	50		
1.98							
End of Borehole							
Practical refusal to augering at 1.98m depth							
(GWL at 1.34 m depth - Mar 9, 2022)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

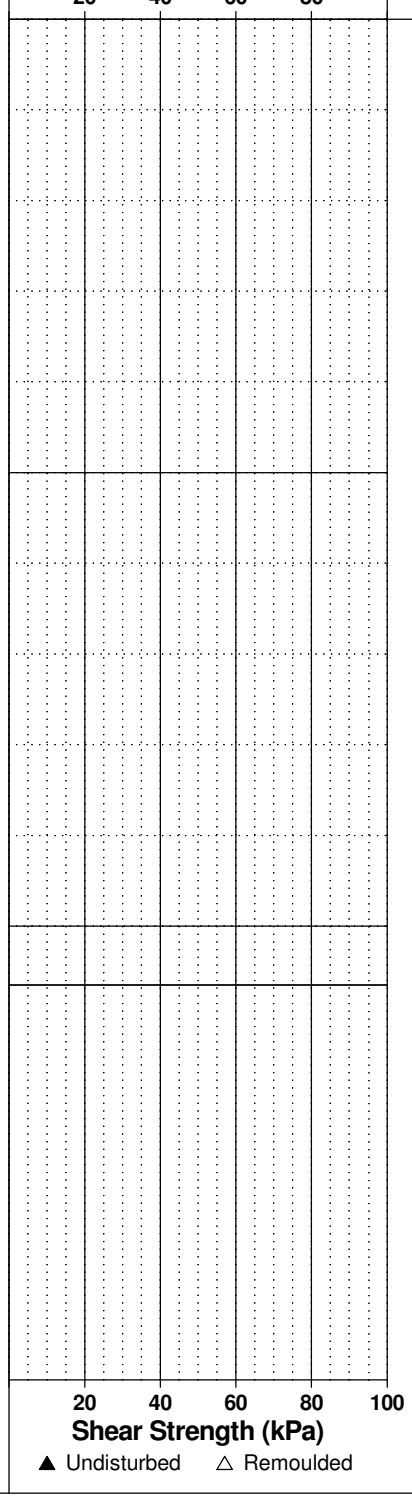
FILE NO. PG6160

REMARKS Moved east approx 1 m from BH 1-22 location

HOLE NO. BH 1A-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
Asphalt 0.05						0	94.24		
OVERBURDEN						1	93.24		
2.13						2	92.24		
End of Borehole Practical refusal to augering at 2.13m depth									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

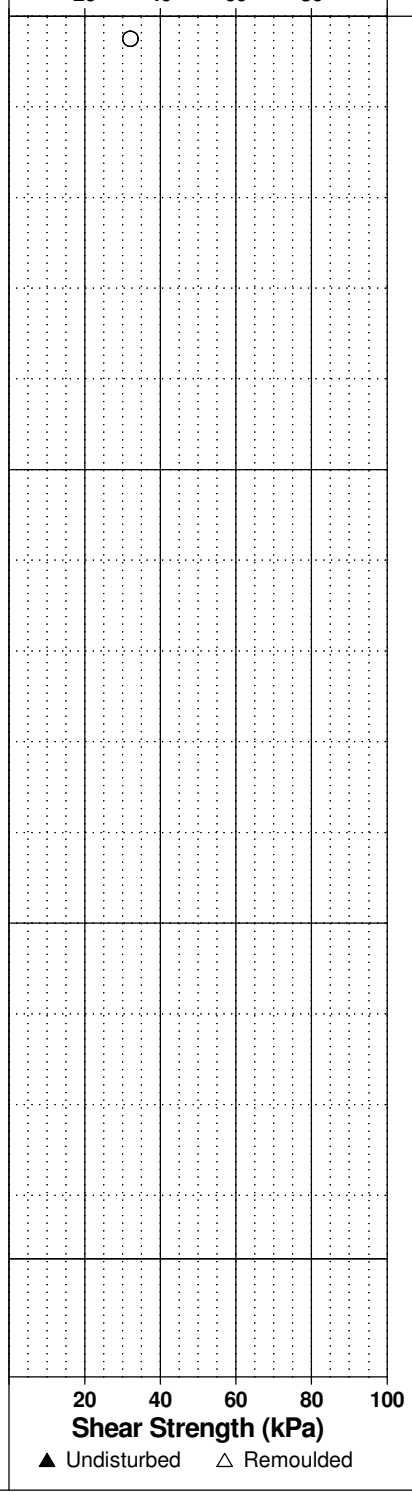
FILE NO. PG6160

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
Asphalt 0.05						0	94.46		
FILL: Brown silty sand with gravel and crushed stone 0.23		AU	1						
End of Borehole						1	93.46		
Practical refusal to augering at 0.23m depth						2	92.46		



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

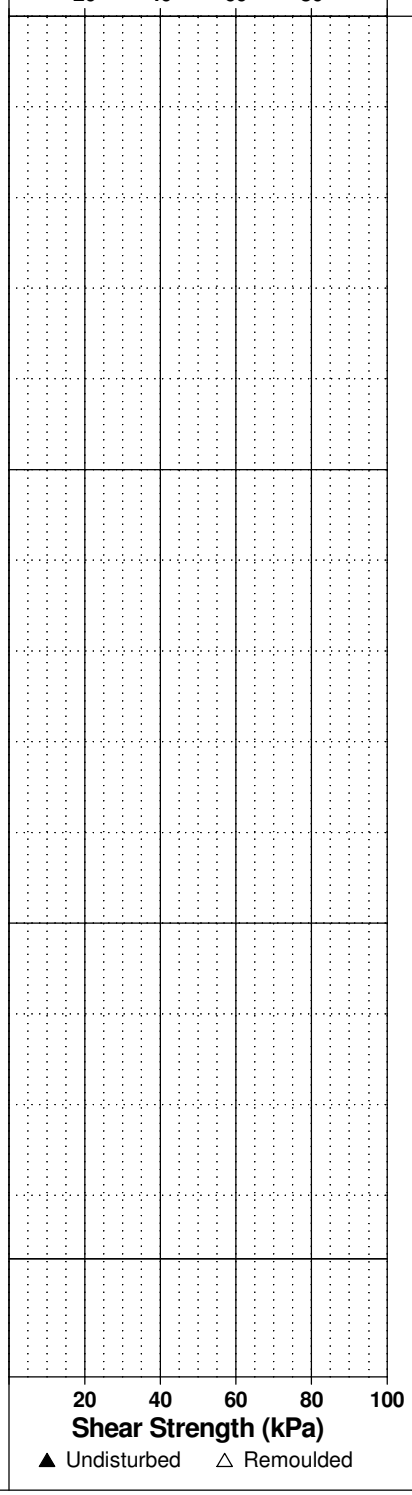
FILE NO. PG6160

REMARKS Moved north approx 1 m from BH 2-22 location

HOLE NO. BH 2A-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
Asphalt 0.05						0	94.46		
OVERBURDEN									
0.23									
End of Borehole						1	93.46		
Practical refusal to augering at 0.23m depth						2	92.46		



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG6160

REMARKS

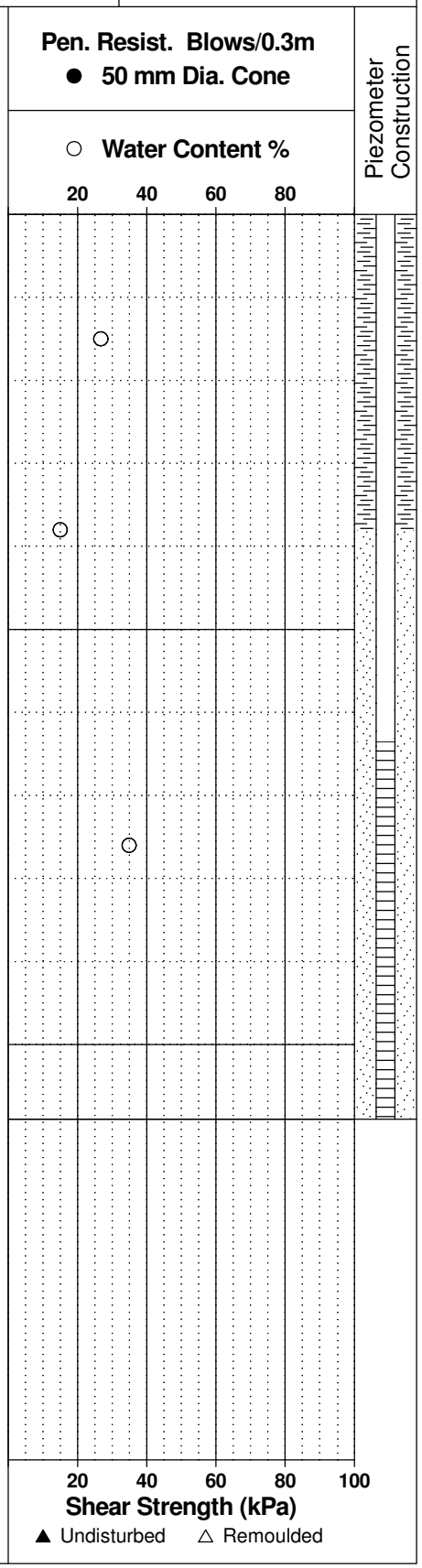
HOLE NO. BH 3-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	91.65
TOPSOIL 0.10							
FILL: Brown silty clay trace sand and gravel		AU	1				
		SS	2	33	11	1	90.65
1.22 Very stiff brown **SILTY CLAY**							
1.68 **GLACIAL TILL:** Compact brown silty sand to sandy silt with gravel, trace clay, cobbles and boulders		SS	3	90	12	2	89.65
2.18 End of Borehole							

Practical refusal to augering at 2.18m depth

(Monitoring well dry - Mar 9, 2022)



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG6160

REMARKS Moved north approx 1 m from BH 3-22 location

HOLE NO. BH 3A-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.10						0	91.65		
OVERBURDEN						1	90.65		
2.18						2	89.65		
End of Borehole Practical refusal to augering at 2.18m depth									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development
1185 Beaverwood Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG6160

REMARKS

HOLE NO. BH 4-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 March 1

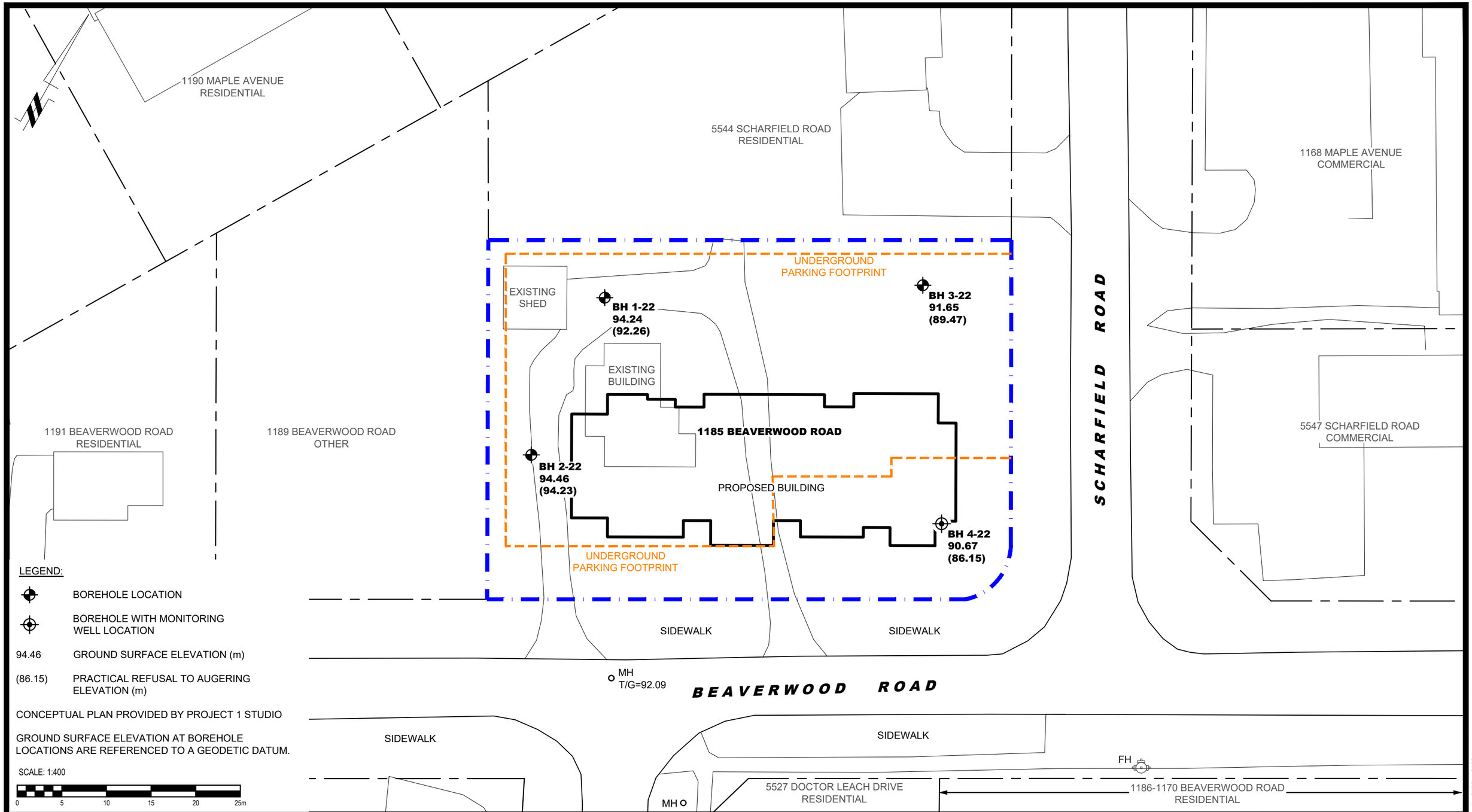
SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.67
TOPSOIL 0.10							
FILL: Brown silty clay trace sand							
0.69		AU	1				
Hard to very stiff brown **SILTY CLAY**		SS	2	75	10	1	89.67
		SS	3	42	7	2	88.67
		SS	4	42	4	3	87.67
3.35		SS	5	50	2		
GLACIAL TILL: Compact brown silty sand to sandy silt with gravel, trace clay, cobbles and boulders		SS	6	50	30	4	86.67
4.52							
End of Borehole							
Practical refusal to augering at 4.52m depth							
(GWL at 3.14 m depth - Mar 9, 2022)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded



LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 94.46 GROUND SURFACE ELEVATION (m)
- (86.15) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY PROJECT 1 STUDIO

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:400

0 5 10 15 20 25m

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NO.	REVISIONS	DATE	INITIAL

ARK CONSTRUCTION

GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
1185 BEAVERWOOD ROAD

OTTAWA, ONTARIO

Title:

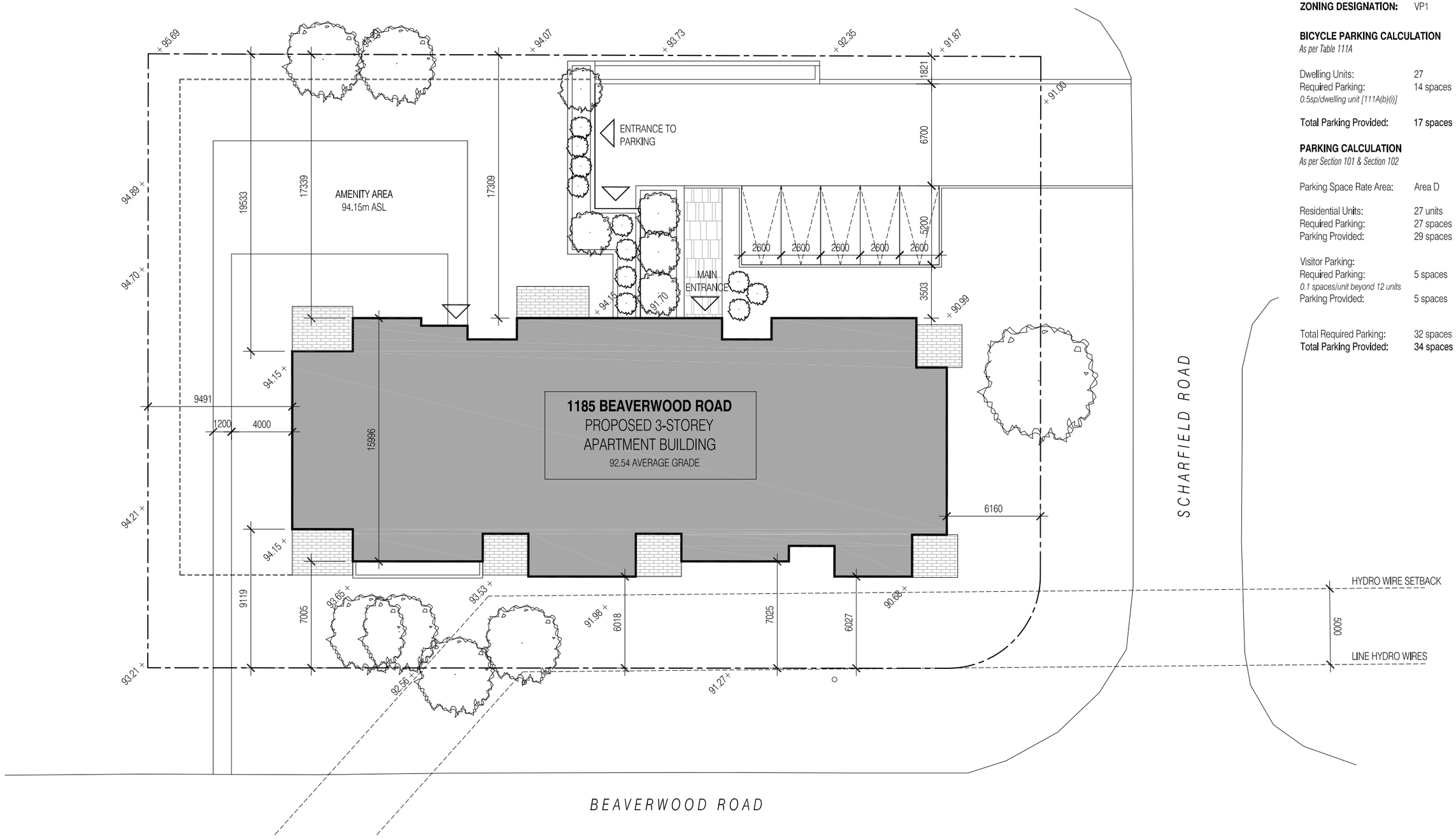
TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 03/2022
Drawn by: YA	Report No.: PG6160-1
Checked by: SD	Dwg. No.: PG6160-1
Approved by: SD	Revision No.:

p:\autocad drawings\geotechnical\pg61xx\pg6160\pg6160-1-test hole location plan.dwg

APPENDIX 3

Project1 Studio Architects - Plan/Profile Drawings



ZONING & STATISTICS

ZONING DESIGNATION: VP1

BICYCLE PARKING CALCULATION
As per Table 111A

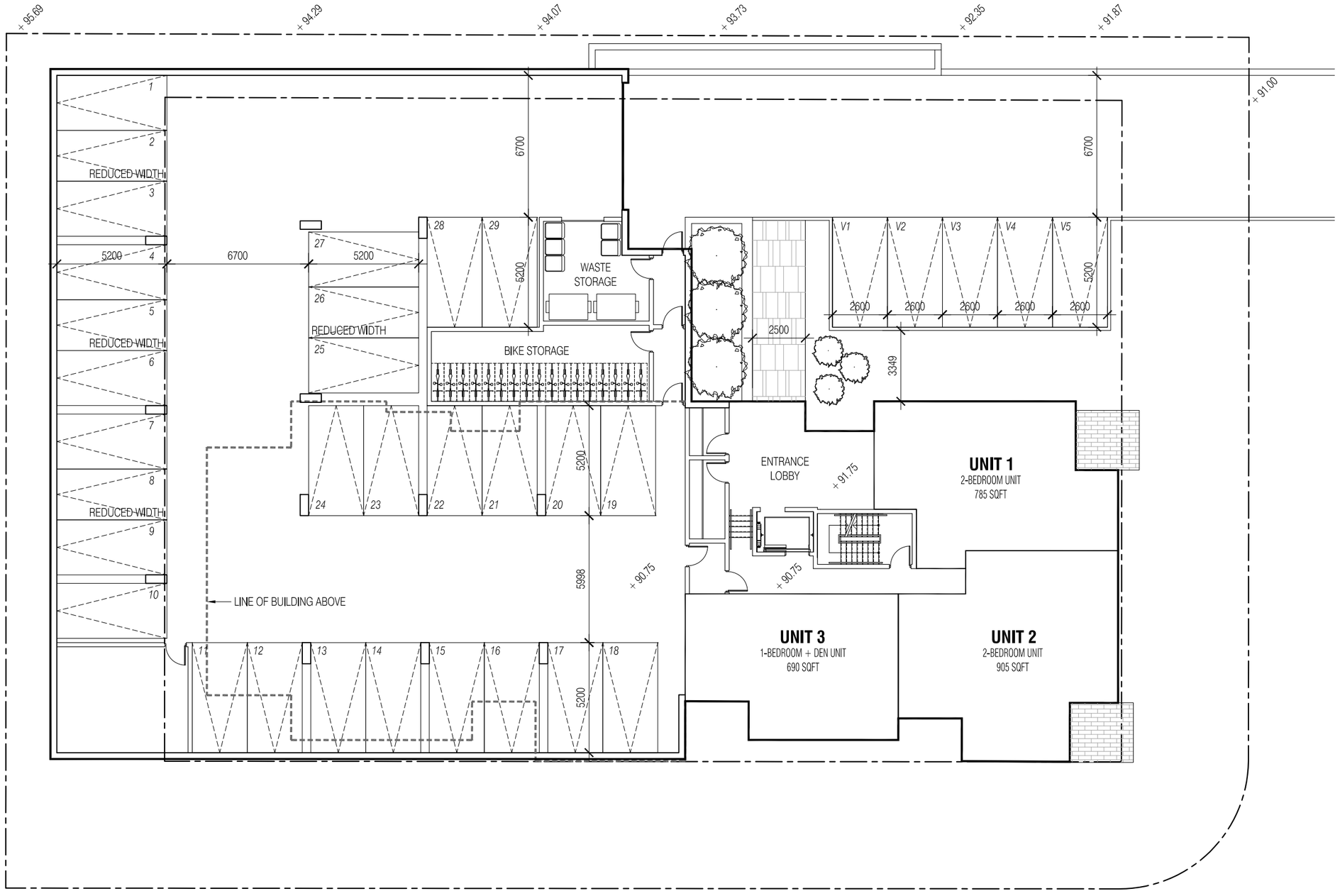
Dwelling Units:	27
Required Parking:	14 spaces
0.5sp/dwelling unit [111A(b)(i)]	
Total Parking Provided:	**17 spaces**

PARKING CALCULATION
As per Section 101 & Section 102

Parking Space Rate Area:	Area D
Residential Units:	27 units
Required Parking:	27 spaces
Parking Provided:	29 spaces
Visitor Parking:	
Required Parking:	5 spaces
0.1 spaces/unit beyond 12 units	
Parking Provided:	5 spaces
Total Required Parking:	32 spaces
Total Parking Provided:	**34 spaces**

1185 BEAVERWOOD ROAD PROPOSED SITE PLAN
|2119 |SCALE 1:250 | 18 NOVEMBER 2021

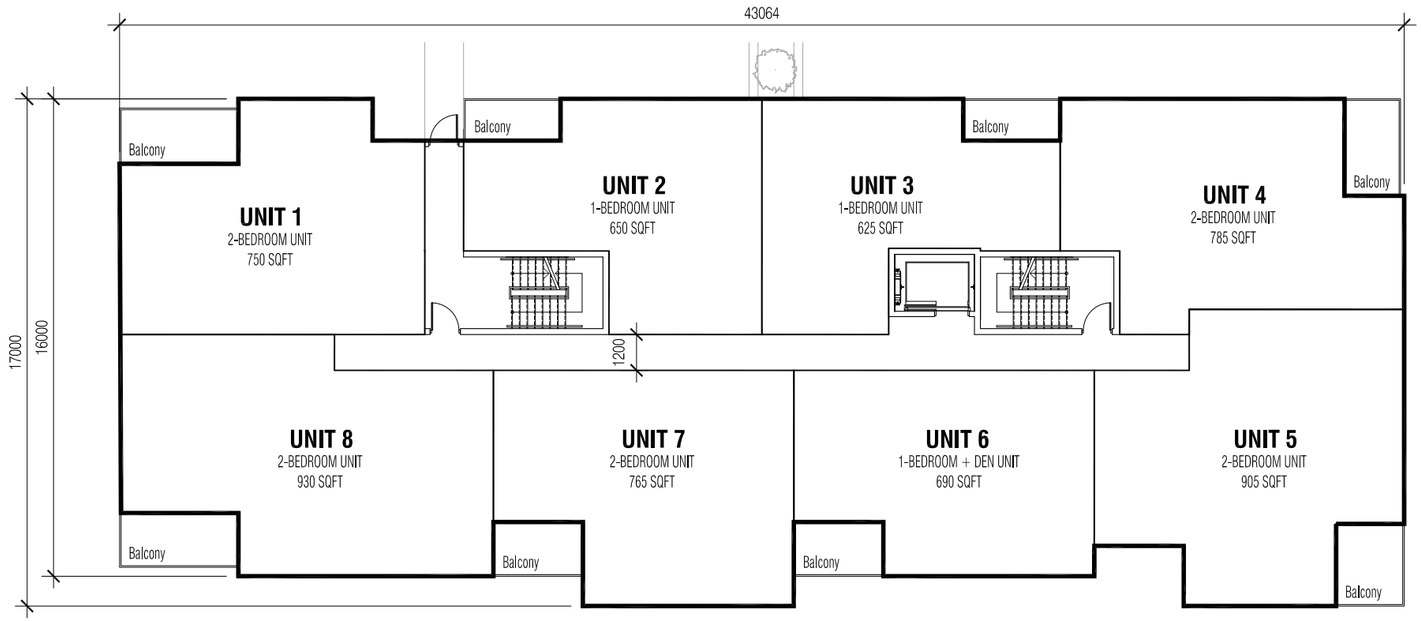
project1 studio



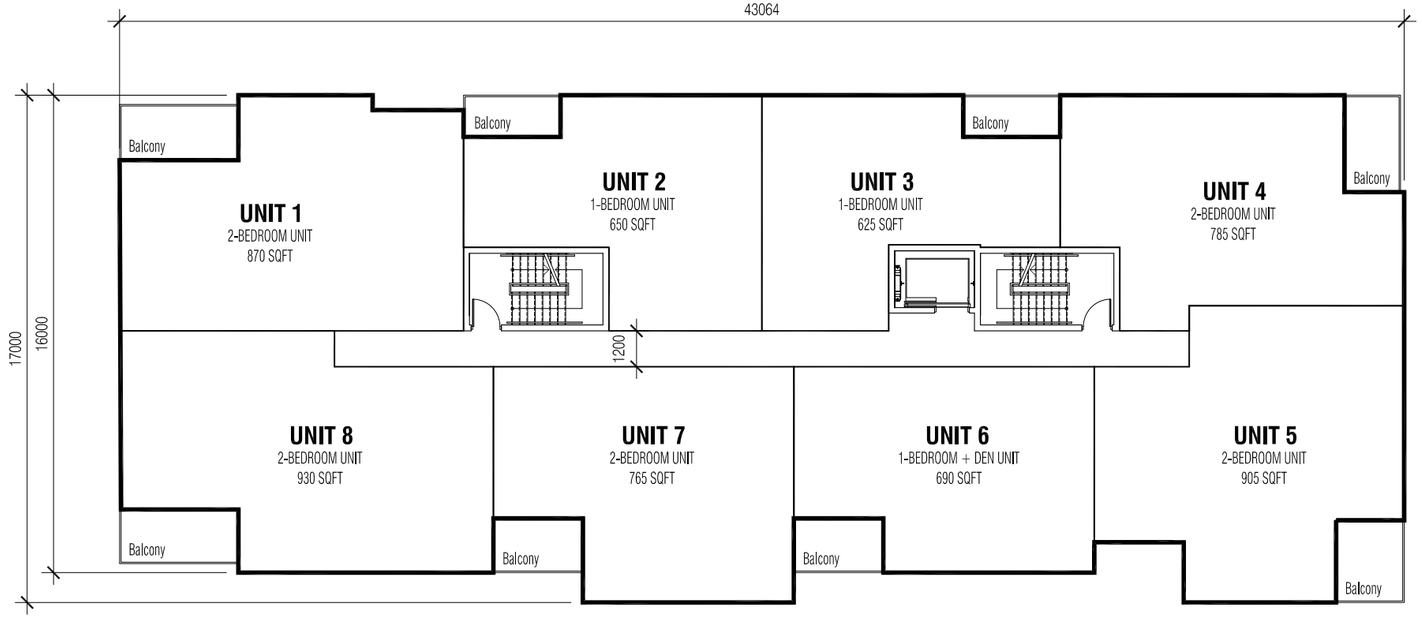
1185 BEAVERWOOD ROAD PROPOSED LEVEL 00 FLOOR PLAN

|2119 |SCALE 1:200 | 18 NOVEMBER 2021

project1 studio



LEVEL 01 FLOOR PLAN

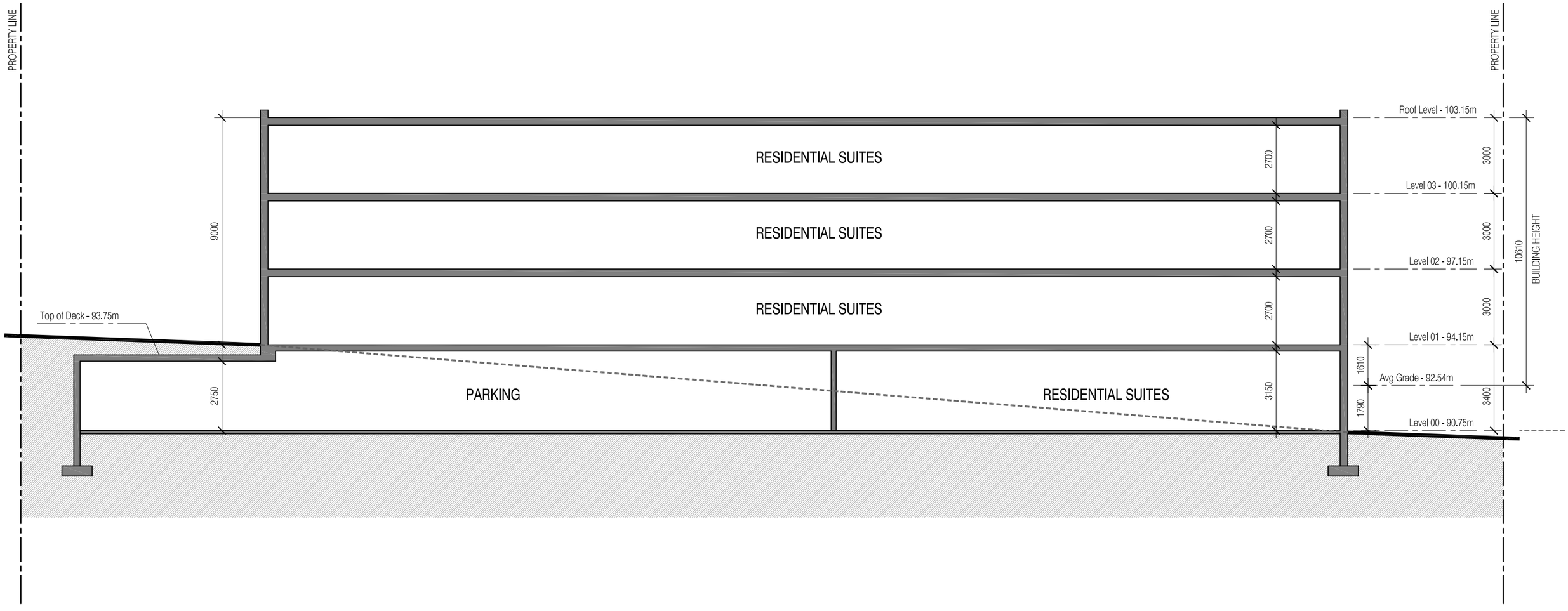


LEVEL 02 - 03 FLOOR PLANS

1185 BEAVERWOOD ROAD PROPOSED FLOOR PLANS

|2119 |SCALE 1:200 | 18 NOVEMBER 2021

project1 studio



1185 BEAVERWOOD ROAD PROPOSED BUILDING SECTION

|2119 |SCALE 1:150 | 18 NOVEMBER 2021

project11 studio

1185 BEAVERWOOD ROAD | 3-STOREYS

BUILDING AREA CALCULATIONS			
Level	**Gross Building Area**	**Gross Leasble Area**	**Efficiency**
Level 00	3,323.0	2,383.0	72%
Level 01	6,952.0	6,109.0	88%
Level 02	6,982.0	6,232.0	89%
Level 03	6,982.0	6,232.0	89%
TOTAL	**24,239.0**	**20,956.0**	**86%**

UNIT MATRIX					
Level	**studio**	**1 bed**	**1bed+den**	**2 bed**	**TOTAL**
Level 00	-	-	1	2	3
Level 01	-	2	1	5	8
Level 02	-	2	1	5	8
Level 03	-	2	1	5	8
TOTAL	**0**	**6**	**4**	**17**	**27**
	0%	22%	15%	63%