1101A, 1105 and 1163 Kingston Road, Pickering, Ontario

L1V1B5
Preliminary Hydrogeological Investigation

Client:
Tribute (Brookdale) Limited
1815 Ironstone Manor, Unit 1, Pickering, Ontario, L1W3W9

Type of Document:
Final Report

Project Name:
1101A, 1105 and 1163 Kingston Road, Pickering, Ontario

Project Number:
GTR-22015419-B0

EXP Services Inc.
1595 Clark Boulevard
Brampton, ON, L6T 4V1
t: 905.793.9800
f: 905.793.0641

Date Submitted:
2023-10-30

Table of Contents

List of Figures

List of Appendices

1 Introduction

1.1 Project Description

EXP Services Inc. (EXP) was retained by Tribute (Brookdale) Limited to prepare a Preliminary Hydrogeological Investigation Report associated with the proposed development located at 1101A, 1105 and 1163 Kingston Road, Pickering, Ontario (hereinafter referred to as the 'Site').

The Site is currently occupied by the Brookdale Centre (containing five commercial buildings) and portion of a Walnut Lane at northern portion of the Site. It is our understanding that the Site has an area of approximately 7.75 hectares and proposed development plan is in preliminary stage and comprises of six parcels (A1, A2, B, C1, C2 and D) having thirteen (13) to thirty-five (35) storeys towers with one (1) to three (3) levels of underground parking. The Site location plan is shown on Figure 1.

EXP conducted a Preliminary Geotechnical Investigation in conjunction with this investigation. The pertinent information gathered from the noted investigations is utilized for this report.

1.2 Project Objectives

The main objectives of the Preliminary Hydrogeological Investigation are as follows:

- Establish the local hydrogeological settings within the Site;
- Provide Preliminary recommendations on construction and long-term dewatering;
- Assess groundwater quality; and
- Prepare a Preliminary Hydrogeological Investigation Report.

1.3 Scope of Work

To achieve the investigation objectives, EXP has completed the following scope of work:

- Reviewed available geological and hydrogeological information for the Site;
- Drilled and installed ten (10) monitoring wells (BH1, BH2S, BH2D, BH3S, BH3D, BH4, BH5S, BH5D, BH6, BH7) to an approximate depth ranging from 11 meter below ground surface (mbgs) to 19 mbgs and three monitoring wells (BH2S/2D, BH3S/3D and BH5S/5D) are in nested configurations;
- Installed 50 mm diameter monitoring wells in the geotechnical boreholes;
- Developed and conducted Single Well Response Tests (SWRT) on monitoring wells to assess hydraulic conductivities of the saturated soils at the Site;
- Completed two (2) rounds of groundwater level measurements at all monitoring wells;
- Collected one (1) groundwater sample for analyses of parameters, as listed in the Durham Region Sanitary and Storm Sewer Use By-Law;
- Evaluated the information collected during the field investigation program, including borehole geological information, Water Well Records (WWR), SWRT results, groundwater level measurements and groundwater water quality;
- Prepared site plans, cross sections, geological mapping and groundwater contour mapping for the Site;
- Provided preliminary recommendations on the requirements for construction and long-term dewatering;

- Provided recommendations on the Ministry of Environment, Conservation and Parks (MECP) Water Taking Permits and Durham Region Sewer Discharge Agreements (SDA) for the construction and post-construction phases; and
- Prepared a Preliminary Hydrogeological Investigation Report.

The Preliminary Hydrogeological Investigation was prepared in accordance with the Ontario Water Resources Act, Ontario Regulation 387/04, and Durham Region Sewer Use By-Lay No. 55-2013. The scope of work outlined above was made to assess dewatering and did not include a review of Environmental Site Assessments (ESA).

1.4 Review of Previous Reports

The following reports were reviewed as part of this Preliminary Hydrogeological Investigation:

- EXP Services Inc. (July 12, 2023), Preliminary Geotechnical Investigation, 1101A and 1105 Kingston Road, Pickering, ON, prepared for Tribute (Brookdale) Limited.
- EXP Services Inc. (Revised October 18, 2023), Phase One Environmental Site Assessment, 1101A, 1105 and 1163 Kingston Road, Pickering, ON, prepared for Tribute (Brookdale) Limited.

Any past and/or future geotechnical, hydrogeological, environmental and risk assessments, and updated development/architectural plans should be provided to update this hydrogeological report prior to submission of permits and approvals by the municipalities and agencies.

2 Hydrogeological Setting

2.1 Regional Setting

2.1.1 Regional Physiography

The Site is within a physiographic region known as the Iroquois Plain. The physiographic landform is named Sand Plains on the west side and Clay Plains on the east side of the Site. The South Slope lies to the north of the Iroquois Plain (Chapman & Putnam, 2007).

The Iroquois Plain was created along the shores of former Lake Iroquois, an ancient glacial lake. The noted Plain primarily consists of shallow water sandy deposits.

The topography of the Iroquois Plain is relatively flat with a gradual slope to the south, toward Lake Ontario.

2.1.2 Regional Geology and Hydrogeology

The surficial geology can be described as fine-textured glaciolacustrine deposits consisting of silt and clay, minor sand and gravel and Till (5b) consisting of stone-poor sandy silt to silty sand-textures till on a small portion of northwest portion of the Site (Ministry of Northern Development and Mines, 2012). The surficial geology of the Site and surrounding areas is shown on Figure 2.

Based on the available regional geology maps, the subsurface stratigraphy of the Site from top to bottom is summarized in Table 2-1 (TRCA, 2008 and Oak Ridge Moraine Groundwater Program, 2018). The overburden thickness is approximately 18.2 m. Two cross sections obtained from the ORMGP are presented in Figure 5C and 5D.

Table 2-1: Summary of Subsurface Stratigraphy

Stratigraphic Unit	General Description	Top Elevation of Stratigraphic Unit
Undifferentiated Upper Sediments	fine-textured glaciolacustrine deposits consisting of silt and clay, minor sand and gravel on the east side and Till (5b) consisting of stone-poor sandy silt to silty sand-textures till on the small portion of west side of the Site	85.1
Lower Newmarket Till (Aquitard)	This lithologic unit typically consists of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel.	82.1
Thorncliffe Formation (Aquifer)	This geology formation generally consists of glaciofluvial (sand, silty sand) or glaciolacustrine deposits (silt, sand, pebbly silt and clay).	81.7
Scarborough Formation (Aquifer)	This geology unit is interpreted as deposits of a fluvial-deltaic system fed by large braided melt-water rivers draining from an ice sheet. It consists of	70.5

	peat sand overlaying silt and clay deposits.	
Georgian Bay Formation	Bedrock primarily consists of interbedded shale, limestone, dolostone and siltstone. It belongs to the Upper Ordovician, (Ministry of Northern Development and Mines, 2012).	66.9

Regional groundwater across the area flows southeast, towards Lake Ontario (Oak Ridge Moraine Groundwater Program, 2018). Local deviation from the regional groundwater flow pattern may occur in response to changes in topography and/or soils, as well as the presence of surface water features and/or existing subsurface infrastructure.

2.1.3 Existing Water Well Survey

Water Well Records (WWRs) were compiled from the database maintained by the Ministry of the Environment, Conservation and Parks (MECP) and reviewed to determine the number of water wells documented within a 500-m radius of the Site boundaries. The locations of the MECP WWRs within 500 m of the Site are shown on Figure 3. A summary of the WWR is included in Appendix A.

The MECP WWR database indicates that eighty-seven (87) records within a 500 m radius from the Site centroid where ten (10) well records are identified onsite (Figure 3 and Appendix A). Well distances are calculated relative to the Site centroid, therefore some distances in Appendix A exceed 500 m.

The database indicates that the offsite wells are at an approximate distance of one hundred twenty-four (124) m or greater from the Site centroid. All wells were reportedly identified as monitoring and test holes (33), water supply wells (5), abandoned (23) and/or listed with unknown use (26).

The Well Identification Numbers (Well ID No.) of the offsite water supply wells are 4601194, 4601195, 4601196, 4601197 4601889 where those are reportedly located ranging from 190 m to 491 m from the Site centroid.

The reported water found depths ranged from 0.9 m to 41.1 meters below ground surface (mbgs).

Based on the date of installation of the water supply wells (12/3/1959 to 12/11/1964) and since the area is municipally serviced, it is unlikely that the noted water supply wells are still active.

2.2 Site Setting

2.2.1 Site Topography

The Site is in an urban land use setting. The topography is considered relatively flat with a regional gradual southeasterly slope towards Pine Creek and Lake Ontario.

As indicated on the borehole logs included in Appendix B, the surface elevation of the Site ranges between approximately 84.89 to 86.38 meters above sea level (masl).

2.2.2 Local Surface Water Features

The Site is within the Lake Ontario Waterfront watershed. No surface water features exist onsite. The nearest surface water features are Pine Creek, approximately located 100 meters east of the Site boundary and a wetland associated with Pine Creek. Lake Ontario is approximately 2.2 kms from the Site boundary to the south.

2.2.3 Local Geology and Hydrogeology

A summary of subsurface soil stratigraphy is provided in the following paragraphs. The soil descriptions are based on the geotechnical investigation report (EXP, July 12, 2023). They are summarized for the hydrogeological interpretations. As such, the information provided in this section shall not be used for construction design purposes.

The detailed soil profiles encountered in each borehole and the results of moisture content determinations are presented on the attached borehole logs (Appendix B). The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the Preliminary Hydrogeological Investigation and shall not be interpreted as exact planes of geological change.

The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report. The following is a brief description of the soil conditions encountered during the investigation.

Based on the results of the geotechnical investigation, the general subsurface soil stratigraphy consists of the following units from top to bottom:

Pavement Structure

Pavement structure, comprising 50 to 75 mm asphaltic concrete and 360 to 580 mm granular material, was encountered surficially in all of the boreholes.

Fill

Fill was encountered below the pavement structure in Boreholes 1, 4, 5D, 6 and 7. The fill varied from dark brown to brown topsoil-stained sandy silt to silty sand or silty clay with some gravel and topsoil inclusions. The compactness of the fill varied from loose to compact. Moisture contents of the moist to very moist fill ranged from 8 to 30%. The fill extended to depths of approximately 0.45 to 0.65 m below existing grade.

Silty Sand

Silty sand was encountered below the pavement structure in Borehole 2D. The silty sand deposit was brown in colour and existed in a compact state of compactness. The silty sand had a moisture content of 10%, indicating a moist condition. The silty sand deposit extended to a depth of about 1.0 m below existing grade.

Silt

Silt was encountered at depths ranging from approximately 0.65 to 1.65 m below existing grade in Boreholes 2D, 3D and 5D. The silt stratum was brown in colour and existed in a loose to compact state of compactness. Moisture contents of this material ranged from 17 to 20%, indicating a saturated condition. The silt stratum extended to a depth of about 2.5 m below existing grade.

Clayey Silt

Clayey silt was encountered at depths ranging from approximately 1.0 to 2.5 m below existing grade in Boreholes 1, 2D, 5D, 6 and 7. The clayey silt stratum was brown and grey in colour and soft to very stiff in consistency. Field shear vane tests indicated undrained shear strengths ranging from 19 to 130 kPa. Moisture contents of this material ranged from 19 to 26%, indicating a saturated condition. The clayey silt stratum extended to depths of about 2.5 to 8.75 m below existing grade.

Sandy Silt Till

Sandy silt till was encountered at depths ranging from approximately 1.75 to 10.25 m below existing grade in all of the boreholes. The sandy silt till deposit was primarily grey in colour and contained wet sand/sand and gravel seams and scattered gravel and cobbles. Cobble and boulder layers were encountered in Boreholes 4 and 7. The compactness of the sandy silt till varied from loose to very dense. The sandy silt till was loose to depths of about 4.0 to 5.5 m in Boreholes 3D, 5D and 7. Moisture contents of the sandy silt till generally ranged from 7 to 13%, indicating a moist to saturated condition. The sandy silt till deposit extended to depths of approximately 7.0 m to 17.5 m below existing grade.

Coarse Sand

Coarse sand was encountered at a depth of about 7.0 m below existing grade in Borehole 5D. The coarse sand deposit was grey in colour, contained occasional gravel and existed in a very dense state of compactness. Moisture contents of the wet coarse sand ranged from 12 to 14%. The coarse sand deposit extended to a depth of about 11.75 m below existing grade.

Sand and Gravel

Sand and gravel was encountered below the coarse sand deposit in Borehole 5D. The sand and gravel deposit was grey in colour, wet with moisture contents ranging from 8 to 10%, and existed in a very dense state of compactness. The sand and gravel deposit extended to a depth of about 14.5 m below existing grade.

Clayey Silt (lower)

A lower clayey silt stratum was encountered at a depth of approximately 11.5 m below existing grade in Borehole 1. The clayey silt stratum was grey in colour, moist with moisture contents ranging from 16 to 18%, and hard in consistency. The lower clayey silt stratum extended to a depth of about 14.75 m below existing grade.

Silty Sand Till

Silty sand till was encountered at depths ranging from approximately 8.5 to 16.0 m below existing grade in Boreholes 1, 2D, 3D and 6. The silty sand till deposit was grey in colour, contained scattered gravel and cobbles, and existed in a very dense state of compactness. Cobble and boulder layers were encountered near the bottom of the deposit in Borehole 1. Moisture contents of the very moist to wet silty sand till ranged from 8 to 11%. The silty sand till deposit extended to depths of about 10.25 to 18.5 m below existing grade.

Bedrock

Shale bedrock was encountered at depths ranging from about 14.5 to 18.5 m below existing grade in Boreholes 1, 2D, 3D, 4, 5D, 6 and 7 (approximate Elevation 66.6 to 70.4 m), indicating variable depths to bedrock. The inferred bedrock boundaries should not be interpreted as exact planes of bedrock since the auger will frequently penetrate some distance into the weathered rock before noticeable resistance is encountered.

To confirm bedrock and to determine its quality, Boreholes 1 and 4 were extended about 3 m into the bedrock by coring in HQ size using diamond drilling equipment. The rock core logs are attached to Log of Boreholes 1 and 4. Based on the rock recovery and the Rock Quality Designation (RQD), the bedrock is poor to good quality rock with horizontal fractures and some vertical

joints. Generally, the upper 1 to 2 m of the shale bedrock is weathered becoming more sound with depth. However, it should be noted that weathered shale bedrock extended to a depth of 30.55 m below existing grade in Borehole 5D based on auger resistance and recovered split spoon samples.

The bedrock encountered in the boreholes is of the Blue Mountain Formation and underlies this site to a significant depth. Based on our experience, the upper zone of the shale bedrock is typically weathered with isolated weathered zones extending to greater depth. The predominate rock type is shale, but this shale is interbedded with limestone and siltstone. Typically, EXP has found the shale component in this formation is in the order of 80 percent in Greater Toronto area excavations. The limestone and siltstone components are generally 50 to 300 mm thick; however, thicker layers of up to 1,000 mm have been encountered. Stress relief features such as folds and faults are common in the Blue Mountain Formation. In these fractures, the rock is heavily fractured and sheared. It can also contain layers of shale rubble and clay. Due to the fracturing, these features may also contain groundwater conduits, which could result in excessive water flow into excavations. Weathering is much deeper than the surrounding sound unweathered bedrock. The stress relief features are usually in the order of 4 to 6 m wide, but in depth can vary from 4 to 5 m to in excess of 10 m.

The borehole and monitoring well locations are shown on Figure 4. Geological cross-sections were generated based on the available borehole logs completed as part of the previous and current investigations and shown on Figure 5A (Cross section A-A') and on Figure 5B (Cross section B-B'). The cross section shows a simplified representation of soil conditions and soil deposits may be interconnected differently than represented. Borehole logs used to generate both cross-sections are provided in Appendix B.

3 Results

3.1 Monitoring Well Details

The monitoring well network was installed as part of the Geotechnical Investigations at the Site. It consists of the following:

- Installed ten (10) monitoring wells (BH1, BH2S, BH2D, BH3S, BH3D, BH4, BH5S, BH5D, BH6, BH7) to an approximate depth ranging from 11 meter below ground surface (mbgs) to 19 mbgs and three monitoring wells (BH2S/2D, BH3S/3D and BH5S/5D) are on nested configurations.

The diameter of all monitoring wells is 50 mm. All wells were installed with a flush mount protective casing. Borehole logs and monitoring well installation details are provided in Appendix B. The monitoring well locations are shown on Figure 4.

3.2 Water Level Monitoring

As part of the Preliminary Hydrogeological Investigation, static water levels in the monitoring wells were recorded in two (2) monitoring events, including May 31 and June 6 of 2023. A summary of all static water level data as it relates to the elevation survey is given in Table 3-1 below.

The groundwater elevation recorded in the intermediate monitoring wells ranged from 81.04 masl (4.04 mbgs at BH/MW 3S on June 6, 2023) to 83.47 masl (2.91 mbgs at BH/MW 2S on June 6, 2023). The groundwater elevation recorded for the deep wells ranged from 78.51 masl (6.79 mbgs at BH/MW 6 on June 6, 2023) to 82.55 masl (3.83 mbgs at BH/MW 2D on May 31, 2023).

Table 3-1: Summary of Measured Groundwater Elevations

Monitoring Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	31-May-23	6-Jun-23
BH/MW1	85.79	16.55	mbgs	3.42	3.37
			masl	82.37	82.42
BH/MW2S	86.38	12.27	mbgs	2.97	2.91
			masl	83.41	83.47
BH/MW2D	86.38	18.47	mbgs	3.83	3.98
			masl	82.55	82.40
BH/MW3S	85.08	11.41	mbgs	2.10	4.04
			masl	82.98	81.04
BH/MW3D	85.08	17.88	mbgs	4.04	4.04
			masl	81.04	81.04
BH/MW4	85.41	16.32	mbgs	3.97	4.19
			masl	81.44	81.22
BH/MW5S	84.89	10.78	mbgs	2.67	2.62
			masl	82.22	82.27
BH/MW5D	84.89	13.88	mbgs	2.54	2.61
			masl	82.35	82.28
BH/MW6	85.30	18.82	mbgs	3.11	6.79
			masl	82.19	78.51*I
BH/MW7	85.12	18.28	mbgs	3.10	3.59
			masl	82.02	81.53

*not static
mbgs - meters below ground surface
masl - meters above sea level

Two (2) maps were created for the Site to show groundwater contours of the intermediate and deep water-bearing zones (Figures 6 A and 6 B). Accordingly, the groundwater flow directions in the intermediate and deep zones are interpreted to be southeast of the Site, towards Pine Creek, respectively.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. This may also affect the direction and rate of flow. It is recommended to conduct seasonal groundwater level measurements to provide more information on seasonal groundwater level fluctuations.

3.3 Hydraulic Conductivity Testing

Nine (9) Single Well Response Tests (SWRT's) were completed on monitoring wells BH/MW1, BH/MW2S, BH/MW2D, BH/MW3S, BH/MW3D, BH/MW4, BH/MW5S, BH/MW5D and BH/MW7 on June 6, 2023. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths utilizing data loggers, preprogramed to take measurement on time in half second intervals.

The static water level within each monitoring well was measured prior to the start of testing. In advance of performing SWRTs, each monitoring well underwent development to remove fines introduced into the screens following construction. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. Each monitoring well was permitted to fully recover prior to performing SWRTs.

Hydraulic conductivity values were calculated from the SWRT and constant rate test data as per Hvorslev's solution included in the Aqtesolv Pro. V.4.5 software package. The semi-log plots for normalized drawdown versus time are included in Appendix C.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in Table 3-2.

Table 3-2: Summary of Hydraulic Conductivity Testing

Monitoring Well ID	Measured Well Depth (mbgs)	Screened Interval (mbgs)	Formation Screened	Estimated Hydraulic Conductivity (m/s)
BH/MW1	16.55	13.55-16.55	Silty Sand Till/Clayey Silt	2.6E-05
BH/MW2S	12.27	9.27-12.27	Sandy Silt Till/Silty Sand Till	8.5E-06
BH/MW2D	18.47	15.47–18.47	Sandy Silt Till	9.1E-05
BH/MW3S	11.41	8.41-11.41	Silty Sand Till	9.6E-05
BH/MW3D	17.88	14.88-17.88	Silty Sand Till	1.1E-04
BH/MW4	16.32	13.32-16.32	Sandy Silt Till	7.9E-07
BH/MW5S	10.78	7.78-10.78	Coarse Sand	4.4E-05
BH/MW5D	13.88	10.88-13.88	Coarse Sand/Sand and Gravel	2.3E-05
BH/MW7	18.28	15.28-18.28	Sandy Silt Till	8.9E-06
			Highest Estimated K Value	1.1E-04
			Geometric Mean of Estimated K Values	3.4E-05
			Arithmetic Mean of Estimated K Values	5.1E-05

SWRTs provide K-estimates of the geological formation surrounding the well screens and may not be representative of bulk formation hydraulic conductivity. As shown in Table 3-2, the highest K-value of the tested water-bearing zone is 1.1E-4 m/s, and the geometric mean and arithmetic mean of the K-values are 3.4E-5 m/s and 5.1E-5 m/s respectively.

The silty sand Till, sand and gravel, and coarse sand deposits belong to the Thorncliffe and Scarborough formations which are regional aquifers. The Till denomination is based on a geotechnical soil description and does not reflect a low permeability deposit as is commonly expected from a Till deposit.

3.4 Groundwater Quality

To assess the suitability for discharging pumped groundwater into the sewers owned by the Durham Region during dewatering activities, one (1) groundwater sample was collected from monitoring well BH1 on June 6, 2020 using a peristaltic pump. Prior to collecting the noted water sample, approximately three (3) standing well volumes of groundwater were purged from the referred well. The samples were collected unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis to Bureau Veritas Laboratory, a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix D.

Table 3-3 summarizes exceedance(s) of the Sanitary (Table 1) and Storm (Table 2) Sewer Use By-Law parameters.

When comparing the chemistry of the collected groundwater samples to the Durham Region Sanitary Sewer Discharge Criteria (Table 1), there were no parameter exceedances to be reported.

When comparing the chemistry of the collected groundwater samples to the Durham Region Storm Sewer Discharge Criteria (Table 2) the following parameters reported an exceedance: Total Suspended Solids (TSS).

Reporting detection limits (RDLs) were below the Sewer Use By-Law parameter criteria of Tables 1 and 2.

Table 3-3: Summary of Analytical Results

Parameter	Units	Durham Region Sanitary and Combined Sewer Discharge Limit (Table 1)	Durham Region Storm Sewer Discharge Limit (Table 2)	Concentration BH1 6-Jun-23
Total Suspended Solids (TSS)	mg/L	350	15	**59**

Bold – Exceeds Durham Region Storm Sewer Discharge Limit (Table 2).
Bold & underlined – Exceeds Durham Region Sanitary and Combined Sewer Discharge Limit (Table 1).

For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction

dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

For the short-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the short-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

For the long-term dewatering discharge to the sanitary sewer system (post-development phase) and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the long-term dewatering discharge to the storm sewer system (post-development phase) and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality onsite. As such, regular water quality monitoring is recommended for the post-construction phase, as required by the City.

An agreement to discharge into the sewers owned by the Durham Region will be required prior to releasing dewatering effluent.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

4 Dewatering Assessment

The dimensions of the proposed structure to support the dewatering assessment are summarized in Table 4-1 below.

Table 4-1 Building Dimensions for Dewatering Assessment

Input Parameter	Assumption					Units	Notes
	Parcel A1	Parcel A2	Parcel B	Parcel C1 and C2	Parcel D		
Number of Subgrade Levels	3	3	2	2	1	-	
Ground Elevations	85.43	85.43	85.43	85.43	85.43	masl	Average of the borehole elevations on Site
Top of Slab Elevation	75.43	75.43	78.43	78.43	81.43	masl	Based on Underground level plans prepared by Turner Fleischer (October 6, 2023) and assumed 10 mbgs for P3, 7 mbgs for P2 and 4 mbgs for P1 levels
Lowest Footing Elevation	73.93	73.93	76.93	76.93	79.93	masl	Assumed to be approximately 1.5 m below the top of slab elevation
Excavation Area (Length x Width)	(94 x 88)	(116 x 61)	(164 x 100)	(166 x 103)	(143 x 65)	m^2 (m x m)	Approximate area (length x width) based on underground plans prepared by Turner Fleischer (October 6, 2023)

Hydraulic Conductivity (permeability)		5.1 x 10^{-5} m/sec	Average K values for the site to be confirmed with pumping test.

4.1 Dewatering Flow Rate Estimate and Zone of Influence

The Dupuit-Forcheimer equation for radial flow to both sides of an excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate. Dewatering flow rate is expressed as follows:

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\left[\frac{R_o}{r_e}\right]}$$

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e$$

Where:

Qw = Rate of pumping (m^3/s)
X = Length of excavation (m)
K = Hydraulic conductivity (m/s)
H = Hydraulic head beyond the influence of pumping (static groundwater elevation) (m)
h = Hydraulic head above the base of aquifer in an excavation (m)
R_0 = Radius of influence (m)
R_{cj} = Cooper-Jacob's radius of influence (m)
r_e = Equivalent perimeter (m)
a = Length of the excavation area (m)
b = Width of the excavation area (m)

It is expected that the initial dewatering rate will be higher to remove groundwater from within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed, primarily from storage, resulting in lower seepage rates into the excavation.

4.2 Cooper-Jacob's Radius of Influence

The radius of influence (Rcj) for the construction dewatering was calculated based on Cooper-Jacob's equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible.

The estimated radius of influence due to pumping is based on Cooper-Jacob's formula as follows:

$$\mathrm{R}_{cj} = \sqrt{2.25KDt/s}$$

Where:

Ro = Estimated radius of influence (m)
D = Aquifer thickness (original saturated thickness) (m)
K = Hydraulic conductivity (m/s)
S = Storage coefficient

t = Duration of pumping (s)

4.3 Stormwater

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Therefore, the dewatering rates at the Site should also include removing stormwater from the excavation.

A 15 mm precipitation event was utilized for estimating the stormwater volume. The calculation of the stormwater volume is included in Appendix E.

The estimate of the stormwater volume only accounts for direct precipitation into the excavation. The dimensions of the excavation are considered in the dewatering calculations. Runoff which originated outside of the excavation's footprint is excluded and it should be directed away from the excavation.

During precipitation events greater than 15 mm (ex: 100-year storm), measures should be taken by the contractor to retain stormwater onsite in a safe manner to not exceed the allowable water taking and discharge limits, as necessary. A two (2) and a one hundred (100) year storm event over a 24-hour period are 55.4 and 121.0 mm (refer to Appendix E).

4.4 Results of Dewatering Rate Estimates

4.4.1 Preliminary Construction Dewatering Rate Estimate

Short-term (construction) dewatering calculations are presented in Appendix E.

Pits (elevator, sump pits) are assumed to have the same excavation depth and dewatering target as the main excavation; deeper pits may require localized dewatering and revised dewatering estimates.

Based on the assumptions provided in this report, the results of the dewatering rate estimate can be summarized as follows:

Table 4-2 Summary of Preliminary Construction Dewatering Rate

Peak Dewatering Flow Rate Including Rain Collection Volume					
Description	Parcel A1 (3 levels UG) (m3/day)	Parcel A2 (3 levels UG) **(m^3/day)**	Parcel B (2 levels UG) **(m^3/day)**	Parcels C1 and C2 (2 levels UG) **(m^3/day)**	Parcel D (1 level UG) **(m^3/day)**
Total Volume (m^3/day) Short Term Discharge of Groundwater (Construction dewatering) with Safety Factor (including precipitation)	6,131	6,023	6,410	6,492	3,981
Total Volume (m^3/day) Short Term Discharge of Groundwater (Construction	3,128	3,064	3,328	3,374	2,060

dewatering) without Safety Factor (including precipitation					
Total Volume (m^3/day) Short Term Discharge of Groundwater (construction dewatering) with Safety Factor (excluding Precipitation) for EASR and PTTW	6,007	5,917	6,164	6,235	3,842

These dewatering estimates are considered preliminary and are based on an average K value. Based on the soil type and highly permeable deposit encountered on site, a pumping test(s) is recommended to provide permeability on a broader scale for the final design of the dewatering system and for permitting.

Caisson walls around the full perimeter of the buildings may be required to reduce the groundwater inflows subject to final design.

The peak dewatering flow rates does not account for flow from utility beddings and variations in hydrogeological properties beyond those encountered during this investigation.

Local dewatering may be required for pits (elevator pits, sump pits, raft) and for localized areas with permeable, soft, or wet soil conditions. Local dewatering is not considered to be part of this assessment, but contractor should be ready to install additional system to manage such conditions. Dewatering estimates should be reviewed once the pit dimensions are available.

All grading around the perimeter of the excavation should be graded away from the shoring the systems and ramp/site access to redirect runoff away from excavation.

If groundwater cutoff systems (ex: caisson walls, sheet piles) are installed, these should be designed for maximal hydrostatic pressure for shallow and deep water levels, without dewatering on the outer side of the groundwater cutoff. Soldier pile and lagging and caisson wall systems should be designed to account for shallow groundwater conditions and take into consideration that dewatering systems may not provide fully dewatered soil conditions.

If groundwater cutoff systems are used for decreasing long-term dewatering rates, these should be designed as permanent structures to cutoff groundwater inflow in the long-term. All perforations should be sealed permanently (ex: tiebacks, breaches, and cold joints) with no leakages and inspected. Fillers should extend into low permeability deposits (ex: sound bedrock or till) to cutoff groundwater from water bearing zones. Inspections should be conducted to confirm the depth of low permeability deposits along shoring system and that fillers are keyed into low permeability soil deposits.

The contractor is responsible for the design of the dewatering systems (depth of wells, screen length, number of wells, spacing sand pack around screens, prevent soil loss etc.) to ensure that dry conditions are always maintained within the excavation at all costs.

Dewatering should be monitored using dedicated monitoring wells within and around the perimeter of the excavation, and these wells should be monitored using manual measurements and with electronic data loggers; records should be maintained on site to track dewatering progress. Discharge rates should be monitored using calibrated flow meters and records of dewatering progress, and daily precipitation as per MECP requirements should be maintained.

4.4.2 Post-Construction Dewatering Rate Estimate

It is our understanding that the development plan includes a permanent foundation sub-drain system that will ultimately discharge to the municipal sewer system if conventional footings are installed.

The long-term dewatering estimates are based on the same equations as construction dewatering shown in Section 4.1.

The calculation for the estimated flow to the future sub-drain system (with no cutoff walls) is provided in Appendix F. The dewatering target for the foundation drainage system is taken at 0.5 m below the lowest slab elevation.

The foundation drain analysis provides a flow rate estimate. Once the foundation drain is built, actual flow rate measurements of the sump discharge will be required to confirm the estimated flow rate.

Based on the assumptions provided in this report, the estimated sub-drain discharge volumes are summarized in Appendix F. Seasonal and daily fluctuations are expected. These estimates may be affected by hydrogeological conditions beyond those encountered at this time, fluctuations in groundwater regimes, surrounding Site alterations, and existing and future infrastructures.

Table 4-3: Summary of Long-Term Dewatering Rate

Long-Term Dewatering Flow Rate	Parcel A1 (3 levels UG) (m^3/day)	Parcel A2 (3 levels UG) (m^3/day)	Parcel B (2 levels UG) (m^3/day)	Parcels C1 and C2 (2 levels UG) (m^3/day)	Parcel D (1 level UG) (m^3/day)
Total Volume (m^3/day) Long-Term Drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) with Safety Factor Included	2,119	2,412	1,835	1,905	1,456
Long-Term Dewatering Rate without Safety Factor	1,413	1,609	1,224	1,271	971

Intermittent cycling of sump pumps and seasonal fluctuation in groundwater regimes should be considered for pump specifications. A safety factor was applied to the flow rate to account for water level fluctuations due to seasonal changes.

These estimates assume that pits (elevator and/or sump pits) are made as watertight structures (without drainage), if their depths extend below the dewatering target, as previously stated.

The sub-drain rate estimate is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this investigation may significantly influence the sub-drain discharge volumes.

4.5 MECP Water Taking Permits

4.5.1 Short-Term Discharge Rate (Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50 m^3/day but less than 400 m^3 L/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with

the MECP will be required. If groundwater dewatering rates onsite exceed 400 m^3/day, a Category 3 Permit to Take Water (PTTW) will be required from the MECP.

As of July 1, 2021, an amendment of O. Reg. 63/16 has come into effect and replaced the former subsection 7 (5) such that the EASR water taking limit of 400 m^3/day would apply to groundwater takings of each dewatered work area only, excluding stormwater.

The dewatering estimate including a safety factor is greater than 400 m^3/day as shown in Table 4-2. The MECP construction dewatering rate excludes the precipitation amount and is the rate used for the permit application. Based on the MECP construction dewatering a PTTW will be required to facilitate the construction dewatering program of the Site.

A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. Monitoring of both water quantity and water quality must be carried out for the entire duration of the construction dewatering phase. During this phase, the Discharge Plan and the daily water taking records must be available onsite.

The PTTW, Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements must also be available at the construction Site during the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the dewatering rate will need to be updated to reflect these modifications. Altogether, the hydrogeological report, PTTW, Discharge Plan and geotechnical assessment constitute the Water Taking Plan which needs to be available onsite during the construction dewatering.

4.5.2 Long-Term Discharge Rate (Post Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50 m^3/day, then an application for a Category 3 Permit to Take Water (PTTW) will be required from the MECP.

Based on the dewatering estimate shown in Table 4-3 greater than 50 m^3/day, a Category 3 Permit to Take Water (PTTW) will be required to facilitate the post-development phase.

The safety factor for construction (short-term) dewatering is selected larger than for long-term to account for anticipated greater groundwater volumes during initial dewatering. The applied analytical formula is adequate for long-term (steady state) conditions as it omits specific yield and time dependency. When the formula is used for short-term conditions a larger safety factor is recommended to cover a larger initial dewatering rate, which is required to remove stored groundwater. Moreover, a large initial construction dewatering rate is favorable, as it supports reducing the time to reach the dewatering target elevation.

5 Environmental Impact

5.1 Surface Water Features

The Site is located within the Lake Ontario Waterfront watershed. No surface water features exist onsite. The nearest surface water features are Pine Creek, approximately located 100 meters east of the Site boundary and a wetland associated with Pine Creek. Lake Ontario is approximately 2.2 kms from the Site boundary to the south.

Due to the extent of zone of influence and the distance to the nearest surface water features, potential impacts on surface water features are expected during construction activities.

5.2 Groundwater Sources

Well Records from the MECP Water Well Record (WWR) Database were reviewed to determine the presence and number of water supply wells within a 500 m radius of the Site boundaries. Given that the dewatering zone of influence is limited, no dewatering related impact is expected on the water wells in the area. Based on the date of installation of the water supply wells (12/3/1959 to 12/11/1964) and since the area is municipally serviced, it is unlikely that the noted water supply wells are still active.

5.3 Geotechnical Considerations

As per the MECP technical requirement for PTTW, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence, etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities, etc.).

A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.

5.4 Groundwater Quality

It is our understanding that the potential effluent from the dewatering system during the construction will be released to the municipal sewer system. As such, the quality of groundwater discharge is required to conform the Durham Region Sewer Use By-Law.

Dewatering (short and long-term) may induce migration of contaminants within the zone of influence and beyond due to changing hydraulic gradients, hydrogeological conditions beyond Site boundaries and preferential pathways in utility beddings etc. The water quality sampling conducted as part of this assessment was performed under static conditions. As a result, monitoring may be required during dewatering activities (short and long-term) to monitor potential migration, and this should be performed more frequently during early dewatering stages.

For the short-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the short-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

For the long-term dewatering discharge to the sanitary sewer system (post-development phase) and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the long-term dewatering discharge to the storm sewer system (post-development phase) and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality onsite. As such, regular water quality monitoring is recommended for the post-construction phase as required by the City.

An agreement to discharge into the sewers owned by the Durham Region will be required prior to releasing dewatering effluent.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

5.5 Well Decommissioning

In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

6 Conclusions and Recommendations

Based on the findings of the Preliminary Hydrogeological Investigation, the following conclusions and recommendations are provided:

- When comparing the chemistry of the collected groundwater samples to the Durham Region Sanitary Sewer Discharge Criteria (Table 1), there were no parameter exceedances to be reported.
- When comparing the chemistry of the collected groundwater samples to the Durham Region Storm Sewer Discharge Criteria (Table 2) the following parameters reported an exceedance: Total Suspended Solids (TSS).
- Based on the assumptions outlined in this report, the estimated peak preliminary dewatering rates for proposed construction activities at Parcels A1, A2, B, C1&2, and D are approximately 6,131 m^3/day, 6,023 m^3/day, 6,410 m^3/day, 6,492 m^3/day and 3,981 m^3/day respectively. These are the rates which will be required to be discharged to the municipal sewer system.
- As the dewatering flow rate estimate is greater than 400 m^3/day, a PTTW will be required to facilitate the construction dewatering program for the Site.
- The long-term flow rate of the foundation sub-drain is estimated to be approximately 2,119 m^3/day, 2,412 m^3/day, 1,835 m^3/day, 1,905 m^3/day and 1,456 m^3/day for Parcels A1, A2, B, C1&2 and D respectively. It is recommended that once the sub-drain system is in place, a flow meter be installed at the sump(s) to record daily discharge volumes during the commissioning stage of the system. Regular maintenance/cleaning of the sub-drain system is recommended to ensure its proper operation. A PTTW will be required for long-term discharge.
- These dewatering estimates are considered preliminary and are based on an average K value. Based on the soil type and highly permeable deposit encountered on site, a pumping test(s) is recommended to provide permeability on a broader scale for the final design of the dewatering system and for permitting.
- Caisson walls around the full perimeter of the buildings may be required to reduce the groundwater inflows subject to final design.
- The construction dewatering and long-term estimate of sub-drain discharge volumes is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this preliminary investigation may significantly influence the discharge volumes.
- For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.
- For the short-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.
- For the short-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.
- For the long-term dewatering discharge to the sanitary sewer system (post-development phase) and based on the water quality test results, the water is suitable to be discharged without a treatment system.
- For the long-term dewatering discharge to the storm sewer system (post-development phase) and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

- As per the MECP technical requirement for PTTW, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities etc.). A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.
- An agreement to discharge into the sewers owned by the Durham Region will be required prior to releasing dewatering effluent.
- A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. The Discharge Plan and monitoring for both water quantity and water quality must be carried at the Site during the entire construction dewatering phase. The daily water taking records must be maintained onsite for the entire construction dewatering phase. The PTTW, Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements must always also be available at the construction Site for the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since EASR will need to be updated to reflect these modifications. The hydrogeological report, PTTW, Discharge Plan and geotechnical assessment constitutes the Water Taking Plan which needs to be available onsite for the duration of construction dewatering.
- In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

The conclusions and recommendations provided above should be reviewed in conjunction with the entirety of the report. They assume that the present design concept described throughout the report will proceed to construction. This report is solely intended for the construction and long-term dewatering assessments. Any changes to the design concept may result in a modification to the recommendations provided in this report.

7 Limitations

This report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the study area. The conclusions and recommendations presented within this report reflect Site conditions existing at the time of the assessment. EXP must be contacted immediately, if any unforeseen Site conditions are experienced during construction activities. This will allow EXP to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience/engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of Tribute (Brookdale) Limited. This report may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this information is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Sincerely,

EXP Services Inc.

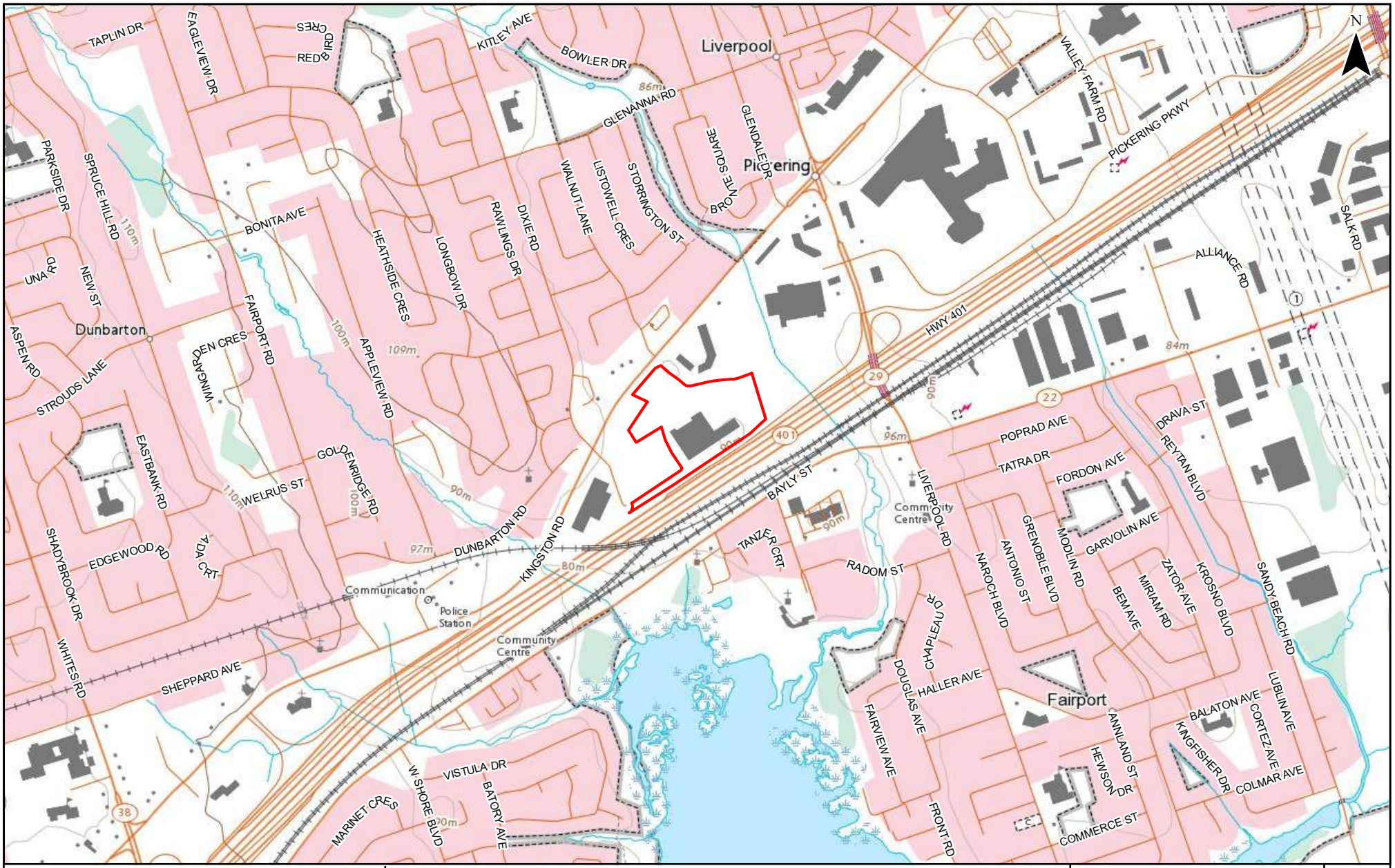
Amar Neku, Ph.D., P.Eng., P.Geo.
Senior Hydrogeologist
Environmental Services

Francois Chartier, M.Sc., P.Geo.
Discipline Manager, Hydrogeology
Environmental Services

8 References

- Cashman and Preene (2013) Groundwater Lowering in Construction, 2nd Edition.
- Chapman, L.J. and Putnam, D.F. (2007). Physiography of Southern Ontario, 3rd Edition, Ontario Geological Survey.
- EXP Services Inc. (July 12, 2023), Preliminary Geotechnical Investigation, 1101A and 1105 Kingston Road, Toronto, ON, prepared for Tribute Communities.
- J.P. Powers, A.B. Corwin, P.C. Schmall and W.E. Kaeck (2007). Construction Dewatering and Groundwater Control, Third Edition.
- Ministry of Northern Development and Mines (May, 2012). OGS Earth. Retrieved from http://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth.
- Oak Ridges Moraine Groundwater Program. Accessed to the website (https://oakridgeswater.ca/) dated July 2023.
- Toronto and Region Conservation, Lake Ontario Waterfront.

Figures



SCALE:

0 150 300 450 600 750 m

LEGEND:

APPROXIMATE SITE BOUNDARY

exp.

DRAWN BY:	CHECKED BY:
AC	AN

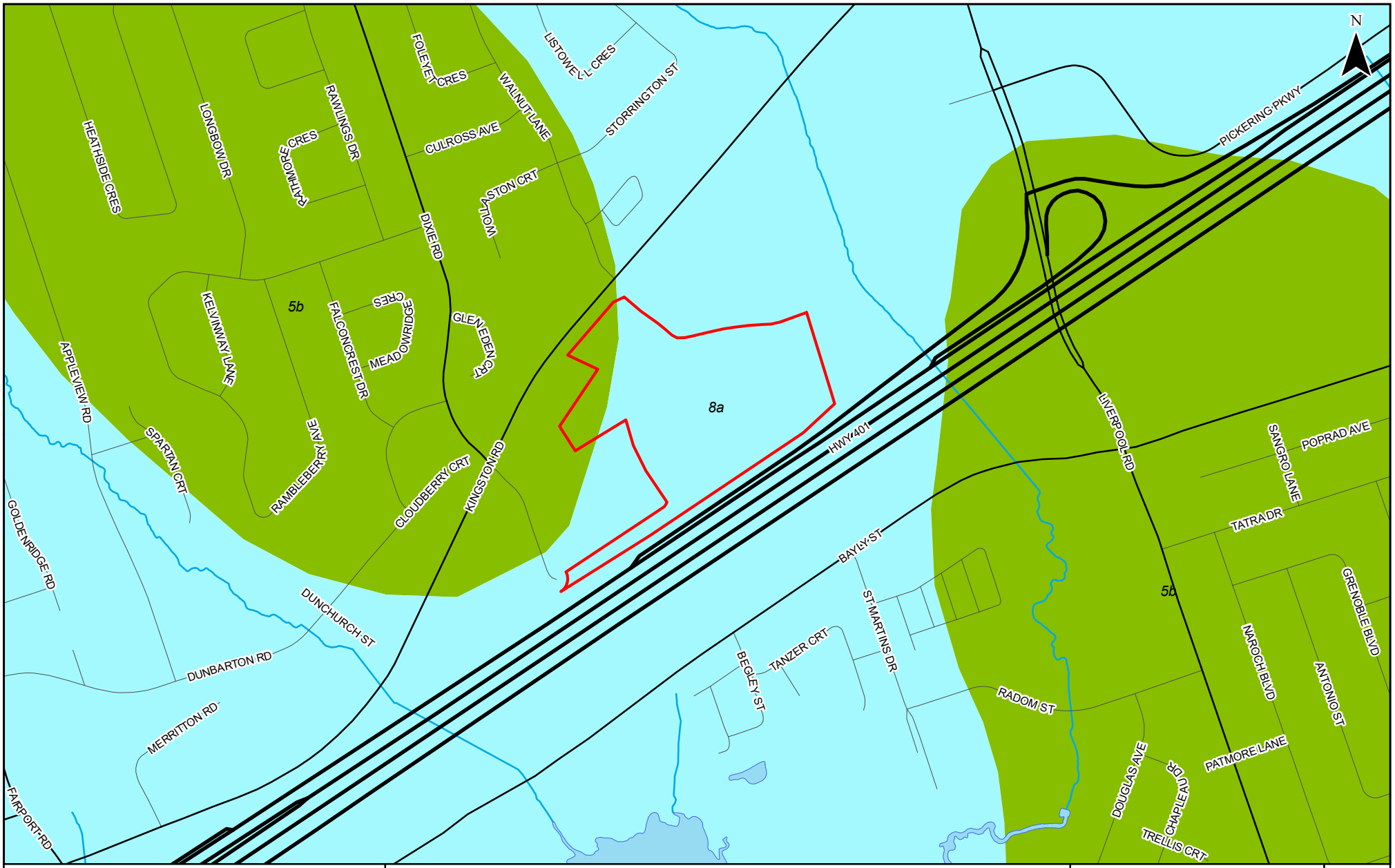
SITE LOCATION PLAN

FIGURE: 1

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0

DATE: OCTOBER 2023



SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2010

exp.

DRAWN BY:	CHECKED BY:
AC	AN

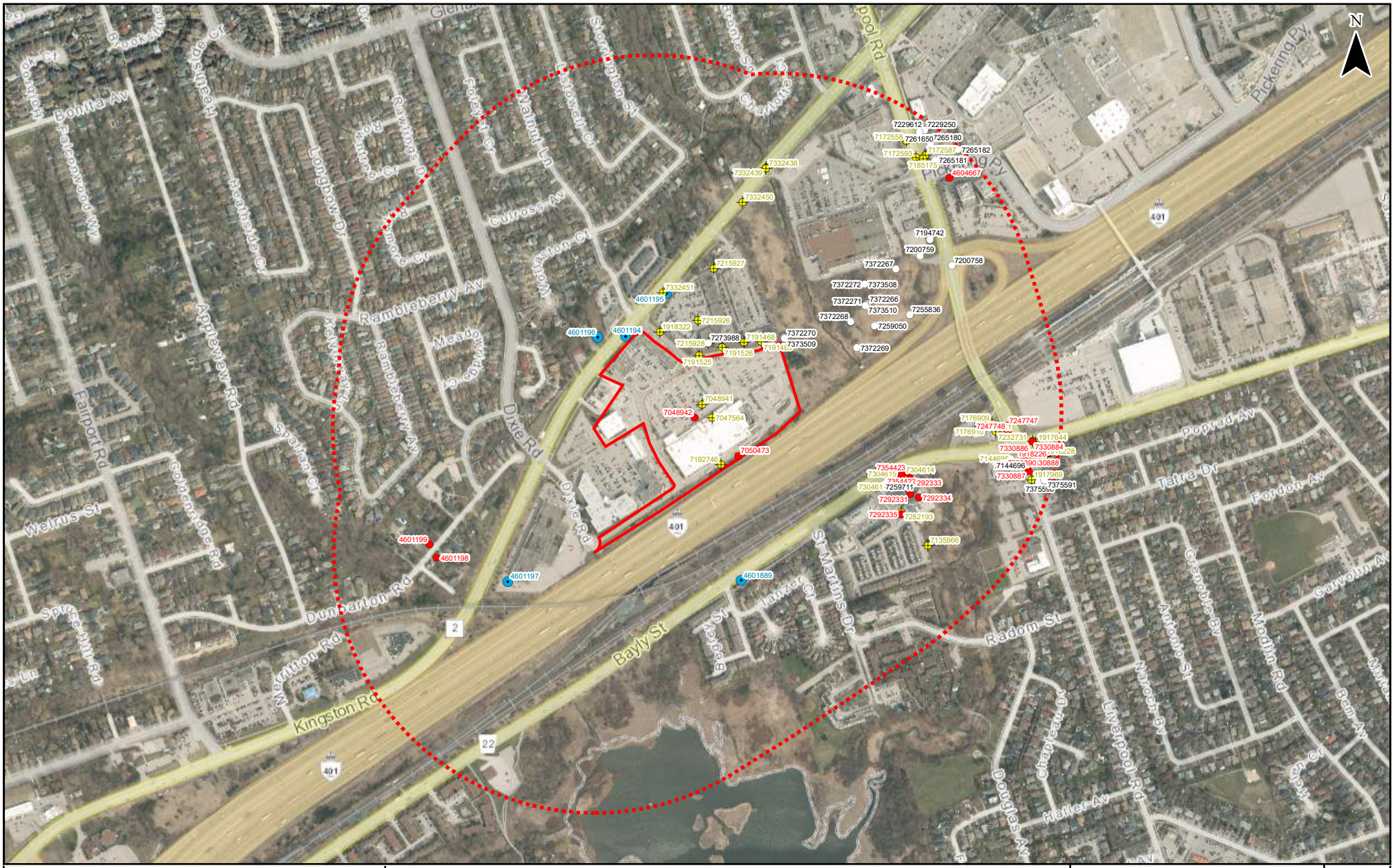
LEGEND:
- APPROXIMATE SITE BOUNDARY
- 8A: FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- 5B: STONE-POOR, CARBONATE-DERIVED SILTY TO SANDY TILL

SURFICIAL GEOLOGY

FIGURE: 2

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0 | DATE: JUNE 2023



SCALE:

0 100 200 300 400 500 m

SOURCE:

BASED ON GOOGLE EARTH IMAGERY DATED 2022,
AVAILABLE WELL RECORD INFORMATION AS OF MARCH 2021

exp.

DRAWN BY:	CHECKED BY:
AC	AN

LEGEND:

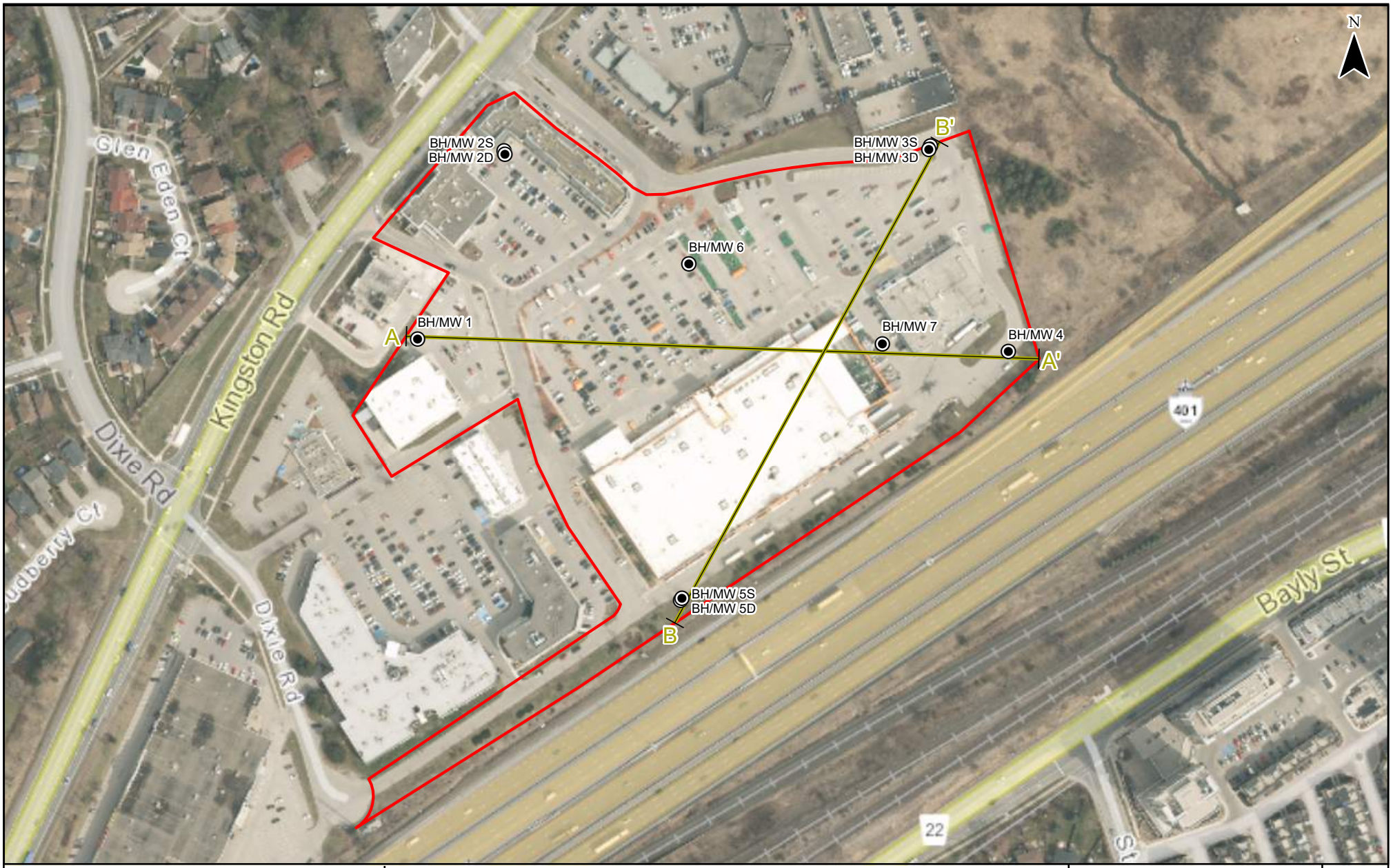
- MONITORING WELL / TEST HOLE
- WATER SUPPLY WELL
- ABANDONED WELL
- UNCLASSIFIED / UNFINISHED WELL
- APPROXIMATE SITE BOUNDARY
- 500 m ZONE

MECP WATER WELL RECORDS MAP

FIGURE: 3

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0 | DATE: JUNE 2023



SCALE:

0 30 60 90 120 150 m

LEGEND:

- BOREHOLE / MONITORING WELL (EXP, 2023)
- CROSS SECTION AXIS
- APPROXIMATE SITE BOUNDARY

exp.

DRAWN BY:	CHECKED BY:
AC	AN

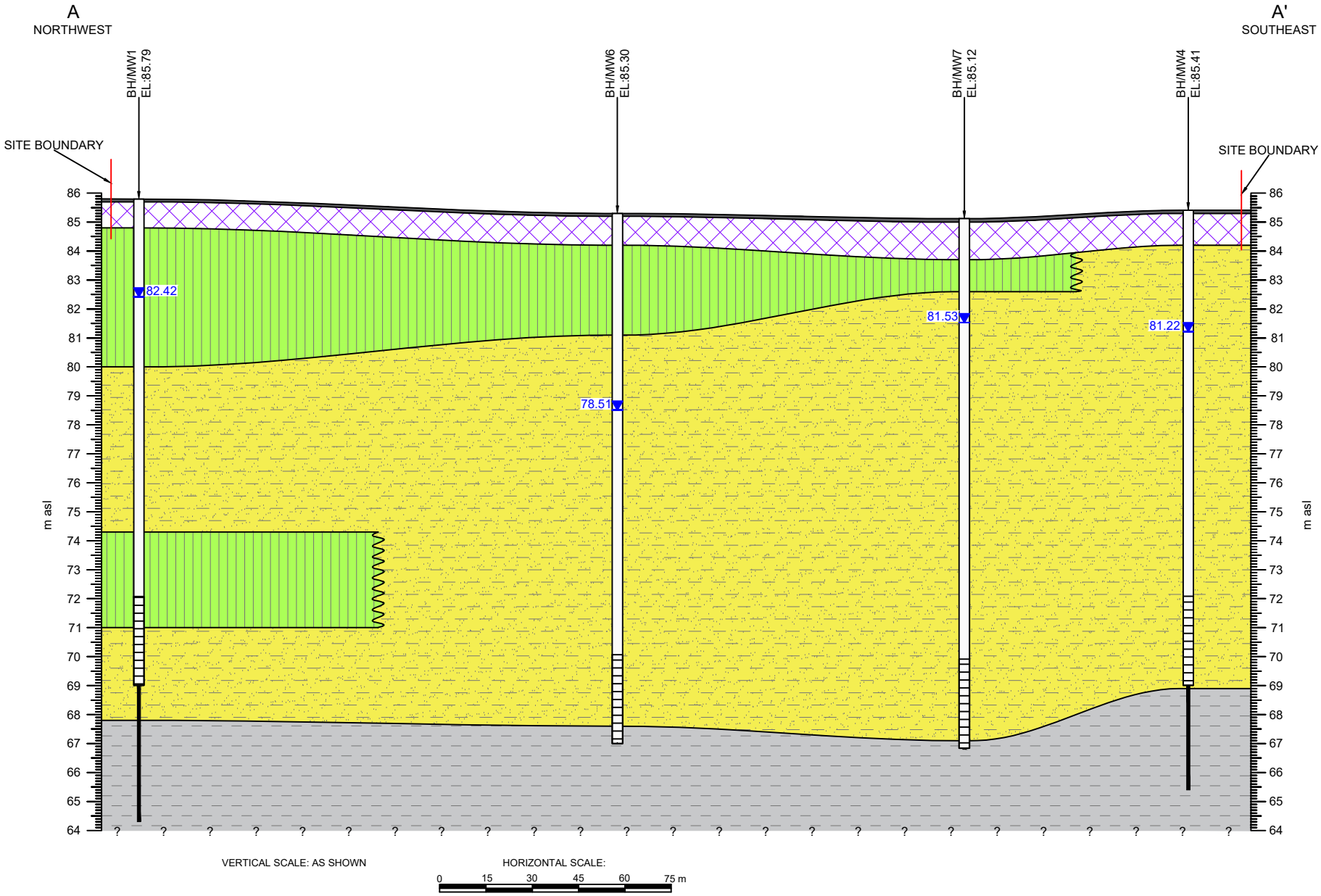
BOREHOLE / MONITORING WELL LOCATION PLAN

FIGURE: 4

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0

DATE: OCTOBER 2023



EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
www.exp.com

LEGEND:

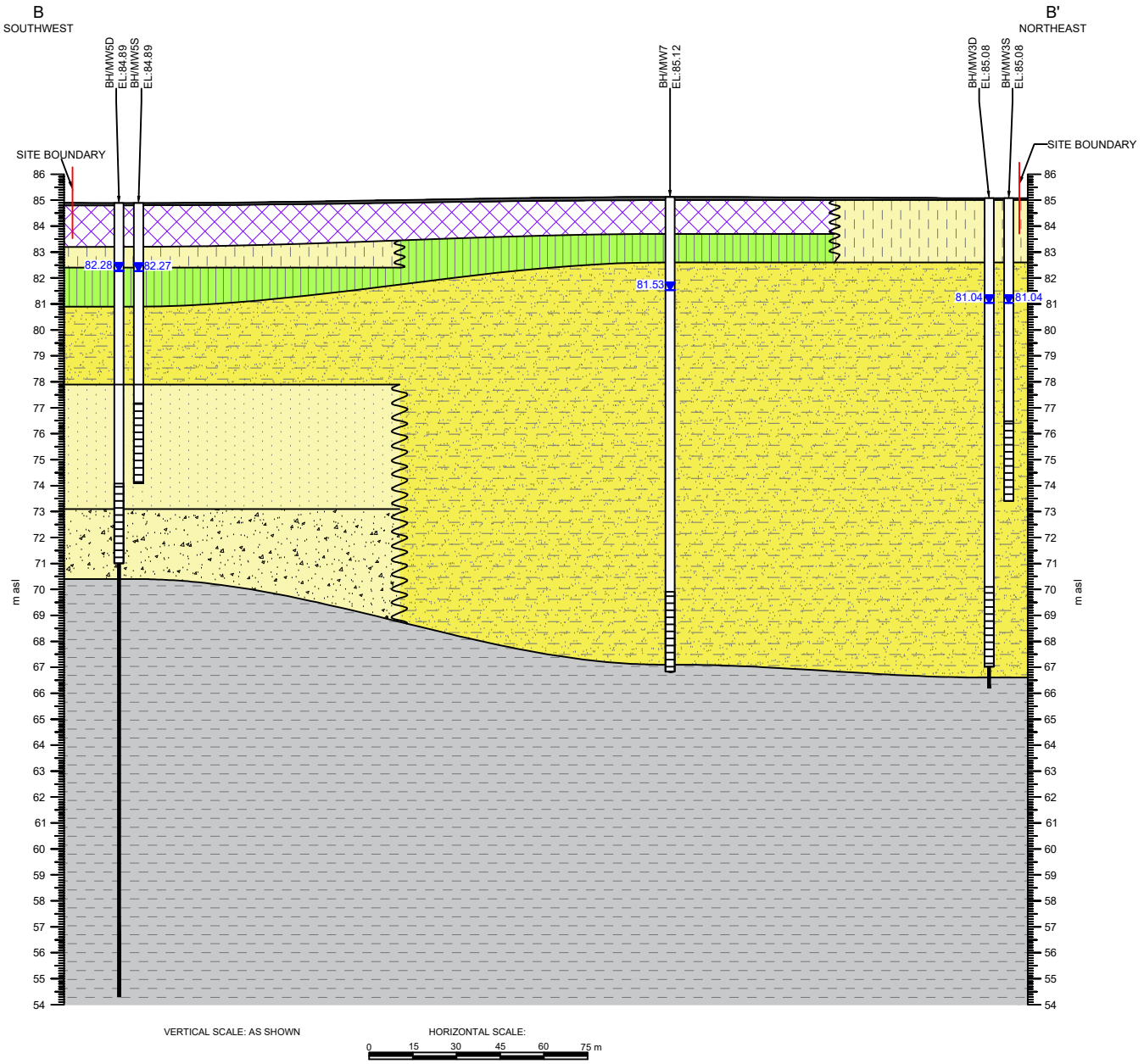
- PAVEMENT STRUCTURE
- FILL
- SILTY SAND TILL / SANDY SILT TILL
- CLAYEY SILT
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON JUNE 6, 2023

TITLE AND LOCATION:

CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NO.:	DWN.:
GTR-22015419-B0	HY
SCALE:	CK:
AS NOTED	AN
DATE:	FIG. NO.:
OCTOBER 2023	5A

\\exp\data\MRK\GTR-22015419-A0\60 Execution\68 ArcGIS\HG\Cross Sections\GTR-22015419-B0.dwg



EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
www.exp.com

LEGEND:

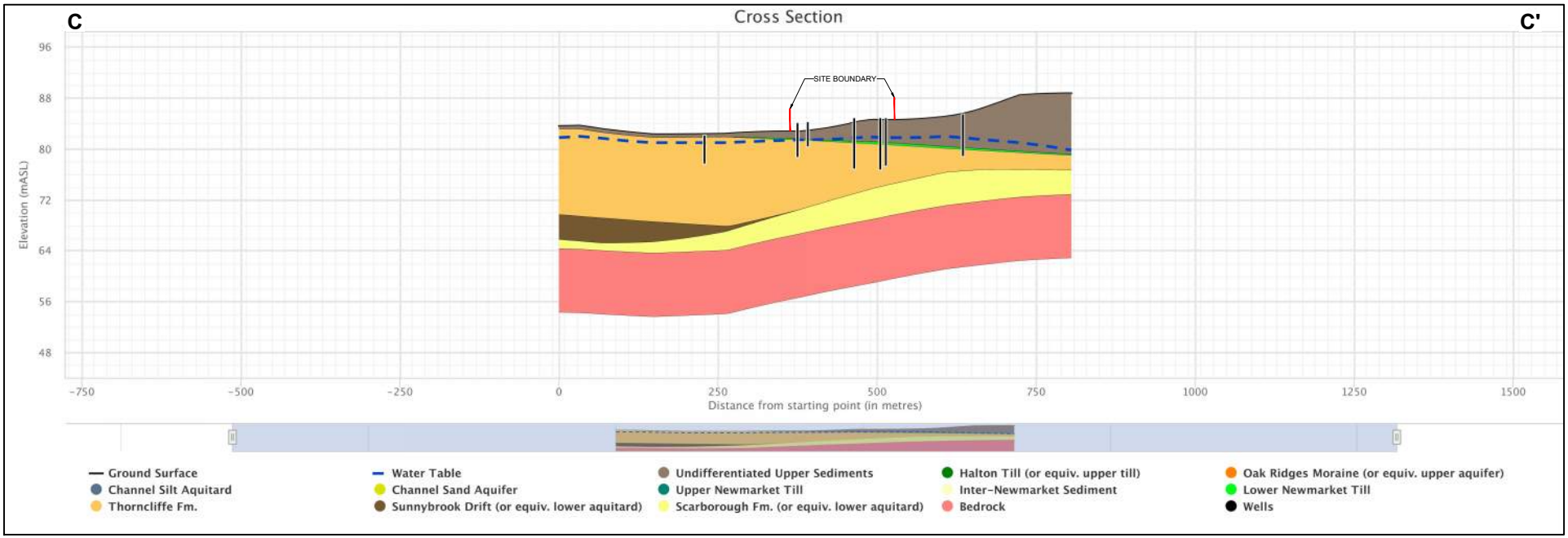
- PAVEMENT STRUCTURE
- FILL
- SILTY SAND TILL / SANDY SILT TILL
- CLAYEY SILT
- SILT
- COARSE SAND
- SAND AND GRAVEL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON JUNE 6, 2023

TITLE AND LOCATION:

CROSS SECTION B-B'
HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NO.:	DWN.:
GTR-22015419-B0	HY
SCALE:	CK:
AS NOTED	AN
DATE:	FIG. NO.:
OCTOBER 2023	5B

\\exp\data\MRK\GTR-22015419-A0\60 Execution\68 ArcGIS\HG\Cross Sections\GTR-22015419-B0.dwg



EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada

www.exp.com

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

SOURCE:

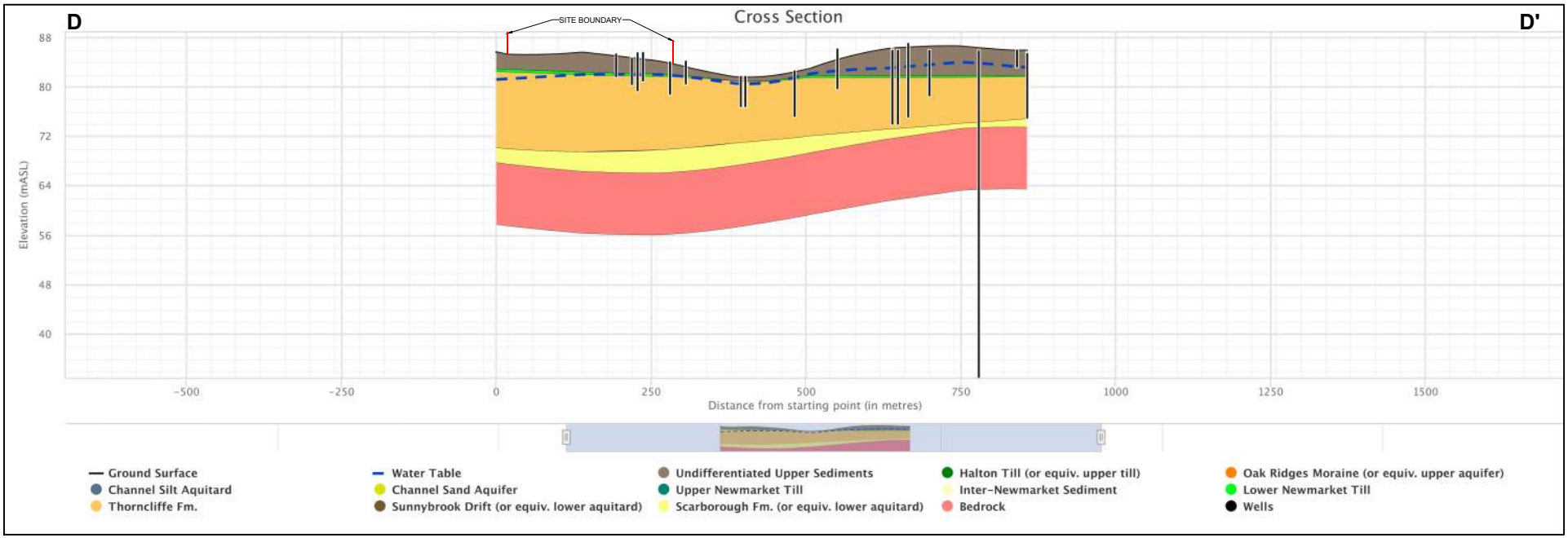
Oak Ridges Moraine Groundwater Program, 2023
"Cross Sections Preview Version 2.0 "<https://partners.oakridgeswater.ca/CrossSection/>. (July, 2023)

TITLE AND LOCATION:

CROSS SECTION C-C'
HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NO.:	DWN.:
GTR-22015419-B0	JA
SCALE:	CK:
AS NOTED	AN
DATE:	FIG. NO.:
JULY 2023	5C

\\exp\data\MRK\GTR-22015419-A0\60 Execution\68 ArcGIS\HG\Cross Sections\GTR-22015419-B0.dwg



EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada

www.exp.com

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

SOURCE:

Oak Ridges Moraine Groundwater Program, 2023
"Cross Sections Preview Version 2.0 "<https://partners.oakridgeswater.ca/CrossSection/>. (July, 2023)

TITLE AND LOCATION:

CROSS SECTION D-D'
HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NO.:	DWN.:
GTR-22015419-B0	JA
SCALE:	CK:
AS NOTED	AN
DATE:	FIG. NO.:
JULY 2023	5D

\\exp\data\MRK\GTR-22015419-A0\60 Execution\68 ArcGIS\HG\Cross Sections\GTR-22015419-B0.dwg

SCALE:

0 30 60 90 120 150 m

LEGEND:

- BOREHOLE / MONITORING WELL (EXP, 2023)
- XX.XX GROUNDWATER ELEVATION (m asl) AS MEASURED ON JUNE 6, 2023
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE SITE BOUNDARY

exp.

DRAWN BY:	CHECKED BY:
AC	AN

SHALLOW GROUNDWATER CONTOUR PLAN

FIGURE: 6A

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0

DATE: JULY 2023

SCALE:

0 30 60 90 120 150 m

LEGEND:

- BOREHOLE / MONITORING WELL (EXP, 2023)
- XX.XX GROUNDWATER ELEVATION (m asl) AS MEASURED ON JUNE 6, 2023
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE SITE BOUNDARY

DRAWN BY: AC

CHECKED BY: AN

DEEP GROUNDWATER CONTOUR PLAN

FIGURE: 6B

HYDROGEOLOGICAL INVESTIGATION
1101A AND 1105 KINGSTON ROAD
PICKERING, ONTARIO

PROJECT NUMBER: GTR-22015419-B0

DATE: JULY 2023

Appendix A – MECP WWR Summary Table

On-Site

BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
11551311	1918322	6/19/2006	653100	4854848	86.3	margin of error : 10 - 30 m	1163 KINGSTON ROAD	PICKERING	159	Boring	6.0	5.0	5.1			Observation Wells
23048941	7048941	7/19/2007	653181	4854709	84.7	margin of error : 10 - 30 m	1105 KINGSTON ROAD	PICKERING	14	Boring	6.0	3.0	5.1	Not Used		Observation Wells
23050473	7050473	8/8/2007	653250	4854610	84.6	margin of error : 10 - 30 m	1105 KINGSTON RD.	PICKERING	125	Boring		3.0	5.1			Abandoned-Other
1004203356	7191468	11/5/2012	653261	4854828	83.9	margin of error : 30 m - 100 m	1105 KINGSTON RD	Pickering	155	Direct Push	5.5		3.8	Monitoring and Test Hole		Test Hole
1004203359	7191469	11/5/2012	653294	4854829	83.5	margin of error : 30 m - 100 m	1105 KINGSTON RD	Pickering	177	Direct Push	4.0		3.8	Monitoring and Test Hole		Test Hole
1004204037	7191525	11/5/2012	653175	4854802	85.1	margin of error : 30 m - 100 m	1105 KINGSTON RD	Pickering	98	Direct Push	4.0		3.8	Monitoring and Test Hole		Test Hole
1004204040	7191526	11/5/2012	653219	4854818	85.3	margin of error : 30 m - 100 m	1105 KINGSTON RD	Pickering	125	Direct Push	4.9		3.8	Monitoring and Test Hole		Test Hole
1004214724	7192746	11/15/2012	653217	4854594	84.6	margin of error : 10 - 30 m	1105 KINGSTON RD	PICKERING	121	DIRECT PUSH	4.6		3.8	Monitoring and Test Hole		Monitoring and Test Hole
23047564	7047564	6/25/2007	653200	4854683	85.2	margin of error : 10 - 30 m	1105 KINGSTON ROAD	PICKERING	38	Boring	6.0		5.1			Observation Wells
23048942	7048942	7/19/2007	653167	4854683	84.7	margin of error : 10 - 30 m	1105 KINGSTON ROAD	PICKERING	21	Boring		3.0		Not Used		Abandoned-Other

Off-Site

BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
10292563	4601194	8/7/1964	653035	4854839	86.2	margin of error : 100 m - 300 m			190	Cable Tool	21.3	18.9	17.8	Domestic		Water Supply
10292564	4601195	12/11/1964	653113	4854921	84.3	margin of error : 100 m - 300 m			224	Boring	7.3	7.0	86.4	Domestic		Water Supply
10292565	4601196	7/17/1967	652982	4854837	87.1	margin of error : 100 m - 300 m			229	Boring	4.9	2.4	76.2	Domestic		Water Supply
10292566	4601197	10/8/1958	652810	4854369	87.0	margin of error : 100 m - 300 m			491	Cable Tool	13.1	13.1	12.7	Domestic		Water Supply
10292567	4601198	9/30/1958	652674	4854415	92.5	margin of error : 100 m - 300 m			573	Cable Tool	10.7	10.7	12.7			Abandoned-Supply
10293254	4601889	12/3/1959	653256	4854371	82.2	margin of error : 100 m - 300 m			345	Boring	4.9	0.9	76.2	Public		Water Supply
10295997	4604667	9/25/1970	653655	4855143	87.0	margin of error : 30 m - 100 m			655	Cable Tool	76.2	8.8	15.2	Not Used		Abandoned-Supply
11317234	1917644	5/25/2005	653819	4854636	93.1	margin of error : 30 m - 100 m	935 LIVERPOOL RD.	PICKERING	654	Rotary (Convent.)	6.0	5.2		Not Used		Observation Wells
11317559	1917969	10/7/2005	653811	4854564	94.3	margin of error : 30 m - 100 m	935 LIVER POOL RD	PICKERING	658	Boring	6.8	4.5	5.4			Observation Wells
11551215	1918226	4/25/2006	653847	4854615	91.3	margin of error : 10 - 30 m	1260 EGLINTON AVE W	TORONTO	685	Rotary (Convent.)	7.0	5.0	4.5			Abandoned-Other
11551217	1918228	4/21/2006	653835	4854609	93.9	margin of error : 10 - 30 m	935 LIVERPOOL RD	PICKERING	674	Rotary (Convent.)	8.0	5.2	4.5			Observation Wells
1002878876	7135966	11/27/2009	653613	4854438	88.1	margin of error : 30 m - 100 m	ST. MARTINS DRIVE	Pickering	518	Auger	3.4		5.0	Not Used	Monitoring	Observation Wells
1002978738	7144695	5/7/2010	653774	4854597	93.6	margin of error : 30 m - 100 m	935 LIVERPOOL RD	Pickering	615	Rotary (Convent.)	7.6		5.1	Test Hole		Test Hole
1002978740	7144696	4/7/2010	653772	4854604	93.6	margin of error : 30 m - 100 m	935 LIVERPOOL RD	Pickering	612							Other Status
1003614196	7172558	11/7/2011	653572	4855214	87.0	margin of error : 10 - 30 m	1799 LIVERPOOL RD	Pickering	650	Boring	4.6		4.6	Monitoring		Observation Wells
1003614254	7172587	7/22/2011	653608	4855187	87.3	margin of error : 10 - 30 m	1799 LIVERPOOL RD	Pickering	653	Boring	4.6		4.6	Monitoring		Observation Wells
1003614266	7172593	9/13/2011	653590	4855182	86.8	margin of error : 10 - 30 m	1799 LIVERPOOL RD	Pickering	637	Boring	4.6		4.6	Monitoring		Observation Wells
1003693810	7176909	12/22/2011	653736	4854673	93.3	margin of error : 30 m - 100 m	1300 BAYLY ST.	Pickering	569	Direct Push	9.4		5.1	Monitoring and Test Hole		
1003693813	7176911	12/22/2011	653715	4854676	91.8	margin of error : 30 m - 100 m	1300 BAYLY ST.	Pickering	548	Direct Push	12.2		5.1	Monitoring and Test Hole		
1003696991	7176910	12/22/2011	653725	4854667	93.3	margin of error : 30 m - 100 m	1300 BAYLY ST.	Pickering	558	Direct Push	12.2		5.1	Monitoring and Test Hole		
1004102857	7185175	3/14/2012	653604	4855180	87.3	margin of error : 30 m - 100 m	1799 LIVERPOOL RD	PICKERING	645	Boring	3.7		5.1	Monitoring		Observation Wells
1004705637	7215926	11/13/2013	653173	4854870	83.8	margin of error : 30 m - 100 m	1167 KINGSTON RD	Pickering	166	Boring	6.1		5.1	Monitoring		Observation Wells
1004705640	7215927	11/29/2013	653203	4854969	83.0	margin of error : 30 m - 100 m	1167 KINGSTON RD	Pickering	267	Boring	4.6	3.0	5.1	Monitoring		Observation Wells
1004705643	7215928	11/29/2013	653193	4854826	85.3	margin of error : 30 m - 100 m	1167 KINGSTON RD	Pickering	124	Boring	4.6	3.0	5.1	Monitoring		Observation Wells
10292568	4601199	9/1/1958	652660	4854440	93.5	margin of error : 100 m - 300 m			573	Cable Tool	61.3		12.7			Abandoned-Supply
1005243962	7232731	7/30/2014	653743	4854657	93.3	margin of error : 30 m - 100 m	1300 BAYLY ST	Pickering	577	Rotary (Convent.)	12.8	7.6		Monitoring and Test Hole		Monitoring and Test Hole
1005667022	7247747	4/25/2015	653764	4854668	94.5	margin of error : 30 m - 100 m	CORNER OF LIVERPOOL & BAYLY ST.	PICKERING	597							Abandoned-Other
1005667025	7247748	4/24/2015	653766	4854657	94.5	margin of error : 30 m - 100 m	CITY OF PICKERING/CORNER OF BAYLY & LIVERPOOL	PICKERING	600							Abandoned-Other
1005735369	7249786	9/7/2015	653813	4854638	93.1	margin of error : 30 m - 100 m		Pickering	648	Boring	7.6			Monitoring		Observation Wells
1006064681	7265180	5/19/2016	653618	4855210	87.0	margin of error : 30 m - 100 m	1799 LIVERPOOL ROAD	PICKERING	677	Direct Push	6.1					
1006064684	7265181	5/19/2016	653627	4855177	87.3	margin of error : 30 m - 100 m	1799 LIVERPOOL ROAD	PICKERING	659	Direct Push	6.1					
1006064687	7265182	5/19/2016	653671	4855197	86.8	margin of error : 30 m - 100 m	1799 LIVERPOOL ROAD	PICKERING	704	Direct Push	6.1					
1006360299	7282193	11/23/2016	653562	4854502	88.5	margin of error : 30 m - 100 m	1261 BAYLY ST	Pickering	443	Boring	2.4	1.6		Test Hole		Test Hole
1006709789	7292331	6/9/2017	653580	4854537	89.7	margin of error : 30 m - 100 m	1261 BAYLY ST	PICKERING	445							Abandoned-Other
1006709792	7292332	6/9/2017	653563	4854571	87.6	margin of error : 30 m - 100 m	1261 BAYLY ST	PICKERING	417							Abandoned-Other
1006709795	7292333	6/9/2017	653578	4854567	88.6	margin of error : 30 m - 100 m	1261 BAYLY ST	PICKERING	432							Abandoned-Other
1006709798	7292334	6/9/2017	653596	4854530	89.7	margin of error : 30 m - 100 m	1261 BAYLY ST	PICKERING	462							Abandoned-Other
1006709801	7292335	6/9/2017	653562	4854498	88.5	margin of error : 30 m - 100 m	1261 BAYLY ST	PICKERING	445							Abandoned-Other
1006979559	7304614	12/19/2017	653566	4854573	87.6	margin of error : 30 m - 100 m	1261 BAYLY STREET	PICKERING	419	Rotary (Convent.)	4.6	1.2		Test Hole	Monitoring	Monitoring and Test Hole
1006979562	7304615	12/19/2017	653558	4854566	88.5	margin of error : 30 m - 100 m	1261 BAYLY STREET	PICKERING	414	Rotary (Convent.)	4.6			Test Hole	Monitoring	Monitoring and Test Hole
1006979565	7304616	12/18/2017	653540	4854562	88.5	margin of error : 30 m - 100 m	1261 BAYLY STREET	PICKERING	398	Rotary (Convent.)	4.0			Test Hole	Monitoring	Monitoring and Test Hole
1007429107	7332438	6/14/2018	653303	4855163	84.0	margin of error : 30 m - 100 m	1792 LIVERPOOL RD.	PICKERING	478	Boring	10.7	9.1		Test Hole	Monitoring	Observation Wells
1007429110	7332439	6/13/2018	653303	4855161	84.0	margin of error : 30 m - 100 m	1792 LIVERPOOL RD.	PICKERING	476	Boring	10.7	6.7		Test Hole	Monitoring	Observation Wells
1007429359	7332450	10/11/2018	653258	4855096	82.8	margin of error : 30 m - 100 m	1105 KINGSTON RD.	PICKERING	402	Boring	9.1	5.2		Test Hole	Monitoring	Monitoring and Test Hole
1007429420	7332451	10/11/2018	653106	4854923	84.5	margin of error : 30 m - 100 m	1105 KINGSTON RD.	PICKERING	227	Boring	7.6	4.3		Test Hole	Monitoring	
1007414369	7330884	8/23/2018	653813	4854638	93.1	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	648			4.1				Abandoned-Other
1007414372	7330885	8/23/2018	653812	4854605	93.9	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	651			4.1				Abandoned-Other
1007414375	7330886	8/23/2018	653810	4854614	93.9	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	648			4.1				Abandoned-Other
1007414378	7330887	8/23/2018	653806	4854580	94.2	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	650			4.1				Abandoned-Other
1007414381	7330888	8/23/2018	653803	4854589	94.6	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	645			41.1				Abandoned-Other
1007414384	7330889	8/23/2018	653799	4854601	94.6	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	639			4.1				Abandoned-Other
1007414387	7330890	8/23/2018	653796	4854609	94.6	margin of error : 30 m - 100 m	935 Liverpool Road	Pickering	635			4.1				Abandoned-Other
1004230937	7194742	10/25/2012	653617	4855025	87.0	margin of error : 30 m - 100 m			552							
1004277532	7200758	2/26/2013	653659	4854975	90.8	margin of error : 30 m - 100 m			561							
1004277535	7200759	2/25/2013	653598	4854994	87.4	margin of error : 30 m - 100 m			518							
1005159451	7229250	9/11/2014	653607	4855235	87.1	margin of error : 30 m - 100 m			689							
1005164565	7229612	6/25/2014	653607	4855235	87.1	margin of error : 30 m - 100 m			689							
1005864964	7255836	3/7/2014	653578	4854880	89.7	margin of error : 30 m - 100 m			446							
1005904064	7259050	9/14/2015	653511	4854859	88.8	margin of error : 30 m - 100 m			376							
1005911966	7259711	10/19/2015	653556	4854563	88.5	margin of error : 30 m - 100 m			413							
1005934277	7261650	6/24/2014	653597	4855231	86.9	margin of error : 30 m - 100 m			679							
1006278807	7273988		653193	4854826	85.3	margin of error : 30 m - 100 m			124							
1008181448	7354421	4/22/2019	653553	4854566	88.5	margin of error : 30 m - 100 m	1261 Bayly St	Pickering	409							Abandoned-Other
1008181451	7354422	4/22/2019	653563	4854573	87.6	margin of error : 30 m - 100 m	1261 Bayly St	Pickering	416							Abandoned-Other
1008181454	7354423	4/22/2019	653575	4854578	87.5	margin of error : 30 m - 100 m	1261 Bayly Street	Pickering	426							Abandoned-Other

BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
1008507567	7372266	10/6/2020	653497	4854900	90.7	margin of error : 30 m - 100 m			383							
1008507570	7372267	10/5/2020	653552	4854968	87.8	margin of error : 30 m - 100 m			466							
1008507573	7372268	10/9/2020	653466	4854867	87.8	margin of error : 30 m - 100 m			339							
1008507576	7372269	10/9/2020	653477	4854817	81.8	margin of error : 30 m - 100 m			329							
1008507579	7372270		653339	4854835	82.3	margin of error : 30 m - 100 m			215							
1008507582	7372271	10/9/2020	653493	4854898	89.0	margin of error : 30 m - 100 m			378							
1008507585	7372272	10/9/2020	653492	4854939	84.8	margin of error : 30 m - 100 m			400							
1008511612	7373508		653492	4854939	84.8	margin of error : 30 m - 100 m			400							
1008511615	7373509		653339	4854835	82.3	margin of error : 30 m - 100 m			215							
1008511618	7373510		653493	4854898	89.0	margin of error : 30 m - 100 m			378							
1008561314	7375590	9/16/2020	653825	4854559	94.3	margin of error : 30 m - 100 m			673							
1008561350	7375591	9/16/2020	653836	4854563	94.3	margin of error : 30 m - 100 m			683							

	COUNT
Monitoring Well / Test Hole	33
Dewatering Well	0
Water Supply Well	5
Abandoned Well	23
Unclassified / Unfinished Well	26
TOTAL	87

Appendix B – Borehole Logs

Log of Borehole 1

Project No. GTR-22015419-BO

Drawing No. 2

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

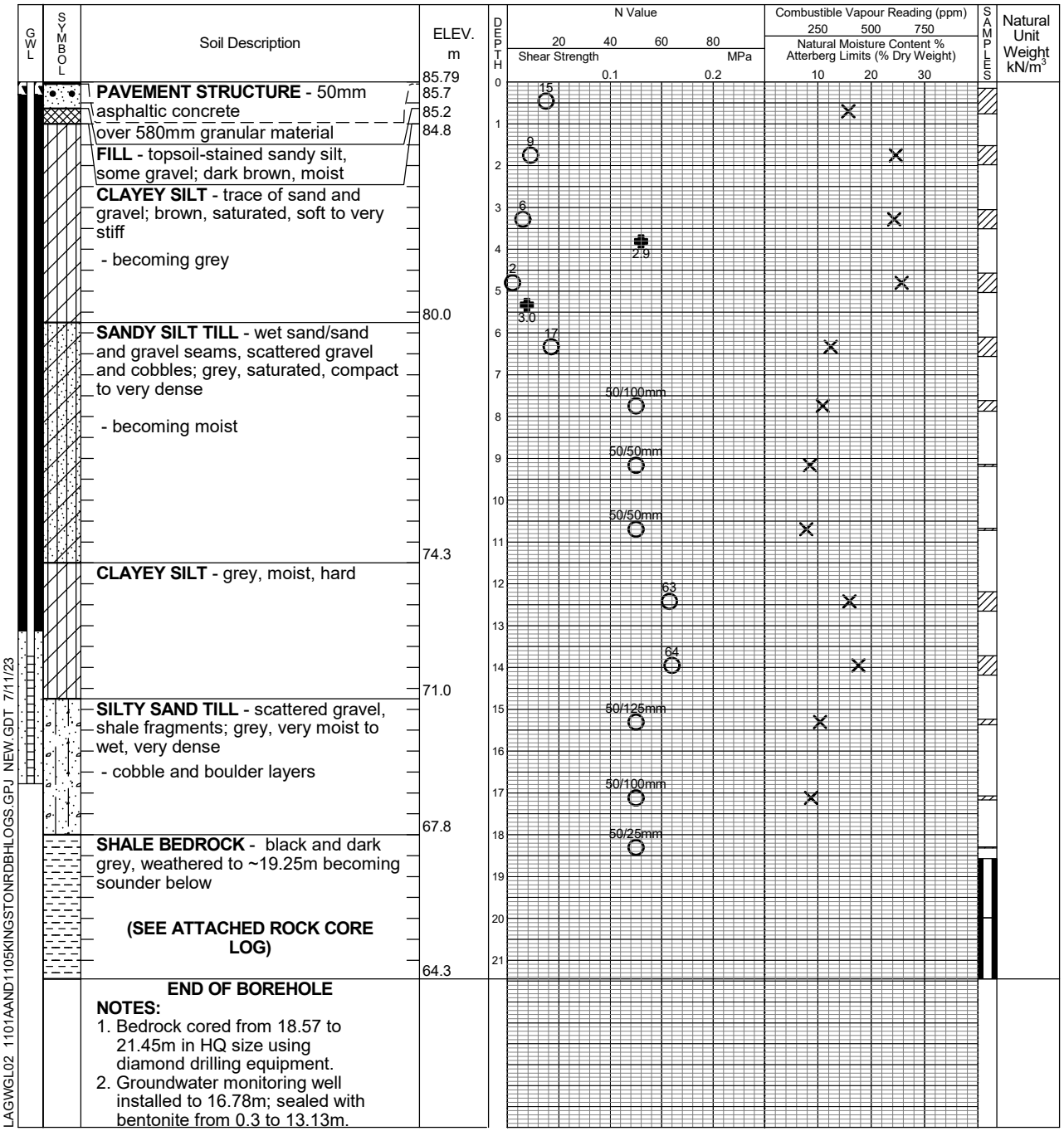
Date Drilled: May 16, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:

1. Bedrock cored from 18.57 to 21.45m in HQ size using diamond drilling equipment.
2. Groundwater monitoring well installed to 16.78m; sealed with bentonite from 0.3 to 13.13m.

Time	Water Level (m)	Depth to Cave (m)
After 4 days	3.36	Well
After 15 days	3.42	Well
After 21 days	3.37	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

ROCK CORE LOG

BH1

PROJECT Preliminary Geotechnical Investigation	**ORIENTATION** Vertical	**ELEVATION (m)** 85.8	**DATUM** Geodetic	**PROJECT NUMBER** GTR-22015419-B0
LOCATION 1101A and 1105 Kingston Road, Pickering, Ontario	**DATE STARTED** 05/16/23	**COMPLETED** 05/16/23	**LOGGED BY** RY	**DRAWING NUMBER** 2
CLIENT Tribute Communities	**DRILLER** Pontil Drilling	**DRILL TYPE** CME 75 Truck	**CORE BARREL** HQ	**SHEET** 1 of 1

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	ELEVATION (m)	JOINT CHARACTERISTICS: JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
67.2			**BLUE MOUNTAIN FORMATION** Dark grey to black shale with thin interbeds of limestone or calcareous siltstone	67.2	B	F		SP	T									
					B	F		SP	T									
			Slightly weathered (W2) to fresh (W1), weak (R3), laminated to thinly bedded, dark grey to black, fissile SHALE		B	F		SP	T									
					B	F		SP	T									
	19		Run 1: Shale (100%)															
					B	F		SP	T									
			Fracture Zone: 18.68 - 18.75 m (76mm) 18.91 - 19.03 m (125mm)															
			SOLID CORE RECOVERY: 83%											1	100	61	100	Grey
					B	F		SU	T									
	20		Run 2: Shale (100%)															
			SOLID CORE RECOVERY: 100%											2	100	100	100	Grey
	21																	
64.4			End of Borehole at 21.4 m	64.4														
	22																	

EXP_ROCKCOREAM ROCK CORE LOGS.GPJ CORE_LOG.GDT 6/22/23

exp.

Log of Borehole 2D

Project No. GTR-22015419-BO

Drawing No. 3

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

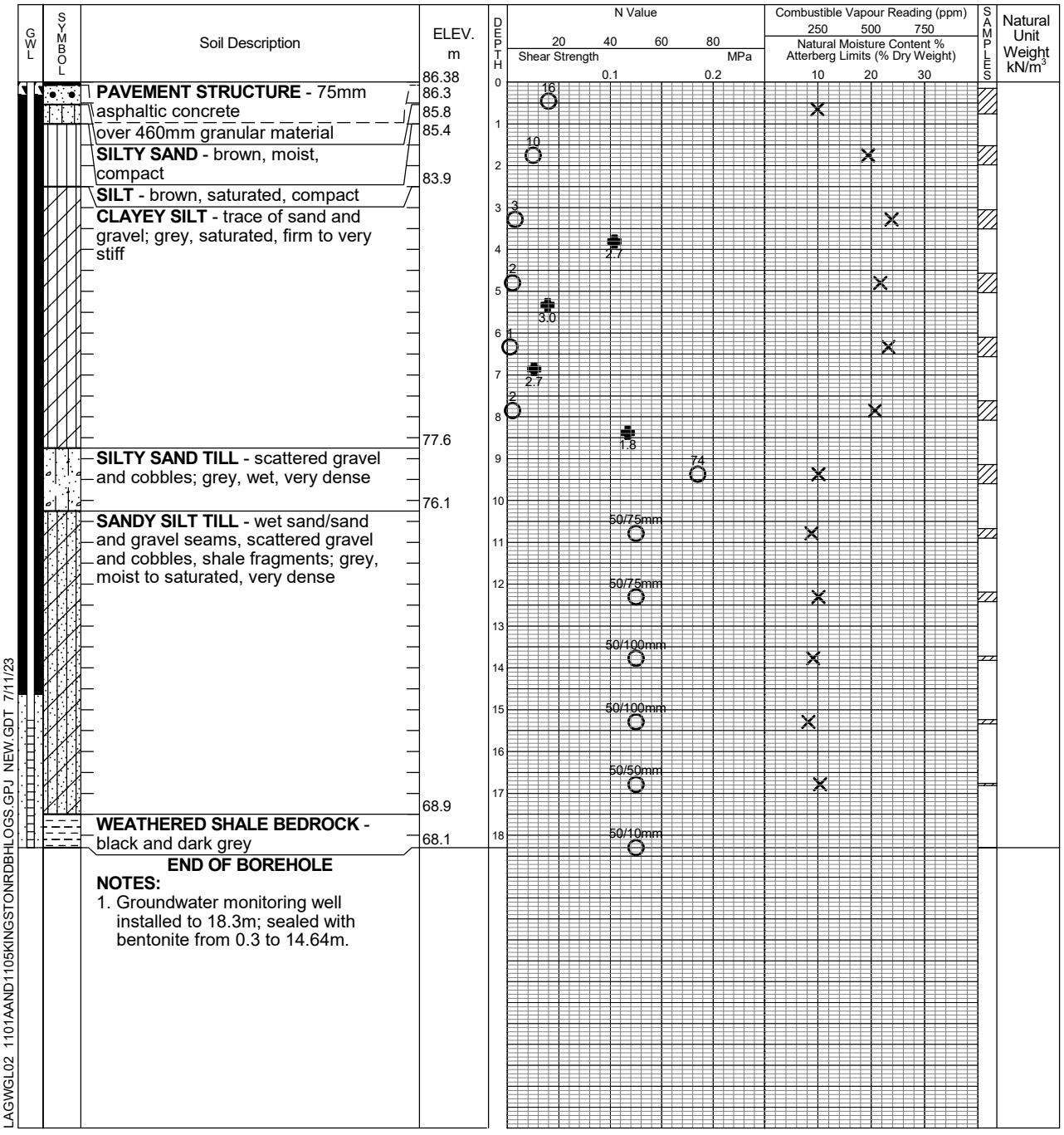
Date Drilled: May 18, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:

1. Groundwater monitoring well installed to 18.3m; sealed with bentonite from 0.3 to 14.64m.

Time	Water Level (m)	Depth to Cave (m)
After 2 days	2.96	Well
After 13 days	3.83	Well
After 19 days	3.98	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Log of Borehole 2S

Project No. GTR-22015419-BO

Drawing No. 4

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

Date Drilled: May 18, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			86.38	0
		PAVEMENT STRUCTURE - 75mm asphaltic concrete	86.3	
		over 460mm granular material	85.8	1
		SILTY SAND - brown, moist, compact	85.4	
		SILT - brown, saturated, compact	83.9	2
		CLAYEY SILT - trace of sand and gravel; grey, saturated, firm to very stiff		3
				4
				5
				6
				7
				8
			77.6	
		SILTY SAND TILL - scattered gravel and cobbles; grey, wet, very dense		9
			76.1	10
		SANDY SILT TILL - wet sand/sand and gravel seams, scattered gravel and cobbles, shale fragments; grey, moist to saturated, very dense		11
			74.1	12
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Borehole 2S drilled adjacent to Borehole 2D.
2. Groundwater monitoring well installed to 12.27m; sealed with bentonite from 0.3 to 8.61m.

Time	Water Level (m)	Depth to Cave (m)
After 2 days	2.89	Well
After 13 days	2.97	Well
After 19 days	2.91	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Log of Borehole 3D

Project No. GTR-22015419-BO

Drawing No. 5

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

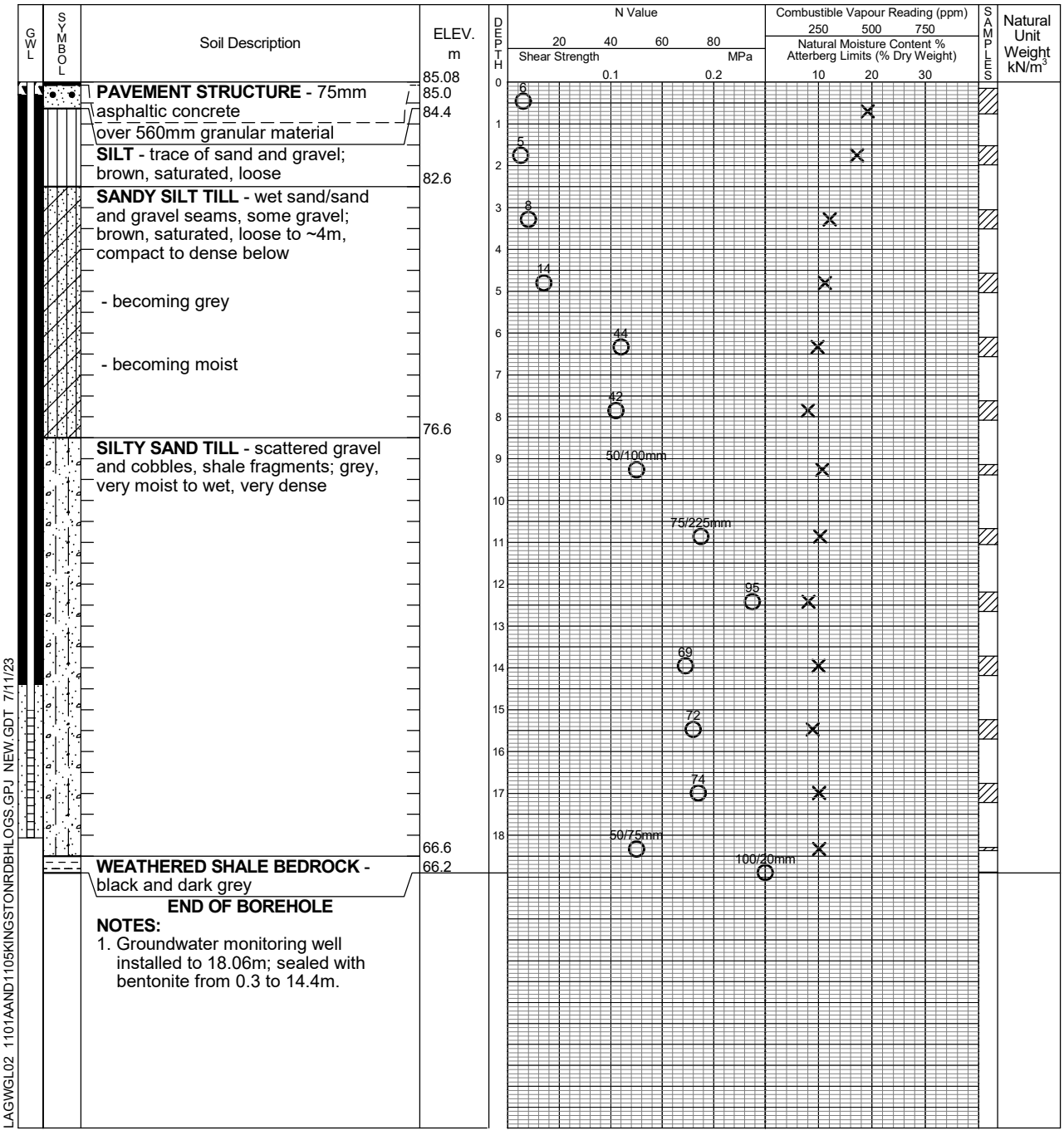
Date Drilled: May 8, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:

1. Groundwater monitoring well installed to 18.06m; sealed with bentonite from 0.3 to 14.4m.

Time	Water Level (m)	Depth to Cave (m)
After 12 days	3.97	Well
After 23 days	4.04	Well
After 29 days	4.04	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Log of Borehole 3S

Project No. GTR-22015419-BO

Drawing No. 6

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

Date Drilled: May 8, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			85.08	0
		PAVEMENT STRUCTURE - 75mm asphaltic concrete	85.0	
		over 560mm granular material	84.4	1
		SILT - trace of sand and gravel; brown, saturated, loose	82.6	2
		SANDY SILT TILL - wet sand/sand and gravel seams, some gravel; brown, saturated, loose to ~4m, compact to dense below		3
		- becoming grey		4
		- becoming moist		5
				6
				7
			76.6	8
		SILTY SAND TILL - scattered gravel and cobbles, shale fragments; grey, very moist to wet, very dense		9
				10
			73.4	11
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Borehole 3S drilled adjacent to Borehole 3D.
1. Groundwater monitoring well installed to 11.68m; sealed with bentonite from 0.3 to 8.02m.

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Time	Water Level (m)	Depth to Cave (m)
After 12 days	1.38	Well
After 23 days	2.10	Well
After 29 days	4.04	Well

Log of Borehole 4

Project No. GTR-22015419-BO

Drawing No. 7

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

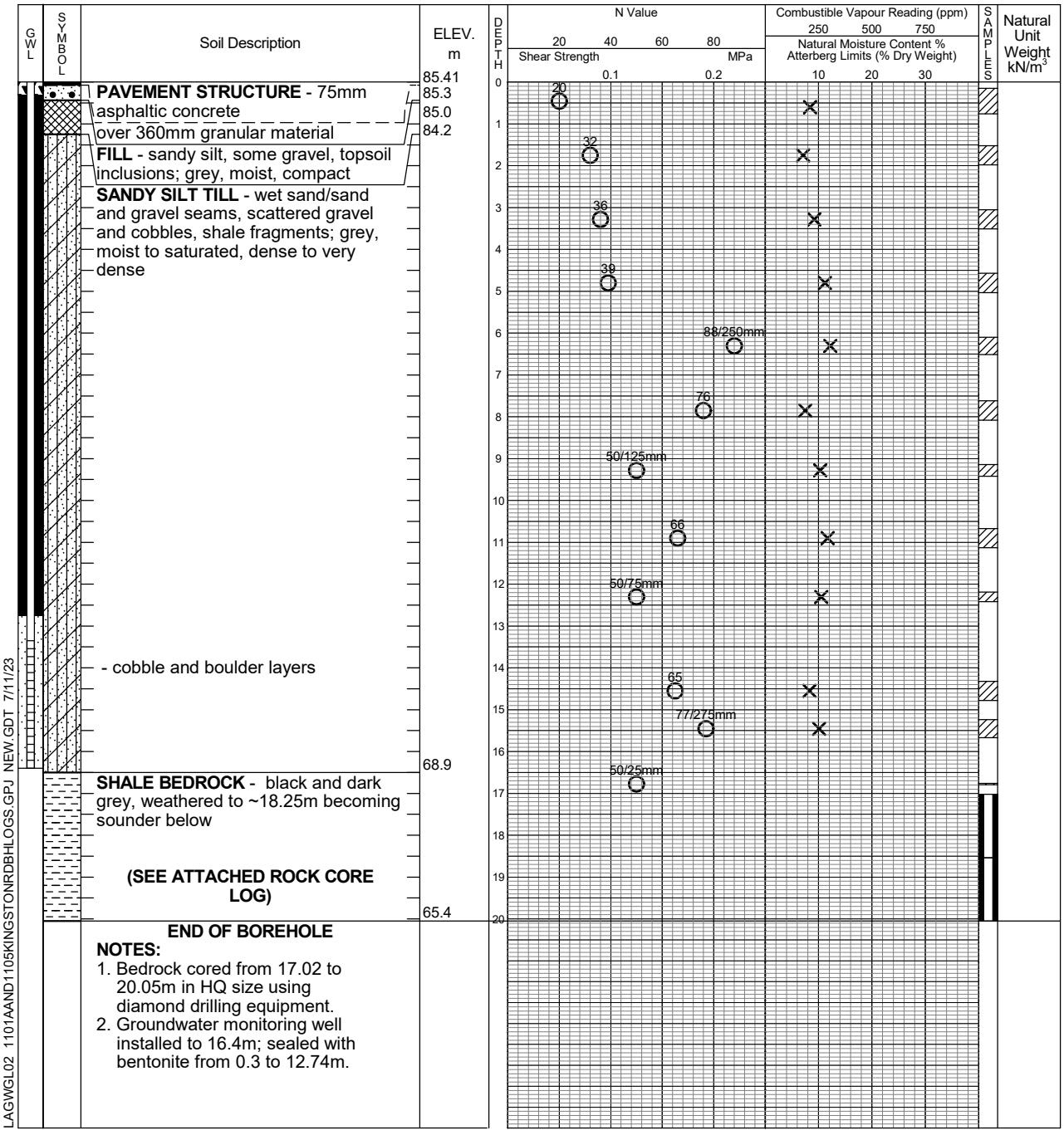
Date Drilled: May 11 and 12, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:

1. Bedrock cored from 17.02 to 20.05m in HQ size using diamond drilling equipment.
2. Groundwater monitoring well installed to 16.4m; sealed with bentonite from 0.3 to 12.74m.

Time	Water Level (m)	Depth to Cave (m)
After 8 days	3.92	Well
After 19 days	3.97	Well
After 25 days	4.19	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

ROCK CORE LOG

BH4

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Preliminary Geotechnical Investigation	Vertical	85.4	Geodetic	GTR-22015419-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
1101A and 1105 Kingston Road, Pickering, Ontario	05/12/23	05/12/23	RY	7
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
Tribute Communities	Pontil Drilling	CME 75 Truck	HQ	1 of 1

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	ELEVATION (m)	JOINT CHARACTERISTICS: JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
68.4			**BLUE MOUNTAIN FORMATION** Dark grey to black shale with thin interbeds of limestone or calcareous siltstone	68.4	B	F		SP	T									
			Fresh (W1), weak (R3), laminated to thinly bedded, dark grey to black, fissile SHALE		B	F		SP	T									
					B	F		SP	T									
			Run 1: Shale (100%)		B	F		SP	T									
			Fracture Zone: 17.02 - 17.15 m (130mm) 18.16 - 18.20 m (40mm)															
			SOLID CORE RECOVERY: 82%		B	F		SP	T									
					B	F		SP	T									
					C	V		SP	T					1	100	76	100	Grey
					B	F		SP	T									
	18																	
					B	F		SU	O	1								
					B	F		SP	T									
					B	F		SP	T									
					B	F		SP	S	1								
					B	F		SP	T									
			Run 2: Shale (100%)		C	V		SU	T									
			SOLID CORE RECOVERY: 100%		B	F		SP	T									
	19																	
														2	100	100	100	Grey
	20																	
65.3			End of Borehole at 20.1 m	65.3														

EXP_ROCKCOREAM ROCK CORE LOGS.GPJ CORE_LOG.GDT 6/22/23

exp.

Log of Borehole 5D

Project No. GTR-22015419-BO

Drawing No. 8

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 2

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

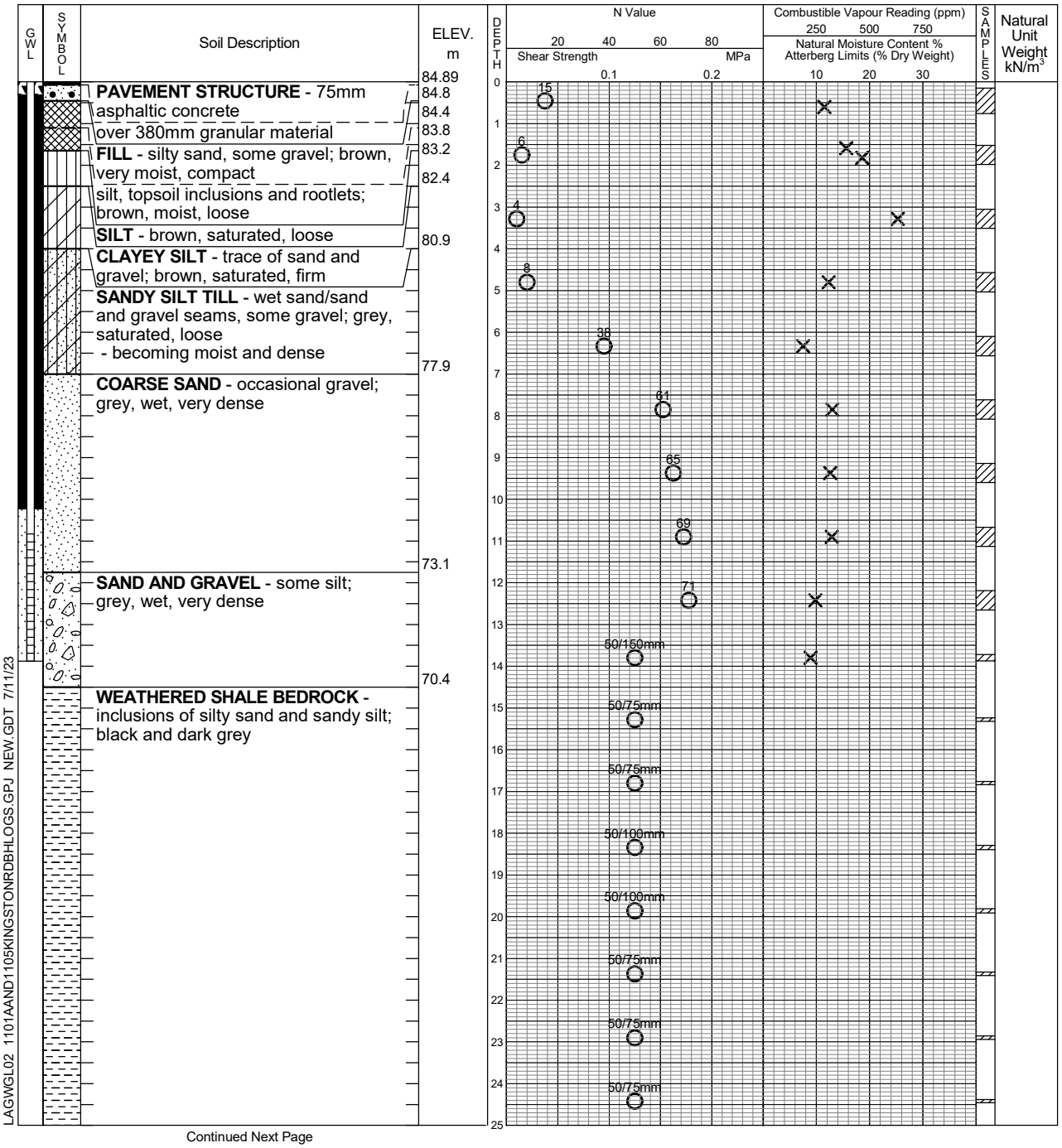
Date Drilled: May 12 and 15, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
After 5 days	2.60	Well
After 16 days	2.54	Well
After 22 days	2.61	Well

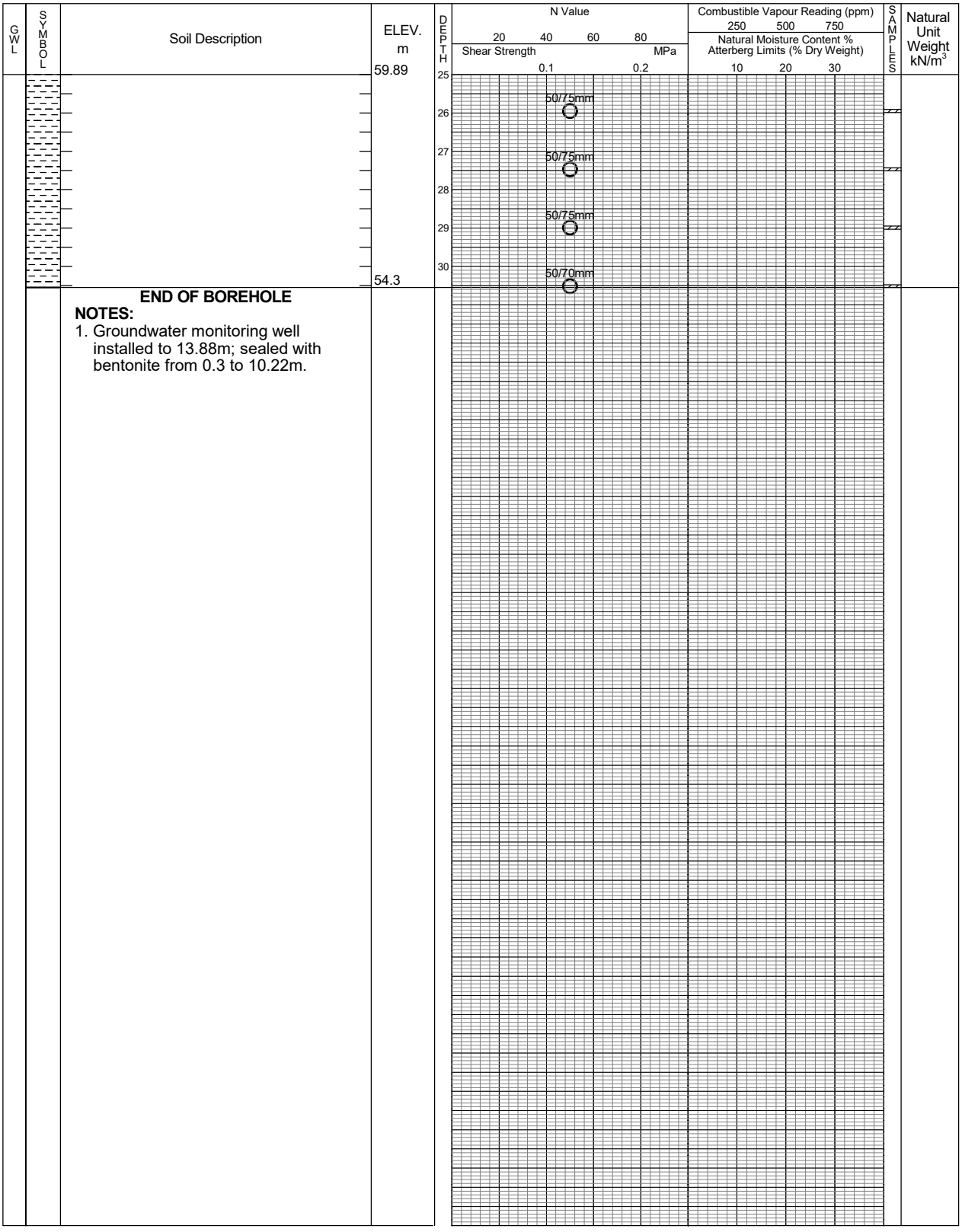
Log of Borehole 5D

Project No. GTR-22015419-BO

Drawing No. 8

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 2 of 2



LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Time	Water Level (m)	Depth to Cave (m)
After 5 days	2.60	Well
After 16 days	2.54	Well
After 22 days	2.61	Well

Log of Borehole 5S

Project No. GTR-22015419-BO

Drawing No. 9

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

Date Drilled: May 15, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			84.89	0
		PAVEMENT STRUCTURE - 75mm asphaltic concrete	84.8	
		over 380mm granular material	84.4	
		FILL - silty sand, some gravel; brown, very moist, compact	83.8	
		silt, topsoil inclusions and rootlets; brown, moist, loose	83.2	
		SILT - brown, saturated, loose	82.4	3
		CLAYEY SILT - trace of sand and gravel; brown, saturated, firm	80.9	4
		SANDY SILT TILL - wet sand/sand and gravel seams, some gravel; grey, saturated, loose		5
		- becoming moist and dense	77.9	7
		COARSE SAND - occasional gravel; grey, wet, very dense		8
			74.1	10
		END OF BOREHOLE		

N Value: 20 40 60 80

Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

NOTES:

1. Borehole 5S drilled adjacent to Borehole 5D.
2. Groundwater monitoring well installed to 10.79m; sealed with bentonite from 0.3 to 7.13m.

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Time	Water Level (m)	Depth to Cave (m)
After 5 days	2.56	Well
After 16 days	2.67	Well
After 22 days	2.62	Well

Log of Borehole 6

Project No. GTR-22015419-BO

Drawing No. 10

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

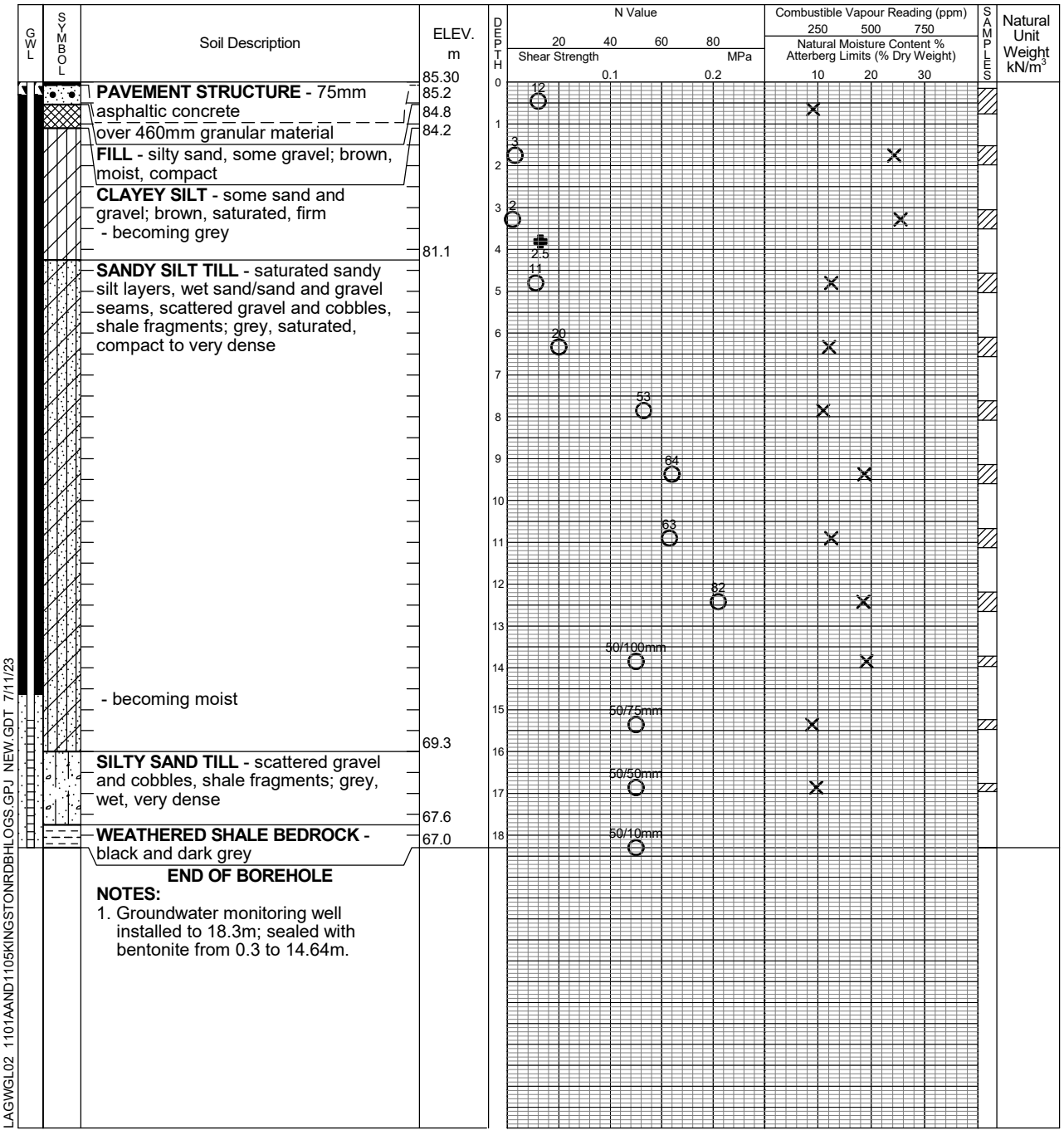
Date Drilled: May 17, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



END OF BOREHOLE

NOTES:

1. Groundwater monitoring well installed to 18.3m; sealed with bentonite from 0.3 to 14.64m.

Time	Water Level (m)	Depth to Cave (m)
After 3 days	3.03	Well
After 14 days	3.11	Well
After 20 days	6.79	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Log of Borehole 7

Project No. GTR-22015419-BO

Drawing No. 11

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 1101A and 1105 Kingston Road, Pickering, Ontario

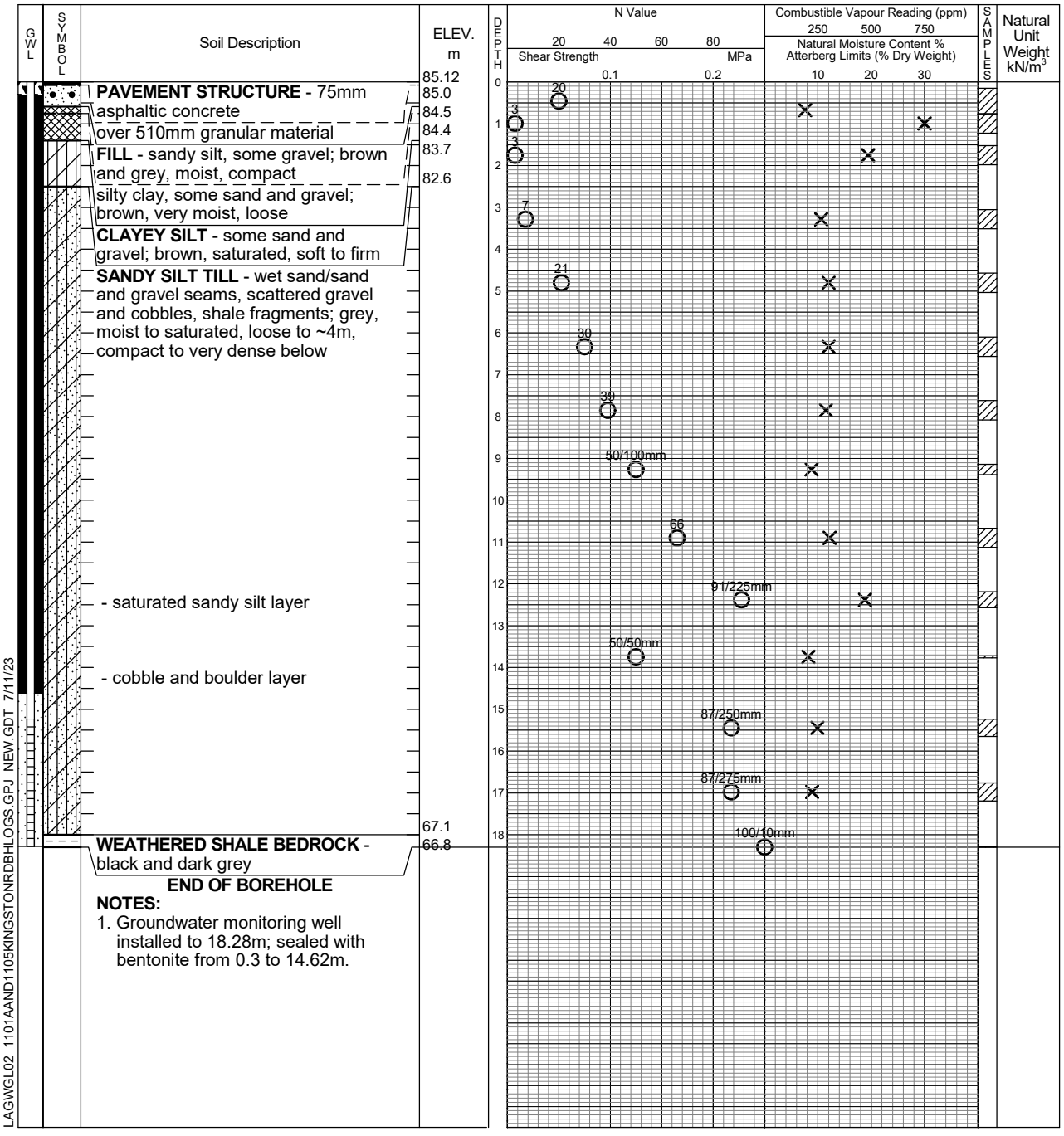
Date Drilled: May 9 and 10, 2023

Drill Type: Mud rotary with CME 75

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



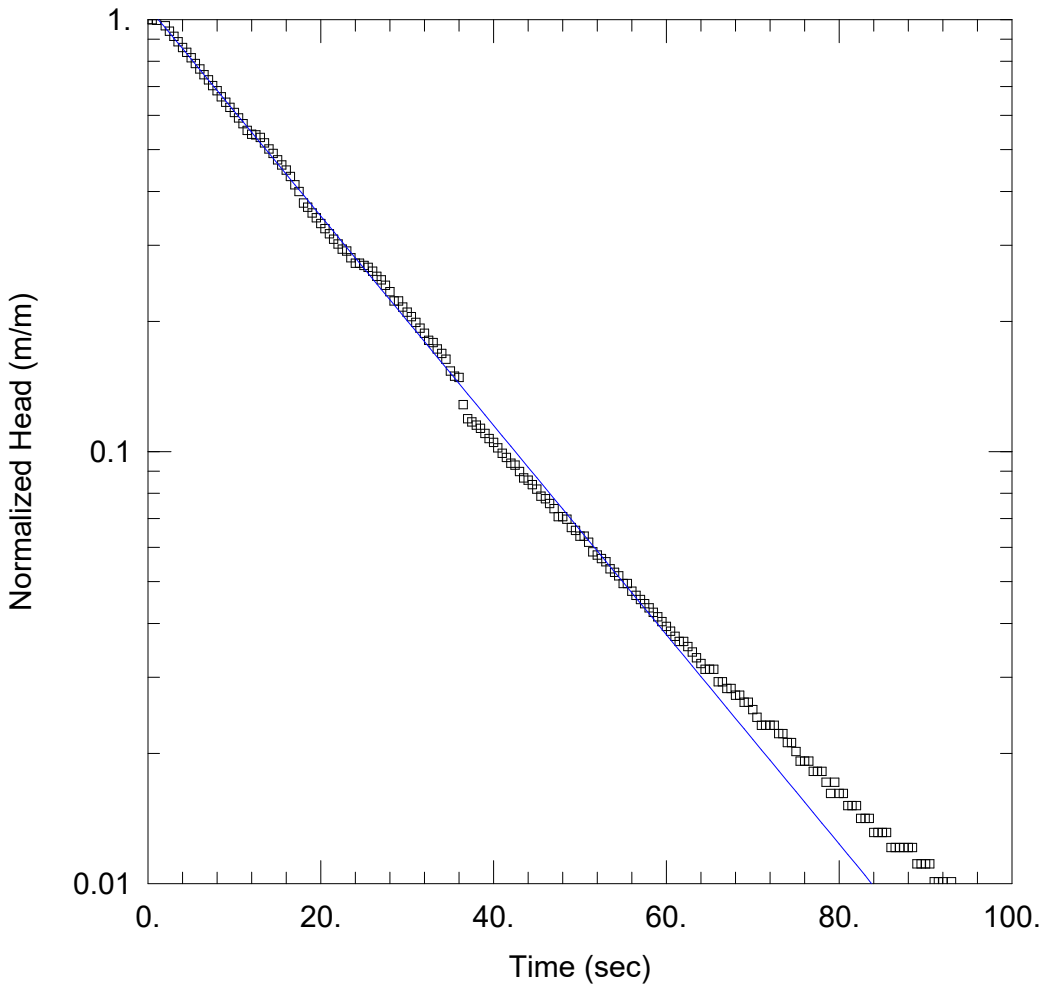
NOTES:

1. Groundwater monitoring well installed to 18.28m; sealed with bentonite from 0.3 to 14.62m.

Time	Water Level (m)	Depth to Cave (m)
After 10 days	3.07	Well
After 21 days	3.10	Well
After 27 days	3.59	Well

LAGWGL02 1101AAND1105KINGSTONRDBHLOGS.GPJ NEW.GDT 7/11/23

Appendix C – SWRT Procedures and Results



FALLING HEAD SWRT BH1 - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 1.aqt
Date: 06/08/23 Time: 17:07:39

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 1 Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 13.4 m Anisotropy Ratio (Kz/Kr): 1.

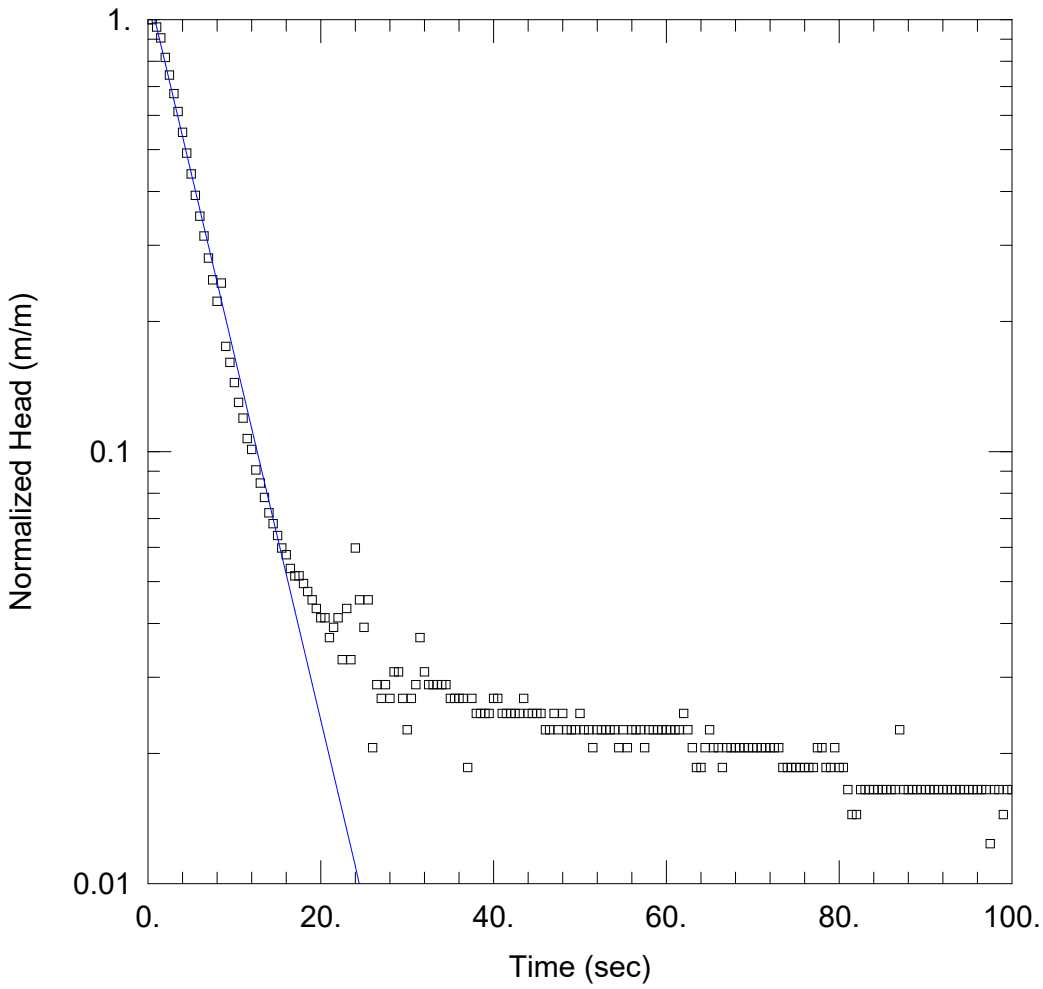
WELL DATA (BH 1 Falling Head)

Initial Displacement: 0.99 m
Total Well Penetration Depth: 13.4 m
Casing Radius: 0.0254 m
Static Water Column Height: 13.4 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 2.619E-5 m/sec y0 = 1.06 m



FALLING HEAD SWRT BH2D - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 2D.aqt
Date: 06/08/23 Time: 17:07:27

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 2D Falling Head
Test Date: June 6, 2023

AQUIFER DATA

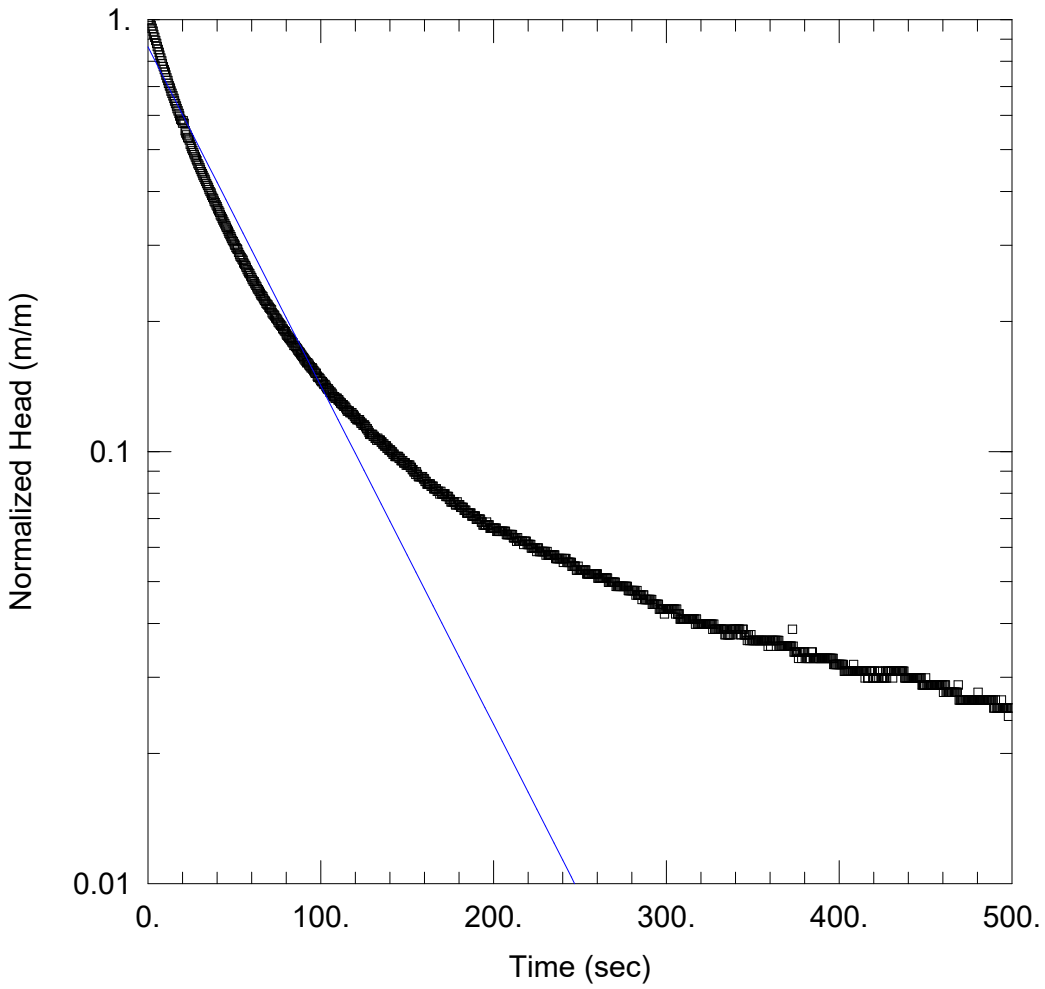
Saturated Thickness: 14.44 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2D Falling Head)

Initial Displacement: 0.485 m
Total Well Penetration Depth: 14.44 m
Casing Radius: 0.0254 m
Static Water Column Height: 14.44 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 9.129E-5 m/sec
y0 = 0.5661 m



FALLING HEAD SWRT BH2S - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 2S.aqt
Date: 06/08/23 Time: 17:07:14

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 2S Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 9.46 m Anisotropy Ratio (Kz/Kr): 1.

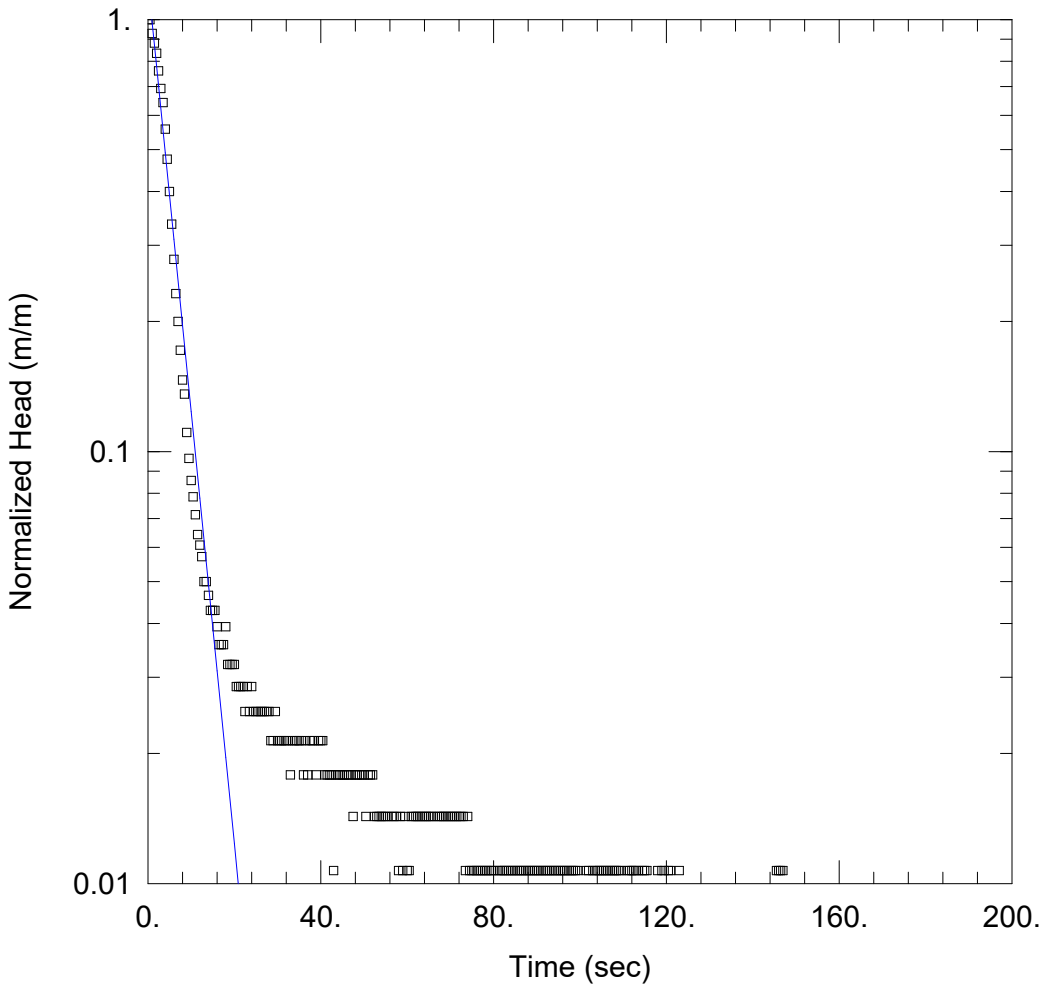
WELL DATA (BH 2S Falling Head)

Initial Displacement: 0.903 m
Total Well Penetration Depth: 9.46 m
Casing Radius: 0.0254 m
Static Water Column Height: 9.46 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 8.478E-6 m/sec y0 = 0.7805 m



FALLING HEAD SWRT BH3D - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 3D.aqt
Date: 06/08/23 Time: 17:07:00

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 3D Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 13.83 m Anisotropy Ratio (Kz/Kr): 1.

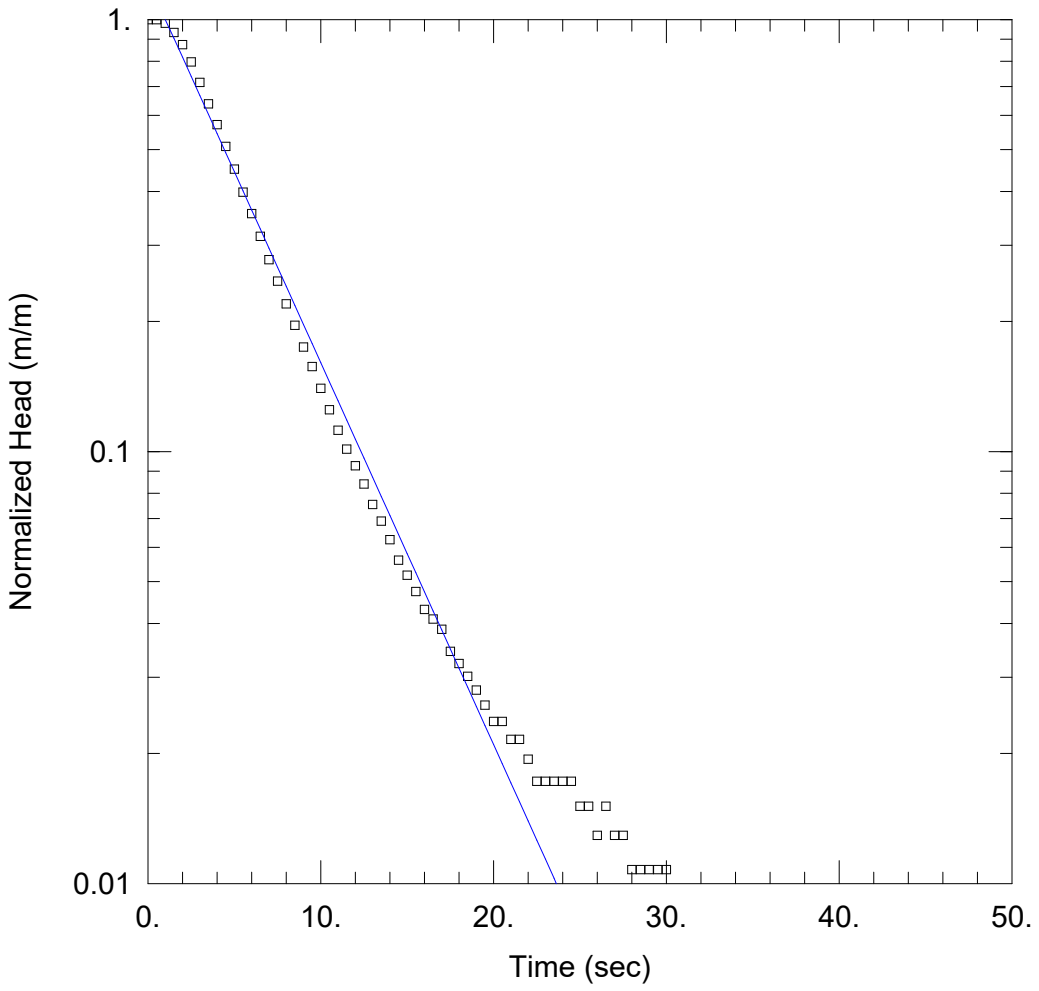
WELL DATA (BH 3D Falling Head)

Initial Displacement: 0.28 m
Total Well Penetration Depth: 13.83 m
Casing Radius: 0.0254 m
Static Water Column Height: 13.83 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.000108 m/sec y0 = 0.3453 m



FALLING HEAD SWRT BH3S - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 3S.aqt
Date: 06/08/23 Time: 17:06:44

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 3S Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 7.43 m Anisotropy Ratio (Kz/Kr): 1.

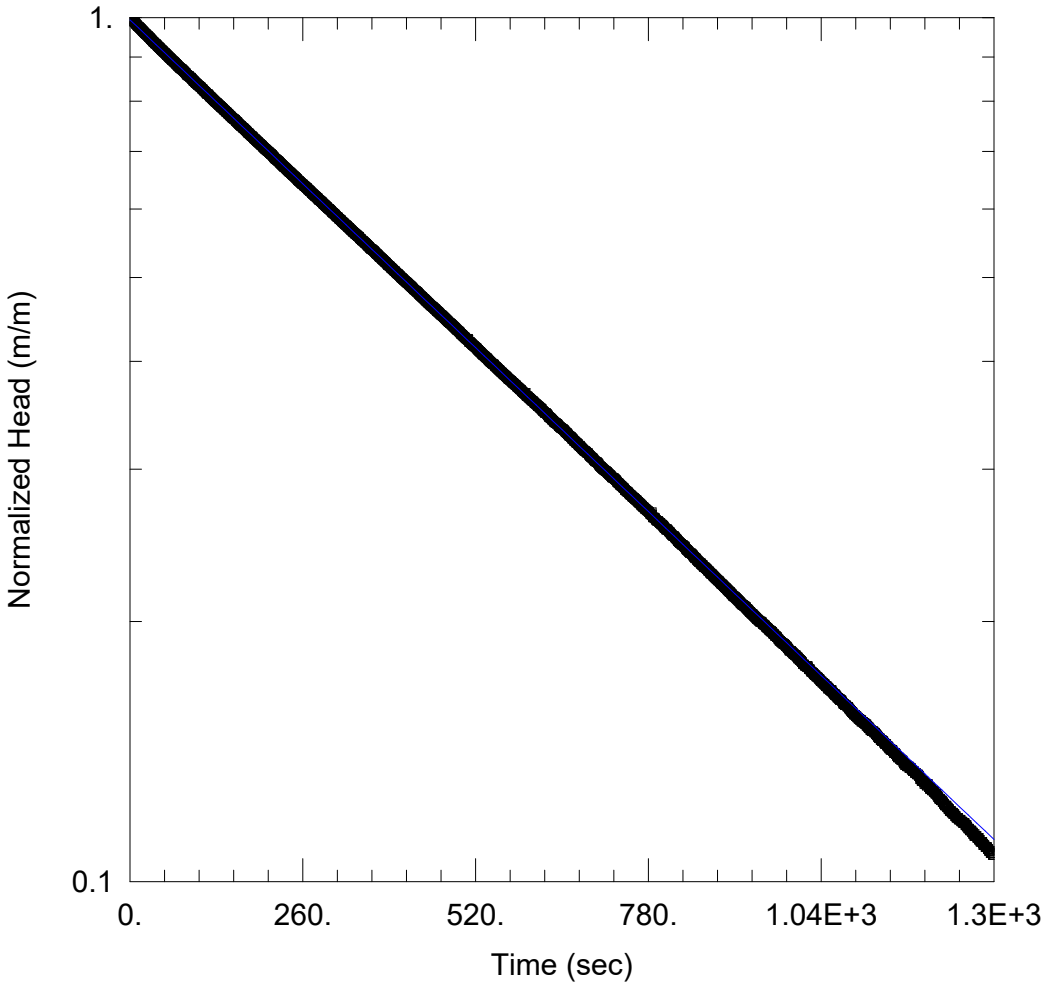
WELL DATA (BH 3S Falling Head)

Initial Displacement: 0.464 m
Total Well Penetration Depth: 7.43 m
Casing Radius: 0.0254 m
Static Water Column Height: 7.43 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 9.555E-5 m/sec y0 = 0.57 m



FALLING HEAD SWRT BH4 - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 4.aqt
Date: 06/08/23 Time: 17:06:26

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 4 Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 12.17 m Anisotropy Ratio (Kz/Kr): 1.

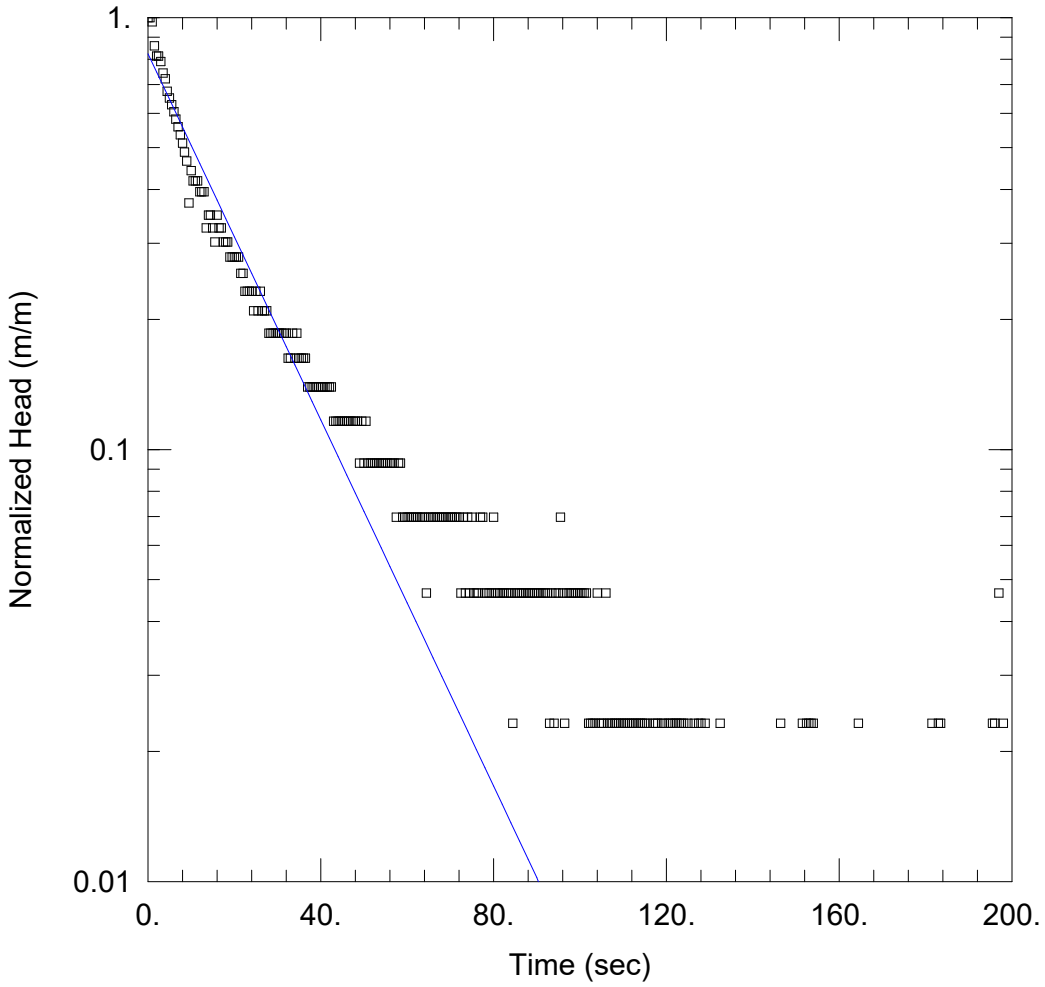
WELL DATA (BH 4 Falling Head)

Initial Displacement: 1.789 m
Total Well Penetration Depth: 12.17 m
Casing Radius: 0.0254 m
Static Water Column Height: 12.17 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 7.889E-7 m/sec y0 = 1.778 m



RISING HEAD SWRT BH5D - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 5D-2.aqt
Date: 06/08/23 Time: 17:05:55

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 5D-2 Rising Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 11.27 m Anisotropy Ratio (Kz/Kr): 1.

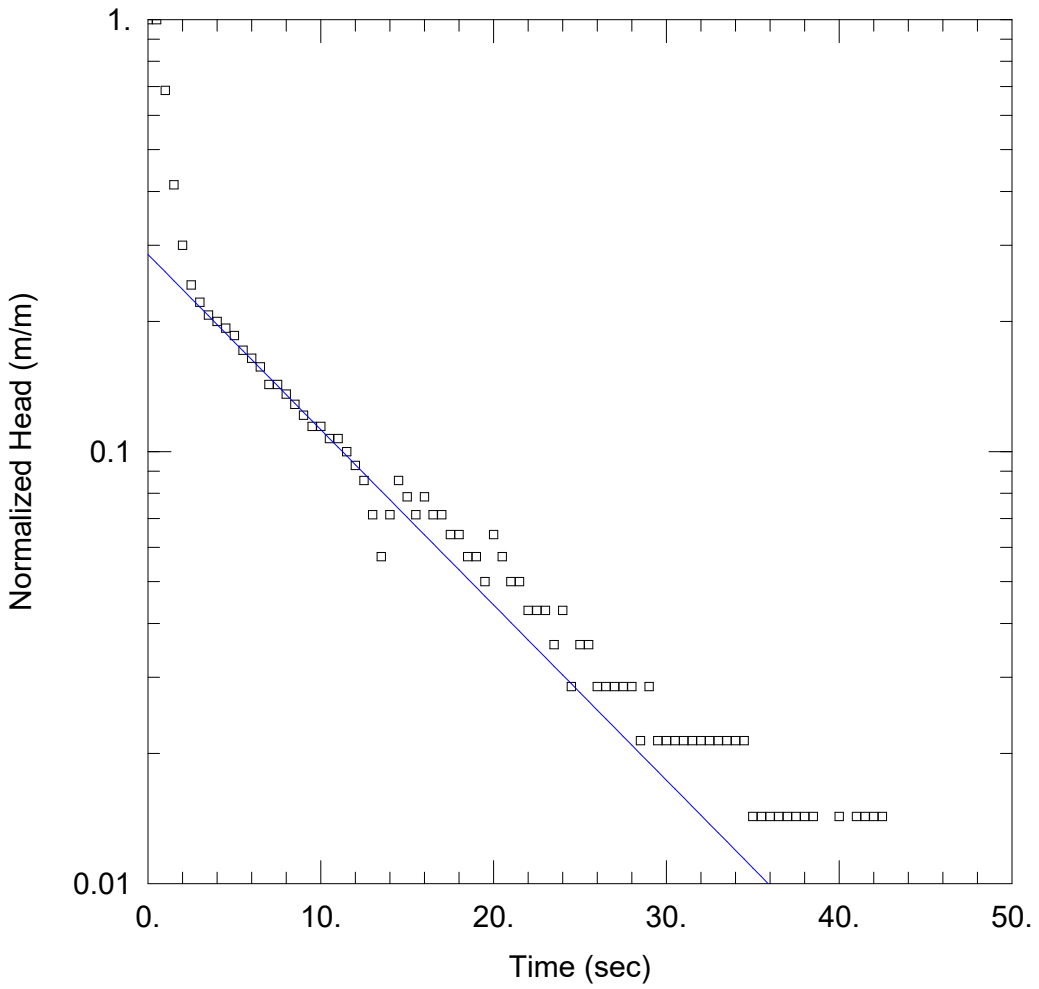
WELL DATA (BH 5D-2 Rising Head)

Initial Displacement: 0.043 m
Total Well Penetration Depth: 11.27 m
Casing Radius: 0.0254 m
Static Water Column Height: 11.27 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 2.291E-5 m/sec
y0 = 0.03545 m



RISING HEAD SWRT BH5S - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 5S.aqt
Date: 06/08/23 Time: 17:06:12

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 5S Rising Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 8.2 m Anisotropy Ratio (Kz/Kr): 1.

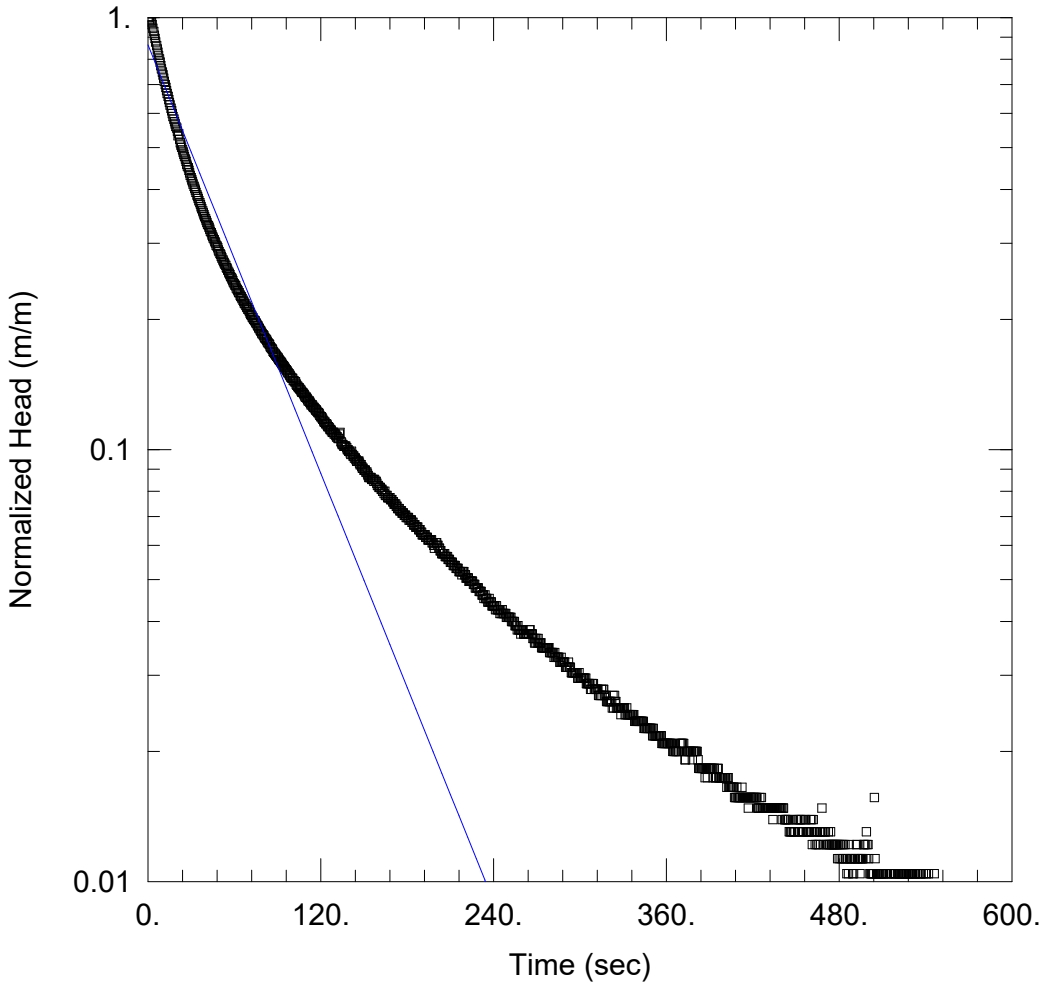
WELL DATA (BH 5S Rising Head)

Initial Displacement: 0.14 m
Total Well Penetration Depth: 8.2 m
Casing Radius: 0.0254 m
Static Water Column Height: 8.2 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 4.386E-5 m/sec y0 = 0.04002 m



FALLING HEAD SWRT BH7 - 1101A-1105 KINGSTON RD, PICKERING

Data Set: I:\...\BH 7.aqt
Date: 06/08/23 Time: 17:05:34

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Tribute Communities
Project: GTR-22015419-B0
Location: 1101A and 1105 Kingston Road
Test Well: BH 7 Falling Head
Test Date: June 6, 2023

AQUIFER DATA

Saturated Thickness: 14.61 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 7 Falling Head)

Initial Displacement: 1.15 m
Total Well Penetration Depth: 14.61 m
Casing Radius: 0.0254 m
Static Water Column Height: 14.61 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

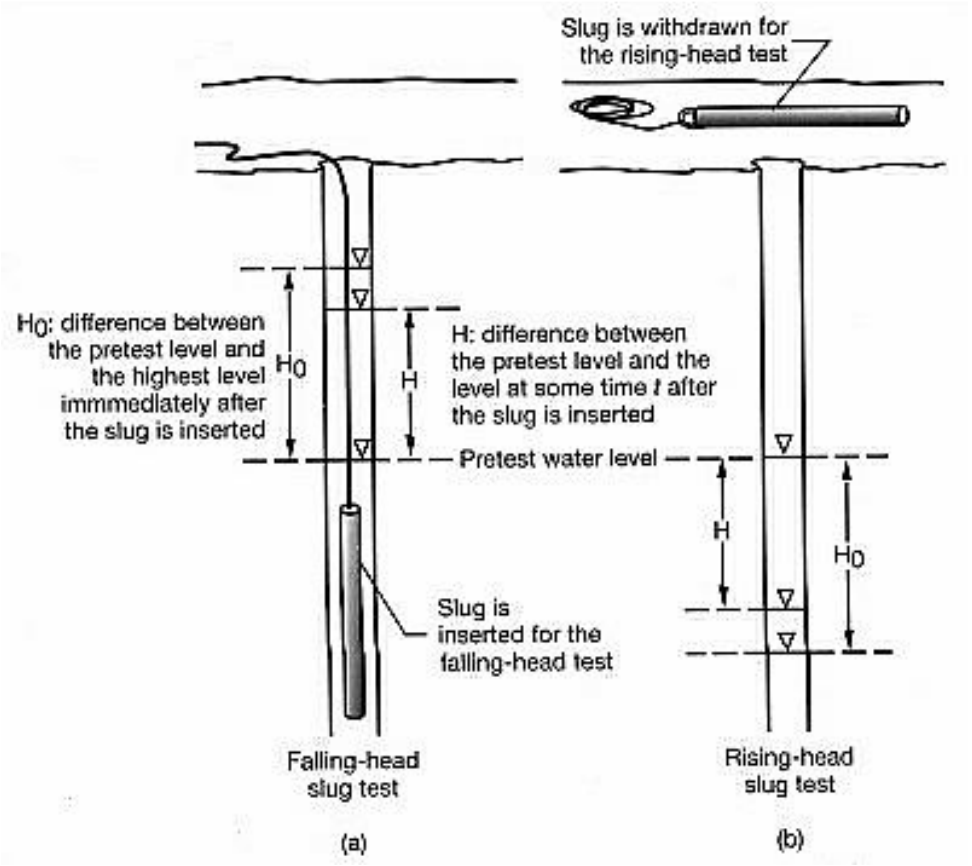
K = 8.933E-6 m/sec y0 = 0.9939 m

Single Well Response Test Procedure

A Single Well Response Test (SWRT), also known as a bail test or a slug test, is conducted in order to determine the saturated hydraulic conductivity (K) of an aquifer. The method of the SWRT is to characterize the change of groundwater level in a well or borehole over time.

In order to ensure consistency and repeatability, all **exp** employees are to follow the procedure outlined in this document when conducting SWRTs.

The figure below depicts a schematic of a slug and bail test and the respective water level changes.



Initials ___

Slug Test Procedure

Equipment Required

- Copy of a signed health and safety plan
- Copy of the work program
- PPE as required by Site-Specific HASP
- Copy of the monitoring well location plan/site plan
- Waterproof pen and bound field note book
- SWRT field data Entry form
- Disposable gloves
- Duct tape
- Deionized water
- Alconox (phosphate free detergent)
- Spray bottles
- Electronic water level meter and spare batteries
- Solid PVC or stainless steel slug of known volume or clean water
- String (nylon)
- Water pressure transducer (data logger) and baro-logger
- Watch or stop watch with second hand
- Plastic sheeting

Testing Procedure

1. Remove cap from well and collect static water level
2. Remove waterra tubing/bailer and place in garbage bag. Record static water level measurement again.
3. Lower the slug into the well and record the dynamic water level.
4. Record the drawdown (for the slug test) at set five (5) second intervals for the first five (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown until 95% recovery is reached. To calculate this value: Find the difference between the dynamic water level and the static water level, then multiply by 95% (.95). Add the resulting value to the dynamic water level.

   (Static Water Level – Dynamic Water Level).95 + Static Water Level = 95% Recovery Value
6. Once complete, replace the waterra tubing/bailer and re-secure the well cap.

Note: If the well is deep, more than one slug may be inserted by attaching the slugs to a series.

Slugs must be washed with methanol, then lab grade soap, and then rinsed with de-ionized water after each use.

Based on the recorded observations, the hydraulic conductivity (in m/s) of the aquifer will be determined. In order to determine the hydraulic conductivity; the well diameter, radius of the borehole and length of the screen will also be required.

Bail Test Procedure

Equipment Required

- 20 L (5 gal) Graduated pail
- Stop watch or watch with seconds
- Garbage bags
- Water level meter
- Field sheets/log book
- Latex Gloves
- Bailer and Rope

Procedure

1. Remove cap from well and collect static water level.
2. If using a **bailer**:
    a. Affix the rope to the bailer.
    b. Remove the waterra tubing and place in garbage bag
    c. Record static water level measurement again.
    d. Record how much water was removed by either counting the number of full bailers or emptying removed water into a container.
    e. Quickly lower the bailer into the well and remove.
    f. Continue this process until the water level will reduce no further.
    g. Record the dynamic water level.
3. If using **waterra** to bail the water:
    a. Pump the water into graduated bucket until the water level will reduce no further.
    b. Record how much water has been removed.
    c. Record the dynamic water level.
4. Record the recovery at set five (5) second intervals for the first (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown/recovery until 95% recovery is reached.
6. Once complete, replace any waterra tubing that may have been removed from the well and re-secure the well cap.

Appendix D – Laboratory's Certificates of Analysis

Your P.O. #: ENV-BRM
Your Project #: GTR-22015419-B0
Site#: 1101A-1105 KINGSTON RD, ON
Site Location: 1101A-1105 KINGSTON RD., ON
Your C.O.C. #: 938208-01-01

Attention: Amar Neku

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/06/15
Report #: R7672954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3G2732
Received: 2023/06/06, 18:02

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/06/09	2023/06/12	CAM SOP-00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2023/06/08	2023/06/13	CAM SOP-00427	SM 23 5210B m
Total Cyanide	1	2023/06/08	2023/06/08	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2023/06/08	2023/06/08	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2023/06/09	2023/06/09	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/06/08	2023/06/09	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2023/06/06	CAM SOP-00552	MECP E3371
Total Nonylphenol in Liquids by HPLC	1	2023/06/09	2023/06/10	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2023/06/09	2023/06/10	CAM SOP-00313	Bureau Veritas
Animal and Vegetable Oil and Grease	1	N/A	2023/06/15	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2023/06/14	2023/06/15	CAM SOP-00326	EPA1664B m,SM5520B m
Polychlorinated Biphenyl in Water	1	2023/06/07	2023/06/08	CAM SOP-00309	EPA 8082A m
pH	1	2023/06/08	2023/06/08	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/06/08	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/06/08	CAM SOP-00464	SM 23 4500-SO42- E m
Total Kjeldahl Nitrogen in Water	1	2023/06/08	2023/06/08	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2023/06/14	2023/06/15	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2023/06/10	2023/06/12	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/06/08	CAM SOP-00228	EPA 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your P.O. #: ENV-BRM
Your Project #: GTR-22015419-B0
Site#: 1101A-1105 KINGSTON RD, ON
Site Location: 1101A-1105 KINGSTON RD., ON
Your C.O.C. #: 938208-01-01

Attention: Amar Neku

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/06/15
Report #: R7672954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3G2732
Received: 2023/06/06, 18:02

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
15 Jun 2023 09:25:18

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

DURHAM SANITARY & STORM BYLAW (55-2013)

Bureau Veritas ID				WAE502			WAE502		
Sampling Date				2023/06/06 11:00			2023/06/06 11:00		
COC Number				938208-01-01			938208-01-01		
	UNITS	Criteria	Criteria-2	BH1	RDL	QC Batch	BH1 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Total Animal/Vegetable Oil and Grease	mg/L	-	150	ND	0.50	8706333			
Inorganics									
Total BOD	mg/L	15	300	4	2	8712023			
Fluoride (F-)	mg/L	-	10	0.23	0.10	8711869			
Total Kjeldahl Nitrogen (TKN)	mg/L	1	100	0.37	0.10	8712040			
pH	pH	6.0:9.0	6.0:10.5	7.91		8711941			
Phenols-4AAP	mg/L	0.008	1	ND	0.0010	8713543	ND	0.0010	8713543
Total Suspended Solids	mg/L	15	350	**59**	10	8714467			
Dissolved Sulphate (SO4)	mg/L	-	1500	23	1.0	8710528			
Total Cyanide (CN)	mg/L	0.02	2	ND	0.0050	8711846			
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	ND	0.50	8726131			
Total Oil & Grease Mineral/Synthetic	mg/L	-	15	ND	0.50	8726141			
Miscellaneous Parameters									
Nonylphenol Ethoxylate (Total)	mg/L	-	0.2	ND	0.025	8716362			
Nonylphenol (Total)	mg/L	-	0.02	ND	0.001	8716292			
Metals									
Mercury (Hg)	mg/L	0.0004	0.01	ND	0.00010	8715008			
Total Aluminum (Al)	ug/L	-	50000	1200	4.9	8713018			
Total Antimony (Sb)	ug/L	-	5000	0.88	0.50	8713018			
Total Arsenic (As)	ug/L	20	1000	1.0	1.0	8713018			
Total Cadmium (Cd)	ug/L	8	700	ND	0.090	8713018			
Total Chromium (Cr)	ug/L	80	2000	ND	5.0	8713018			
Total Cobalt (Co)	ug/L	-	5000	1.7	0.50	8713018			
Total Copper (Cu)	ug/L	50	3000	3.0	0.90	8713018			
Total Lead (Pb)	ug/L	120	1000	1.5	0.50	8713018			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Durham Municipality Storm Sewer Discharge. By-Law No. 55-2013
Criteria-2: Durham Municipality Sanitary Sewer Discharge. BY-LAW No.55-2013
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

DURHAM SANITARY & STORM BYLAW (55-2013)

Bureau Veritas ID				WAE502			WAE502		
Sampling Date				2023/06/06 11:00			2023/06/06 11:00		
COC Number				938208-01-01			938208-01-01		
	UNITS	Criteria	Criteria-2	BH1	RDL	QC Batch	BH1 Lab-Dup	RDL	QC Batch
Total Manganese (Mn)	ug/L	150	5000	87	2.0	8713018			
Total Molybdenum (Mo)	ug/L	-	5000	16	0.50	8713018			
Total Nickel (Ni)	ug/L	80	2000	3.8	1.0	8713018			
Total Phosphorus (P)	ug/L	400	10000	ND	100	8713018			
Total Selenium (Se)	ug/L	20	1000	ND	2.0	8713018			
Total Silver (Ag)	ug/L	120	5000	0.21	0.090	8713018			
Total Tin (Sn)	ug/L	-	5000	ND	1.0	8713018			
Total Titanium (Ti)	ug/L	-	5000	27	5.0	8713018			
Total Zinc (Zn)	ug/L	40	2000	16	5.0	8713018			
Semivolatile Organics									
Bis(2-ethylhexyl)phthalate	ug/L	8.8	12	ND	2.0	8714753			
Di-N-butyl phthalate	ug/L	15	80	ND	2.0	8714753			
Volatile Organics									
Benzene	ug/L	2	10	0.75	0.20	8709671			
Chloroform	ug/L	2	40	ND	0.20	8709671			
1,2-Dichlorobenzene	ug/L	5.6	50	ND	0.40	8709671			
1,4-Dichlorobenzene	ug/L	6.8	80	ND	0.40	8709671			
cis-1,2-Dichloroethylene	ug/L	5.6	4000	ND	0.50	8709671			
trans-1,3-Dichloropropene	ug/L	5.6	140	ND	0.40	8709671			
Ethylbenzene	ug/L	2	160	0.21	0.20	8709671			
Methylene Chloride(Dichloromethane)	ug/L	5.2	2000	ND	2.0	8709671			
Methyl Ethyl Ketone (2-Butanone)	ug/L	-	8000	ND	10	8709671			
Styrene	ug/L	-	200	ND	0.40	8709671			
1,1,2,2-Tetrachloroethane	ug/L	17	1400	ND	0.40	8709671			
Tetrachloroethylene	ug/L	4.4	1000	ND	0.20	8709671			
Toluene	ug/L	2	270	1.1	0.20	8709671			
Trichloroethylene	ug/L	8	400	ND	0.20	8709671			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Durham Municipality Storm Sewer Discharge. By-Law No. 55-2013
Criteria-2: Durham Municipality Sanitary Sewer Discharge. BY-LAW No.55-2013
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

DURHAM SANITARY & STORM BYLAW (55-2013)

Bureau Veritas ID				WAE502			WAE502		
Sampling Date				2023/06/06 11:00			2023/06/06 11:00		
COC Number				938208-01-01			938208-01-01		
	UNITS	Criteria	Criteria-2	BH1	RDL	QC Batch	BH1 Lab-Dup	RDL	QC Batch
p+m-Xylene	ug/L	-	-	1.3	0.20	8709671			
o-Xylene	ug/L	-	-	0.59	0.20	8709671			
Total Xylenes	ug/L	4.4	1400	1.9	0.20	8709671			
PCBs									
Total PCB	ug/L	0.4	1	ND	0.05	8710683			
Microbiological									
Escherichia coli	CFU/100mL	200	-	<10	10	8708652			
Surrogate Recovery (%)									
2,4,6-Tribromophenol	%	-	-	86		8714753			
2-Fluorobiphenyl	%	-	-	72		8714753			
2-Fluorophenol	%	-	-	38		8714753			
D14-Terphenyl	%	-	-	88		8714753			
D5-Nitrobenzene	%	-	-	76		8714753			
D5-Phenol	%	-	-	26		8714753			
Decachlorobiphenyl	%	-	-	71		8710683			
4-Bromofluorobenzene	%	-	-	101		8709671			
D4-1,2-Dichloroethane	%	-	-	102		8709671			
D8-Toluene	%	-	-	96		8709671			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Durham Municipality Storm Sewer Discharge. By-Law No. 55-2013
Criteria-2: Durham Municipality Sanitary Sewer Discharge. BY-LAW No.55-2013
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

TEST SUMMARY

Bureau Veritas ID: WAE502
Sample ID: BH1
Matrix: Water

Collected: 2023/06/06
Shipped:
Received: 2023/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in Water by GC/MS	GC/MS	8714753	2023/06/09	2023/06/12	Milijana Avramovic
Biochemical Oxygen Demand (BOD)	DO	8712023	2023/06/08	2023/06/13	Gurjot Kaur
Total Cyanide	SKAL/CN	8711846	2023/06/08	2023/06/08	Prgya Panchal
Fluoride	ISE	8711869	2023/06/08	2023/06/08	Kien Tran
Mercury in Water by CVAA	CV/AA	8715008	2023/06/09	2023/06/09	Japneet Gill
Total Metals Analysis by ICPMS	ICP/MS	8713018	2023/06/08	2023/06/09	Arefa Dabhad
E.coli, (CFU/100mL)	PL	8708652	N/A	2023/06/06	Yizhou Han
Total Nonylphenol in Liquids by HPLC	LC/FLU	8716292	2023/06/09	2023/06/10	Dennis Boodram
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	8716362	2023/06/09	2023/06/10	Dennis Boodram
Animal and Vegetable Oil and Grease	BAL	8706333	N/A	2023/06/15	Automated Statchk
Total Oil and Grease	BAL	8726131	2023/06/14	2023/06/15	Kishan Patel
Polychlorinated Biphenyl in Water	GC/ECD	8710683	2023/06/07	2023/06/08	Li Peng
pH	AT	8711941	2023/06/08	2023/06/08	Kien Tran
Phenols (4AAP)	TECH/PHEN	8713543	N/A	2023/06/08	Mandeep Kaur
Sulphate by Automated Turbidimetry	KONE	8710528	N/A	2023/06/08	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	8712040	2023/06/08	2023/06/08	Jency Sara Johnson
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	8726141	2023/06/14	2023/06/15	Kishan Patel
Total Suspended Solids	BAL	8714467	2023/06/10	2023/06/12	Shaneil Hall
Volatile Organic Compounds in Water	GC/MS	8709671	N/A	2023/06/08	Hai Son Tran

Bureau Veritas ID: WAE502 Dup
Sample ID: BH1
Matrix: Water

Collected: 2023/06/06
Shipped:
Received: 2023/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8713543	N/A	2023/06/08	Mandeep Kaur

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.0°C

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8709671	4-Bromofluorobenzene	2023/06/08	102	70 - 130	100	70 - 130	99	%				
8709671	D4-1,2-Dichloroethane	2023/06/08	103	70 - 130	101	70 - 130	100	%				
8709671	D8-Toluene	2023/06/08	98	70 - 130	99	70 - 130	98	%				
8710683	Decachlorobiphenyl	2023/06/08	58 (1)	60 - 130	77	60 - 130	76	%				
8714753	2,4,6-Tribromophenol	2023/06/12	78	10 - 130	82	10 - 130	79	%				
8714753	2-Fluorobiphenyl	2023/06/12	63	30 - 130	56	30 - 130	66	%				
8714753	2-Fluorophenol	2023/06/12	47	10 - 130	50	10 - 130	49	%				
8714753	D14-Terphenyl	2023/06/12	74	30 - 130	75	30 - 130	79	%				
8714753	D5-Nitrobenzene	2023/06/12	78	30 - 130	82	30 - 130	84	%				
8714753	D5-Phenol	2023/06/12	27	10 - 130	29	10 - 130	29	%				
8709671	1,1,2,2-Tetrachloroethane	2023/06/08	95	70 - 130	93	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8709671	1,2-Dichlorobenzene	2023/06/08	92	70 - 130	91	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8709671	1,4-Dichlorobenzene	2023/06/08	100	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8709671	Benzene	2023/06/08	91	70 - 130	89	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	Chloroform	2023/06/08	93	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	cis-1,2-Dichloroethylene	2023/06/08	97	70 - 130	93	70 - 130	ND, RDL=0.50	ug/L	NC	30		
8709671	Ethylbenzene	2023/06/08	87	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	Methyl Ethyl Ketone (2-Butanone)	2023/06/08	113	60 - 140	108	60 - 140	ND, RDL=10	ug/L	NC	30		
8709671	Methylene Chloride(Dichloromethane)	2023/06/08	105	70 - 130	101	70 - 130	ND, RDL=2.0	ug/L	NC	30		
8709671	o-Xylene	2023/06/08	88	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	p+m-Xylene	2023/06/08	91	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	Styrene	2023/06/08	96	70 - 130	95	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8709671	Tetrachloroethylene	2023/06/08	86	70 - 130	86	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	Toluene	2023/06/08	93	70 - 130	92	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8709671	Total Xylenes	2023/06/08					ND, RDL=0.20	ug/L	NC	30		
8709671	trans-1,3-Dichloropropene	2023/06/08	100	70 - 130	97	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8709671	Trichloroethylene	2023/06/08	99	70 - 130	97	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8710528	Dissolved Sulphate (SO4)	2023/06/08	93	75 - 125	97	80 - 120	ND, RDL=1.0	mg/L	4.8	20		
8710683	Total PCB	2023/06/08	53 (2)	60 - 130	79	60 - 130	ND, RDL=0.05	ug/L	NC	40		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8711846	Total Cyanide (CN)	2023/06/08	105	80 - 120	103	80 - 120	ND, RDL=0.0050	mg/L	2.2	20		
8711869	Fluoride (F-)	2023/06/08	83	80 - 120	98	80 - 120	ND, RDL=0.10	mg/L	13	20		
8711941	pH	2023/06/08			101	98 - 103			0.54	N/A		
8712023	Total BOD	2023/06/13					ND,RDL=2	mg/L	NC	30	93	80 - 120
8712040	Total Kjeldahl Nitrogen (TKN)	2023/06/08	98	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	8.3	20	107	80 - 120
8713018	Total Aluminum (Al)	2023/06/09	95	80 - 120	94	80 - 120	ND, RDL=4.9	ug/L				
8713018	Total Antimony (Sb)	2023/06/09	111	80 - 120	105	80 - 120	ND, RDL=0.50	ug/L				
8713018	Total Arsenic (As)	2023/06/09	101	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L				
8713018	Total Cadmium (Cd)	2023/06/09	103	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8713018	Total Chromium (Cr)	2023/06/09	100	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8713018	Total Cobalt (Co)	2023/06/09	99	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L				
8713018	Total Copper (Cu)	2023/06/09	106	80 - 120	100	80 - 120	ND, RDL=0.90	ug/L	NC	20		
8713018	Total Lead (Pb)	2023/06/09	95	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8713018	Total Manganese (Mn)	2023/06/09	NC	80 - 120	96	80 - 120	ND, RDL=2.0	ug/L				
8713018	Total Molybdenum (Mo)	2023/06/09	114	80 - 120	107	80 - 120	ND, RDL=0.50	ug/L				
8713018	Total Nickel (Ni)	2023/06/09	94	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	1.2	20		
8713018	Total Phosphorus (P)	2023/06/09	105	80 - 120	107	80 - 120	ND, RDL=100	ug/L				
8713018	Total Selenium (Se)	2023/06/09	99	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L				
8713018	Total Silver (Ag)	2023/06/09	99	80 - 120	98	80 - 120	ND, RDL=0.090	ug/L				
8713018	Total Tin (Sn)	2023/06/09	107	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L				
8713018	Total Titanium (Ti)	2023/06/09	101	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L				
8713018	Total Zinc (Zn)	2023/06/09	97	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	0.19	20		
8713543	Phenols-4AAP	2023/06/08	106	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8714467	Total Suspended Solids	2023/06/12			96	85 - 115	ND, RDL=10	mg/L	NC	20		
8714753	Bis(2-ethylhexyl)phthalate	2023/06/13	85	30 - 130	89	30 - 130	ND, RDL=2.0	ug/L	NC	40		
8714753	Di-N-butyl phthalate	2023/06/13	87	30 - 130	86	30 - 130	ND, RDL=2.0	ug/L	NC	40		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8715008	Mercury (Hg)	2023/06/09	105	75 - 125	107	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
8716292	Nonylphenol (Total)	2023/06/12	106	50 - 130	102	50 - 130	ND, RDL=0.001	mg/L	NC	40		
8716362	Nonylphenol Ethoxylate (Total)	2023/06/10	94	50 - 130	92	50 - 130	ND, RDL=0.025	mg/L	6.5	40		
8726131	Total Oil & Grease	2023/06/15			99	85 - 115	ND, RDL=0.50	mg/L	0.76	25		
8726141	Total Oil & Grease Mineral/Synthetic	2023/06/15			98	85 - 115	ND, RDL=0.50	mg/L	1.5	25		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Spike recovery is below the control limit stipulated by Ont Reg 153 & 406, however, this recovery is still within Bureau Veritas' performance based limits. Results reported with recoveries within this range are still valid but may have a low bias.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Yizhou Han

Yizhou Han, Analyst 1

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

MICRO

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

CHAIN

06-Jun-23 18:02
Patricia Legette
C3G2732
JDK ENV-1636

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#30554 exp Services Inc	Company Name:	ExP Services Inc	Quotation #:	C31675 Stream 2
Attention:	Accounts Payable	Attention:	Amar Neku	P.O. #:	ENV-BRM
Address:	1595 Clark Blvd	Address:	Edwin.Cussell @exp.com	Project:	GTR-22015419-B0
	Brampton ON L6T 4V1		Ryan.Alexander	Project Name:	
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	Fax:	Site #:	1101A-1105 Kingston Rd, ON
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	amar.neku@exp.com	Sampled By:	EC

COC #:	Project Manager:
C#938208-01-01	Patricia Legette

938208

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☒ Sanitary Sewer Bylaw
- ☐ Reg 558. ☒ Storm Sewer Bylaw
- ☐ MISA Municipality Durham
- ☐ PWQO ☐ Reg 406 Table
- ☐ Other

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? Yes

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Durham Sanitary & Storm Bylaw (55-2013)	# of Bottles	Comments
1		BH1	23/6/6	11:00	GW	N/A	X	16	- Please include COC in final Report
2									
3									
4									
5									
6									
7									
8									
9									
10									

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Edwin Cussell	23/6/6	18:00	Ameri ANERI	2023/06/06	18:02	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	12 12 12	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

on ice

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C3G2732
Report Date: 2023/06/15

exp Services Inc
Client Project #: GTR-22015419-B0
Site Location: 1101A-1105 KINGSTON RD., ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

Exceedance Summary Table – Durham Storm Sewer

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH1	WAE502-06	Total Suspended Solids	15	59	10	mg/L

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – Durham Sanitary Sewer

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Appendix E – Construction Flow Rate Calculations

APPENDIX E: Dewatering Flow Rates

1101A and 1105 Kingston Road, Pickering
GTR-22015419-B0

Table E-1: Construction Dewatering Assessments

Parameters	Symbols	Unit	Parcel A1 (P3)	Parcel A2 (P3)	Parcel B (P2)	Parcel C (P2)	Parcel D (P1)
Geological Formation	-	-	Glacial Deposit				
INPUTS							
Ground Elevation	-	mASL	**85.43**	**85.43**	**85.43**	**85.43**	**85.43**
Highest Groundwater Elevation	-	mASL	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**
Lowest Top Slab Elevation	-	mASL	**75.43**	**75.43**	**78.43**	**78.43**	**81.43**
Lowest Foundation Invert Elevation	-	mASL	**73.93**	**73.93**	**76.93**	**76.93**	**79.93**
Height of Static Water Table Above the Base of the Water-Bearing Zone	**H**	m	18.47	18.47	18.47	18.47	18.47
Dewatering Target Elevation	-	mASL	72.93	72.93	75.93	75.93	78.93
Height of Target Water Level Above the Base of Water-Bearing Zone	**h_w**	m	6.93	6.93	9.93	9.93	12.93
Drawdown	**s**	m	11.54	11.54	8.54	8.54	5.54
Dupuit Check (> 45%)		m	38%	38%	54%	54%	70%
Base of Aquifer / Water Bearing Zone	-	mASL	**66.00**	**66.00**	**66.00**	**66.00**	**66.00**
Hydraulic Conductivity	**K**	m/s	**5.1E-05**	**5.1E-05**	**5.1E-05**	**5.1E-05**	**5.1E-05**
Length of Excavation	-	m	**94.00**	**116.00**	**164.00**	**166.00**	**143.00**
Width of Excavation	-	m	**88.00**	**61.00**	**100.00**	**103.00**	**65.00**
Equivalent Radius (equivalent perimeter)	**r_e**	m	57.93	56.34	84.03	85.63	66.21
Method to Calculate Radius of Influence	-	-	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**
Time (days)			**30.00**	**30.00**	**30.00**	**30.00**	**30.00**
Time (seconds)	**t**	s	2592000	2592000	2592000	2592000	2592000
Specific Yield	**Sy**		**0.20**	**0.20**	**0.20**	**0.20**	**0.20**
OUTPUTS							
Cooper-Jacob's Radius of Influence from Sides of Excavation	**Rcj**	m	165.73	165.73	165.73	165.73	165.73
Radius of Influence	**Ro**	m	223.67	222.08	249.77	251.36	231.94
Dewatering Flow Rate (unconfined radial flow component)	**Q**	m^3/day	**3003.7**	**2958.3**	**3082.2**	**3117.7**	**1920.8**
Factor of Safety	**fs**	-	2.00	2.00	2.00	2.00	2.00
Dewatering Flow Rate (multiplied by factor of safety)	**Q.fs**	m^3/day	**6007**	**5917**	**6164**	**6235**	**3842**
Precipitation Event	-	mm/day	15	15	15	15	15
Volume from Precipitation	-	m^3/day	124	106	246	256	139
Total Volume (L/day) Discharge of Groundwater (Construction dewatering) **without Safety Factor** (including precipitation	-	m^3/day	**3128**	**3064**	**3328**	**3374**	**2060**
Total Volume (L/day) Discharge of Groundwater (Construction dewatering) **with Safety Factor** (including precipitation)	-	m^3/day	**6131**	**6023**	**6410**	**6492**	**3981**

Precipitation Event 2 year storm	-	mm/day	55.4
Volume from Precipitation	-	m^3/event	458
Precipitation Event 100 year storm	-	mm/day	121
Volume from Precipitation	-	m^3/event	1001

Notes:
mASL - meters above sea level

Analytical Solution for Estimating Radial Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\,[\frac{R_o}{r_e}]}$$ (Based on the Dupuit-Forcheimer Equation)

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e \qquad R_{cj} = \sqrt{2.25KDt/S}$$

Where:

Q_w = Flow rate per unit length of excavation (m^3/s)

K = Hydraulic conductivity (m/s)

H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

Rcj=Cooper Jacob Radius of Influence (m)

R_o=Radius of influence (m)

re=Equivalent perimeter (m)

Appendix F - Post-Construction Flow Rate Calculations

APPENDIX F: Dewatering Flow Rates

1101A and 1105 Kingston Road, Pickering
GTR-22015419-B0

TableF-1: Post Construction Dewatering Assessments

Parameters	Symbols	Unit	Parcel A1 (P3)	Parcel A2 (P3)	Parcel B (P2)	Parcel C (P2)	Parcel D (P1)
Geological Formation	-	-	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit
INPUTS							
Ground Elevation	-	mASL	**85.43**	**85.43**	**85.43**	**85.43**	**85.43**
Highest Groundwater Elevation	-	mASL	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**
Lowest Top Slab Elevation	-	mASL	**75.43**	**75.43**	**78.43**	**78.43**	**81.43**
Height of Static Water Table Above the Base of the Water-Bearing Zone	**H**	m	18.47	18.47	18.47	18.47	18.47
Dewatering Target Elevation	-	mASL	74.93	74.93	77.93	77.93	80.93
Height of Target Water Level Above the Base of Water-Bearing Zone	**h_w**	m	8.93	8.93	11.93	11.93	14.93
Drawdown	**s**	m	9.54	9.54	6.54	6.54	3.54
Dupuit Check (> 45%)		m	48%	48%	65%	65%	81%
Base of Aquifer / Water Bearing Zone	-	mASL	**66.00**	**66.00**	**66.00**	**66.00**	**66.00**
Hydraulic Conductivity	**K**	m/s	**5.1E-05**	**5.1E-05**	**5.1E-05**	**5.1E-05**	**5.1E-05**
Length of Excavation	-	m	**97.00**	**117.00**	**117.00**	**152.00**	**227.00**
Width of Excavation	-	m	**55.00**	**97.00**	**97.00**	**83.00**	**186.00**
Equivalent Radius (equivalent perimeter)	**r_e**	m	48.38	68.12	68.12	74.80	131.46
Method to Calculate Radius of Influence	-	-	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**
Time (days)			**365.00**	**365.00**	**365.00**	**365.00**	**365.00**
Time (seconds)	**t**	s	31536000	31536000	31536000	31536000	31536000
Specific Yield	**Sy**		**0.20**	**0.20**	**0.20**	**0.20**	**0.20**
OUTPUTS							
Cooper-Jacob's Radius of Influence from Sides of Excavation	**Rcj**	m	578.09	578.09	578.09	578.09	578.09
Radius of Influence	**Ro**	m	626.48	646.21	646.21	652.90	709.56
Dewatering Flow Rate (unconfined radial flow component)	**Q**	m^3/day	**1412.96**	**1608.32**	**1223.28**	**1270.32**	**970.84**
Factor of Safety	**fs**	-	1.50	1.50	1.50	1.50	1.50
Dewatering Flow Rate (multiplied by factor of safety)	**Q.fs**	m^3/day	**2119**	**2412**	**1835**	**1905**	**1456**

Analytical Solution for Estimating Radial Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\,[\frac{R_o}{r_e}]}$$ (Based on the Dupuit-Forcheimer Equation)

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e \qquad R_{cj} = \sqrt{2.25KDt/S}$$

Where:

Q_w = Flow rate per unit length of excavation (m^3/s)

K = Hydraulic conductivity (m/s)

H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

Rcj=Cooper Jacob Radius of Influence (m)

R_o=Radius of influence (m)

re=Equivalent perimeter (m)

Appendix G – Architectural Drawings

STATISTICS	M2	SF
SITE AREA:	77,476	833,953
R.O.W. AREA	5,683	61,172
TOTAL NFA	340,726	3,667,570
FSI (ON NET SITE AREA)	5.00	
TOTAL RETAIL	7,149	76,951
TOTAL RESIDENTIAL	332,861	3,582,915
NET AVERAGE APARTMENT UNIT SIZE	59	635
TOTAL RESIDENTIAL UNIT#	5,238	
TOTAL UPH (ON NET SITE AREA)	768.1	

PHASE 1	10,251		
PHASE 2	9,373		
PHASE 3	14,096		
PHASE 4	13,420		
PHASE 5	28,253		
POPS	6,180	8.6%	OF SITE AREA EXCLUDING R.O.W.
PARK	4,515	6.3%	OF SITE AREA EXCLUDING R.O.W.
TOTAL (POPS AND PARK)	10,695	14.9%	OF SITE AREA EXCLUDING R.O.W.
R.O.W	5,683		
SITE AREA EXCLUDING R.O.W.	71,793		
NET SITE AREA	68,203		DEDUCTED BY PARKLAND (5%) AND R.O.W.
TOTAL	77,476		

NFA CALCULATION

	DESCRIPTION		RETAIL		DAYCARE		TOWNHOUSE			RESIDENTIAL APARTMENT TOTAL NFA		NET SALEABLE			TOTAL NFA	
	PORTION	FLOORS	m2	ft2	m2	ft2	m2	ft2	UNITS	m2	ft2	m2	ft2	UNIT#	m2	ft2
BUILDING 'A1'	BASE(F1~F6)	6	4,946	53,242						21,374	230,069	19,268	207,404	327	26,320	283,311
	TOWER (F7~F19)	13								17,661	190,104	16,634	179,054	282	17,661	190,104
BUILDING 'A2'	BASE(F1~F6)	6			716	7,705				13,956	150,224	12,575	135,361	213	14,672	157,929
	TOWER (F7~F23)	17								24,330	261,885	22,973	247,287	389	24,330	261,885
BUILDING 'B'	BASE(F1~F6)	6								23,807	256,254	21,271	228,962	361	23,807	256,254
	TOWER (F7~F30)	24								55,364	595,935	51,933	559,006	880	55,364	595,935
	TOWER (F31~F35)	5								3,863	41,579	3,650	39,292	62	3,863	41,579
BUILDING 'C1'	BASE(F1~F6)	6	2,203	23,709						17,396	187,249	15,653	168,493	265	19,598	210,958
	TOWER (F7~F27)	21								31,648	340,663	29,797	320,732	505	31,648	340,663
BUILDING 'C2'	BASE(F1~F6)	6								5,317	57,233	4,831	52,002	82	5,317	57,233
	TOWER (F7~F27)	21								15,772	169,770	14,789	159,184	251	15,772	169,770
BUILDING 'D'	BASE(F1~F6)	6								20,694	222,746	18,743	201,751	318	20,694	222,746
	TOWER (F7~F27)	21								64,526	694,559	60,878	655,288	1,032	64,526	694,559
	TOWER (F28~F31)	4								12,495	134,495	11,691	125,844	198	12,495	134,495
	TOWER (F32~F33)	2								3,100	33,365	2,922	31,448	50	3,100	33,365
	TOWER (F34~F35)	2								1,559	16,785	1,460	15,717	25	1,559	16,785
GRAND TOTAL			7,149	76,951	716	7,705	0	0	0	332,861	3,582,915	309,069	3,326,823	5,238	340,726	3,482,925

UNIT MIX

	FLOOR	UNIT TYPE						SUB-TOTAL
		BACH	1B	1B+D	2B	2B+D	3B	
BUILDING 'A1' PHASE 1A	BASE(F1~F6)	33	160	0	108	0	26	327
	TOWER (F7~F19)	28	138	0	93	0	23	282
	TOTAL	61	298	0	201	0	49	609
		61	298		201		49	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			
BUILDING 'A2' PHASE 1B	BASE(F1~F6)	21	104	0	70	0	17	213
	TOWER (F7~F23)	39	191	0	128	0	31	389
	TOTAL	60	295	0	199	0	48	603
		60	295		199		48	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			
BUILDING 'B' PHASE 2	BASE(F1~F6)	36	177	0	119	0	29	361
	TOWER (F7~F35)	94	462	0	311	0	75	942
	TOTAL	130	638	0	430	0	104	1,303
		130	638		430		104	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			
BUILDING 'C1','C2' PHASE 3	BASE(F1~F6)	35	170	0	115	0	28	347
	TOWER (F7~F25)	76	370	0	249	0	60	756
	TOTAL	110	540	0	364	0	88	1,103
		110	540		364		88	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			
BUILDING 'D' PHASE 4	BASE(F1~F6)	32	156	0	105	0	25	318
	TOWER (F7~F35)	130	639	0	430	0	104	1,304
	TOTAL	162	795	0	535	0	130	1,622
		162	795		535		130	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			
TOTAL	TOTAL	524	2,567	0	1,729	0	419	5,238
		524	2,567		1,729		419	
	UNIT MIX	10.0%	49.0%		33.0%		8.0%	100.0%
		59.0%			41.0%			

PARKING REQUIRED (1)(2)(3)

	COMMERCIAL	TOWNHOUSE	RESIDENTIAL	VISITOR	TOTAL
	2/100M2	0.6/UNIT	0.6/UNIT	0.15/UNIT	
PARCEL 'A1'	99	0	365	91	555
PARCEL 'A2'	0	0	362	90	452
PARCEL 'B'	0	0	782	195	977
PARCEL 'C1', 'C2'	66	0	847	212	1,125
PARCEL 'D'	0	0	973	243	1,216
TOTAL	165	0	3,329	832	4,326

PARKING PROVIDED

	ABOVE GRADE/LEVEL1	ABOVE GRADE/LEVEL2-6	UG1	UG2	UG3	TOTAL
PARCEL 'A1'			185	185	187	557
PARCEL 'A2'			157	157	160	474
PARCEL 'B'	42	305	313	321	0	981
PARCEL 'C1', 'C2'	74	475	288	290	0	1,127
PARCEL 'D'	94	920	215			1,229
TOTAL	210	1,700	1,158	953	347	4,368

NOTE: 1) ASSUMING COMMERCIAL PARKING RATIO= 2/100M2,
2)ASSUMING RESIDENTIAL PARKLING RATIO= 0.6 /UNIT, 0.15/ VISITOR
3) ASSUMING TOWNHOUSE PARKING=0.6/ UNIT, 0.15/ VISITOR

AMENITY REQUIRED (4)

	OUTDOOR	INDOOR
	2M2/ UNIT	2M2/ UNIT
PARCEL 'A1'	1,217	1,217
PARCEL 'A2'	1,205	1,205
PARCEL 'B'	2,605	2,605
PARCEL 'C1', 'C2'	2,206	2,206
PARCEL 'D'	3,244	3,244
TOTAL	10,477	10,477

AMENITY PROVIDED

	OUTDOOR	INDOOR
PARCEL 'A1'	1,217	1,217
PARCEL 'A2'	1,205	1,205
PARCEL 'B'	2,605	2,605
PARCEL 'C1', 'C2'	2,206	2,206
PARCEL 'D'	3,244	3,244
TOTAL	10,477	10,477

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

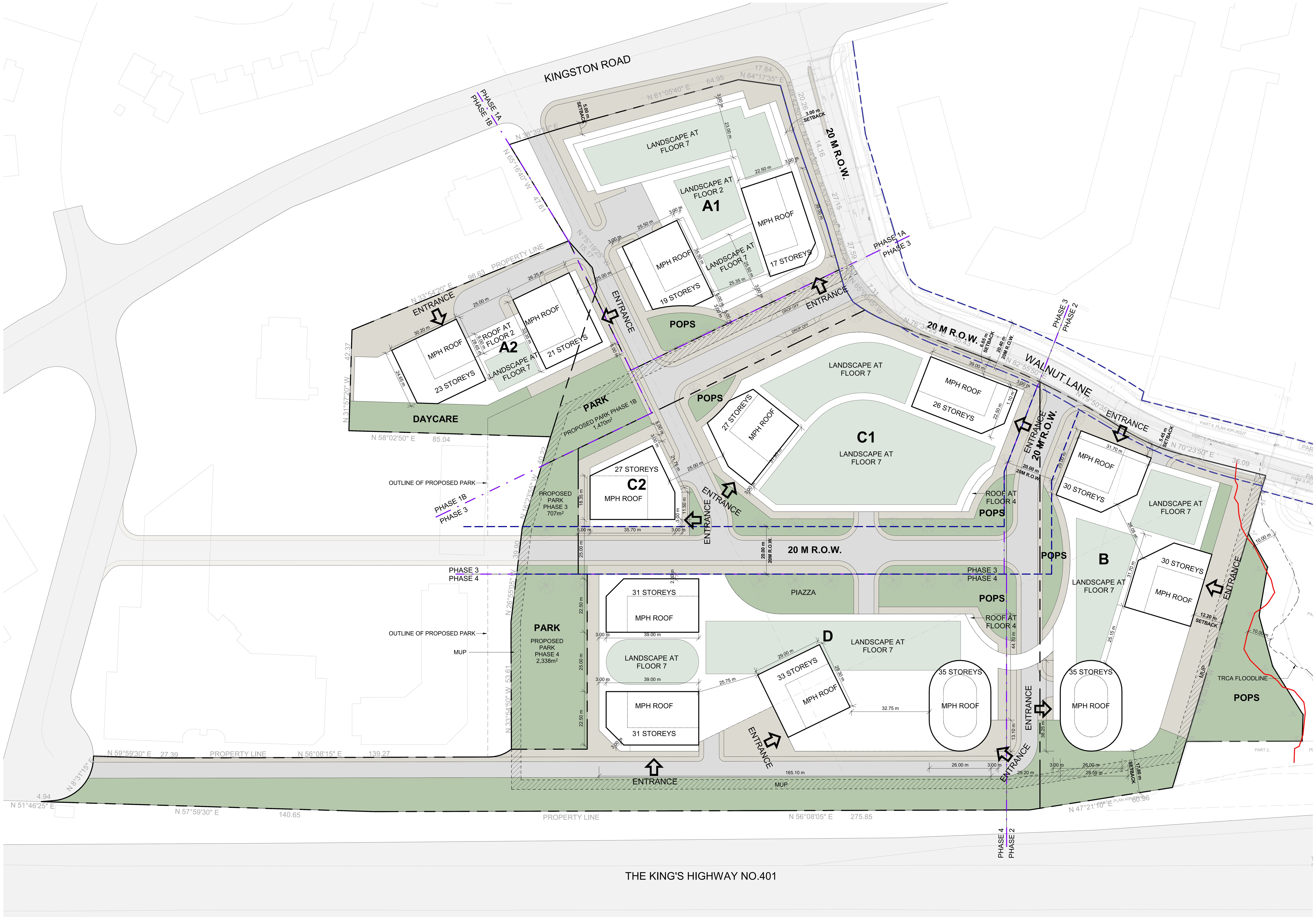
PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
STATISTICS

PROJECT NO. 22.122P01
PROJECT DATE 2023-10-06
DRAWN BY MZH
CHECKED BY AYU
SCALE

DRAWING NO. RZ002
REV. 1

2023-10-06 9:13:48 AM



2023-10-06 9:13:51 AM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

WITHOUT PREJUDICE

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

PROJECT

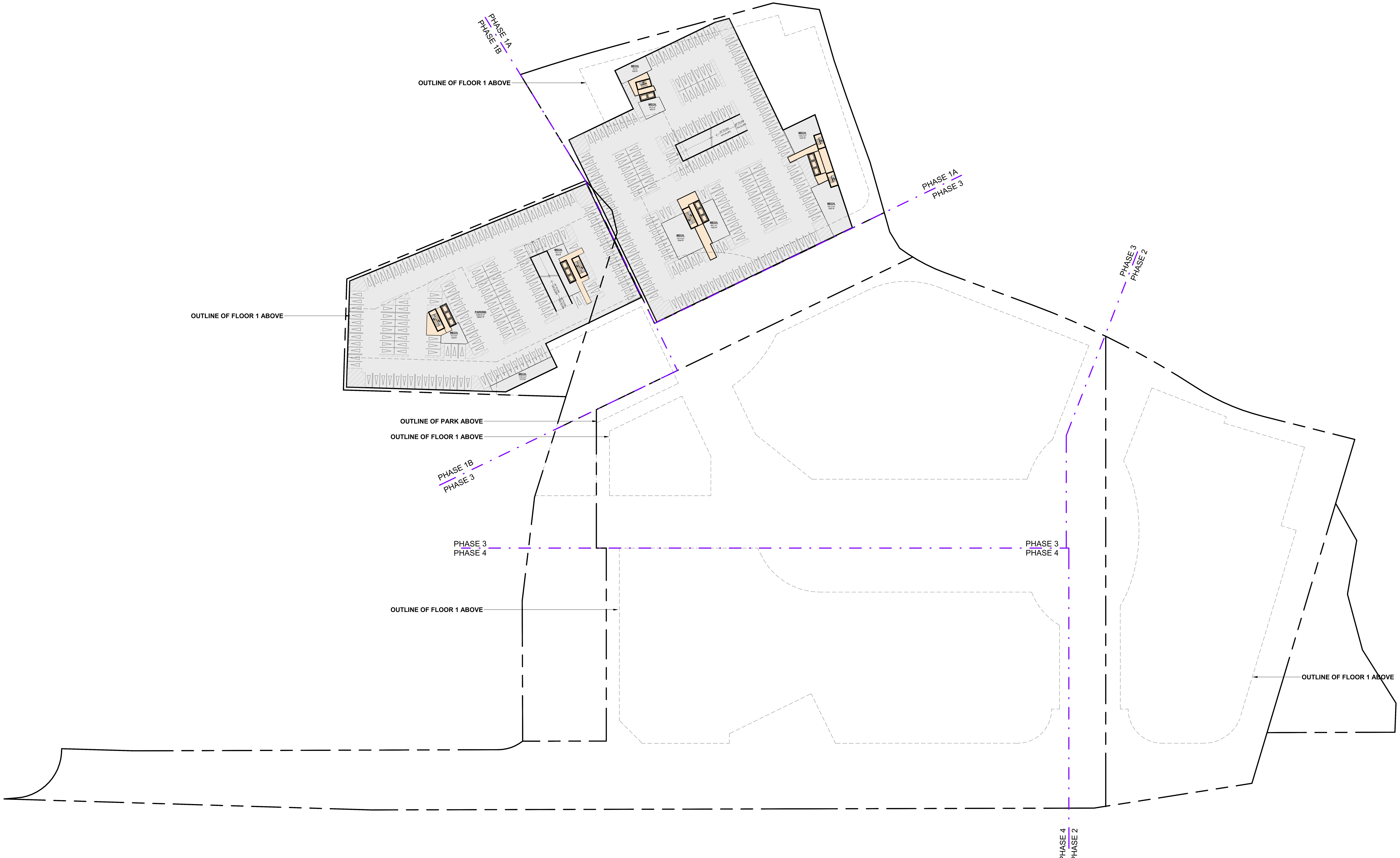
1163 Kingston Road, Pickering, ON

DRAWING

SITE PLAN / ROOF PLAN

PROJECT NO. 22.122P01
PROJECT DATE 2023-10-06
DRAWN BY MZH
CHECKED BY AYU
SCALE 1 : 700

DRAWING NO. RZ005
REV. 1



TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT

1163 Kingston Road, Pickering, ON

DRAWING

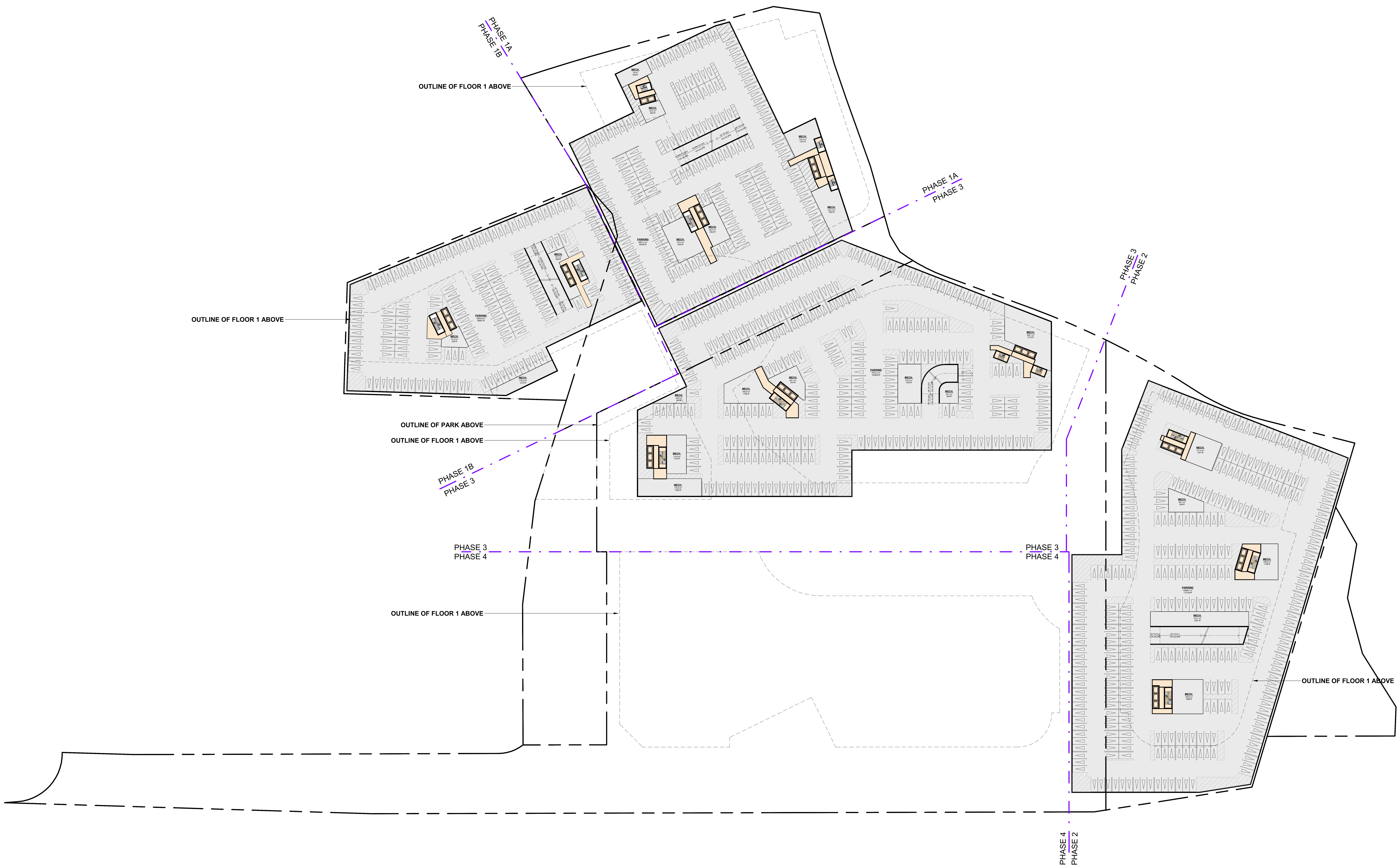
UNDERGROUND LEVEL 03

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-06
DRAWN BY	Author
CHECKED BY	Checker
SCALE	1 : 700

N

DRAWING NO.	REV.
RZ100	

2023-10-06 9:13:52 AM



2023-10-06 9:13:54 AM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT

1163 Kingston Road, Pickering, ON

DRAWING

UNDERGROUND LEVEL 02

PROJECT NO.
22.122P01

PROJECT DATE
2023-10-06

DRAWN BY
Author

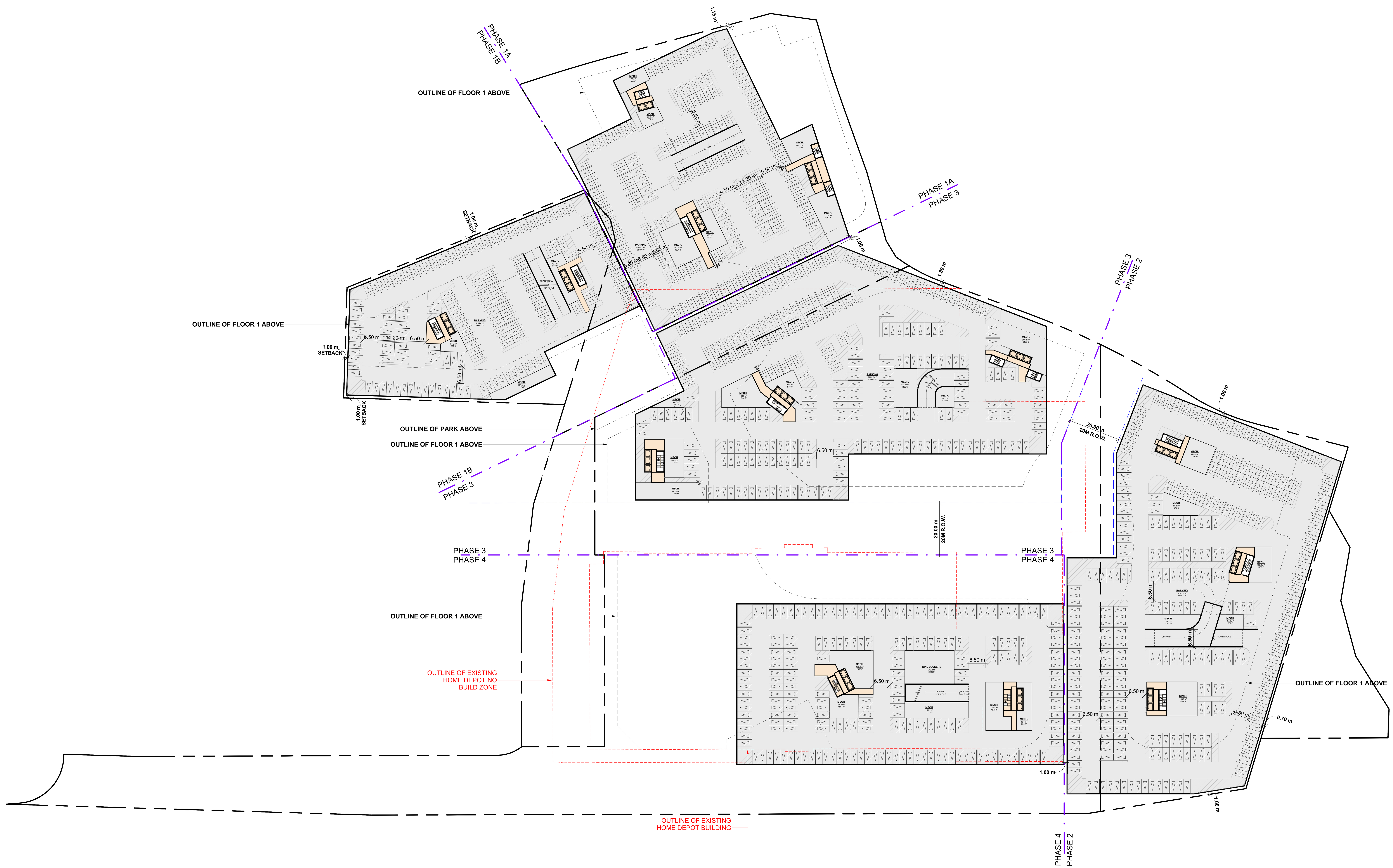
CHECKED BY
Checker

SCALE
1 : 700

N

DRAWING NO.
RZ101

REV.



TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

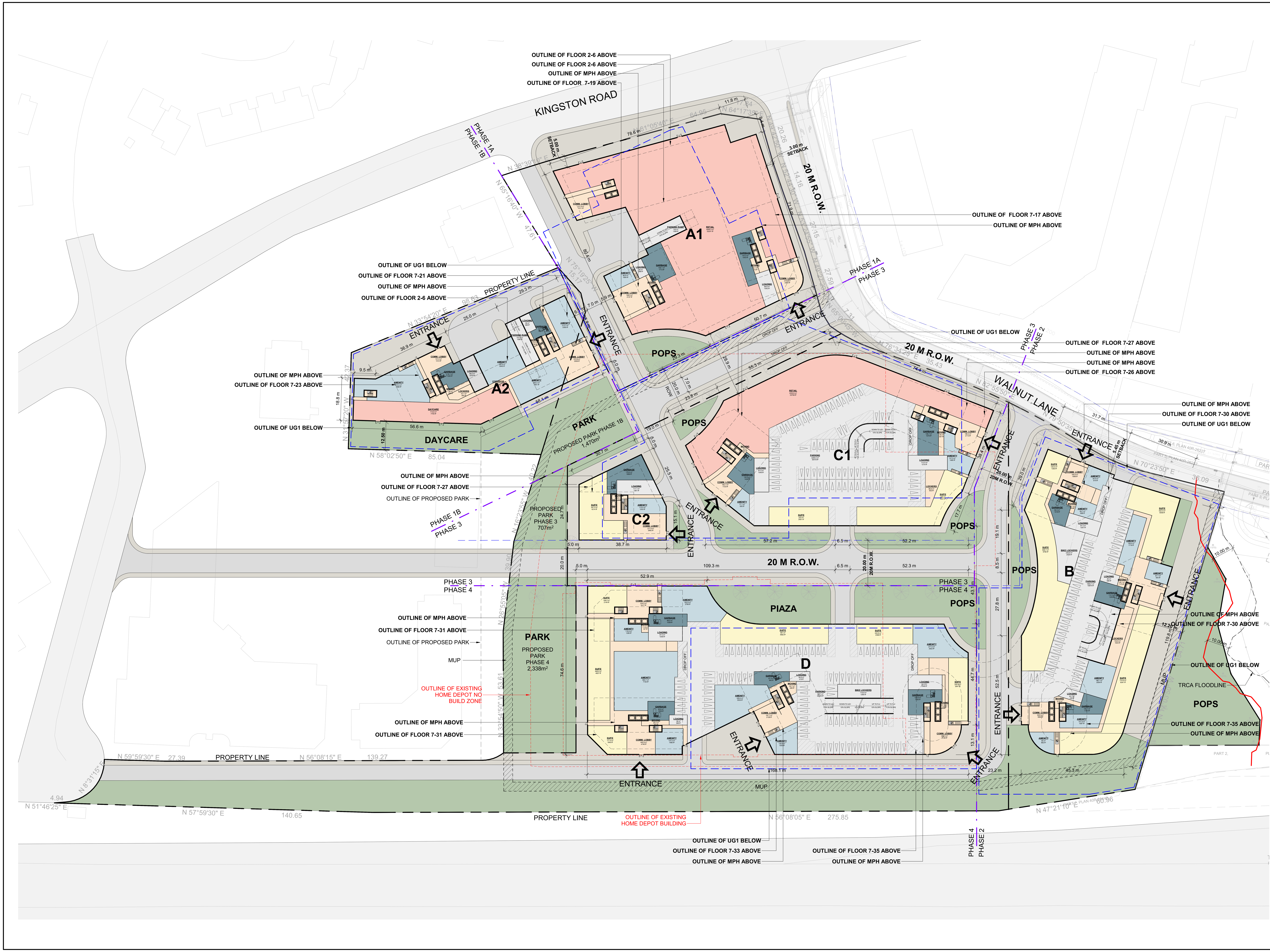
DRAWING
UNDERGROUND LEVEL 01

PROJECT NO.
22.122P01
PROJECT DATE
2023-10-06
DRAWN BY
Author
CHECKED BY
Checker
SCALE
1 : 700

N

DRAWING NO.
RZ102
REV.

2023-10-06 9:13:57 AM



2023-10-06 9:14:02 AM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

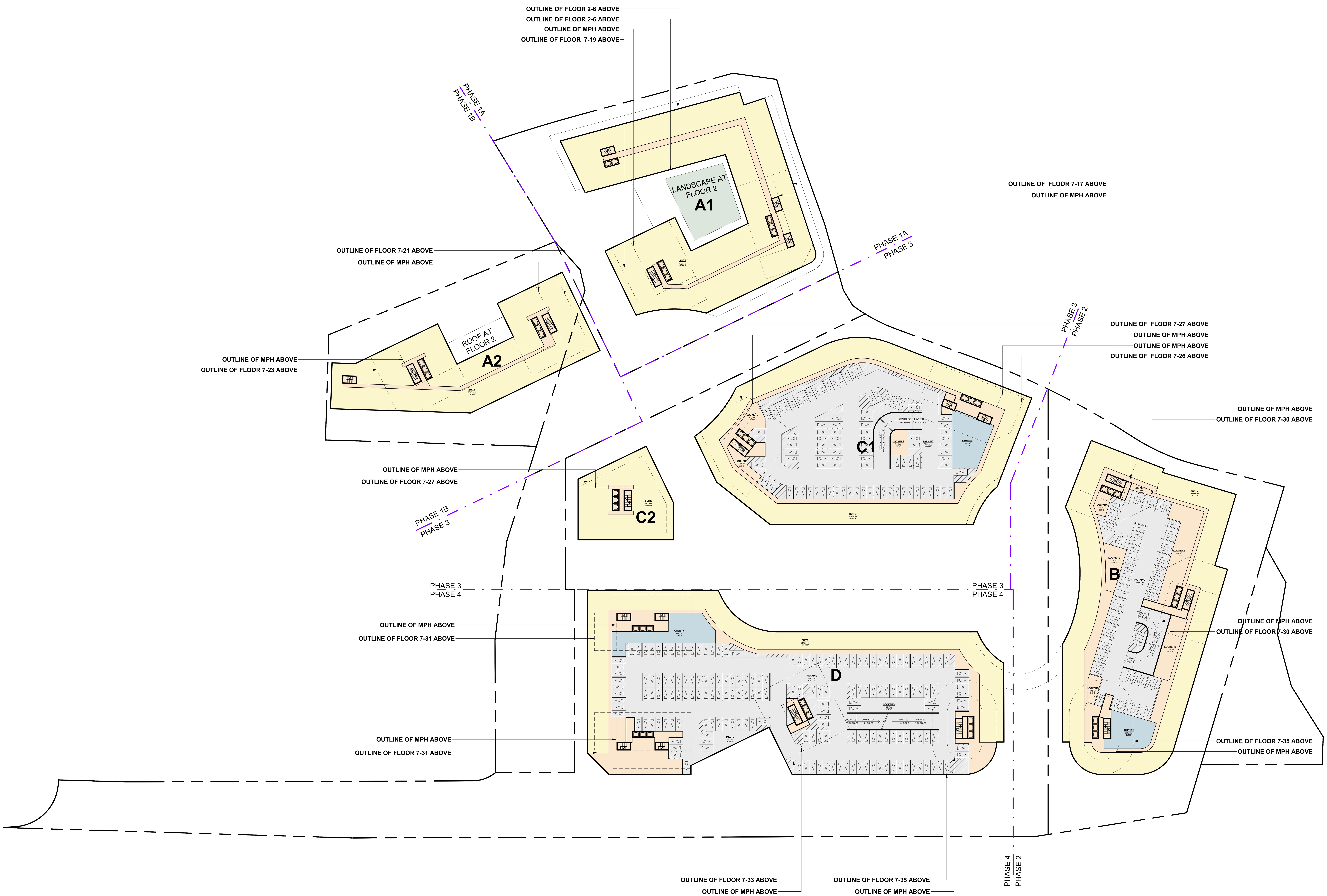
- PRIMARY RESIDENTIAL ENTRANCE
- SECONDARY RESIDENTIAL ENTRANCE
- RETAIL ENTRANCE
- EXIT
- FIRE HYDRANT
- SIAMESE CONNECTION
- CONVEX MIRROR
- TRANSFORMER WITH CLEARANCES
- FIRE ROUTE SIGN
- 000.00 SPOT ELEVATION
- GAS/HYDRO METER

#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
FLOOR 01

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-06
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1:700
DRAWING NO.	RZ151
REV.	



2023-10-06 9:14:05 AM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

PROJECT

1163 Kingston Road, Pickering, ON

DRAWING

FLOOR 02

PROJECT NO.
22.122P01

PROJECT DATE
2023-10-06

DRAWN BY
MZH

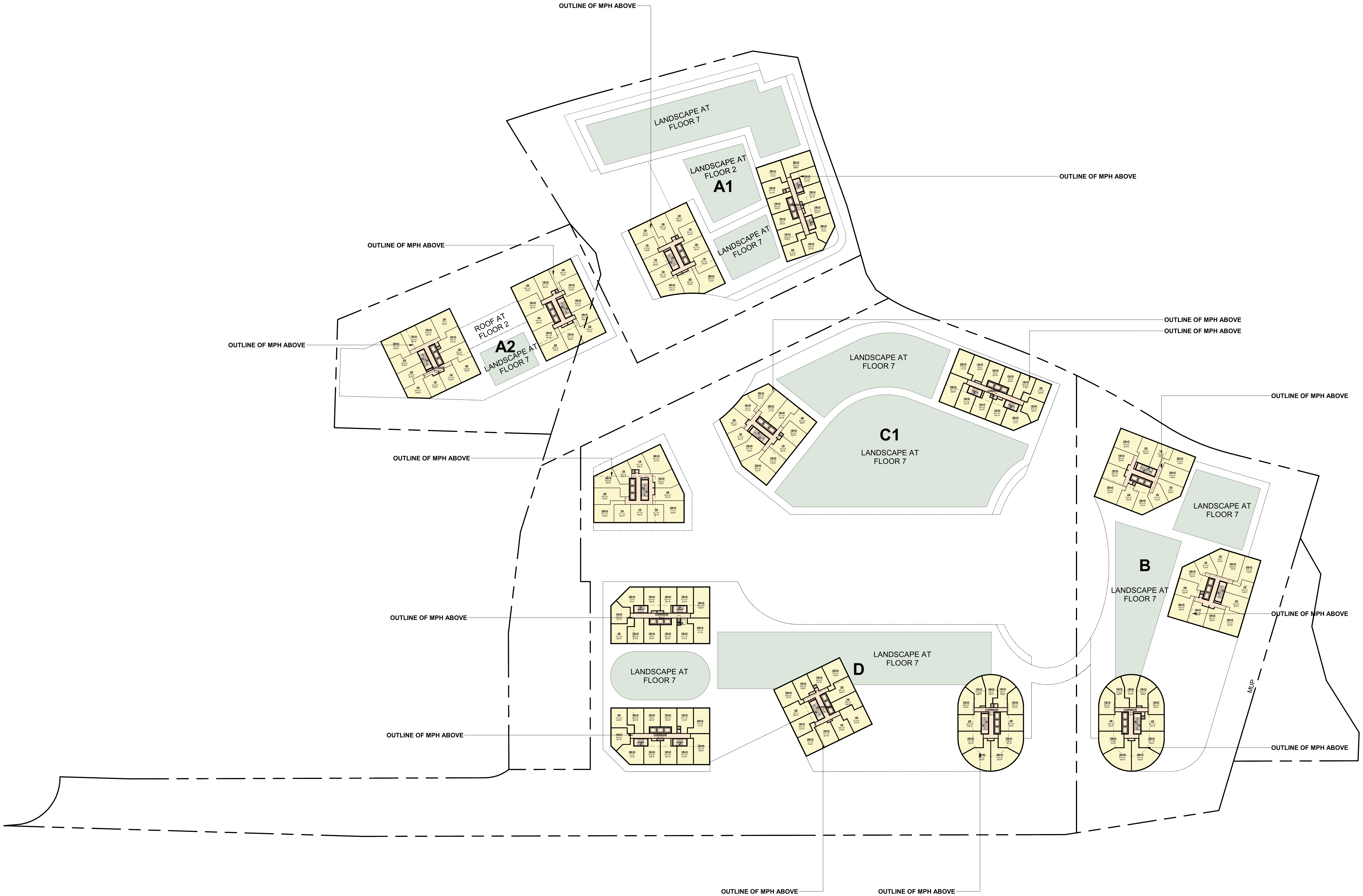
CHECKED BY
AYU

SCALE
1 : 700

N

DRAWING NO.
RZ152

REV.
1



2023-10-05 9:14:09 AM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
FLOOR 07

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-06
DRAWN BY	Author
CHECKED BY	Checker
SCALE	1 : 700

N

DRAWING NO. RZ155
REV.

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

- LOCATION OF EXISTING BUILDINGS
- BUILDING TO BE DEMOLISHED
- BUILDING DEMOLISHED IN PREVIOUS PHASES
- LOCATION OF PROPOSED BUILDINGS
- COMPLETED BUILDING
- FUTURE BUILDING
- PROPOSED PARK
- EXISTING STREET AND SURFACE PARKING
- NEW STREET CURRENT PHASE
- NEW STREET BUILT IN PREVIOUS PHASES
- PHASING BOUNDARY

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

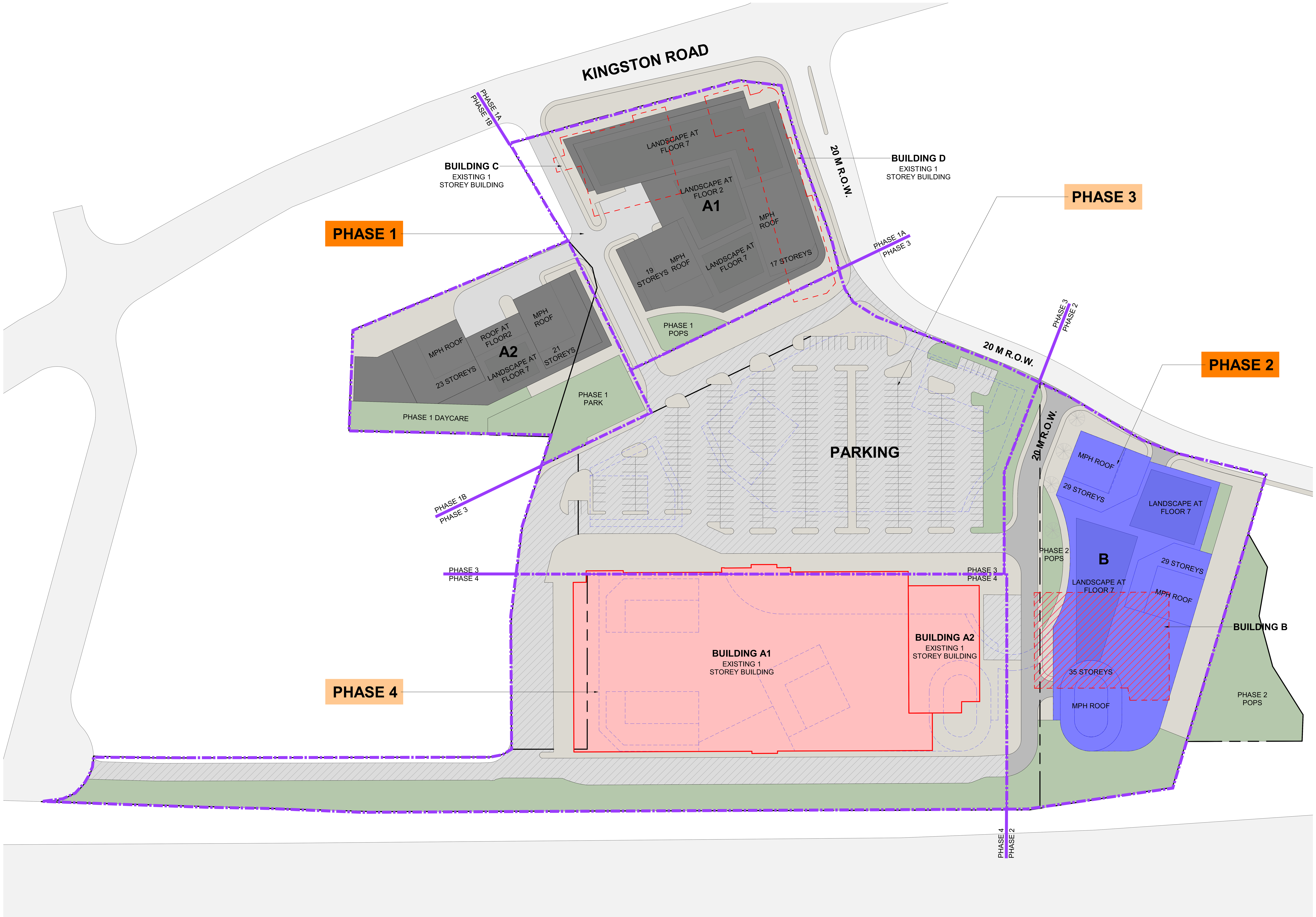
PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 1

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1:700

DRAWING NO.	REV.
RZ007.1	1

2023-10-05 4:20:45 PM



TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

- LOCATION OF EXISTING BUILDINGS
- BUILDING TO BE DEMOLISHED
- BUILDING DEMOLISHED IN PREVIOUS PHASES
- LOCATION OF PROPOSED BUILDINGS
- COMPLETED BUILDING
- FUTURE BUILDING
- PROPOSED PARK
- EXISTING STREET AND SURFACE PARKING
- NEW STREET CURRENT PHASE
- NEW STREET BUILT IN PREVIOUS PHASES
- PHASING BOUNDARY

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

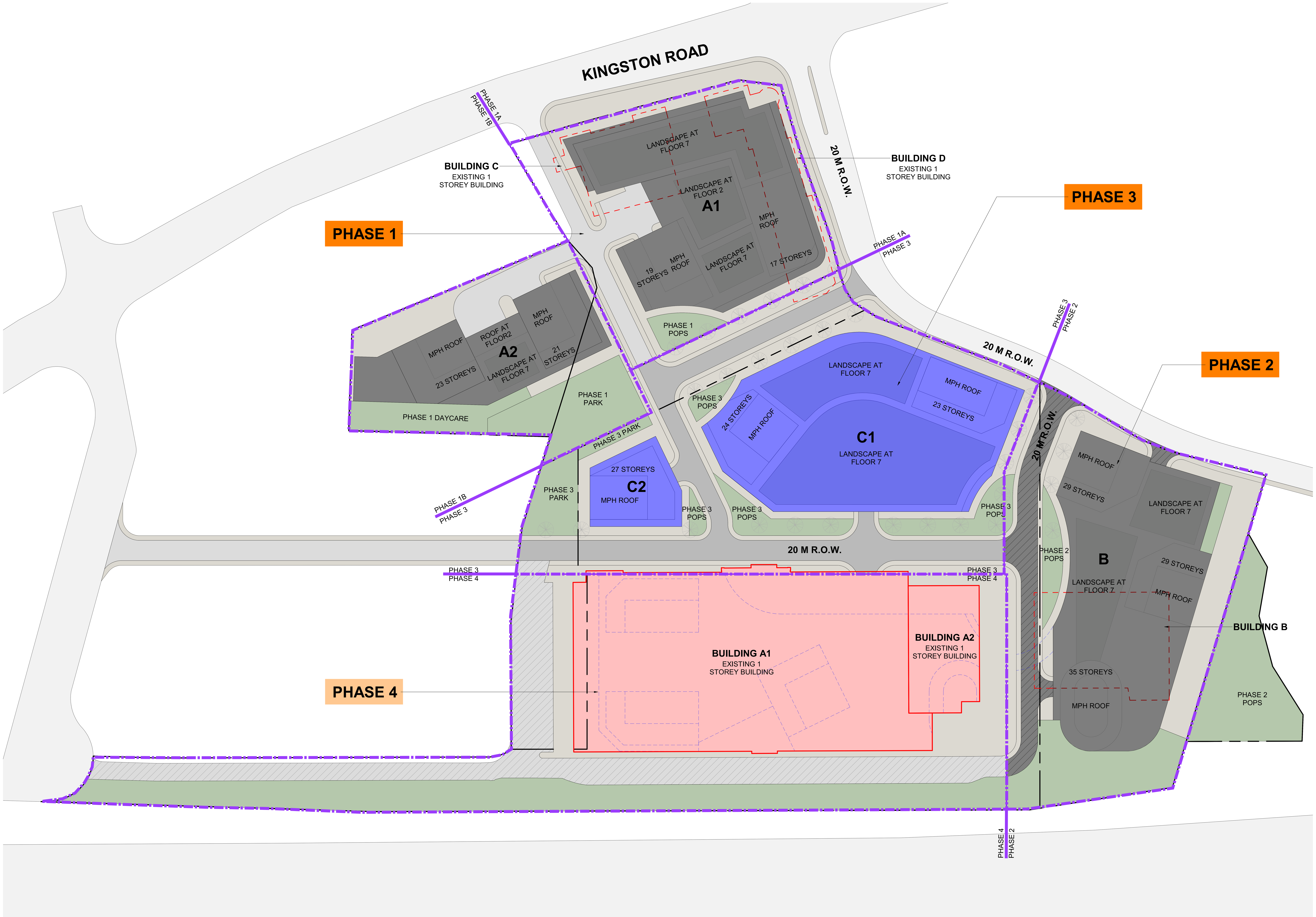
PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 2

PROJECT NO. 22.122P01
PROJECT DATE 2023-10-05
DRAWN BY MZH
CHECKED BY AYU
SCALE 1:700

DRAWING NO. RZ007.2
REV. 1

2023-10-05 4:20:48 PM



2023-10-05 4:20:51 PM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

- LOCATION OF EXISTING BUILDINGS
- BUILDING TO BE DEMOLISHED
- BUILDING DEMOLISHED IN PREVIOUS PHASES
- LOCATION OF PROPOSED BUILDINGS
- COMPLETED BUILDING
- FUTURE BUILDING
- PROPOSED PARK
- EXISTING STREET AND SURFACE PARKING
- NEW STREET CURRENT PHASE
- NEW STREET BUILT IN PREVIOUS PHASES
- PHASING BOUNDARY

#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 3

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1:700
DRAWING NO.	RZ007.3
REV.	1

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

- LOCATION OF EXISTING BUILDINGS
- BUILDING TO BE DEMOLISHED
- BUILDING DEMOLISHED IN PREVIOUS PHASES
- LOCATION OF PROPOSED BUILDINGS
- COMPLETED BUILDING
- FUTURE BUILDING
- PROPOSED PARK
- EXISTING STREET AND SURFACE PARKING
- NEW STREET CURRENT PHASE
- NEW STREET BUILT IN PREVIOUS PHASES
- PHASING BOUNDARY

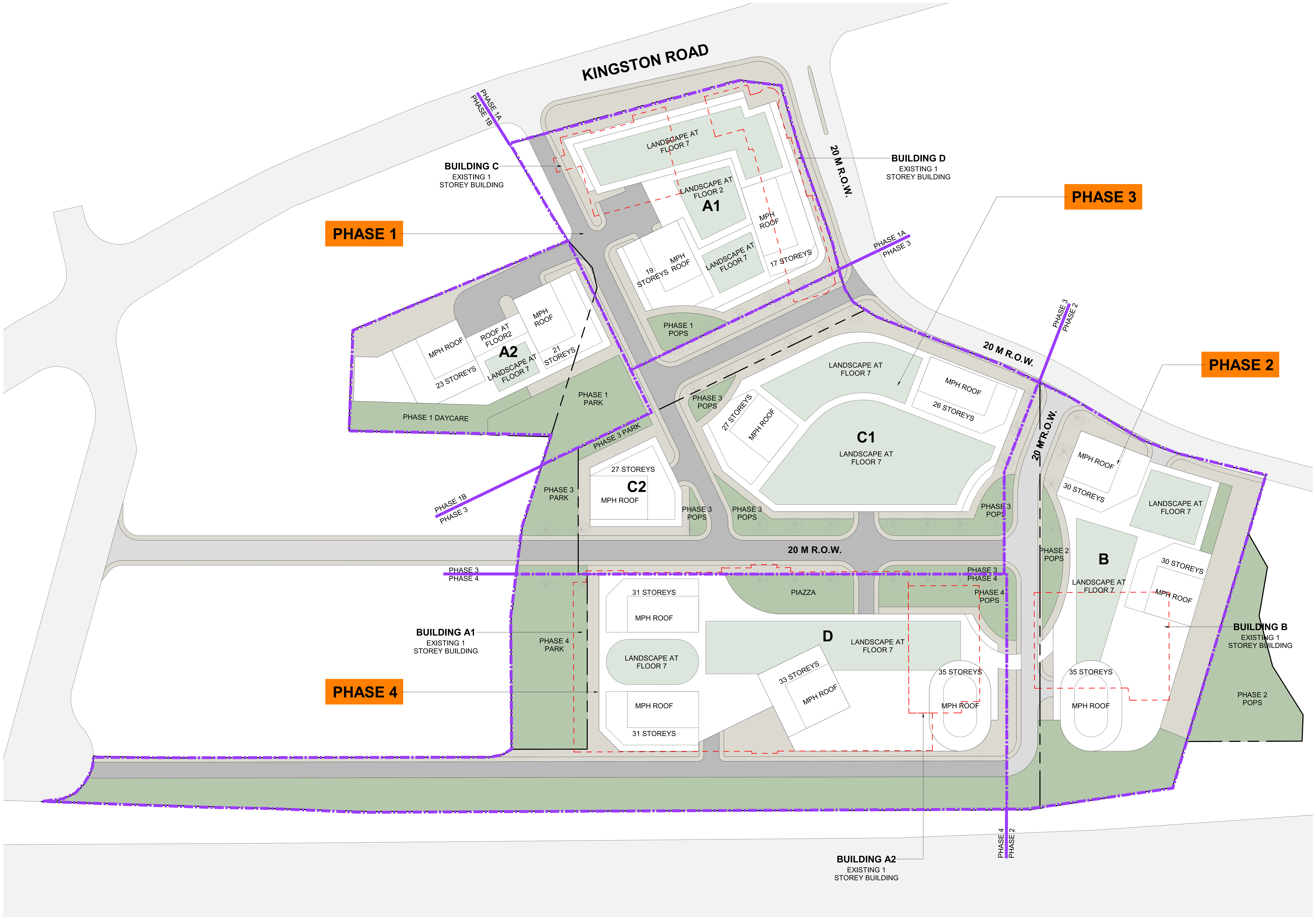
#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 4

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1:700
DRAWING NO.	RZ007.4
REV.	1

2023-10-05 4:20:54 PM



2023-10-05 4:20:55 PM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

LEGEND

- BUILDING DEMOLISHED IN PREVIOUS PHASES
- PROPOSED PARK
- NEW STREET
- PHASING BOUNDARY

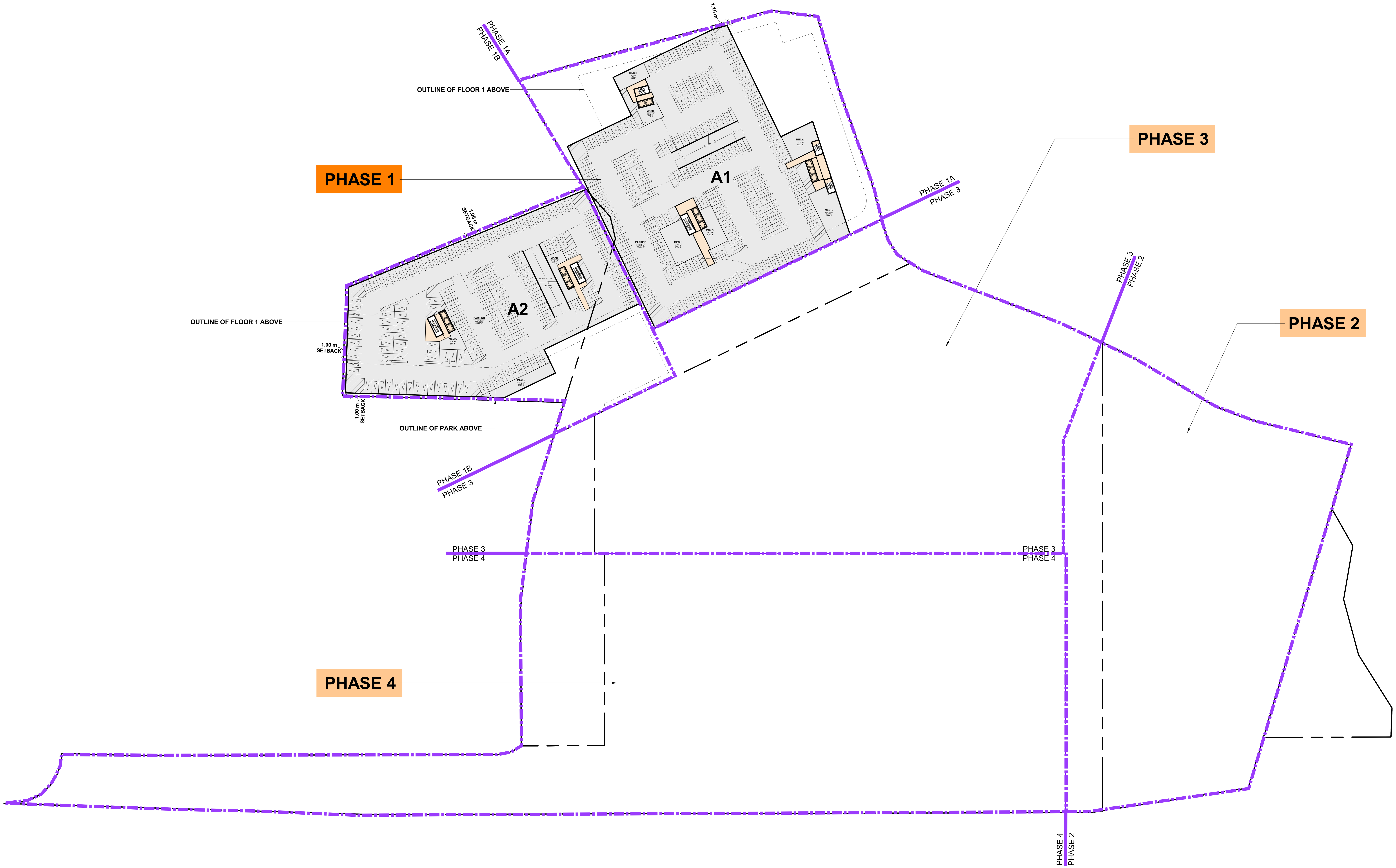
#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - ALL PHASE

PROJECT NO.
22.122P01
PROJECT DATE
2023-10-05
DRAWN BY
MZH
CHECKED BY
AYU
SCALE
1:700

DRAWING NO.
RZ007.5
REV.
1



2023-10-05 4:20:56 PM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

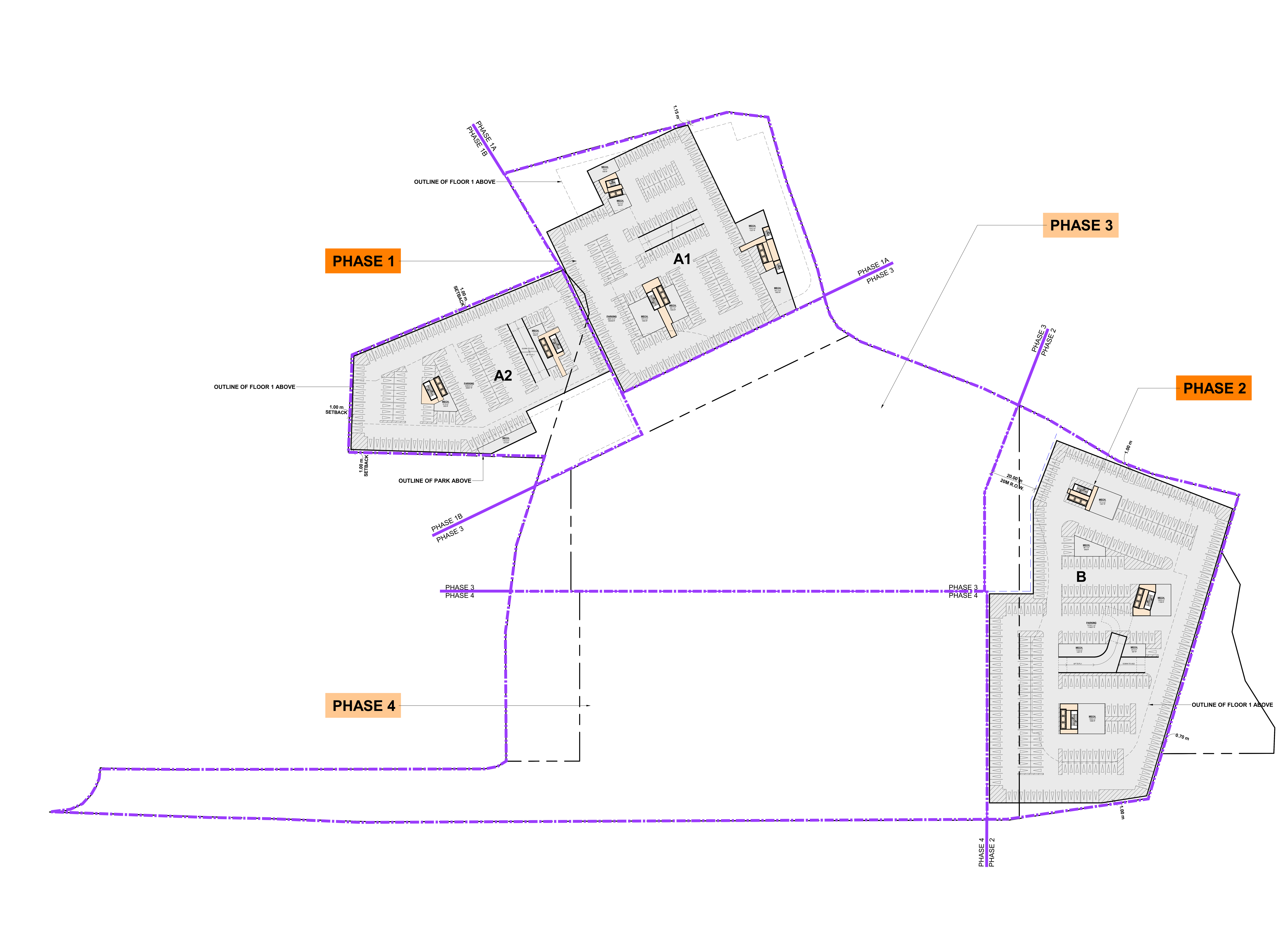
#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 1 - UG

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1 : 700

DRAWING NO. RZ008.1
REV.



TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

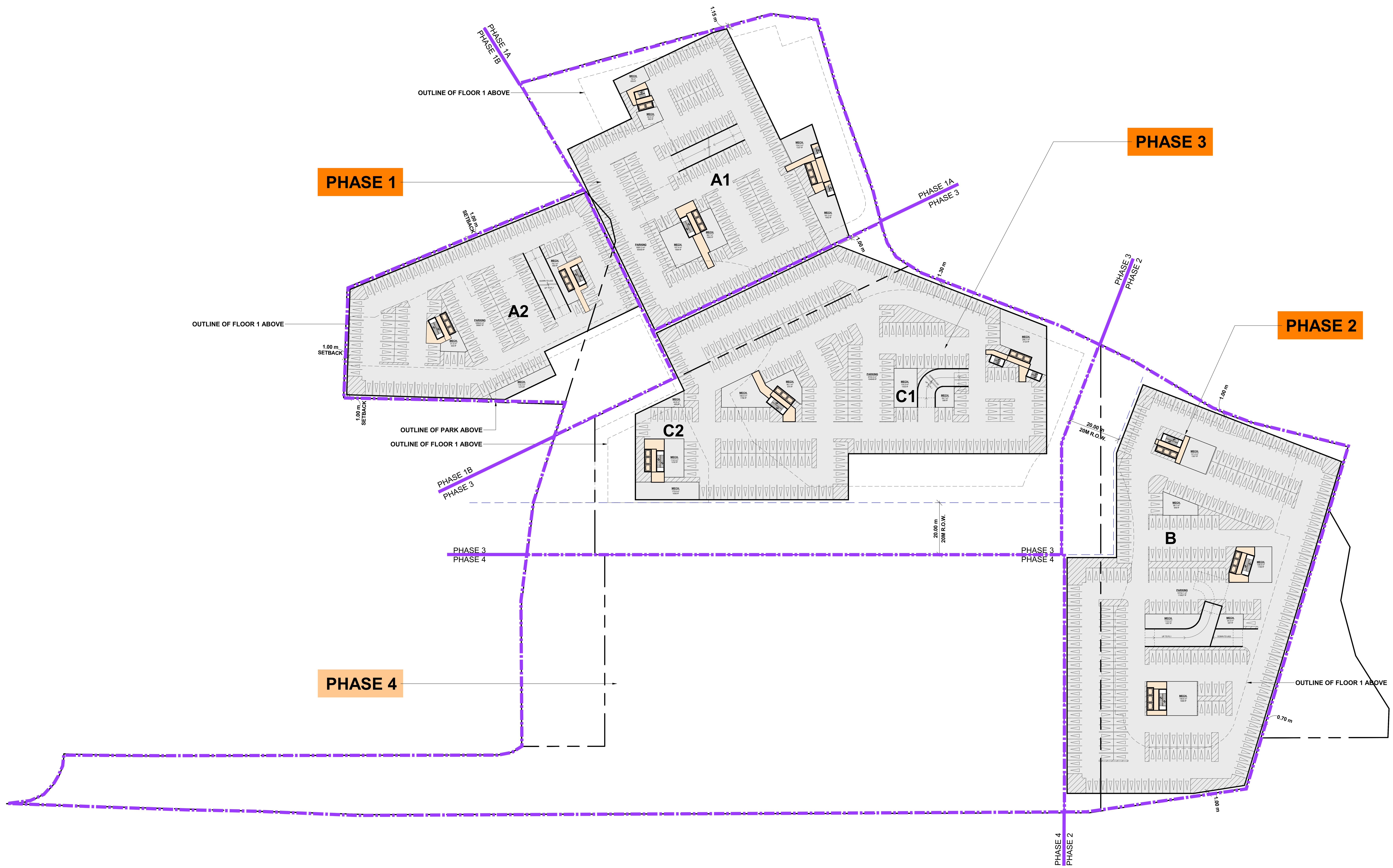
#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 2 - UG

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1 : 700
DRAWING NO.	RZ008.2
REV.	

2023-10-05 4:20:56 PM



2023-10-05 4:20:57 PM

TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

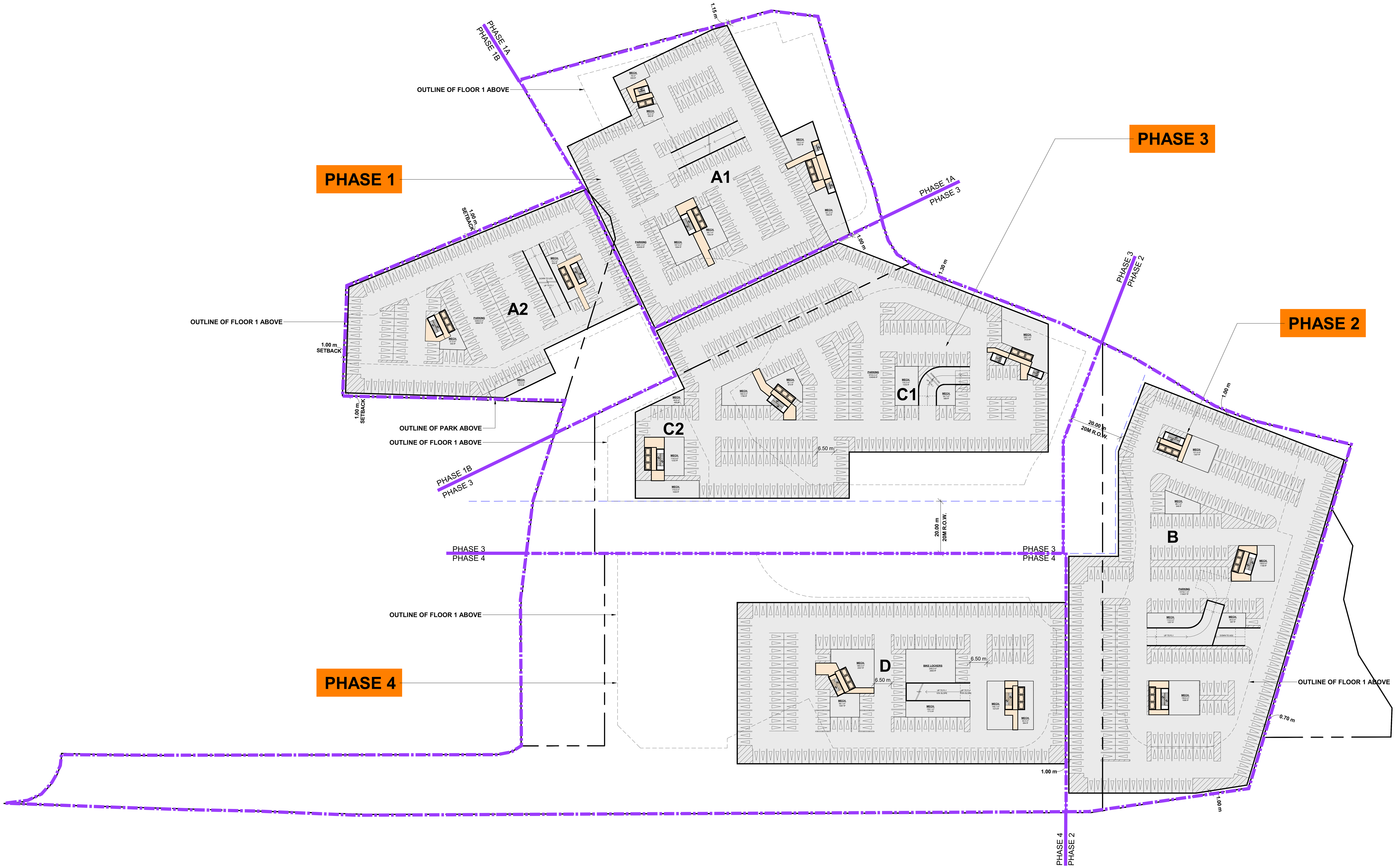
#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 3 - UG

PROJECT NO.	22.122P01
PROJECT DATE	2023-10-05
DRAWN BY	MZH
CHECKED BY	AYU
SCALE	1 : 700

DRAWING NO. RZ008.3
REV.



TURNER FLEISCHER

Turner Fleischer Architects Inc.

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT
1163 Kingston Road, Pickering, ON

DRAWING
PHASING PLAN - PHASE 4 - UG

PROJECT NO.
22.122P01

PROJECT DATE
2023-10-05

DRAWN BY
MZH

CHECKED BY
AYU

SCALE
1 : 700

DRAWING NO.
RZ008.4

REV.

2023-10-05 4:20:58 PM