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MG4842

MARCH 2021

**GEOHYDROLOGY ASSESSMENT
PIER 27
PHASE THREE
25 & 35 QUEENS QUAY EAST
TORONTO, ONTARIO**

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PREPARED FOR:

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TABLE OF CONTENTS

Item	Page
1.0 INTRODUCTION	1
1.1 SCOPE OF WORK	1
1.2 SITE DESCRIPTION	1
1.3 PROPOSED DEVELOPMENT	2
1.4 PROPERTY OWNERSHIP	2
1.5 REVIEW OF PREVIOUS REPORTS	3
2.0 HYDROGEOLOGICAL CONDITIONS	4
2.1 PHYSICAL SETTING	4
2.2 TOPOGRAPHY	4
2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY	4
2.4 LOCAL GEOLOGY AND HYDROGEOLOGY	5
3.0 SCOPE OF INVESTIGATION	6
3.1 OVERVIEW OF SITE INVESTIGATION	6
3.2 MONITORING WELL INSTALLATION	6
3.3 ELEVATION SURVEYING	6
3.4 GROUNDWATER SAMPLING	7
3.5 GROUNDWATER ANALYSIS	7
4.0 INVESTIGATION RESULTS	8
4.1 GEOLOGY	8
4.2 GROUNDWATER LEVEL MONITORING	9
4.3 GROUNDWATER QUALITY	10
4.4 GROUNDWATER DISCHARGE ASSESSMENT	10
5.0 REVIEW AND EVALUATION	11
5.1 TEMPORARY DEWATERING ASSESSMENT	11
5.1.1 NUMERICAL ANALYSIS	13
5.2 PERMANENT FOUNDATION DRAIN FLOW RATES	14
5.2.1 NUMERICAL ANALYSIS	14
5.3 MECP PERMIT TO TAKE WATER REQUIREMENT	15
5.4 TORONTO WATER DISCHARGE PERMIT REQUIREMENTS	15
5.5 ENVIRONMENTAL PROTECTION	16
6.0 CONCLUSIONS AND RECOMMENDATIONS	17
7.0 REFERENCES	20
8.0 STATEMENT OF LIMITATIONS	21
9.0 CLOSURE	22

FIGURES

Drawing No. 1	Borehole Location Plan
Drawing No. 2	Private Water Drainage System

TABLES

Table 1	Construction Details and Elevation of Monitoring Wells
Table 2	Groundwater Analytical Results – City of Toronto Sewers By-Law Discharge Criteria
Table 3	Groundwater Monitoring Data
Table 4	Discharge Estimation of Construction Dewatering
Table 5	Discharge Estimation of Permanent Drainage System

APPENDICES

Appendix A	Legal Survey
Appendix B	Proposed Redevelopment Drawings
Appendix C	Borehole Logs
Appendix D	Certificates of Analysis
Appendix E	Single Well Response Test by InSitu Contractors Inc.

1.0 INTRODUCTION

Pier 27 Toronto (Northeast) Inc. (the Client) intends to redevelop the property located at 25 & 35 Queens Quay East, Toronto, Ontario, M5E 0A4, (hereafter referred to as 'the Site'). MCR was retained to conduct a Geohydrology Assessment for the Site to evaluate the requirement for temporary dewatering and permanent drainage in relation to the proposed redevelopment.

1.1 SCOPE OF WORK

The objectives of the Geohydrology Assessment are to determine the following:

- Hydrogeological conditions of the Site, including the groundwater and phreatic surface, subsurface elevations and flow patterns and the interaction with the design and construction of the proposed development.
- Reviewing the available background information for the Site obtained from MCR's files, City of Toronto, and architectural drawings.
- Estimate the potential temporary dewatering flow rates during construction and assessment of potential impacts on the surrounding environment.
- Estimate the long term flow rates from the Private Water Drainage System (PWDS) of the proposed building.
- Assess the permitting requirements for both dewatering and discharge with the Ministry of Environment, Conservation and Parks (MECP) and the City of Toronto – Toronto Water (the City), respectively.
- Summarize the findings in a Geohydrology Assessment Report.

1.2 SITE DESCRIPTION

The Site is located on the southeast corner of the intersection of Queens Quay East and Yonge Street, in the City of Toronto. The site is rectangular in shape with a total area of approximately 4,400 m².

The Site is bounded by Queens Quay East to the north, Yonge Street to the west and residential developments to the east and south. The ground surface is

relatively flat with a slight slope towards the west. The Site is currently used as an asphalt pave parking lot in the western portion, sales centre in the northeast and construction storage (for Phase II of the development) in the southeast portion.

According to a Survey Plan by KRCMAR presented in Appendix A, the Site is legally described as: Parts of Blocks 18 and 19, Registered Plan 694-E, City of Toronto.

1.3 PROPOSED DEVELOPMENT

The Site is proposed for mixed-use residential/commercial redevelopment with a forty-five [45] storey building with a eleven [11] storey podium (Building F) and a eleven [11] storey building (Building A) plus mechanical penthouse over four [4] levels of below grade parking (Appendix B).

The finished floor elevation (FFE) at ground level is expected to be at an approximate elevation of 77.30 meters above sea level (masl). The P4 level is expected to be at an elevation of 63.24 masl.

Presently, it is assumed that the proposed building structure can be supported on spread/strip footings. The size of the shoring plan layout was assumed to cover approximately 76 m by 58 m.

A sub-floor Private Water Drainage System (PWDS) with perimeter weeping tile will be utilized. A soldier pile and lagging shoring system will be sufficient for the Site except where adjacent structures exist where a caisson wall will be utilized.

1.4 PROPERTY OWNERSHIP

The Site is owned and intended for redevelopment by Pier 27 Toronto (Northeast) Inc. The Client is represented by Ms. Kristine Zwicker with the following contact information:

Pier 27 Toronto (Northeast) Inc.
56 The Esplanade, Suite 308

Toronto, Ontario
M5E 1A7

Ms. Kristine Zwicker
Email: KZwicker@cityzen.ca

1.5 REVIEW OF PREVIOUS REPORTS

The following geo-environmental reports were provided for review prior to initiating the investigation:

- MCR report titled, *Preliminary Geotechnical Report, Proposed Residential/Commercial Development, Pier 27, Phase 3, Buildings A and F, 25 & 35 Queens Quay East, Toronto, Ontario*, prepared for Pier 27 Toronto (Northeast) Inc., dated February 2021.

2.0 HYDROGEOLOGICAL CONDITIONS

2.1 PHYSICAL SETTING

The Site is located in the eastern area of the City of Toronto and is situated in a mixed-use residential and commercial area. The nearest surface water body is Lake Ontario, located 170 m south of the Site.

The Site is located at an elevation of approximately 76 m above sea level (asl) (250 ft) and the topography across the Site is generally flat. Surrounding area slopes gently down to the southwest.

The Site is bounded by the following properties/features:

North	Queens Quay East
South	Residential development
East	Residential development
West	Yonge Street

2.2 TOPOGRAPHY

According to the topographic map, published by the Government of Canada; Natural Resources Canada at the Government of Canada website: <http://atlas.gc.ca/toporama/en/index.html>, the ground surface at the Site is relatively flat with the surrounding area sloping to the southwest, towards Lake Ontario.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

According to the geological map entitled "Quaternary Geology of Ontario, Southern Sheet", published by the Ontario Ministry of Development and Mines, dated 1991, the overburden in the study area consists of predominantly sandy silt to silt matrix, commonly rich in clasts, often high in total matrix carbonate content.

According to the Ontario Ministry of Development and Mines, Map No. 2554 "Bedrock Geology of Ontario, Southern Sheet, 1991", the bedrock typically

consists of Upper Ordovician shale, limestone, dolostone and siltstone. On a regional scale, groundwater generally flows southeast towards Lake Ontario.

2.4 LOCAL GEOLOGY AND HYDROGEOLOGY

On a local scale, geological conditions and hydrogeology are similar to the ones at a regional scale. Locally, near surface groundwater flow may be influenced by underground structures (e.g., service trenches, catch basins, and building foundations or surface watercourses). No surface water features are present onsite and there are no Provincially Significant Wetlands in the vicinity of the Site.

3.0 SCOPE OF INVESTIGATION

3.1 OVERVIEW OF SITE INVESTIGATION

- Twelve boreholes (BH20-1S, BH20-1D, BH20-2 to BH20-4, BH20-5S, BH20-5D, BH20-6S, BH20-6I, BH20-6D and BH20-7 to BH20-8) were drilled by MCR from September 21 to 25, 2020.
- The boreholes were advanced to depths ranging from 3.95 to 14 m.
- Monitoring wells were installed in all borehole except BH20-3, BH20-4 and BH20-7 for long term groundwater monitoring and sampling.
- The boreholes locations are shown in Drawing No. 1 and the records are presented in Appendix C.
- Groundwater levels were recorded from the available monitoring well over various dates and the data is presented in Table 1.
- Groundwater samples were collected from BH20-5S in September 2020 for chemical analysis of the City of Toronto Sewers By-Law criteria.

3.2 MONITORING WELL INSTALLATION

All MCR monitoring wells were installed with a 50 mm diameter schedule 40 PVC pipe and a 3.05m long slotted well screen. Well screens were surrounded by a silica sand pack to at least 0.6 m above the top of screen with a bentonite seal extending from above the sand pack to within 0.5 m of the ground surface. All monitoring wells were completed with a flush mounted cover at ground surface. Monitoring well installation was done in accordance with the *Ontario Water Resources Act*, Sections 35 to 50.

3.3 ELEVATION SURVEYING

The geodetic elevations of the boreholes were surveyed by MCR and referenced to a temporary benchmark established by KRCMAR on September 16, 2020 with a reported elevation of 77.43 masl. All borehole logs are presented in Appendix C and elevations of monitoring wells can be found in Table 1.

3.4 GROUNDWATER SAMPLING

All groundwater sampling activities were conducted in accordance with Ontario Regulation (O.Reg.)153/04, as amended to O.Reg.511/09, July 2011. All monitoring wells were developed prior to sampling activities using a Waterra Hydrolift II (HL-1217) inertial lift pump by purging at least three well volumes or until the monitoring well was purged dry. Groundwater samples were obtained at least 24 hours' post-development under static conditions. No samples were field filtered prior to laboratory analysis, in accordance with the standard.

3.5 GROUNDWATER ANALYSIS

All groundwater samples were submitted to ALS Laboratory Group (ALS) of Richmond Hill, Ontario, certified by the Canadian Association for Laboratory Accreditation (CALA), for chemical analysis. The Certificates of Analysis received are included in Appendix D. The contact information for the laboratory used is included below.

ALS Laboratory Group

95 West Beaver Creek Road
Richmond Hill, ON L4B 1H2

All groundwater samples were submitted for bulk chemical analysis for the criteria provided in the *Toronto Municipal Code, Chapter 681, Sewers By-law*. The results of chemical analysis were compared to the criteria provided in *Table 1 – Limits for Sanitary and Combined Sewers Discharge* and *Table 2 – Limits for Storm Sewer Discharge*. These guidelines establish the maximum allowable concentrations of specific analytical parameters for water discharged into either the municipal sanitary and/or storm sewer system respectively.

4.0 INVESTIGATION RESULTS

4.1 GEOLOGY

The borehole elevations ranged from 76.08 masl (BH 20-2) to 77.06 masl (BH 20-6). Based on the investigation by the geologic formations beneath the Site are illustrated in borehole logs (Appendix C) and include the following (from surface to depth):

Pavement: An asphalt layer, 75 mm in thickness, was observed at the surface of boreholes 20-4, 20-5D and 20-7. A 75 mm thick concrete layer was present at the surface of borehole 20-8. Granular fill, varying from 425 to 525 mm in thickness, underlies the asphalt/concrete in the boreholes.

Fill: Loose to compact fill consisting of sand, silt, gravel and clay/clayey silt was present at the surface of boreholes 20-1D, 20-2, 20-3 and 20-6D and below the pavement at boreholes 20-4, 20-5D, 20-7 and 20-8. The moist to wet fill contained trace clay, sand, gravel and clinker, trace to some organics, and debris such as decayed wood and brick fragments.

For the purpose of offsite disposal, the type/quantity and extent of existing fill/organic materials/granular fill layers should be explored by further test pit investigation, prior to contract award.

Sand: A layer of very loose to loose, medium to fine sand was detected below the fill at boreholes 20-1D and 20-8 and extended to depths of 6.10 and 5.20 m, respectively. The dark brown to black sand contained some silt and trace gravel and was in a wet condition.

Silt/Silty Clay/Sandy Silt: A layer of soft to hard silt/silty clay/sandy silt was encountered below fill/sand at all boreholes except 20-1S, 20-5S, 20-6S and 20-8. The deposit was in a moist to wet condition and contained traces to some sand, trace gravel, shells, clay and organics. The dark brown to black and black to grey silt/silty clay silt extended to depths ranging from 5.20 to 12.50 m.

Although no cobbles or boulders were encountered during the

geotechnical investigation, using 100 to 150 mm boreholes, the proposed excavations will be in soils that went through historic periods of glaciation. As a result, glacial drop stones, ranging from gravel to boulders can be encountered within the overburden.

Shale Bedrock: Grey moist shale was found below the silty clay at boreholes 20-1D, 20-5D and 20-6D at depths ranging from 11.90 to 13.40 m and extended to the maximum depth of all boreholes, at elevations ranging from 63 to 64.4 m.

Groundwater: Upon completion of drilling all the boreholes remained dry.

On September 28, 2020, groundwater levels were measured at depths ranging from 2.25 to 11.29 m in all monitoring wells.

On October 1, 2020, groundwater levels were measured at depths ranging from 2.28 to 11.40 m in all monitoring wells. On October 5, 2020, groundwater levels were measured at depths ranging from 2.26 to 11.26 m in all monitoring wells. On October 9, 2020, groundwater levels were measured at depths ranging from 2.26 to 11.55 m in all monitoring wells.

On October 14, 2020, groundwater levels were measured at depths ranging from 2.25 to 11.20 m in all monitoring wells. On October 19, 2020, groundwater levels were measured at depths ranging from 2.27 to 11.64 m in all monitoring wells. The results are summarized on the Record of Borehole Sheets in Appendix C and Table 1.

4.2 GROUNDWATER LEVEL MONITORING

All current and past groundwater monitoring data is presented in Table 1. It should be noted that groundwater levels are subject to seasonal fluctuations. All groundwater levels were measured manually using an electric water level meter and with respect to the geodetic borehole elevations within the property boundary. The monitoring wells must be decommissioned, prior to construction, in accordance with Regulation 903 by a qualified contractor.

The interpreted groundwater flow direction is based on the 2020 rounds of water

table elevation measurements. The groundwater levels were monitored from September to October 2020 as part of the six rounds of water level readings. The interpreted local direction of hydraulic movement across the Site is inferred to be in a southern direction, towards Lake Ontario.

4.3 GROUNDWATER QUALITY

The groundwater sample collected from BH20-5S in September 2020 was analyzed for the City of Toronto Sewers By-Law criteria. The results of chemical analysis (Table 2) indicate that the sample complies with the *Table 1 Limits for Sanitary & Combined Sewers Discharge* for all parameters analyzed. The following exceedances were recorded for the *Table 2 Limits for Storm Sewer Discharge*: Total Cyanide (0.17 mg/L vs. 0.02 mg/L), Total Manganese (0.208 mg/L vs. 0.05 mg/L) and Total Zinc (0.065 mg/L vs. 0.04 mg/L).

4.4 GROUNDWATER DISCHARGE ASSESSMENT

Presently, the groundwater onsite can be discharged to the City sanitary or combined sewer system with no additional filtration or treatment. A filtration/treatment system cyanide, manganese and zinc would be required prior to discharging to the storm sewer system. A dewatering contractor should be approached to explore the possibility of treatment if discharge to the storm sewer is required.

5.0 REVIEW AND EVALUATION

5.1 TEMPORARY DEWATERING ASSESSMENT

The excavation for the proposed four level underground parking structure will extend into shale bedrock. Positive dewatering such as well points will be required for the proposed excavation above shale. Onsite soils might be subject to localized piping during dewatering. Creation of piping channels may result in a substantial increase in the volume of both temporary dewatering and permanent drainage.

In addition, the (weathered) sedimentary bedrock can be fractured, fissured, or contain water-bearing bedding planes. When these bedding planes are intercepted in rock excavation, a substantial amount of water, often under significant hydrostatic head, may be encountered. The depths and condition of shale bedrock vary across the Site; therefore, its quality should be confirmed during shoring installation and general excavation through inspections in the field.

For the proposed four underground levels, groundwater is required to be drawn down a minimum of 1 m below the underside of the footing. However, for the purpose of temporary/construction dewatering, given the encountered subsurface conditions, groundwater cannot be lowered with well points below the average top elevation of shale bedrock at approximately 64.40 masl.

Localized trenches and sumps can be used within bedrock to lower the water level below the underside of the P4 slab and footings. The assumed foundation elevation is approximately 61.75 masl. Therefore, groundwater will need to be lowered to an elevation of 60.75 masl. This result is preliminary and should be confirmed during the construction phase and final stage of detailed shoring.

The average ground water level recorded in the monitoring wells is taken as the September 2020 readings at an elevation of 72.11 masl (Table 3), representing an approximate 11.35 m hydrostatic head requiring dewatering. The size of the shoring plan layout was assumed to cover approximately 76 m by 58 m.

Theoretically, the groundwater drawdown for a single well pumping can be described as:

$$Q = -2\pi rKh \frac{dh}{dr} \quad (1)$$

And further we have:

$$h^2 = -\frac{Q}{\pi K} \ln(r / r_w) + h_w^2 \quad (2)$$

Where:

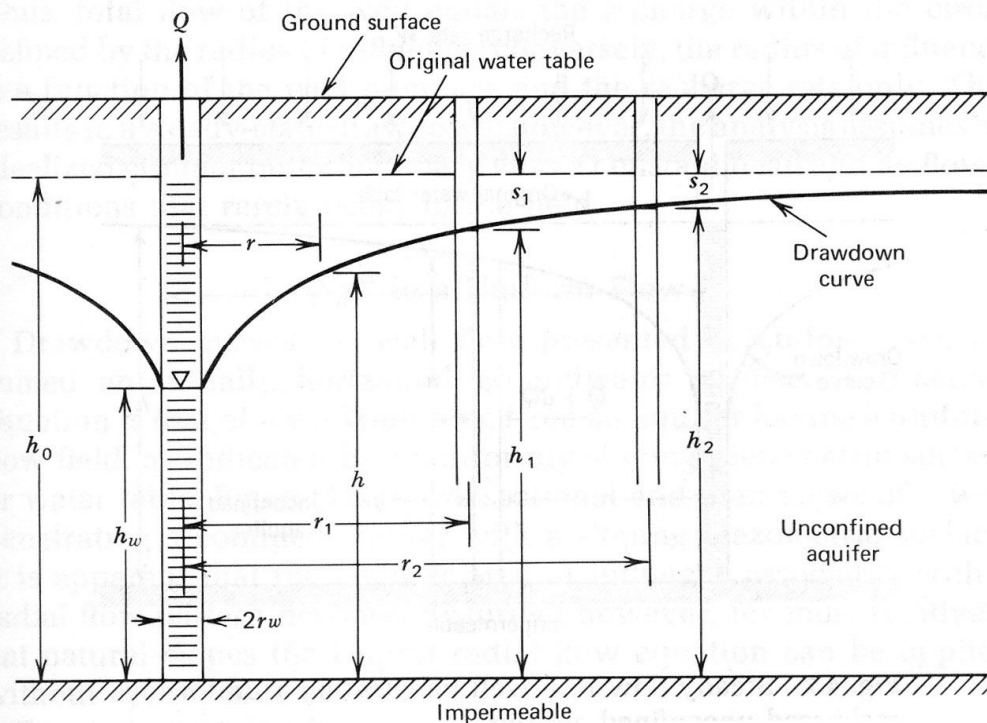
h [m] is the height of the water table above an impervious base

Q [m^3/day] is the rate of pumping discharge

K [m/day] is hydraulic conductivity

R [m] is the radius from the centre of well location

r_w [m] is the radius of pumping well (see Schematic A below).



Schematic A: Radial flow to an unconfined aquifer (Todd 1980)

5.1.1 Numerical Analysis

The abovementioned Site parameters were used to calculate the estimated steady state discharge rate for temporary construction dewatering. Groundwater monitoring data is presented in Table 3. The calculations for temporary dewatering rates are shown in Table 4.

From the observed soil types and based on soil sample descriptions (*Todd, 1980; Mays, 2001; and Craig, 2004*) and the Single Well Response Test by InSitu Contractors Inc. (Appendix E), the average hydraulic conductivity (K) of the aquifer was conservatively estimated at 0.3 m/day. The estimated steady state discharge rate for temporary construction dewatering was calculated at 249 m³/day (46 USG/min), with a safety factor of 1.50.

The initial drawdown pumping rate would be higher to relieve the stored groundwater pressure (prior to the start of construction). Considering the soils onsite being mainly a mixture of sandy silt/silty clay and shale, the average specific yield is estimated as 3%. The total yield from the groundwater stored within the soil pore would be about 1,505 m³.

The additional discharge rate to remove the groundwater store in the pore spaces during initial drawdown could range from 38 m³/day for a 40-day drawdown period to 50 m³/day for a 30-day drawdown period. A factor of two should be applied to account for unforeseen conditions, including potential impact of wet weather conditions and fluctuations in the groundwater table.

Additional pumping may be required to remove surface water from the Site. Assuming a rainfall event of 25 mm over a 24 hour period, about 110 m³/day of water may need to be removed from the Site following rain events.

Accordingly, the following pumping rates are required:

	Typical	Maximum	Units
Groundwater	249	349	m ³ /day
Precipitation	0	110	m ³ /day
Total	249	459	m ³ /day

5.2 PERMANENT FOUNDATION DRAIN FLOW RATES

For the proposed redevelopment, the ground finished floor elevation (FFE) is expected to be at an Elevation of 77.30 meters above sea level (masl). The P4 FFE will be at an approximate elevation of 63.24 masl. A sub-floor Private Water Drainage System (PWDS) with perimeter/underfloor weeping tile is proposed. The invert of the PWDS is assumed to be at an approximate elevation of 62.75 masl.

The proposed PWDS is shown on Drawing No. 2. The slotted pipes should slope to a sump at a minimum 1% slope. Perimeter drainage pipes, with a positive gravity outlet, should be solid PVC with a minimum of 0.5% slope. In addition, silt traps must be provided at convenient/accessible locations.

5.2.1 Numerical Analysis

The abovementioned Site parameters were used to calculate the estimated steady state discharge rate for the PWDS. Groundwater monitoring data is presented in Table 3. The calculations for permanent drainage flow rates are shown in Table 5.

From the observed soil types and based on soil sample descriptions (*Todd, 1980; Mays, 2001; and Craig, 2004*) and the Single Well Response Test by InSitu Contractors Inc, the average hydraulic conductivity (K) of the aquifer was estimated at 0.05 m/day due to the presence of shale bedrock.

The estimated steady state discharge rate/average daily flow rate for the PWDS was calculated at approximately 31 m³/day (6 USG/min) with a safety factor of 1.0. The peak flow rate was calculated to be 46 m³/day (8 USG/min) by applying a safety factor of 1.50.

Please note that due to the presence of bedding planes/vertical fissures in the bedrock, the discharge volume might increase with time. Monitoring of permanent sumps is recommended for quality and quantity of discharge.

5.3 MECP PERMIT TO TAKE WATER REQUIREMENT

The Permit to Take Water (PTTW) requirements for construction site dewatering have been updated to the current O.Reg.63/16 amendment to Environmental Protection Act. In accordance with the updated regulation, construction site dewatering will require a complete PTTW application when water takings greater than 400,000 L/day are predicted. Groundwater taking between 50,000 L/day and 400,000 L/day will require a limited PTTW via an online application process through the Environmental Activity and Sector Registry (EASR). Groundwater taking from a proposed building structure by means of a PWDS will require a PTTW when water taking is greater than 50,000 L/day. The complete permit application process for PTTW takes approximately twelve weeks to review and is required prior to applying for the discharge permits.

The maximum anticipated temporary dewatering discharge rate was calculated at approximately 459 m³/day. Therefore, a complete PTTW application will be required to be applied for with the MECP.

The maximum/peak flow rate from the PWDS was calculated at approximately 46 m³/day. Therefore, a PTTW application for the PWDS will not be required for the proposed building.

In accordance with the current Ontario Regulation 387/04 for Water Taking, every person to whom a permit has been issued under Section 34 of the Act shall collect and record data on the volume of water taken daily. The data collected shall be measured by a flow meter or calculated using a method acceptable to a Director.

5.4 TORONTO WATER DISCHARGE PERMIT REQUIREMENTS

The City of Toronto – Toronto Water requires that any private water to be discharged into the City sewer system must have a permit or agreement in place in order to discharge; this applies to all water not purchased from the City water supply. For temporary dewatering during the construction phase, this includes all groundwater and storm water that is collected or encountered during site excavation. For the PWDS, this includes all groundwater that is constantly

pumped as a result of the PWDS elevation located below the groundwater table elevation or through storm water infiltration.

The groundwater quality sample collected in September 2020 indicates that the water onsite could be discharged into the City sanitary and combined sewer system without additional filtration/treatment required. A filtration and treatment system for cyanide, manganese and zinc would be required prior to discharging into the storm sewer system. A short-term temporary discharge permit must be applied for construction dewatering with Toronto Water.

A long-term permanent discharge permit must be applied for the proposed PWDS since the drainage system is located below the long-term groundwater elevation. The permanent discharge permit will involve coordination with the mechanical and site servicing consultant to provide calculations and drawing specifications for the ultimate discharge location and the sampling port required by Toronto Water.

5.5 ENVIRONMENTAL PROTECTION

The Site is located within the Lake Ontario drainage basin and the Lake is approximately 170 m south of the Site. There are no ecological features, areas of natural significance, or provincially significant wetlands in the vicinity of the Site. The Site is located in the City of Toronto urban environment, which obtains its municipal water supply from Lake Ontario. Therefore, there are no potable groundwater users within the vicinity of the Site.

The proposed redevelopment plan will remove all the overburden to a depth of approximately 15 to 16 mbgs, from the interior Site area. Temporary groundwater dewatering will lower the groundwater table to below the underground parking foundation levels. The extracted water will be discharged into the sanitary sewer or, with some filtration or treatment, into the storm sewer. Updated groundwater monitoring will be conducted by the dewatering contractor prior to and during construction activities to ensure that no additional adverse groundwater impacts are identified throughout the project's construction.

6.0 CONCLUSIONS AND RECOMMENDATIONS

McClymont&Rak Engineers Inc. was retained to conduct a Geohydrology Assessment for the Site in relation to the proposed redevelopment. The Site is currently used as an asphalt pave parking lot in the western portion, sales centre in the northeast and construction storage (for Phase II of the development) in the southeast portion.

The Site is proposed for mixed-use residential/commercial redevelopment with a forty-five [45] storey building with a eleven [11] storey podium (Building F) and a eleven [11] storey building (Building A) plus mechanical penthouse over four [4] levels of below grade parking (Appendix B).

The finished floor elevation (FFE) at ground level is expected to be at an approximate elevation of 77.30 meters above sea level (masl). The P4 level is expected to be at an elevation of 63.24 masl.

Presently, it is assumed that the proposed building structure can be supported on spread/strip footings. The size of the shoring plan layout was assumed to cover approximately 76 m by 58 m.

A sub-floor Private Water Drainage System (PWDS) with perimeter weeping tile will be utilized. A soldier pile and lagging shoring system will be sufficient for the Site except where adjacent structures exist where a caisson wall will be utilized.

The excavation for the proposed four level underground parking structure will extend into shale bedrock. Positive dewatering such as well points will be required for the proposed excavation above shale. Onsite soils might be subject to localized piping during dewatering. Creation of piping channels may result in a substantial increase in the volume of both temporary dewatering and permanent drainage.

In addition, the (weathered) sedimentary bedrock can be fractured, fissured, or contain water-bearing bedding planes. When these bedding planes are intercepted in rock excavation, a substantial amount of water, often under significant hydrostatic head, may be encountered. The depths and condition of shale bedrock vary across the Site; therefore, its quality should be confirmed during shoring installation and

general excavation through inspections in the field.

For the proposed four underground levels, groundwater is required to be drawn down a minimum of 1 m below the underside of the footing. However, for the purpose of temporary/construction dewatering, given the encountered subsurface conditions, groundwater cannot be lowered with well points below the average top elevation of shale bedrock at approximately 64.40 masl.

Localized trenches and sumps can be used within bedrock to lower the water level below the underside of the P4 slab and footings. The assumed foundation elevation is approximately 61.75 masl. Therefore, groundwater will need to be lowered to an elevation of 60.75 masl. This result is preliminary and should be confirmed during the construction phase and final stage of detailed shoring.

The average ground water level recorded in the monitoring wells is taken as the September 2020 readings at an elevation of 72.11 masl (Table 3), representing an approximate 11.35 m hydrostatic head requiring dewatering.

The anticipated temporary construction dewatering was calculated between 249 – 459 m³/day (46 – 84 USG/min). Therefore, based on the amended O.Reg. 63/16 to the Environmental Protection Act, a complete PTTW application will be required from the MECP and a temporary discharge permit will be required from the Toronto Water.

The maximum/peak discharge rate for the PWDS was calculated at approximately 46 m³/day (8 USG/min). Therefore, a PTTW will not be required from the MECP for the PWDS. A long-term permanent discharge permit will be required from Toronto Water since the drainage will be installed below the long-term groundwater elevation.

The selected dewatering contract must be performance driven and the contractor must provide a performance bond. In addition, upon completion of system's installation, the contractor must produce a written statement that "The system installed is robust enough to lower and maintain groundwater at least 1.0 m below the lowest footing elevation, without impacting the integrity of shoring or foundation soils."

Presently, the groundwater onsite can be discharged to the City sanitary or combined sewer system with no additional filtration or treatment. A filtration and treatment system for cyanide, manganese and zinc would be required prior to discharging to the storm sewer system. A dewatering contractor should be approached to explore the possibility of treatment if discharge to the storm sewer is required.

The application process, where a PTTW is required, can take at least three months for a review by the MECP and is required to be approved prior to applying for discharge permits. It is recommended that applications to Toronto Water for discharge permits be applied for at least three months prior to the required start dates. Applications are to be supported by drawings and calculations provided by the mechanical and the site servicing consultant and coordination is required amongst all disciplines. The information provided in this report can be relied upon by Toronto Water – Environmental Monitoring & Protection Unit (TW-EM&P) regarding the short and long term Sanitary Discharge Agreement applications for the Site.

7.0 REFERENCES

1. Ontario Ministry of the Environment. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*. April 15, 2011.
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4. D.K. Todd, *Groundwater Hydrology*, 2nd Edition, John Wiley & Sons, New York, 1980.
5. L.W. Mays, *Water Resources Engineering*, 1st Edition, John Wiley & Sons, New York, 2001.
6. MCR report titled, *Preliminary Geotechnical Report, Proposed Residential/Commercial Development, Pier 27, Phase 3, Buildings A and F, 25 & 35 Queens Quay East, Toronto, Ontario*, prepared for Pier 27 Toronto (Northeast) Inc., dated November 2020.

8.0 STATEMENT OF LIMITATIONS

McClymont&Rak Engineers, Inc. (MCR) conducted the work associated with this report in accordance with the scope of services, time and budget limitations imposed for this work. The work has been conducted according to reasonable and generally accepted local standards for an environmental consultant at the time of the work. No other warranty or representation, expressed or implied, is included or intended in this report.

The work was designed to provide an overall assessment of the environmental conditions at the Site. The conclusions presented in this report are based on the information obtained during the investigation. The work is intended to reduce the client's risk with respect to environmental impairment. No work can completely eliminate the possibility of further environmental impairment on the Site.

It should be noted that subsurface conditions might vary at locations and depths other than those locations where borings, surveys or explorations were made by MCR. Other contaminants, not tested for in this work, may also potentially be present on the Site. Even with exhaustive investigation, it is not possible to warranty the Site will be free of contaminants. Should conditions, not observed during the work, become apparent, MCR should be immediately notified to assess the situation and conduct additional work, where required. The findings of this report are based on conditions as they were observed at the time of the work.

No assurance is made regarding changes in conditions subsequent to the time of the work. Remediation cost estimates is based on the available information. The estimated costs for remediation only represent the costs for the clean-up of known contaminants that have been identified during the work. Additional costs may be incurred as a result of other contaminants or areas of contamination identified by subsequent work.

Regulatory statutes are subject to interpretation. These statutes and their interpretation may change over time, thus these issues should be reviewed with appropriate legal counsel.

MCR relied on information provided by others in this report. MCR cannot guarantee the accuracy, completeness and reliability of the information provided by others, although MCR staff attempted to seek clarification on information provided and verifies authenticity, where practical.

The report and its attachments were prepared for and made available for the sole use of the client. MCR will not be responsible for any use or interpretation of the information contained in this report by any other party without the prior expressed written consent of MCR.

9.0 CLOSURE

In accordance with your request and authorization, McClymont and Rak Engineers Inc. completed this Geohydrology Assessment Report. This report presented the methodology, findings and conclusions of the investigation. The Statement of Limitations for all work performed as part of this investigation is included.

We trust that the information provided in this report is sufficient for your present requirements. Should you have any further questions, please do not hesitate to contact our office. Thank you for retaining McClymont&Rak Engineers, Inc. for this project.

Respectfully,
McCLYMONT&RAK ENGINEERS INC.



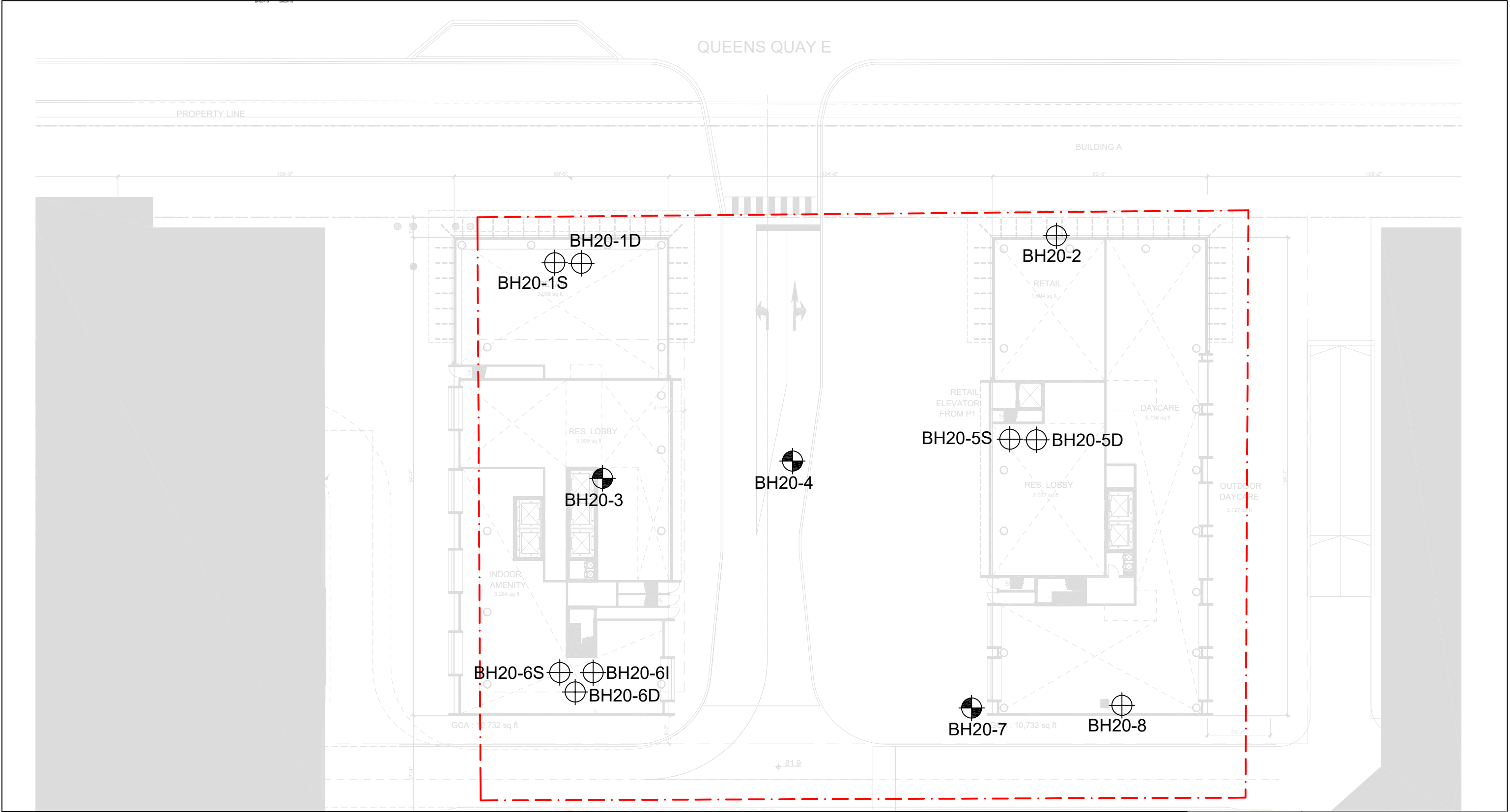
Prepared By:
Richard Sukhu, B.Eng.



Reviewed By:
Lad Rak, P.Eng., M.Eng., QP_{ESA}

Date of Issue: March 1, 2021

FIGURES



LEGEND:

- PHASE ONE PROPERTY BOUNDARY
- BOREHOLE/MONITORING WELL INSTALLED BY MCR, 2020

PROJECT NORTH

TRUE NORTH

0 5 10 20

SCALE (m)

MCR

McCLYMONT & RAK
ENGINEERS, INC.
GEO-ENVIRONMENTAL CONSULTANTS

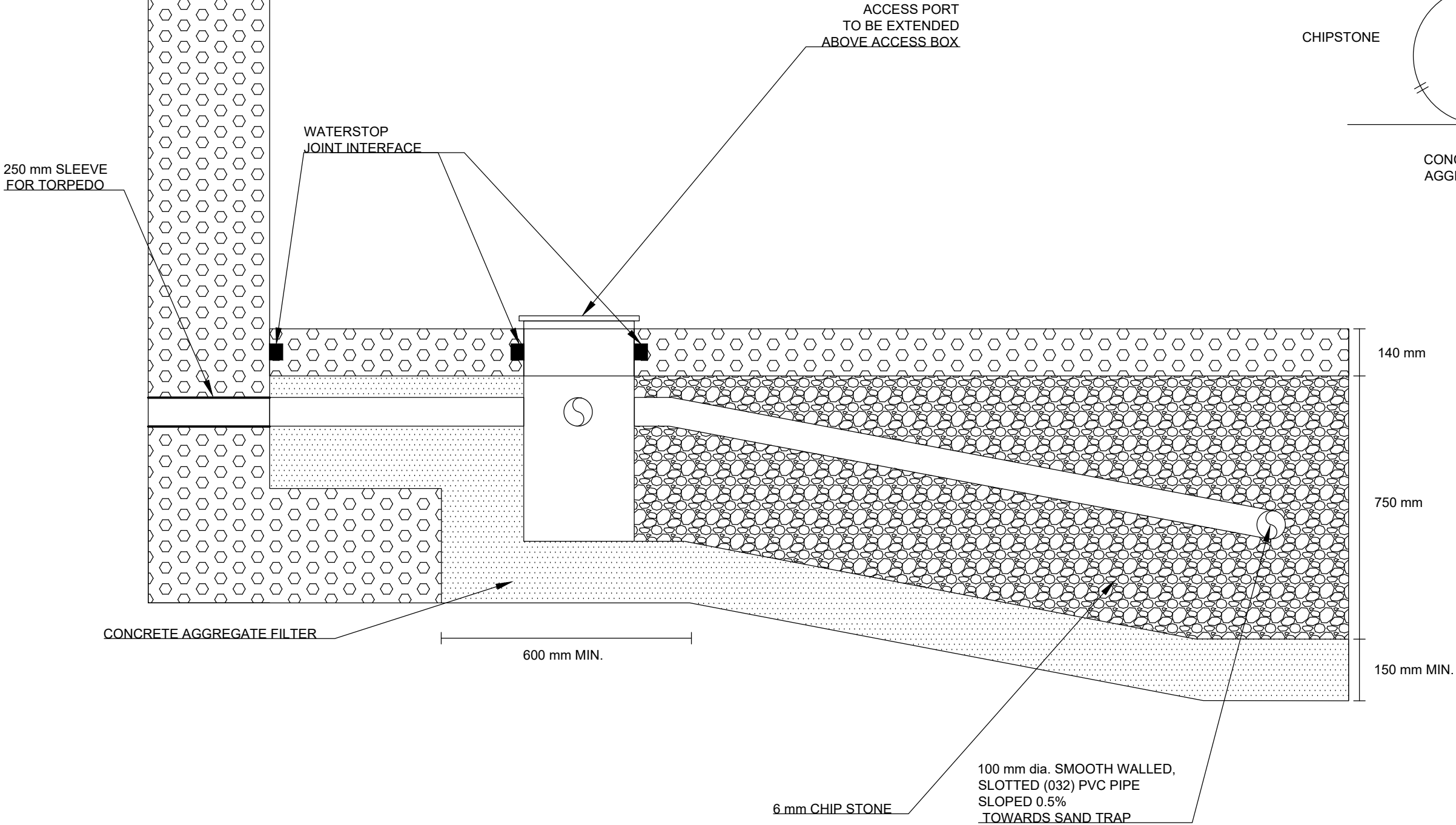
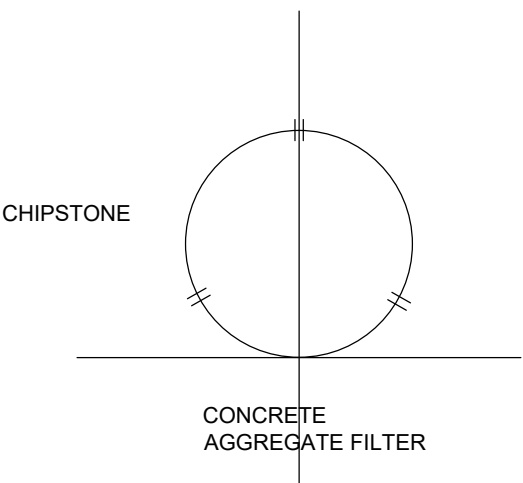
PIER 27, YONGE STREET & QUEENS QUAY EAST, TORONTO, ONTARIO

**BOREHOLE
LOCATION PLAN**

Project No. G4842	Date OCTOBER 2020	Drawing No. 1
----------------------	----------------------	------------------

Drawing Notes: Image drafted from property survey, Toronto Maps, Google Maps, and site inspections. Not for construction purposes.

CROSS SECTION:
100 mm dia.
SMOOTH PVC PIPE



McCLYMONT & RAK
ENGINEERS, INC.
GEO-ENVIRONMENTAL CONSULTANTS

PRIVATE WATER
DRAINAGE SYSTEM

Scale: NTS

Drawing No. 2

TABLES

McCLYMONT AND RAK ENGINEERS INC.
GEO-ENVIRONMENTAL CONSULTANTS

TABLE 1
CONSTRUCTION DETAILS AND ELEVATION OF MONITORING WELLS

MONITORING WELL ID	GROUND SURFACE ELEVATION (masl)	WATER LEVEL (mbgs)	GROUNDWATER ELEVATION (masl)	DATE OF MEASUREMENT (mm/dd/yyyy)	DEPTH OF WELL (mbgs)	DEPTH OF BENTONITE (mbgs)	LENGTH OF SCREEN (m)	INSIDE DIAMETER OF PIPE (mm)	TOP OF MONITORING WELL
BH 20-1S	76.93	2.55	74.38	9/28/2020	3.96	0.30	3.05	50	FLUSH MOUNT
		2.58	74.35	10/1/2020					
		2.61	74.32	10/5/2020					
		2.62	74.31	10/9/2020					
		2.59	74.34	10/14/2020					
		2.64	74.29	10/19/2020					
BH 20-1D	76.93	7.46	69.47	9/28/2020	12.19	9.75	3.05	50	FLUSH MOUNT
		7.50	69.43	10/1/2020					
		7.54	69.39	10/5/2020					
		7.56	69.37	10/9/2020					
		7.50	69.43	10/14/2020					
		7.50	69.43	10/19/2020					
BH 20-2	76.98	2.71	74.27	9/28/2020	5.47	1.01	3.05	50	FLUSH MOUNT
		2.69	74.29	10/1/2020					
		2.72	74.26	10/5/2020					
		2.72	74.26	10/9/2020					
		2.70	74.28	10/14/2020					
		2.78	74.20	10/19/2020					
BH 20-5S	77.03	2.55	74.48	9/28/2020	4.27	0.60	3.05	50	FLUSH MOUNT
		2.56	74.47	10/1/2020					
		2.55	74.48	10/5/2020					
		2.57	74.46	10/9/2020					
		2.58	74.45	10/14/2020					
		2.56	74.47	10/19/2020					
BH 20-5D	77.03	11.29	65.74	9/28/2020	13.41	9.45	3.05	50	FLUSH MOUNT
		11.40	65.63	10/1/2020					
		11.26	65.77	10/5/2020					
		11.55	65.48	10/9/2020					
		11.20	65.83	10/14/2020					
		11.64	65.39	10/19/2020					
BH 20-6S	77.06	2.66	74.40	9/28/2020	4.57	0.60	3.05	50	FLUSH MOUNT
		2.66	74.40	10/1/2020					
		3.36	73.70	10/5/2020					
		2.73	74.33	10/9/2020					
		2.69	74.37	10/14/2020					
		2.69	74.37	10/19/2020					
BH 20-6I	77.06	2.84	74.22	9/28/2020	9.14	5.49	3.05	50	FLUSH MOUNT
		2.89	74.17	10/1/2020					
		2.90	74.16	10/5/2020					
		2.90	74.16	10/9/2020					
		2.82	74.24	10/14/2020					
		2.83	74.23	10/19/2020					
BH 20-6D	77.06	9.80	67.26	9/28/2020	12.19	9.75	3.05	50	FLUSH MOUNT
		9.82	67.24	10/1/2020					
		10.00	67.06	10/5/2020					
		9.83	67.23	10/9/2020					
		9.80	67.26	10/14/2020					
		9.84	67.22	10/19/2020					
BH 20-8	77.05	2.25	74.80	9/28/2020	4.57	0.91	3.05	50	FLUSH MOUNT
		2.28	74.77	10/1/2020					
		2.26	74.79	10/5/2020					
		2.26	74.79	10/9/2020					
		2.25	74.80	10/14/2020					
		2.27	74.78	10/19/2020					
Min	76.93	2.25	65.39	-	3.96	-	-	-	-
Max	77.06	11.64	74.80	-	13.41	-	-	-	-
Average	77.01	4.95	72.06	-	7.75	-	-	-	-

NOTE:

mbgs - meters below ground surface

masl - meters above sea level

N/A - Not Applicable

NF - Not Found

McCLYMONT AND RAK ENGINEERS INC.
GEO-ENVIRONMENTAL CONSULTANTS

TABLE 2
GROUNDWATER ANALYTICAL RESULTS - CITY OF TORONTO SEWERS BY-LAW DISCHARGE CRITERIA
MCR JOB#: GE4842
SITE ADDRESS: 15 Queens Quay East, Toronto, ON

PARAMETER	UNITS	LIMITS FOR STORM SEWER DISCHARGE	LIMITS FOR SANITARY & COMBINED SEWERS DISCHARGE	BH20-5S
				30-Sep-20
pH	pH Units	6.0 - 9.5	6.0 - 11.5	8.01
Total Suspended Solids	mg/L	15	350	7.6
Fluoride (F-)	mg/L	-	10	0.73
Total Kjeldahl Nitrogen (TKN)	mg/L	-	100	8.57
Total Phosphorus (P)	mg/L	0.4	10	0.1220
Total Cyanide (CN)	mg/L	0.02	2	0.17
Escherichia Coli	CFU/100mL	200	-	1
Total Aluminum (Al)	mg/L	-	50	2.09
Total Antimony (Sb)	mg/L	-	5	0.0019
Total Arsenic (As)	mg/L	0.02	1	0.0091
Total Cadmium (Cd)	mg/L	0.008	0.7	0.000067
Total Chromium (Cr)	mg/L	0.08	4	<0.0050
Total Cobalt (Co)	mg/L	-	5	0.0023
Total Copper (Cu)	mg/L	0.04	2	0.0055
Total Lead (Pb)	mg/L	0.12	1	0.0231
Total Manganese (Mn)	mg/L	0.05	5	0.208
Total Mercury (Hg)	mg/L	0.0004	0.01	0.0000227
Total Molybdenum (Mo)	mg/L	-	5	0.0071
Total Nickel (Ni)	mg/L	0.08	2	0.0063
Total Selenium (Se)	mg/L	0.02	1	<0.00050
Total Silver (Ag)	mg/L	0.12	5	<0.00050
Total Tin (Sn)	mg/L	-	5	0.0011
Total Titanium (Ti)	mg/L	-	5	0.0772
Total Zinc (Zn)	mg/L	0.04	2	0.065
Chromium (VI)	mg/L	0.04	2	<0.00050
Biological Oxygen Demand	mg/L	15	300	<3.0
Total Oil & Grease (Animal/Vegetable)	mg/L	-	150	<5.0
Total Oil & Grease Mineral/Synthetic	mg/L	-	15	<2.5
Phenols-4AAP	mg/L	0.008	1	<0.0010
Benzene	µg/L	2	10	<0.50
Chloroform	µg/L	2	40	<1.0
1,2-Dichlorobenzene	µg/L	5.6	50	<0.50
1,4-Dichlorobenzene	µg/L	6.8	80	<0.50
cis-1,2-Dichloroethylene	µg/L	5.6	4000	<0.50
Dichloromethane (Methylene Chloride)	µg/L	5.2	2000	<2.0
trans-1,3-Dichloropropene	µg/L	5.6	140	<0.50
Ethylbenzene	µg/L	2	160	<0.50
1,1,2,2-Tetrachloroethane	µg/L	17	1400	<0.50
Tetrachloroethylene	µg/L	4.4	1000	<0.50
Toluene	µg/L	2	16	<0.50
Trichloroethylene	µg/L	7.6	400	<0.50
o-Xylene	µg/L	-	-	<0.50
m+p-Xylenes	µg/L	-	-	<1.0
Xylene (Total)	µg/L	4.4	1400	<1.1
Total PAHs (18 PAHs)	µg/L	2	5	<1.7
Bis(2-ethylhexyl)phthalate	µg/L	8.8	12	<2.0
3,3'-Dichlorobenzidine	µg/L	0.8	2	<0.40
Di-n-butylphthalate	µg/L	15	80	<1.0
Pentachlorophenol	µg/L	2	5	<1.0
Total PCBs	µg/L	0.4	1	<0.040
Nonylphenol	µg/L	1	20	<1.0
Total Nonylphenol Ethoxylates	µg/L	10	200	<2.0

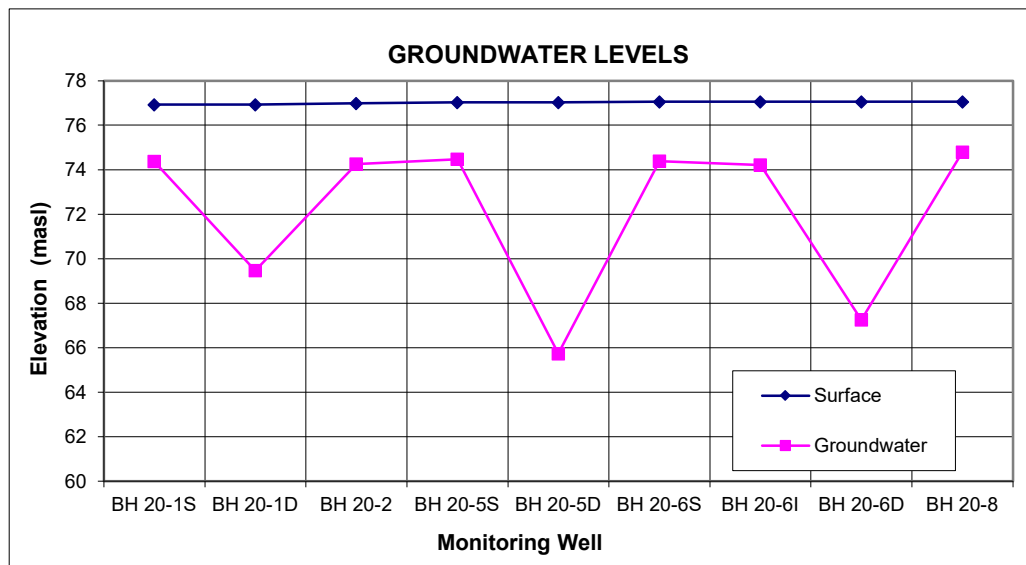
BOLD	Exceeds Criteria - Table 1 Sanitary and Combined Sewer
BOLD	Non-Detect Exceeds Criteria - Table 1 Sanitary and Combined Sewer
BOLD	Exceeds Criteria - Table 2 Storm Sewer Criteria
BOLD	Non-Detect Exceeds Criteria - Table 2 Storm Sewer Criteria

MCR	McCLYMONT & RAK ENGINEERS, INC.	GROUNDWATER
	GEO-ENVIRONMENTAL CONSULTANTS	

Project: Proposed Residential Development
 Location: 15 Queens Quay East, Toronto, ON
 Date: September-20
 Project #: MG4842

TABLE 3
GROUNDWATER MONITORING DATA

Borehole Number	Surface Elevation	Water Level Depth	Elevation	Monitoring Date	NOTES
	(masl)			(mm/dd/yyyy)	
BH 20-1S	76.93	2.55	74.38	9/28/2020	
BH 20-1D	76.93	7.46	69.47	9/28/2020	
BH 20-2	76.98	2.71	74.27	9/28/2020	
BH 20-5S	77.03	2.55	74.48	9/28/2020	
BH 20-5D	77.03	11.29	65.74	9/28/2020	
BH 20-6S	77.06	2.66	74.40	9/28/2020	
BH 20-6I	77.06	2.84	74.22	9/28/2020	
BH 20-6D	77.06	9.80	67.26	9/28/2020	
BH 20-8	77.05	2.25	74.80	9/28/2020	
Average	77.01	4.90	72.11		
Max			74.80		



MCR	McCLYMONT & RAK ENGINEERS, INC.	GROUNDWATER
	GEO-ENVIRONMENTAL CONSULTANTS	

Project: Proposed Residential Development
 Location: 15 Queens Quay East, Toronto, ON
 Date: September-20
 Project #: MG4842

TABLE 4
DISCHARGE ESTIMATION OF CONSTRUCTION DEWATERING

Site Parameters	Units	
Initial Water Level before Dewatering	72.11	(m)
Lowest Water Level during Construction Dewatering	60.75	(m)
Length of Site X	76.00	(m)
Width of Site W	58.00	(m)
Equivalent Radius r_e	37.46	(m)
Hydraulic Conductivity of Aquifer (k)	0.30	(m/day)
Aquifer Bottom Elevation	58.75	(m)
Applied Radius of Influence (Ro)	63.52	(m)
Height btw Initial Water Level and Aquifer Bottom (H)	13.36	(m)
Height btw Lowest Water Level and Aquifer Bottom (h_w)	2.00	(m)
Radius of Influence (R)	100.98	(m)
Factor of Safety (FS)	1.50	

$$Q = \frac{\pi k (H^2 - h_w^2)}{\ln(R / r)}$$

Estimated steady-state discharge of dewatering	248.87 (m ³ /day)
	46 (USG/min)

MCR	McCLYMONT & RAK ENGINEERS, INC.	GROUNDWATER
	GEO-ENVIRONMENTAL CONSULTANTS	

Project: Proposed Residential Development
 Location: 15 Queens Quay East, Toronto, ON
 Date: September-20
 Project #: MG4842

TABLE 5
DISCHARGE ESTIMATION OF PERMANENT DRAINAGE SYSTEM

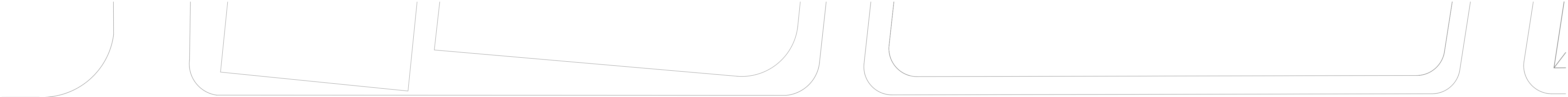
Site Parameters	Units	
Initial Water Level before Dewatering	72.11	(m)
Lowest Water Level under PDS conditions	62.75	(m)
Length of Site X	76.00	(m)
Width of Site W	58.00	(m)
Equivalent Radius r_e	37.46	(m)
Hydraulic Conductivity of Aquifer (k)	0.05	(m/day)
Aquifer Bottom Elevation	62.75	(m)
Applied Radius of Influence (Ro)	21.37	(m)
Height btw Initial Water Level and Aquifer Bottom (H)	9.36	(m)
Height btw Lowest Water Level and Aquifer Bottom (h_w)	0.00	(m)
Radius of Influence (R)	58.83	(m)
Factor of Safety (FS)	1.00	

$$Q = \frac{\pi k (H^2 - h_w^2)}{\ln(R/r)}$$

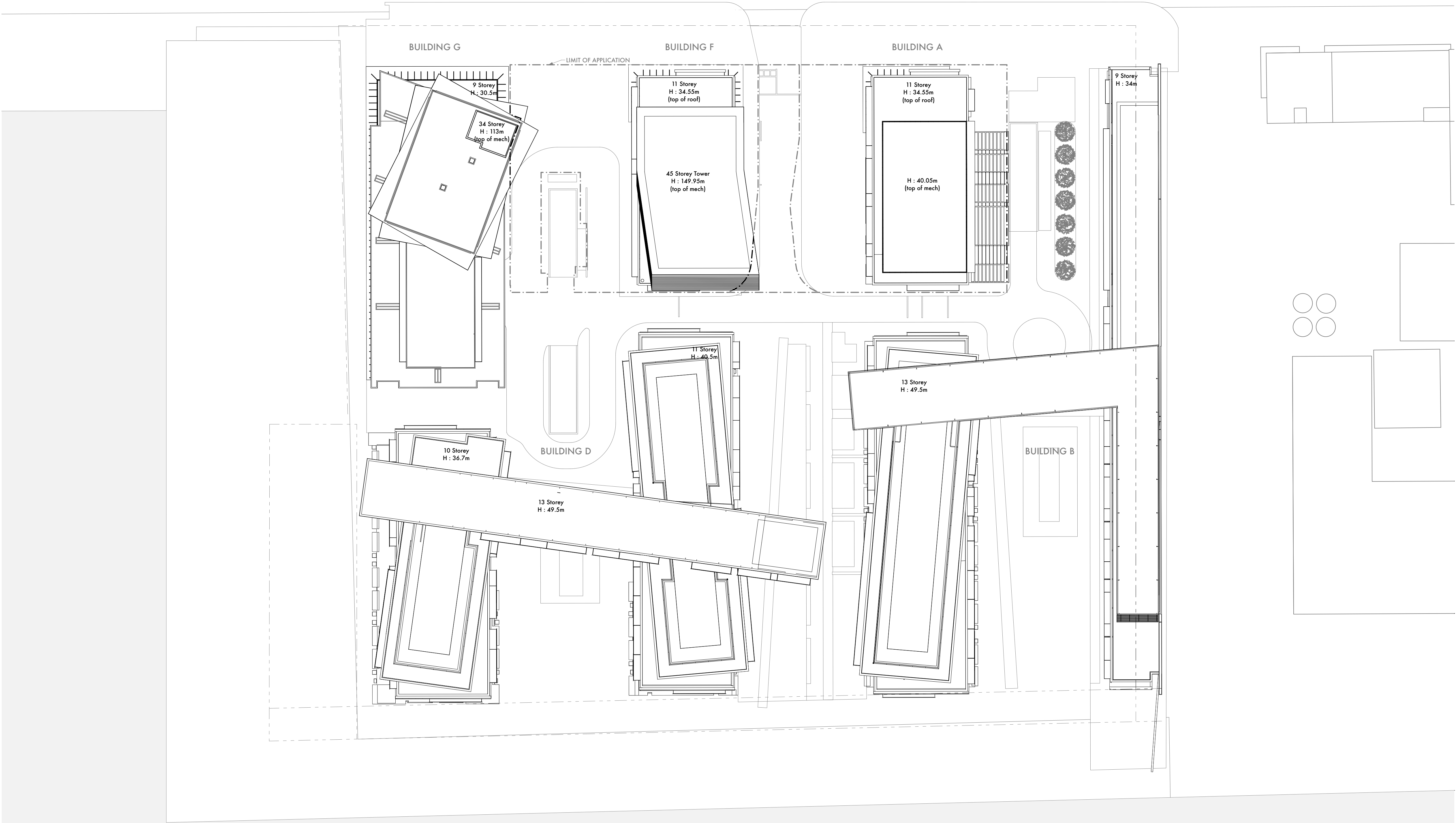
Estimated steady-state discharge of dewatering	30.51 (m ³ /day)	6 (USG/min)
Estimated peak discharge of dewatering	45.77 (m ³ /day)	8 (USG/min)

APPENDIX A

APPENDIX B



QUEENS QUAY E



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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-



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Pier 27 Phase 3
(buildings F and A)
25&35 Queens Quay East

Pier 27 Toronto (Northeast) Inc.
56 The Esplanade, suite 308
Toronto M5E 1A7

Context

Project No.

1:500

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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

35 RESIDENTIAL PARKING SPACES UNDER BUILDING G

61 COMMERCIAL PARKING SPACES

104 RESIDENTIAL PARKING SPACES UNDER BUILDING A & F

344 RESIDENTIAL PARKING SPACES UNDER BUILDING B & D

EXISTING RESIDENTIAL PARKING BUILDING B & D

RESIDENTIAL PARKING BUILDING A & F

RESIDENTIAL PARKING BUILDING G

COMMERCIAL PARKING

aA

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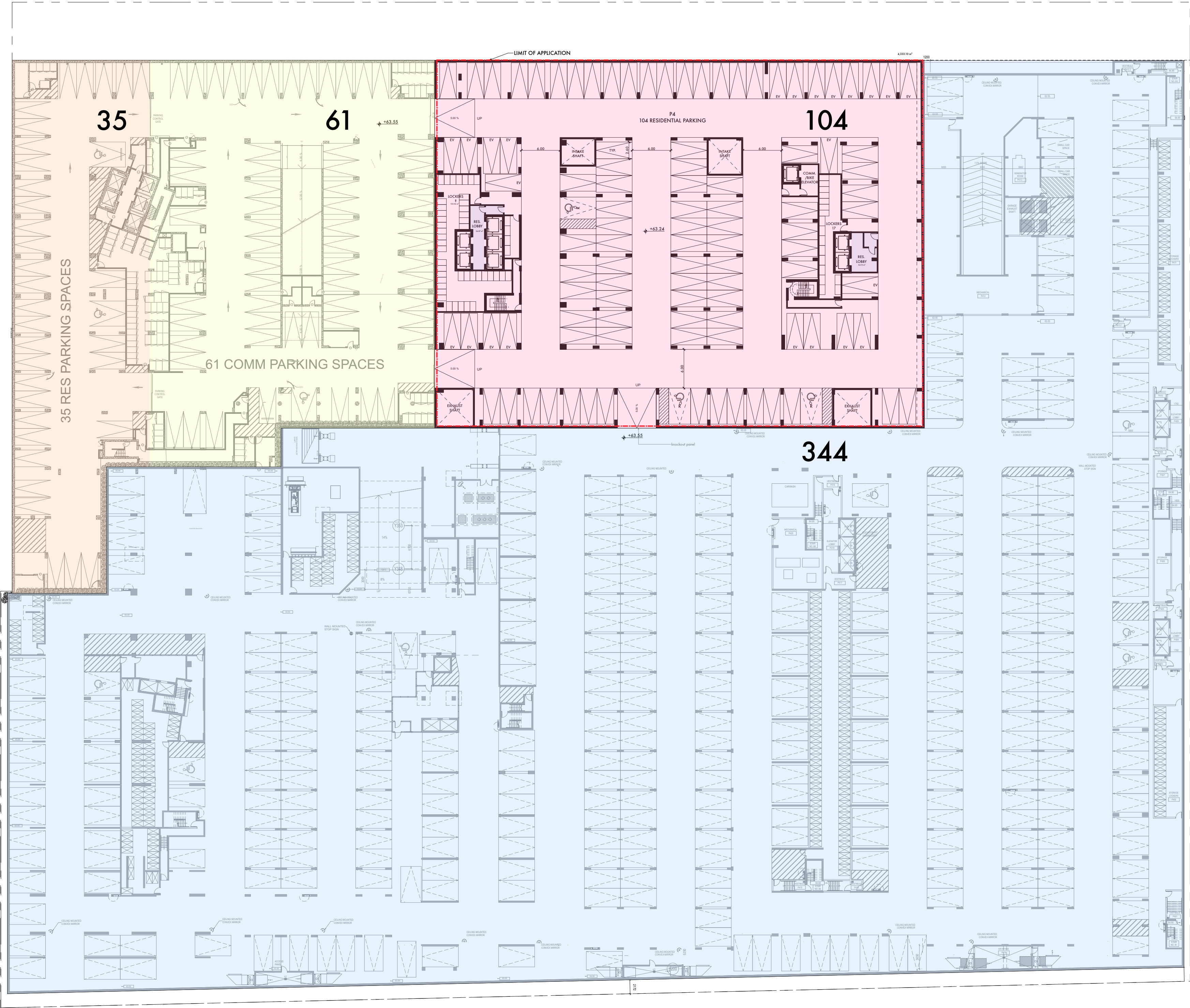
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P4

Project No.

1:400

A.1.1



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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

95 COMMERCIAL PARKING SPACES UNDER BUILDING G

104 RESIDENTIAL PARKING SPACES UNDER BUILDING A & F

338 RESIDENTIAL PARKING SPACES UNDER BUILDING B & G

- EXISTING RESIDENTIAL PARKING BUILDING B & D
- RESIDENTIAL PARKING BUILDING A & F
- COMMERCIAL PARKING

aA

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Pier 27 Phase 3
(buildings F and A)
25&35 Queens Quay East

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Toronto M5E 1A7

P3

Project No.

1:400

A.1.2

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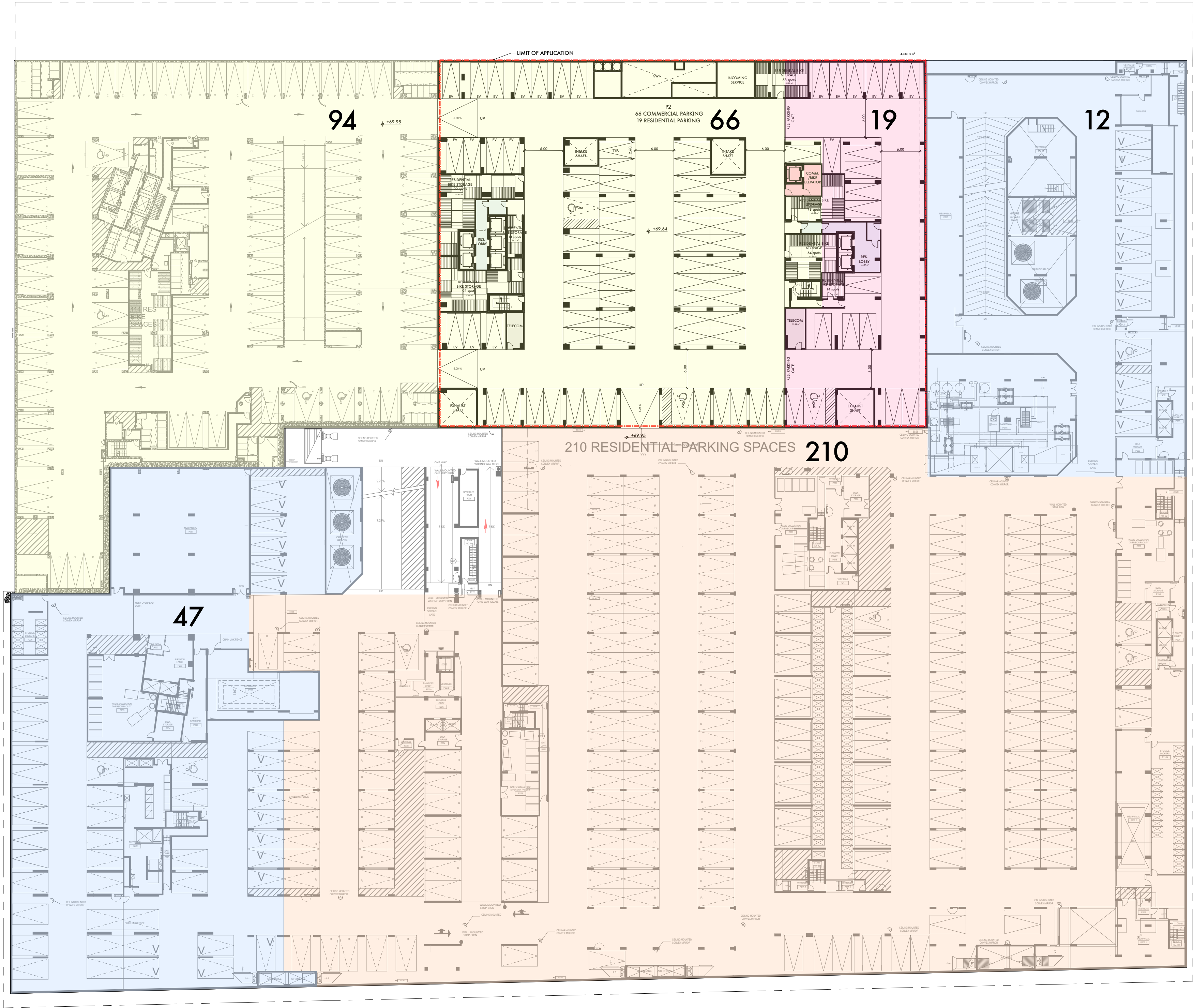
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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

- 94 COMMERCIAL PARKING SPACES UNDER BUILDING G
- 66 COMMERCIAL PARKING SPACES UNDER BUILDING A & F
- 160 TOTAL COMMERCIAL PARKING SPACES ON P2 LEVEL
- 19 RESIDENTIAL PARKING SPACES UNDER BUILDING A & F
- 210 RESIDENTIAL PARKING SPACES FOR BUILDING G
- 59 RESIDENTIAL PARKING SPACES UNDER BUILDING B & D

- EXISTING RESIDENTIAL PARKING BUILDING B & D
- RESIDENTIAL PARKING BUILDING A & F
- RESIDENTIAL PARKING BUILDING G
- COMMERCIAL PARKING



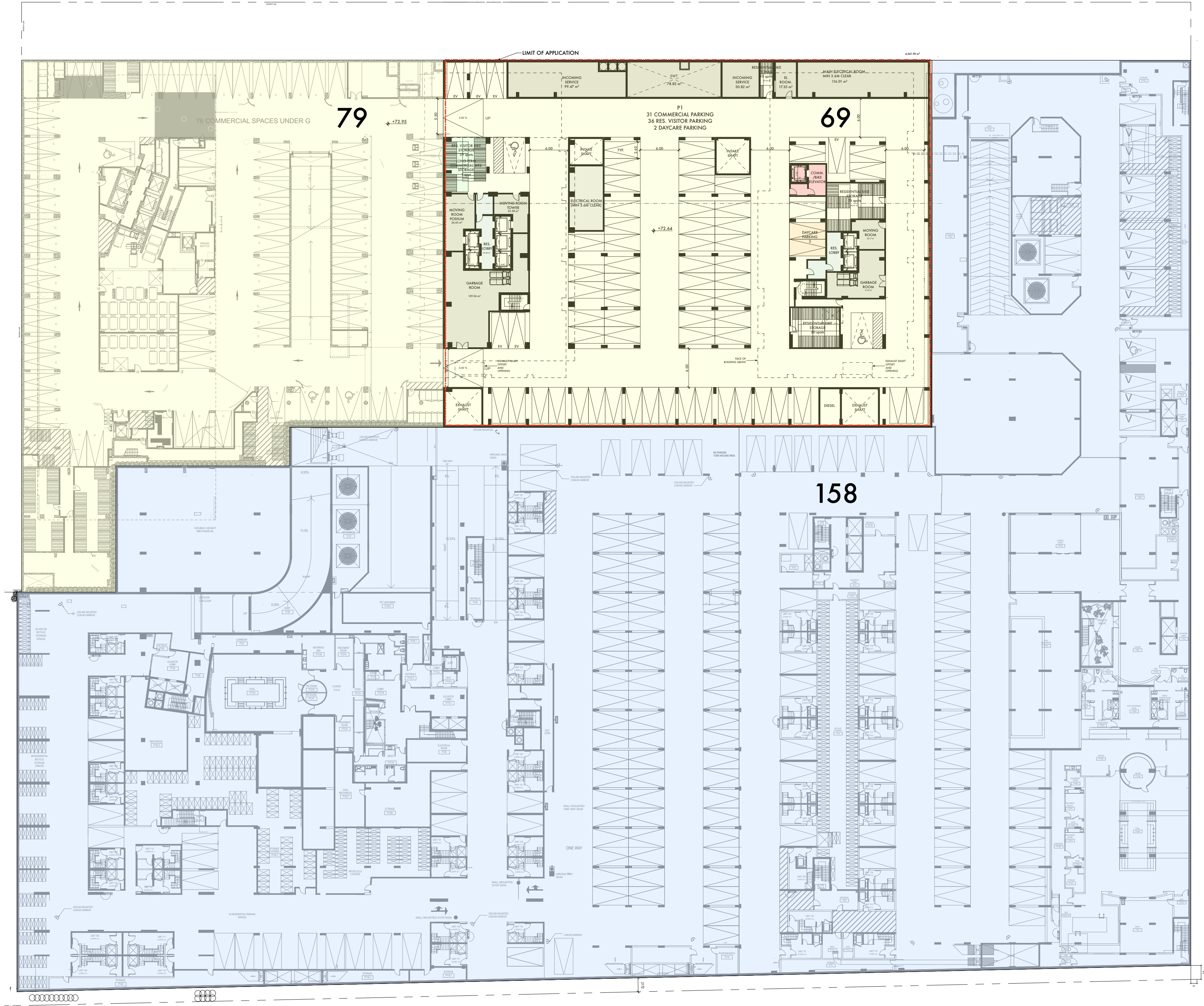
Pier 27 Phase 3
(buildings F and A)
25&35 Queens Quay East

Pier 27 Toronto (Northeast) Inc.
56 The Esplanade, suite 308
Toronto M5E 1A7

P2

Project No.

1:400



- 79 COMMERCIAL PARKING SPACES UNDER BUILDING G
- 31 COMMERCIAL PARKING SPACES UNDER BUILDING A & F
- 112 TOTAL COMMERCIAL PARKING SPACES ON P1 LEVEL
- 2 DAYCARE PARKING SPACES
- 36 RESIDENTIAL VISITOR PARKING SPACES UNDER BUILDING A & F
- 158 RESIDENTIAL PARKING SPACES UNDER BUILDING B & G

- EXISTING RESIDENTIAL PARKING BUILDING B & D
- COMMERCIAL / VISITOR PARKING

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3. Drawings are not to be scaled for construction. The Contractor is to verify all existing conditions and dimensions required to perform the work and report any discrepancies with the Contract Documents to the Architect before commencing any work.

4. Positions of exposed finished mechanical or electrical devices, fittings, and fixtures are indicated on architectural drawings. The locations shown on the architectural drawings govern over the Mechanical and Electrical drawings. Those items not clearly located will be located as directed by the Architect.

5. These drawings are not to be used for construction unless noted below as "Issuance: For Construction"

6. All work is to be carried out in conformance with the Code and Bylaws of the authorities having jurisdiction.

7. The Architect of these plans and specifications gives no warranty or representation to any party about the constructability of the building(s) represented by them. All contractors or subcontractors must satisfy themselves when bidding and at all times ensure that they can properly construct the work represented by these plans.

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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

aA

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Pier 27 Phase 3
(buildings F and A)
25&35 Queens Quay East

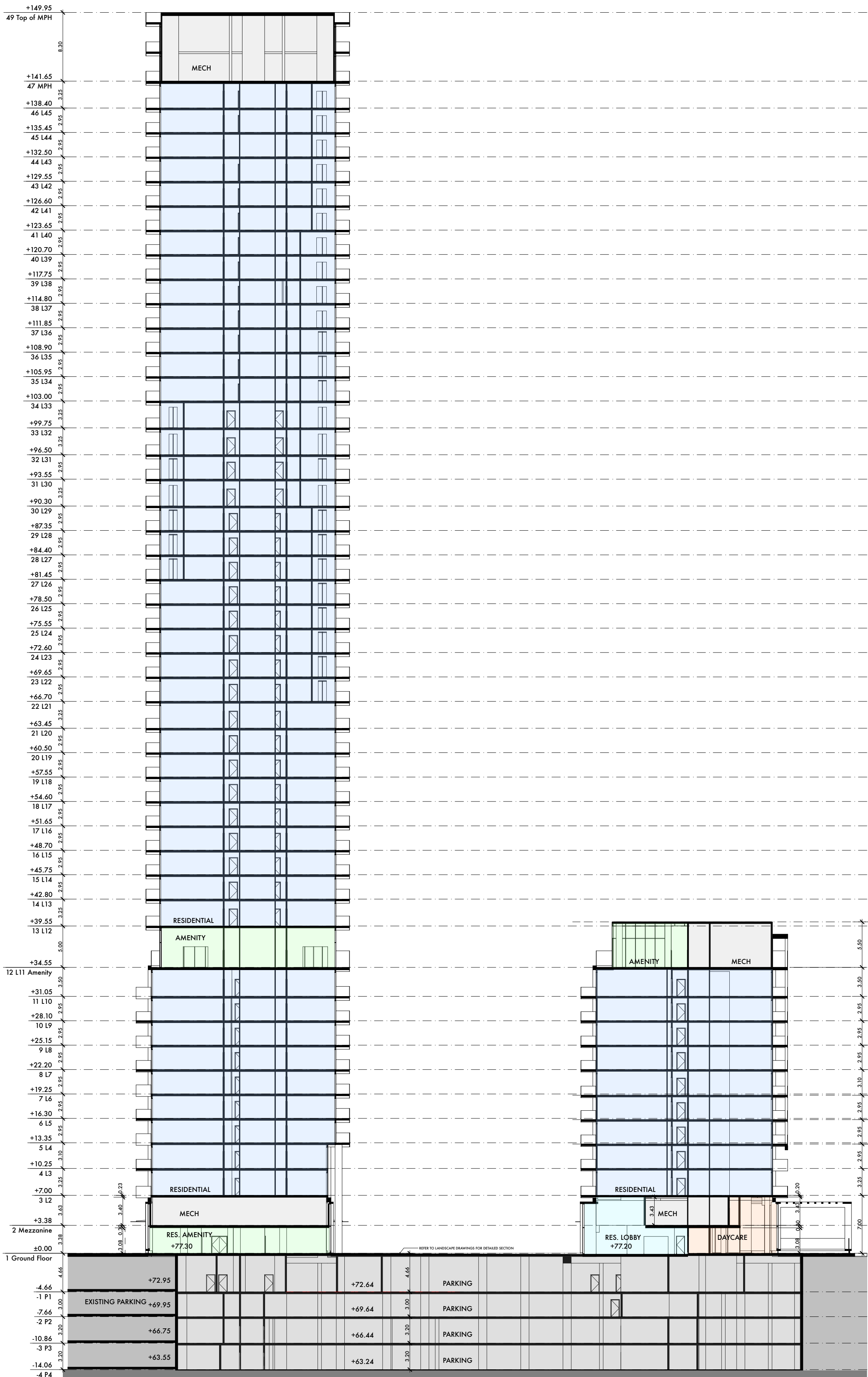
Pier 27 Toronto (Northeast) Inc.
56 The Esplanade, suite 308
Toronto M5E 1A7

P1

Project No.

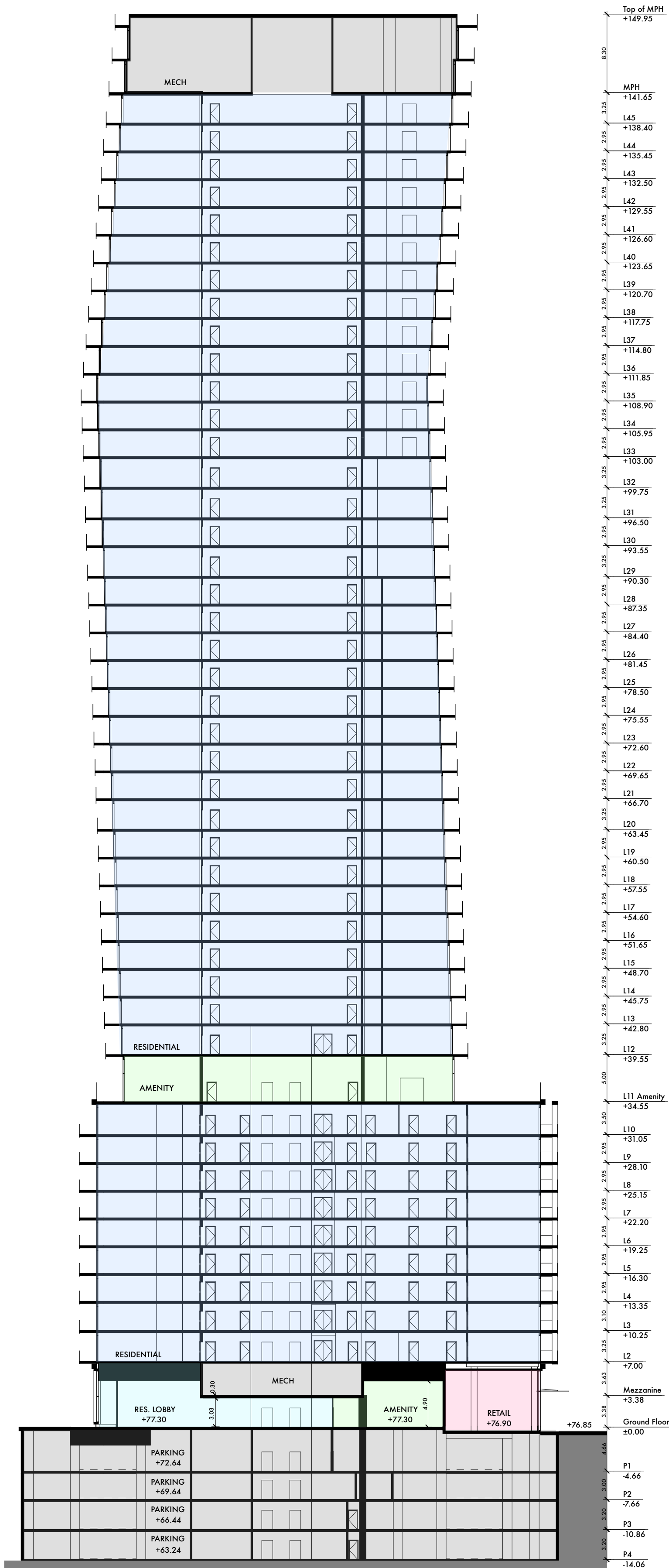
1:400

A.1.4



BUILDING F

BUILDING A



BUILDING F

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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

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Section

Project No.

1:350

A.3.1

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3. Drawings are not to be scaled for construction. The Contractor is to verify all existing conditions and dimensions required to perform the work and report any discrepancies with the Contract Documents to the Architect before commencing any work.

4. Positions of exposed finished mechanical or electrical devices, fittings, and fixtures are indicated on architectural drawings. The locations shown on the architectural drawings govern over the Mechanical and Electrical drawings. Those items not clearly located will be located as directed by the Architect.

5. These drawings are not to be used for construction unless noted below as "Issuance: For Construction"

6. All work is to be carried out in conformance with the Code and Bylaws of the authorities having jurisdiction.

7. The Architect of these plans and specifications gives no warranty or representation to any party about the constructability of the building(s) represented by them. All contractors or subcontractors must satisfy themselves when bidding and at all times ensure that they can properly construct the work represented by these plans.

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NO	ISSUANCE	DATE
1	SPA/OPA/ZBA	-
2	-	-
3	-	-
4	-	-
5	-	-

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Pier 27 Phase 3
(buildings F and A)
25&35 Queens Quay East

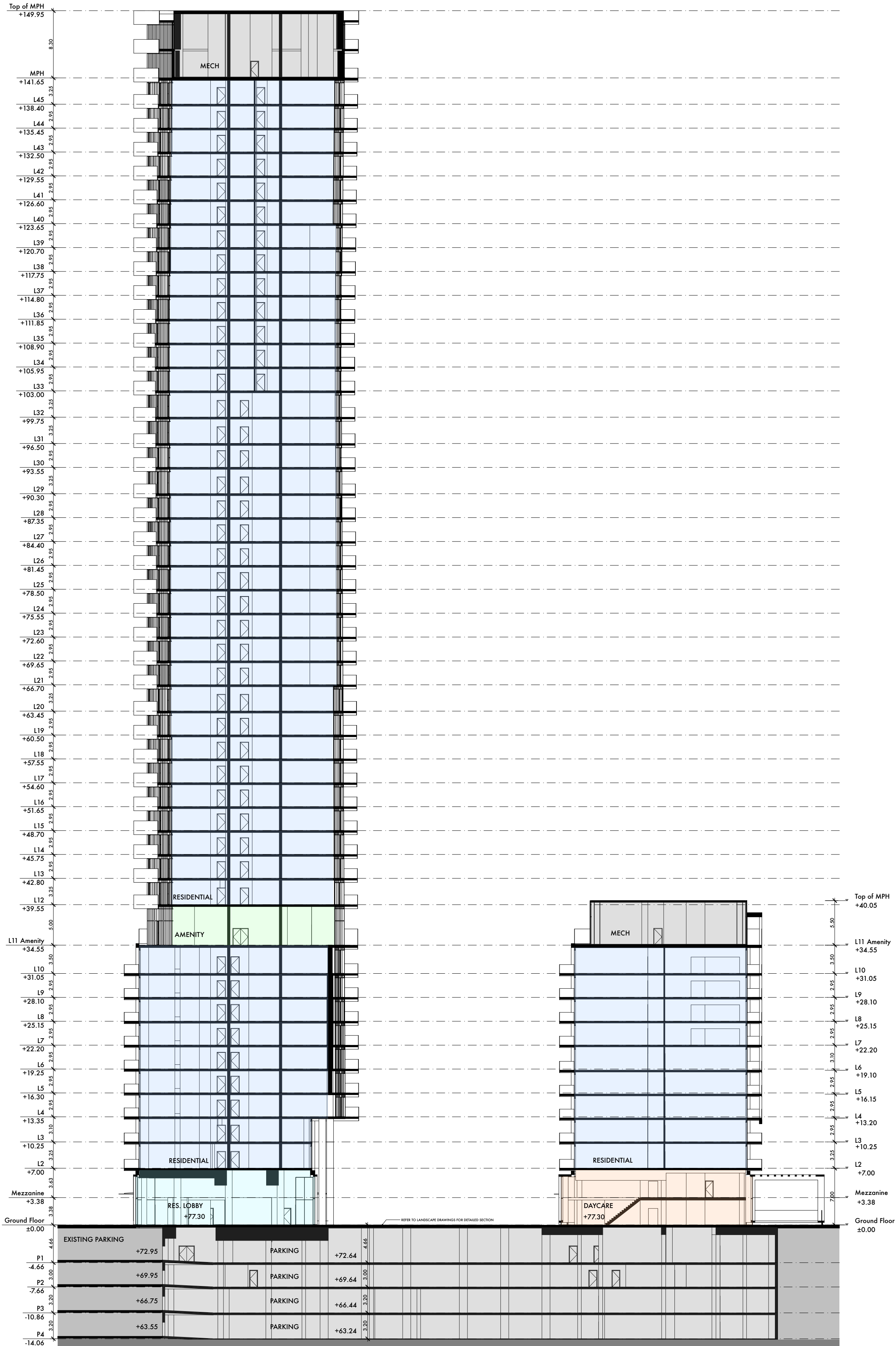
Pier 27 Toronto (Northeast) Inc.
56 The Esplanade, suite 308
Toronto M5E 1A7

Section

Project No.

1:350

A.3.2



APPENDIX C

RECORD OF BOREHOLE 20-1-S

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 21, 2020
COMPLETED : September 21, 2020


**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 2.55 m bqs

 DEEP/DUAL INSTALLATION
WATER LEVEL:

LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-1-D

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 21, 2020
COMPLETED : September 21, 2020

**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 7.46 m bgs

 DEEP/DUAL INSTALLATION
WATER LEVEL:








LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-3

PROJECT : MG4842
 LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
 STARTED : September 22, 2020
 COMPLETED : September 22, 2020

**MC CLYMONT & RAK
 ENGINEERS, INC.**

SHEET 1 OF 1
 DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		ORGANIC VAPOUR READINGS (ppm)				SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION					
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	nat V -  rem V - 				U - 								
								100 200 300 400				20 40 60 80								
								% LEL - (hexane) 				WATER CONTENT, PERCENT								
				wp  w wl																
				20 40 60 80				10 20 30 40												
		GROUND SURFACE		76.88																
2	POWER BORING HOLLOW STEM AUGER	FILL: sand and gravel, brown, moist, compact to loose			1	SS	26	5												
					2	SS	6	10												
					3	SS	4	75												
					4	SS	9	55												
					5	SS	12	10												
4		SILTY CLAY: trace sand and gravel, black to grey, moist, stiff			6	SS	5	5												
					7	SS	13	5												
6																				
		End of Borehole.		70.17 6.71																
		Note: 1) Borehole remained dry on completion of drilling.																		

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL: m bgs

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL: m bgs

LOGGED : PL
 CHECKED : NS

RECORD OF BOREHOLE 20-4

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 24, 2020
COMPLETED : September 24, 2020

**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

 SHALLOW/SINGLE INSTALLATION
WATER LEVEL: m bgs

 DEEP/DUAL INSTALLATION
WATER LEVEL:







































LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-5-D

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 23, 2020
COMPLETED : September 23, 2020


**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES		ORGANIC VAPOUR READINGS (ppm)				SHEAR STRENGTH: Cu, KPa nat V -  rem V -  Q -  U - 				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.3m	% LEL - (hexane)				WATER CONTENT, PERCENT					
				DEPTH (m)													
							100	200	300	400	20	40	60	80			
							% LEL - (hexane)				WATER CONTENT, PERCENT						
							20	40	60	80	wp		w		wl		
							10	20	30	40							
		GROUND SURFACE		77.03													
		75 mm ASPHALT		76.98													
		425 mm GRANULAR FILL: sand and gravel, trace of organics, brown, moist, compact.		76.53 0.50	1	SS	14										
		FILL: sandy and silt, trace organics and gravel, black, moist, loose			2	SS	6		10								
-2		FILL: silt and clay, trace organics and sand, black, moist, loose		75.20 1.83	3	SS	3		10								
					4	SS	3		5								
		- brick fragments at 3.35 m depth			5	SS	2		10								
-4																	
		SANDY SILT: trace organics and gravel, dark brown to black, wet, stiff		72.68 4.35	6	SS	3		130								
																	
-6					7	SS	12		70								
																	
-8		SILTY CLAY: trace of sand and gravel, grey, moist to wet, soft		69.41 7.62	8	SS	3		20					466			
																	
					9	SS	2		10								
-10																	
					10	SS	4		5								
																	
-12					11	SS	4		0								
																	
		WEATHERED SHALE: grey, moist		63.62 13.41													
-14		End of Borehole.		63.01 14.02	12	SS	>10		0								
		Note: 1) Borehole remained dry on completion of drilling. 2) Water level was measured at 11.29 m depth on September 28, 2020															

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 11.29 m bgs

 DEEP/DUAL INSTALLATION
WATER LEVEL:

LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-5-S

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 23, 2020
COMPLETED : September 23, 2020


**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 2.55 m bqs

 DEEP/DUAL INSTALLATION
WATER LEVEL:








LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-6-S

PROJECT : MG4842
 LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
 STARTED : September 22, 2020
 COMPLETED : September 22, 2020

**MC CLYMONT & RAK
 ENGINEERS, INC.**

SHEET 1 OF 1
 DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			ORGANIC VAPOUR READINGS (ppm)				SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	nat V -  rem V - 				Q -  U - 					
								%				WATER CONTENT, PERCENT					
								% LEL - (hexane) 				wp  w wl					
								100	200	300	400	20	40	60	80		
		GROUND SURFACE		77.06													
		STRAIGHT DRILLING TO 9.14 m DEPTH															
2	POWER BORING HOLLOW STEM AUGER																
4																	
6																	
8																	
10		End of Borehole.		67.92 9.14													
		Note: 1) Borehole remained dry on completion of drilling. 2) Water level was measured at 2.66 m depth on September 28, 2020															
						</											

GROUNDWATER ELEVATIONS

∇ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL: 2.66 m bgs

\blacktriangledown DEEP/DUAL INSTALLATION
 WATER LEVEL:

LOGGED : PL
 CHECKED : NS

RECORD OF BOREHOLE 20-6-I

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 24, 2020
COMPLETED : September 24, 2020

**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 2.84 m bgs

 DEEP/DUAL INSTALLATION
WATER LEVEL:

LOGGED : PL
CHECKED : NS

RECORD OF BOREHOLE 20-6-D

PROJECT : MG4842
LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
STARTED : September 22, 2020
COMPLETED : September 22, 2020

**MC CLYMONT & RAK
ENGINEERS, INC.**

SHEET 1 OF 1
DATUM Geodetic

[illegible]

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL: 9.80 m bqs

 DEEP/DUAL INSTALLATION
WATER LEVEL:

LOGGED : PL
CHECKED : NS

MCR LOG ENVIRONMENTAL 4842.GPJ 10/15/20





































MCR LOG ENVIRONMENTAL 4842.GPJ 10/14/20

RECORD OF BOREHOLE 20-8


PROJECT : MG4842
 LOCATION : Pier 27, Yonge Street & Queens Quay East, Toronto, Ontario
 STARTED : September 24, 2020
 COMPLETED : September 24, 2020


**MC CLYMONT & RAK
 ENGINEERS, INC.**

SHEET 1 OF 1
 DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES		ORGANIC VAPOUR READINGS (ppm)				SHEAR STRENGTH: Cu, KPa nat V -  rem V -  Q -  U - 				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	%				WATER CONTENT, PERCENT					
								% LEL - (hexane)									
								100	200	300	400	20	40	60			80
		GROUND SURFACE		77.05													
2		75 mm CONCRETE		76.97 0.08	1	SS	23									Flush Mount Cover	
		525 mm GRANULAR FILL: sand and gravel, trace of organics, brown, moist, compact.															
																	
																	
																	
																	
		FILL: clayey silt with organics, trace of sand and gravel, trace of clinkers and brick pieces, black, moist, compact.			76.44 0.61												Bentonite
																	
																	
																	
																	
4																1.52 m Long 50 mm ID PVC Riser	
																	
																	
																	
																	
																	
																	
																	
																	
																	
6																75.53 Silica Sand	
																	
																	
																	
																	
																	
																	
																	
																	
																	
		SAND: fine, some silt, trace gravel, grey, wet, very loose		72.48 4.57	6	SS	3								3.05 m Long 50 mm ID Well Screen		
		End of Borehole.		71.87 5.18											72.48		
		Note: 1) Borehole remained dry on completion of drilling. 2) Water level was measured at 2.25 m depth on September 28, 2020															

GROUNDWATER ELEVATIONS

 SHALLOW/SINGLE INSTALLATION
 WATER LEVEL: 2.25 m bgs

 DEEP/DUAL INSTALLATION
 WATER LEVEL:

LOGGED : PL
 CHECKED : NS

APPENDIX D



MCCLYMONT & RAK ENG. INC
ATTN: Richard Sukhu
111 ZENWAY BLVD.
UNIT 4
VAUGHAN ON L4H 3H9

Date Received: 30-SEP-20
Report Date: 09-OCT-20 12:10 (MT)
Version: FINAL

Client Phone: 416-675-0160

Certificate of Analysis

Lab Work Order #: L2510345
Project P.O. #: NOT SUBMITTED
Job Reference: G4842
C of C Numbers: 17-844660
Legal Site Desc:

Emily Smith
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 95 West Beaver Creek Road, Unit 1, Richmond Hill, ON L4B 1H2 Canada | Phone: +1 905 881 9887 | Fax: +1 905 881 8062
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ANALYTICAL REPORT

Summary of Guideline Exceedances

Guideline		Client ID	Grouping	Analyte	Result	Guideline Limit	Unit						
ALS ID													
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Sanitary Discharge Sewer By-Law													
(No parameter exceedances)													
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Storm Sewer By-Law													
L2510345-1	BH20-5S	Cyanides	Cyanide, Total	0.170	0.02	mg/L							
		Total Metals	Manganese (Mn)-Total	0.208	0.05	mg/L							
			Zinc (Zn)-Total	0.065	0.04	mg/L							

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

		Lab ID	L2510345-1		
		Sample Date	30-SEP-20		
		Sample ID	BH20-5S		
		Guide Limits			
Analyte	Unit	#1	#2		
pH	pH units	6.00-11.5	6.0-9.5	8.01	
Total Suspended Solids	mg/L	350	15	7.6	

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Anions and Nutrients - WATER

		Lab ID	L2510345-1		
		Sample Date	30-SEP-20		
		Sample ID	BH20-5S		
		Guide Limits			
Analyte	Unit	#1	#2		
Fluoride (F)	mg/L	10	-	0.73	^{D LDS}
Total Kjeldahl Nitrogen	mg/L	100	-	8.57	
Phosphorus, Total	mg/L	10	0.4	0.122	

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.


ANALYTICAL REPORT


Cyanides - WATER

		Lab ID	L2510345-1	
		Sample Date	30-SEP-20	
		Sample ID	BH20-5S	
		Guide Limits		
Analyte	Unit	#1	#2	
Cyanide, Total	mg/L	2	0.02	0.170

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.



ANALYTICAL REPORT

Bacteriological Tests - WATER

					Lab ID	L2510345-1
					Sample Date	30-SEP-20
					Sample ID	BH20-5S
					Guide Limits	
Analyte		Unit	#1	#2		
E. Coli		CFU/100m L	-	200	1	

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.



ANALYTICAL REPORT

Total Metals - WATER

		Lab ID	L2510345-1		
		Sample Date	30-SEP-20		
		Sample ID	BH20-5S		
		Guide Limits			
Analyte	Unit	#1	#2		
Aluminum (Al)-Total	mg/L	50	-	2.09	^{DLHC}
Antimony (Sb)-Total	mg/L	5	-	0.0019	^{DLHC}
Arsenic (As)-Total	mg/L	1	0.02	0.0091	^{DLHC}
Cadmium (Cd)-Total	mg/L	0.7	0.008	0.000067	^{DLHC}
Chromium (Cr)-Total	mg/L	4	0.08	<0.0050	^{DLHC}
Cobalt (Co)-Total	mg/L	5	-	0.0023	^{DLHC}
Copper (Cu)-Total	mg/L	2	0.04	0.0055	^{DLHC}
Lead (Pb)-Total	mg/L	1	0.12	0.0231	^{DLHC}
Manganese (Mn)-Total	mg/L	5	0.05	0.208	^{DLHC}
Mercury (Hg)-Total	mg/L	0.01	0.0004	0.0000227	
Molybdenum (Mo)-Total	mg/L	5	-	0.00708	^{DLHC}
Nickel (Ni)-Total	mg/L	2	0.08	0.0063	^{DLHC}
Selenium (Se)-Total	mg/L	1	0.02	<0.00050	^{DLHC}
Silver (Ag)-Total	mg/L	5	0.12	<0.00050	^{DLHC}
Tin (Sn)-Total	mg/L	5	-	0.0011	^{DLHC}
Titanium (Ti)-Total	mg/L	5	-	0.0772	^{DLHC}
Zinc (Zn)-Total	mg/L	2	0.04	0.065	^{DLHC}

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.



ANALYTICAL REPORT

Speciated Metals - WATER

		Lab ID	L2510345-1	
		Sample Date	30-SEP-20	
		Sample ID	BH20-5S	
		Guide Limits		
Analyte	Unit	#1	#2	
Chromium, Hexavalent	mg/L	2	0.04	<0.00050

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.



L2510345 CONT'D....
Job Reference: G4842
PAGE 9 of 17
09-OCT-20 12:10 (MT)

Aggregate Organics - WATER

		Lab ID		L2510345-1
		Sample Date		30-SEP-20
		Sample ID		BH20-5S
Analyte	Unit	Guide Limits		
		#1	#2	
BOD	mg/L	300	15	<3.0 ^{BODL}
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	0.008	<0.0010

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.




L2510345 CONT'D....
Job Reference: G4842
PAGE 10 of 17
09-OCT-20 12:10 (MT)

Volatile Organic Compounds - WATER

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polycyclic Aromatic Hydrocarbons - WATER

		Lab ID	L2510345-1	
		Sample Date	30-SEP-20	
		Sample ID	BH20-5S	
		Guide Limits		
Analyte	Unit	#1	#2	
Acenaphthene	ug/L	-	-	0.031
Anthracene	ug/L	-	-	0.048
Benzo(a)anthracene	ug/L	-	-	0.041
Benzo(a)pyrene	ug/L	-	-	0.020
Benzo(b)fluoranthene	ug/L	-	-	0.050
Benzo(e)pyrene	ug/L	-	-	<0.050
Benzo(ghi)perylene	ug/L	-	-	0.027
Benzo(k)fluoranthene	ug/L	-	-	0.012
Chrysene	ug/L	-	-	0.048
Dibenz(a,h)acridine	ug/L	-	-	<0.050
Dibenz(a,i)acridine	ug/L	-	-	<0.050
Dibenzo(a,h)anthracene	ug/L	-	-	<0.010
Dibenzo(a,i)pyrene	ug/L	-	-	<0.050
7H-Dibenzo(c,g)carbazole	ug/L	-	-	<0.050
1,3-Dinitropyrene	ug/L	-	-	<1.0
1,6-Dinitropyrene	ug/L	-	-	<1.0
1,8-Dinitropyrene	ug/L	-	-	<1.0
Fluoranthene	ug/L	-	-	0.103
Fluorene	ug/L	-	-	0.013
Indeno(1,2,3-cd)pyrene	ug/L	-	-	0.024
Naphthalene	ug/L	-	-	0.028
Perylene	ug/L	-	-	<0.010
Phenanthrene	ug/L	-	-	0.041
Pyrene	ug/L	-	-	0.172
Surrogate: 2-Fluorobiphenyl	%	-	-	88.1
Surrogate: d14-Terphenyl	%	-	-	88.3
Surrogate: p-Terphenyl d14	%	-	-	106.9
Total PAHs	ug/L	5	2	<1.7

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.




L2510345 CONT'D.....
Job Reference: G4842
PAGE 12 of 17
09-OCT-20 12:10 (MT)

Semi-Volatile Organics - WATER

		Lab ID		L2510345-1
		Sample Date		30-SEP-20
		Sample ID		BH20-5S
Analyte	Unit	Guide Limits		
		#1	#2	
3,3'-Dichlorobenzidine	ug/L	2	0.8	<0.40
Di-n-butylphthalate	ug/L	80	15	<1.0
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2.0
Pentachlorophenol	ug/L	5	2	<1.0 ^{RRR}
Surrogate: 2-Fluorobiphenyl	%	-	-	92.8
Surrogate: p-Terphenyl d14	%	-	-	87.2
Surrogate: 2,4,6-Tribromophenol	%	-	-	107.1

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.



ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

		Lab ID	L2510345-1		
		Sample Date	30-SEP-20		
		Sample ID	BH20-5S		
Analyte	Unit	Guide Limits			
		#1	#2		
Aroclor 1242	ug/L	-	-	<0.020	
Aroclor 1248	ug/L	-	-	<0.020	
Aroclor 1254	ug/L	-	-	<0.020	
Aroclor 1260	ug/L	-	-	<0.020	
Surrogate: Decachlorobiphenyl	%	-	-	119.5	
Total PCBs	ug/L	1	0.4	<0.040	
Surrogate: Tetrachloro-m-xylene	%	-	-	93.1	

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law

Guide Limit #2: Ontario Toronto Storm Sewer By-Law

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.





L2510345 CONT'D....

PAGE 14 of 17

09-OCT-20 12:10 (MT)

Lab ID	L2510345-1
Sample Date	30-SEP-20
Sample ID	BH20-5S

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

L2510345 CONT'D....
Job Reference: G4842
PAGE 15 of 17
09-OCT-20 12:10 (MT)

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comment:
L2510345-1	Water	Note: RRR: Detection limit raised due to suspected bias low results at or near the detection limit.	

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRR	Refer to Report Remarks for issues regarding this analysis

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.			
625-SAN-WT	Water	Ontario Sanitary Sewer SVOC Target List	SW-846 8270
Samples are extracted with solvent and then analyzed by GC/MS.			
BOD-WT	Water	BOD	APHA 5210 B
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.			
When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference			
CR-CR6-IC-WT	Water	Chromium +6	EPA 7199
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-WW-MF-WT	Water	E. Coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200			
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

L2510345 CONT'D....
Job Reference: G4842
PAGE 16 of 17
09-OCT-20 12:10 (MT)

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
NP,NPE-LCMS-WT	Water	Nonylphenols and Ethoxylates by LC/MS-MS	J. Chrom A849 (1999) p.467-482
Water samples are filtered and analyzed on LCMS/MS by direct injection.			
OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION
Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B
The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PAH-EXTRA-WT	Water	Sanitary Sewer Use By-Law Additional PAH	SW 846 8270
PAH-SUM-CALC-WT	Water	TOTAL PAH's	CALCULATION
Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.			
PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082
PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.			
PH-WT	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

Reference Information

L2510345 CONT'D....
Job Reference: G4842
PAGE 17 of 17
09-OCT-20 12:10 (MT)

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.			
TKN-F-WT	Water	TKN in Water by Fluorescence	J. ENVIRON. MONIT., 2005,7,37-42,RSC
Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection			
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
Aqueous samples are analyzed by headspace-GC/MS.			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-844660

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 1 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT		Water						
Batch	R5244941							
WG3416467-2	LCS							
Acenaphthene			89.5		%		50-140	05-OCT-20
Anthracene			92.3		%		50-140	05-OCT-20
Benzo(a)anthracene			96.0		%		50-140	05-OCT-20
Benzo(a)pyrene			93.8		%		60-130	05-OCT-20
Benzo(b)fluoranthene			87.3		%		50-140	05-OCT-20
Benzo(ghi)perylene			94.7		%		50-140	05-OCT-20
Benzo(k)fluoranthene			100.0		%		50-140	05-OCT-20
Chrysene			106.4		%		50-140	05-OCT-20
Dibenzo(a,h)anthracene			97.7		%		50-140	05-OCT-20
Fluoranthene			95.7		%		50-140	05-OCT-20
Fluorene			92.0		%		50-140	05-OCT-20
Indeno(1,2,3-cd)pyrene			92.6		%		50-140	05-OCT-20
Naphthalene			94.5		%		50-130	05-OCT-20
Perylene			95.7		%		50-140	05-OCT-20
Phenanthrene			93.2		%		50-140	05-OCT-20
Pyrene			92.1		%		50-140	05-OCT-20
WG3416467-1	MB							
Acenaphthene			<0.010		ug/L		0.01	05-OCT-20
Anthracene			<0.010		ug/L		0.01	05-OCT-20
Benzo(a)anthracene			<0.010		ug/L		0.01	05-OCT-20
Benzo(a)pyrene			<0.010		ug/L		0.01	05-OCT-20
Benzo(b)fluoranthene			<0.010		ug/L		0.01	05-OCT-20
Benzo(ghi)perylene			<0.010		ug/L		0.01	05-OCT-20
Benzo(k)fluoranthene			<0.010		ug/L		0.01	05-OCT-20
Chrysene			<0.010		ug/L		0.01	05-OCT-20
Dibenzo(a,h)anthracene			<0.010		ug/L		0.01	05-OCT-20
Fluoranthene			<0.010		ug/L		0.01	05-OCT-20
Fluorene			<0.010		ug/L		0.01	05-OCT-20
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	05-OCT-20
Naphthalene			<0.010		ug/L		0.01	05-OCT-20
Perylene			<0.010		ug/L		0.01	05-OCT-20
Phenanthrene			<0.010		ug/L		0.01	05-OCT-20
Pyrene			<0.010		ug/L		0.01	05-OCT-20
Surrogate: 2-Fluorobiphenyl			90.7		%		40-130	05-OCT-20



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 2 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT								
Water								
Batch	R5244941							
WG3416467-1 MB								
Surrogate: p-Terphenyl d14			107.2		%		40-130	05-OCT-20
625-SAN-WT								
Water								
Batch	R5244183							
WG3416467-2 LCS								
3,3'-Dichlorobenzidine			96.1		%		50-140	02-OCT-20
Bis(2-ethylhexyl)phthalate			104.5		%		50-140	02-OCT-20
Di-n-butylphthalate			110.9		%		50-140	02-OCT-20
Pentachlorophenol			89.1		%		50-140	02-OCT-20
WG3416467-1 MB								
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	02-OCT-20
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	02-OCT-20
Di-n-butylphthalate			<1.0		ug/L		1	02-OCT-20
Pentachlorophenol			<0.50		ug/L		0.5	02-OCT-20
Surrogate: 2-Fluorobiphenyl			87.5		%		40-130	02-OCT-20
Surrogate: 2,4,6-Tribromophenol			89.7		%		40-130	02-OCT-20
Surrogate: p-Terphenyl d14			105.8		%		40-130	02-OCT-20
BOD-WT								
Water								
Batch	R5248296							
WG3416548-6 DUP		L2510109-8						
BOD		<3.0	<3.0	RPD-NA	mg/L	N/A	30	01-OCT-20
WG3416548-7 LCS								
BOD			96.0		%		85-115	01-OCT-20
WG3416548-5 MB								
BOD			<2.0		mg/L		2	01-OCT-20
CN-TOT-WT								
Water								
Batch	R5243865							
WG3416107-20 DUP		WG3416107-18						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	01-OCT-20
WG3416107-17 LCS								
Cyanide, Total			111.4		%		80-120	01-OCT-20
WG3416107-16 MB								
Cyanide, Total			<0.0020		mg/L		0.002	01-OCT-20
WG3416107-19 MS		WG3416107-18						
Cyanide, Total			115.9		%		70-130	01-OCT-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT		Water						
Batch	R5244057							
WG3416355-4	DUP	WG3416355-3						
Chromium, Hexavalent		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-OCT-20
WG3416355-2	LCS		105.8		%		80-120	01-OCT-20
Chromium, Hexavalent								
WG3416355-1	MB		<0.00050		mg/L		0.0005	01-OCT-20
Chromium, Hexavalent								
WG3416355-5	MS	WG3416355-3	104.9		%		70-130	01-OCT-20
Chromium, Hexavalent								
EC-WW-MF-WT		Water						
Batch	R5243976							
WG3416345-1	MB							
E. Coli			0		CFU/100mL		1	01-OCT-20
F-IC-N-WT		Water						
Batch	R5244094							
WG3416485-10	DUP	WG3416485-8						
Fluoride (F)		0.249	0.247		mg/L	0.9	20	01-OCT-20
WG3416485-7	LCS		105.1		%		90-110	01-OCT-20
Fluoride (F)								
WG3416485-6	MB		<0.020		mg/L		0.02	01-OCT-20
Fluoride (F)								
WG3416485-9	MS	WG3416485-8	97.6		%		75-125	01-OCT-20
Fluoride (F)								
HG-T-CVAA-WT		Water						
Batch	R5243372							
WG3416177-4	DUP	WG3416177-3						
Mercury (Hg)-Total		0.0000065	0.0000058		mg/L	11	20	01-OCT-20
WG3416177-2	LCS		109.0		%		80-120	01-OCT-20
Mercury (Hg)-Total								
WG3416177-1	MB		<0.0000050		mg/L		0.000005	01-OCT-20
Mercury (Hg)-Total								
WG3416177-6	MS	WG3416177-5	115.0		%		70-130	01-OCT-20
Mercury (Hg)-Total								
MET-T-CCMS-WT		Water						



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 4 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT		Water						
Batch	R5243465							
WG3415956-4 DUP		WG3415956-3						
Aluminum (Al)-Total		0.0562	0.0563		mg/L	0.2	20	01-OCT-20
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-OCT-20
Arsenic (As)-Total		0.00029	0.00030		mg/L	5.9	20	01-OCT-20
Cadmium (Cd)-Total		0.0000050	0.0000052		mg/L	3.9	20	01-OCT-20
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-OCT-20
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-OCT-20
Copper (Cu)-Total		0.0452	0.0458		mg/L	1.3	20	01-OCT-20
Lead (Pb)-Total		0.000107	0.000109		mg/L	2.0	20	01-OCT-20
Manganese (Mn)-Total		0.00413	0.00426		mg/L	3.2	20	01-OCT-20
Molybdenum (Mo)-Total		0.000244	0.000269		mg/L	9.7	20	01-OCT-20
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-OCT-20
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	01-OCT-20
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	01-OCT-20
Tin (Sn)-Total		0.00075	0.00085		mg/L	12	20	01-OCT-20
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	01-OCT-20
Zinc (Zn)-Total		0.0064	0.0062		mg/L	3.5	20	01-OCT-20
WG3415956-2 LCS								
Aluminum (Al)-Total			102.5		%		80-120	01-OCT-20
Antimony (Sb)-Total			98.4		%		80-120	01-OCT-20
Arsenic (As)-Total			99.9		%		80-120	01-OCT-20
Cadmium (Cd)-Total			97.9		%		80-120	01-OCT-20
Chromium (Cr)-Total			100.4		%		80-120	01-OCT-20
Cobalt (Co)-Total			98.9		%		80-120	01-OCT-20
Copper (Cu)-Total			100.2		%		80-120	01-OCT-20
Lead (Pb)-Total			95.3		%		80-120	01-OCT-20
Manganese (Mn)-Total			101.4		%		80-120	01-OCT-20
Molybdenum (Mo)-Total			98.5		%		80-120	01-OCT-20
Nickel (Ni)-Total			99.0		%		80-120	01-OCT-20
Selenium (Se)-Total			98.8		%		80-120	01-OCT-20
Silver (Ag)-Total			99.4		%		80-120	01-OCT-20
Tin (Sn)-Total			93.9		%		80-120	01-OCT-20
Titanium (Ti)-Total			97.3		%		80-120	01-OCT-20
Zinc (Zn)-Total			97.5		%		80-120	01-OCT-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT		Water						
Batch	R5244080							
WG3416911-3	DUP	L2510715-1						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-OCT-20
Nonylphenol Monoethoxylates		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-OCT-20
Nonylphenol Diethoxylates		<0.10	<0.10	RPD-NA	ug/L	N/A	30	02-OCT-20
WG3416911-2	LCS							
Nonylphenol			86.6		%		75-125	02-OCT-20
Nonylphenol Monoethoxylates			102.5		%		75-125	02-OCT-20
Nonylphenol Diethoxylates			105.0		%		75-125	02-OCT-20
WG3416911-1	MB							
Nonylphenol			<1.0		ug/L		1	02-OCT-20
Nonylphenol Monoethoxylates			<2.0		ug/L		2	02-OCT-20
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	02-OCT-20
WG3416911-4	MS	L2510715-1						
Nonylphenol			102.0		%		50-150	02-OCT-20
Nonylphenol Monoethoxylates			120.9		%		50-150	02-OCT-20
Nonylphenol Diethoxylates			100.2		%		50-150	02-OCT-20
OGG-SPEC-WT		Water						
Batch	R5243130							
WG3415929-2	LCS							
Oil and Grease, Total			92.5		%		70-130	01-OCT-20
Mineral Oil and Grease			81.9		%		70-130	01-OCT-20
WG3415929-1	MB							
Oil and Grease, Total			<5.0		mg/L		5	01-OCT-20
Mineral Oil and Grease			<2.5		mg/L		2.5	01-OCT-20
P-T-COL-WT		Water						
Batch	R5245145							
WG3415971-3	DUP	L2510411-7						
Phosphorus, Total		0.0506	0.0471		mg/L	7.2	20	05-OCT-20
WG3415971-2	LCS							
Phosphorus, Total			97.9		%		80-120	05-OCT-20
WG3415971-1	MB							
Phosphorus, Total			<0.0030		mg/L		0.003	05-OCT-20
WG3415971-4	MS	L2510411-7						
Phosphorus, Total			85.8		%		70-130	05-OCT-20
PAH-EXTRA-WT		Water						



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 8 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT		Water						
Batch	R5243111							
WG3416100-4	DUP	WG3416100-3						
pH		8.10	8.02	J	pH units	0.08	0.2	01-OCT-20
WG3416100-2	LCS							
pH			7.02		pH units		6.9-7.1	01-OCT-20
PHENOLS-4AAP-WT		Water						
Batch	R5244059							
WG3415972-3	DUP	WG3415972-5						
Phenols (4AAP)		0.0056	0.0058		mg/L	2.5	20	01-OCT-20
WG3415972-2	LCS							
Phenols (4AAP)			99.6		%		85-115	01-OCT-20
WG3415972-1	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	01-OCT-20
WG3415972-4	MS	WG3415972-5						
Phenols (4AAP)			104.3		%		75-125	01-OCT-20
SOLIDS-TSS-WT		Water						
Batch	R5247460							
WG3417646-3	DUP	L2510088-1						
Total Suspended Solids		5.4	4.6		mg/L	16	20	06-OCT-20
WG3417646-2	LCS							
Total Suspended Solids			97.0		%		85-115	06-OCT-20
WG3417646-1	MB							
Total Suspended Solids			<3.0		mg/L		3	06-OCT-20
TKN-F-WT		Water						
Batch	R5244077							
WG3415970-3	DUP	L2510487-5						
Total Kjeldahl Nitrogen		3.15	3.13		mg/L	0.6	20	01-OCT-20
WG3415970-2	LCS							
Total Kjeldahl Nitrogen			109.3		%		75-125	01-OCT-20
WG3415970-1	MB							
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-OCT-20
WG3415970-4	MS	L2510487-5						
Total Kjeldahl Nitrogen			105.6		%		70-130	01-OCT-20
VOC-ROU-HS-WT		Water						
Batch	R5243096							
WG3415903-4	DUP	WG3415903-3						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 9 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT		Water						
Batch	R5243096							
WG3415903-4 DUP		WG3415903-3						
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-OCT-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-OCT-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
m+p-Xylenes		<1.0	<0.40	RPD-NA	ug/L	N/A	30	01-OCT-20
o-Xylene		<0.50	<0.30	RPD-NA	ug/L	N/A	30	01-OCT-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
Toluene		<0.50	<0.40	RPD-NA	ug/L	N/A	30	01-OCT-20
trans-1,3-Dichloropropene		<0.50	<0.30	RPD-NA	ug/L	N/A	30	01-OCT-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-OCT-20
WG3415903-1 LCS								
1,1,2,2-Tetrachloroethane			61.0	MES	%		70-130	01-OCT-20
1,2-Dichlorobenzene			97.8		%		70-130	01-OCT-20
1,4-Dichlorobenzene			100.5		%		70-130	01-OCT-20
Benzene			100.1		%		70-130	01-OCT-20
Chloroform			101.6		%		70-130	01-OCT-20
cis-1,2-Dichloroethylene			94.6		%		70-130	01-OCT-20
Dichloromethane			96.1		%		70-130	01-OCT-20
Ethylbenzene			96.6		%		70-130	01-OCT-20
m+p-Xylenes			97.3		%		70-130	01-OCT-20
o-Xylene			102.8		%		70-130	01-OCT-20
Tetrachloroethylene			97.1		%		70-130	01-OCT-20
Toluene			97.4		%		70-130	01-OCT-20
trans-1,3-Dichloropropene			93.2		%		70-130	01-OCT-20
Trichloroethylene			102.3		%		70-130	01-OCT-20
WG3415903-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	01-OCT-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	01-OCT-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	01-OCT-20
Benzene			<0.50		ug/L		0.5	01-OCT-20
Chloroform			<1.0		ug/L		1	01-OCT-20
cis-1,2-Dichloroethylene			<0.50				0.5	



Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Page 10 of 11

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Contact: Richard Sukhu

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT		Water						
Batch	R5243096							
WG3415903-2 MB								
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-OCT-20
Dichloromethane			<2.0		ug/L		2	01-OCT-20
Ethylbenzene			<0.50		ug/L		0.5	01-OCT-20
m+p-Xylenes			<0.40		ug/L		0.4	01-OCT-20
o-Xylene			<0.30		ug/L		0.3	01-OCT-20
Tetrachloroethylene			<0.50		ug/L		0.5	01-OCT-20
Toluene			<0.40		ug/L		0.4	01-OCT-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	01-OCT-20
Trichloroethylene			<0.50		ug/L		0.5	01-OCT-20
Surrogate: 1,4-Difluorobenzene			101.9		%		70-130	01-OCT-20
Surrogate: 4-Bromofluorobenzene			96.6		%		70-130	01-OCT-20
WG3415903-5 MS		WG3415903-3						
1,1,2,2-Tetrachloroethane			76.3		%		50-150	01-OCT-20
1,2-Dichlorobenzene			96.7		%		50-150	01-OCT-20
1,4-Dichlorobenzene			95.1		%		50-150	01-OCT-20
Benzene			100.5		%		50-150	01-OCT-20
Chloroform			104.0		%		50-150	01-OCT-20
cis-1,2-Dichloroethylene			97.7		%		50-150	01-OCT-20
Dichloromethane			101.5		%		50-150	01-OCT-20
Ethylbenzene			90.9		%		50-150	01-OCT-20
m+p-Xylenes			91.3		%		50-150	01-OCT-20
o-Xylene			99.0		%		50-150	01-OCT-20
Tetrachloroethylene			88.2		%		50-150	01-OCT-20
Toluene			93.3		%		50-150	01-OCT-20
trans-1,3-Dichloropropene			95.1		%		50-150	01-OCT-20
Trichloroethylene			98.3		%		50-150	01-OCT-20

Quality Control Report

Workorder: L2510345

Report Date: 09-OCT-20

Client: MCCLYMONT & RAK ENG. INC
111 ZENWAY BLVD. UNIT 4
VAUGHAN ON L4H 3H9

Page 11 of 11

Contact: Richard Sukhu

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Canada Toll Free: 1 800 668 9878

www.alsglobal.com



Page 1 of 1

slow - Contact your AM to confirm all E&P TATs (surcharges may apply)

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

9/25/2018 1:02

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX E



48 Dawson Road., Guelph, ON N1H 5V1
tel. (519) 763-0700 fax (519) 763-6684

November 23, 2020

Pier 27 Toronto (Northeast) Inc.
56 The Esplanade Suite 308
Toronto, ON M5E 1A7

Attention: Kristine Zwicker

Re: Single Well Response Test
Pier 27, Phase 3
Toronto, Ontario

Dear Kristine,

Please find below a summary of the insitu single well response test completed at 15 Queens Quay, Toronto. The purpose of the testing was to determine hydraulic conductivity of the soils at the 50 mm wells installed by McClymont and Rak Engineers Inc. as part of the geohydrology investigation. The borehole logs indicate that the wells were screened in fill.

INTRODUCTION

The field work took place on October 13, 2020. A stabilized water level was obtained using an electronic water level tape before testing began. Next, an electronic pressure transducer was installed in the well to measure pressure changes during the single well response test. A volume of water was removed from the well and water levels were measured as the water level recovered.

DATA ANALYSIS

The rising head test in BH 20-6-I was assessed using the Hvorslev equation to estimate hydraulic conductivity. The hydraulic conductivity of this unit has been estimated to be 1.4×10^{-6} m/sec. The data from BH 20-6-S was insufficient for analysis due to the speed of recharge, and we cannot provide a hydraulic conductivity for this unit.

QUALIFICATIONS

Insitu Contractors Inc. is licensed by both the Professional Engineers of Ontario to provide engineering services and by the Ministry of the Environment & Climate Change as a water well contractor. Our staff includes water well technicians and engineers who have accumulated over forty years' experience in soil and ground water and excavation projects.

This report has been prepared for Forward Engineering & Associates Inc. Its use by a third party, or decisions made based on it, are the sole responsibility of such parties. If you have any questions or concerns, please contact us at (519) 763-0700.

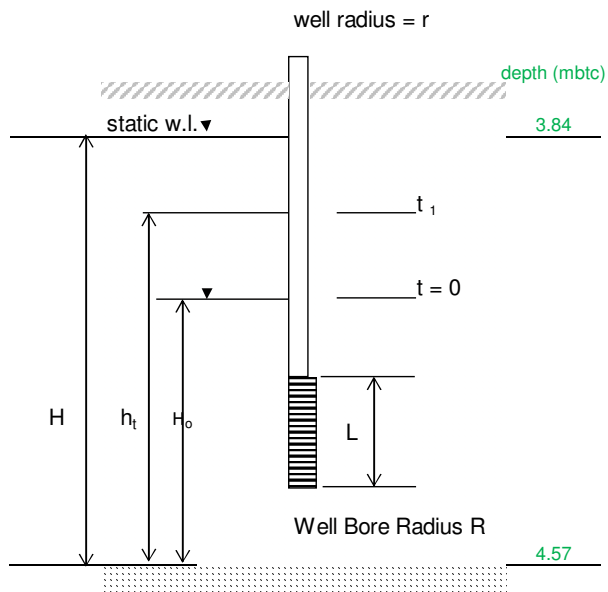
Sincerely,

Susanna Meteer, B.A., Dipl.
Encl. SWRT data and graph

Harry Oussoren, P.Eng.

Slug Test - Hvorslev Method

homogeneous, isotropic, infinite medium

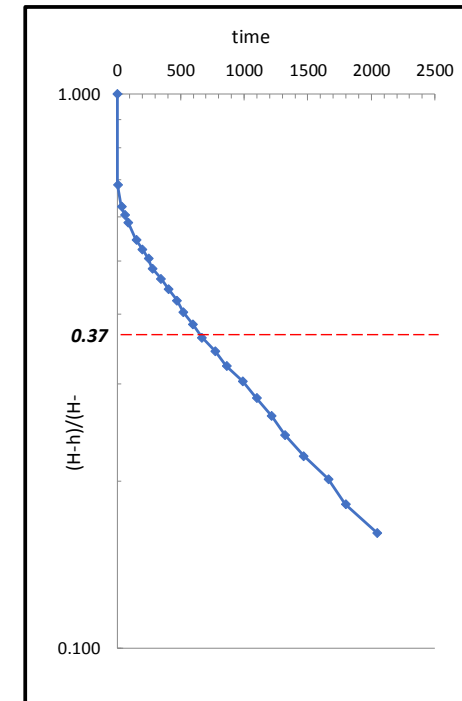


$r = 0.0254$ m
 $L = 0.73$ m
 $R = 0.1$ m
 $T_o = 630$ seconds

$H = 0.73$ m
 $H - H_o = 0.235$ m

1 L of water removed from 2-inch diameter well equals 0.495-m

time (sec)	depth to w/ (m)	$H - h_t$ (m)	$(H - h_t)/(H - H_o)$
0	3.84	0.000	0.000
0	4.335	0.495	1.000
5	4.18	0.340	0.687
35	4.15	0.310	0.626
60	4.14	0.300	0.606
88	4.13	0.290	0.586
150	4.11	0.270	0.545
197	4.1	0.260	0.525
246	4.09	0.250	0.505
277	4.08	0.240	0.485
344	4.07	0.230	0.465
405	4.06	0.220	0.444
469	4.05	0.210	0.424
520	4.04	0.200	0.404
596	4.03	0.190	0.384
667	4.02	0.180	0.364
772	4.01	0.170	0.343
861	4	0.160	0.323
987	3.99	0.150	0.303
1097	3.98	0.140	0.283
1214	3.97	0.130	0.263
1320	3.96	0.120	0.242
1468	3.95	0.110	0.222
1660	3.94	0.100	0.202
1797	3.93	0.090	0.182
2043	3.92	0.080	0.162



$$k = \frac{r^2 \ln(L/R)}{2 L T_o}$$

Calculated Value of k (m/sec)

$$< 1.4E-06 \text{ (m/sec)}$$

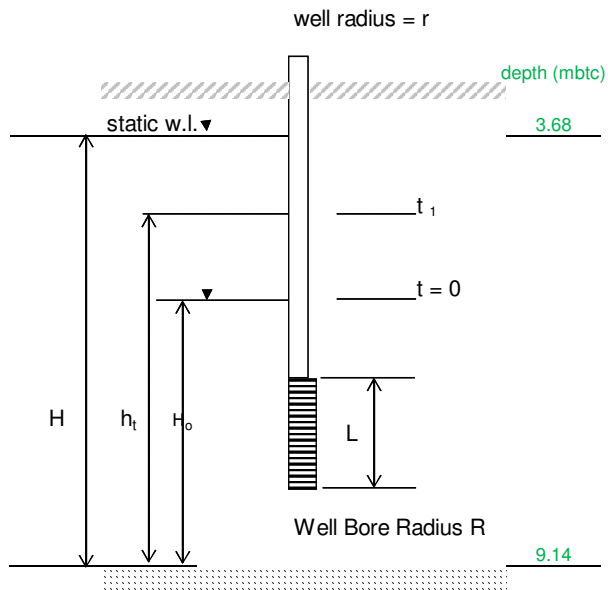
Project Pier 27

Well # BH20-6-I

Date 2020/10/13

Slug Test - Hvorslev Method

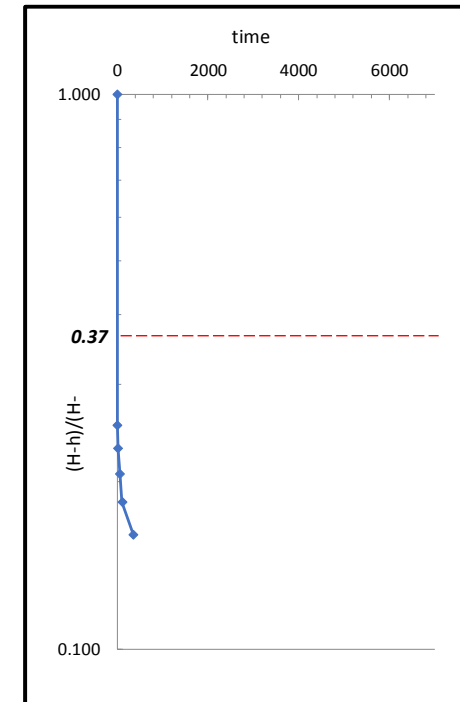
homogeneous, isotropic, infinite medium



$r = 0.0254$ m
 $L = 3$ m
 $R = 0.1$ m
 $T_o =$ seconds

$H = 5.46$ m
 $H - H_o = 4.965$ m
 1 L of water removed from 2-inch diameter well equals 0.495-m

time (sec)	depth to wl (m)	$H - h_t$ (m)	$(H - h_t)/(H - H_o)$
0	3.62	-0.060	-0.012
0	4.115	0.435	1.000
10	3.79	0.110	0.253
24	3.78	0.100	0.230
60	3.77	0.090	0.207
110	3.76	0.080	0.184
356	3.75	0.070	0.161



$$k = \frac{r^2 \ln(L/R)}{2 L T_o}$$

Calculated Value of k (m/sec)

< too large to determine by slug test

Project Pier 27

Well # BH20-6-S

Date 2020/10/13