S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

Functional Servicing Report

40-70 PLAINS ROAD EAST

CITY OF BURLINGTON

INFINITY DEVELOPMENT GROUP

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1.0 INTRODUCTION AND BACKGROUND

1.1 OVERVIEW

S. Llewellyn & Associates Limited has been retained by Infinity Development Group to provide Consulting Engineering services for the proposed development at 40-70 Plains Road East in the City of Burlington, Region of Halton (see Figure 1.0 for location plan). This report will outline the functional servicing strategy for the proposed development.

The proposed development consists of constructing a nine-storey residential building including two levels of underground parking, an asphalt driveway/parking lot, concrete curb/sidewalk, and landscaped areas.

This Functional Servicing Report will provide detailed information of the proposed servicing scheme for this development. Please refer to the site engineering plans prepared by S. Llewellyn and Associates Limited (see Appendix F) and the site plan prepared by RAW Design for additional information.

1.2 BACKGROUND INFORMATION

The following documents were referenced in the preparation of this report:

Ref. 1: MOE Stormwater Management Practices Planning and Design Manual (Ministry of Environment, March 2003)

Ref. 2: City of Burlington Standard Drawings (City of Burlington, March 2014)

Ref. 3: Halton Region Water and Wastewater Linear Design Manual (Halton Region, May 2014)

Ref. 4: Low Impact Development Stormwater Management Planning and Design Guide (Credit Valley Conservation Authority / Toronto and Region Conservation Authority, 2010)

Ref. 5: Geotechnical Investigation (Fisher Engineering, April 16, 2021)

Ref. 6: Hydrogeological Investigation (Fisher Engineering, April 7, 2021)

Ref. 7: Stormwater Management Design Guidelines (City of Burlington, May 21, 2020)



Figure 1.0 – Location Plan

1.3 GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

A geotechnical and hydrogeological investigation was prepared by Fisher Engineering dated April 16, 2021 and April 7, 2021, respectively. Six boreholes were drilled between May 26 and June 18, 2020 to approximate depths ranging between 6.25m and 13.56m below grade. Fill consisting of dark brown silty sand with some trace of topsoil/roots and trace of gravel was encountered at depths ranging between 0.76m and 1.98m below grade. Native soils of sand/silty sand, gravelly sand/gravel and sand were found underlying the fill soils. Groundwater was encountered at depths between 7.82m and 9.78m below grade (elevations of 93.03m to 92.00m). Temporary construction dewatering will be required and the dewatering flowrate of 128.55 m^3/day (1.5 l/s) (FS of 1.5) is less than the allowable discharge rate of 66.6 l/s noted in Table 2.2 of this report. The groundwater quality was analysed and found that several parameters exceed the storm sewer guidelines of the Region of Halton. Based on these results, pre-treatment of the groundwater will be required prior to discharging to the storm or sanitary sewer system. Groundwater levels are being monitored over the period of March to June 2021 and the report will be updated upon completion of the groundwater monitoring programme. For

additional information, refer to the geotechnical and hydrogeological investigations in Appendix D and E, respectively.

2.0 STORMWATER MANAGEMENT

The following stormwater management (SWM) criteria will be applied to the site, in accordance with the City of Burlington and Region of Halton:

Quantity Control
The proposed condition discharge rates from site will be controlled to the 5-year existing condition discharge rate or less during all storm events up to and including the 100-year storm.

Quality Control
The stormwater runoff from the proposed condition site must meet Level 1 (Enhanced) stormwater quality control (80% TSS removal, 90% average annual runoff treatment).

Erosion Control
Erosion and sediment control measures will be implemented in accordance with the standards of the City of Burlington.

2.1 EXISTING CONDITIONS

In the existing condition, there are three existing dwellings with associated asphalt driveways located on the subject site. The site is bounded by Plains Road East to the north, and existing residential lands to the east, south, and west. The entire site sheet drains north to Plains Road East where runoff is captured by the existing 600mmø and 1200mmø storm sewers along Plains Road East.

One (1) catchment area, Catchment 101, has been identified in the existing condition. Catchment 101 represents the existing condition discharge for the entire site. See Table 2.1 below and the Pre-Development Storm Drainage Area Plan in Appendix A for details.

Table 2.1 – Existing Conditions Catchment Areas

Catchment ID	Description	Area (ha)	Percent Impervious	Runoff Coefficient
101	Entire Site	0.68	28%	0.44

An analysis was performed on Catchment 101 using the Rational Method based on the above runoff coefficient (C) and the City of Burlington design storm intensities at a time of concentration of 10 minutes (Tc=10min). A summary of the results can be found in Table 2.2 below.

Table 2.2 – Existing Condition Site Discharge (Catchment 101)	
Storm Event	Catchment 101 Discharge (m^3/s)
2-year	0.0652
5-year	**0.0842**
10-year	0.0967
25-year	0.1125
50-year	0.1241
100-year	0.1356

2.2 PROPOSED CONDITIONS

It is proposed to develop the site by constructing a nine-storey residential building including two levels of underground parking, an asphalt driveway/parking lot, concrete curb/sidewalk, and landscaped areas. It is proposed to service the site with a 250mmø storm sewer, designed and constructed in accordance with the City of Burlington and Region of Halton standards.

Two (2) catchment areas, Catchment 201 and 202, have been identified in the proposed condition. Catchment 201 represents controlled drainage from the site, which will be captured by the proposed area drains and discharged to the existing 600mmø storm sewer along Plains Road East. Catchment 202 represents uncontrolled drainage from the site that sheet drains to Plains Road East. See Table 2.3 below and the Post-Development Storm Drainage Area Plan in Appendix A for details.

Table 2.3 – Proposed Condition Catchment Areas				
Catchment ID	Description	Area (ha)	Percent Impervious	Runoff Coefficient
201	Controlled drainage to Plains Road East	0.64	95%	0.92
202	Uncontrolled drainage to Plains Road East	0.04	100%	0.90

Water Quantity Control

Under proposed conditions, the post development discharge rates from the site will be controlled to maximum discharge rate of 0.0842 m^3/s (5-year pre development discharge rate from Catchment 101) during all storm events.

It is proposed to apply quantity control measures to the runoff from Catchment 201 by installing a 160mmø outlet on the proposed cast-in-place concrete storage tank. With the installation of quantity control measures for Catchment 201, it will be required to provide 179.5m^3 of on-site stormwater storage. On-site storage will be provided by a cast-in-place concrete storage tank within the underground parking. See Table 2.4 and Appendix A for the stage-storage-discharge relationship of the orifice controls and on-site storage.

Table 2.4: Proposed Condition Stage-Storage-Discharge (Catchment 201)		
Elevation (m)	Storage (m^3)	Discharge (m^3/s)
98.30 (Orifice pipe invert)	0	0
98.70 (0.4m deep)	49	0.0302
99.10 (0.8m deep)	97	0.0453
99.50 (1.2m deep)	146	0.0566
99.90 (Top of tank)	195	0.0659

The maximum discharge rates for Catchments 201 and 202 were calculated using the Rational Method based on the proposed condition runoff coefficients for the 2-year to 100-year storm events. Additionally, the 2-year to 100-year storage volumes for Catchment 201 were calculated using the Modified Rational Method (MRM). The proposed discharge rates and storage volumes are summarized in Table 2.5 below and in Appendix A for details.

Table 2.5 – Proposed Condition Stormwater Discharge					
Storm Event	Catchment 201 Controlled Discharge (m^3/s)	Catchment 202 Uncontrolled Discharge (m^3/s)	Total Discharge (m^3/s)	Allowable Discharge (m^3/s)	Required Storage (m^3)
2-Yr	>0.0659	0.0078	<0.0822	0.0842	46.0
5-Yr	>0.0659	0.0191	<0.0822	0.0842	77.2
10-Yr	>0.0659	0.0116	<0.0822	0.0842	100.3
25-Yr	>0.0659	0.0135	<0.0822	0.0842	131.3
50-Yr	>0.0659	0.0149	<0.0822	0.0842	155.2
100-Yr	0.0659	0.0163	0.0822	0.0842	179.5

This analysis determined the following:

- The proposed condition discharge rates from site (Catchment 201 and 202) will not exceed the maximum allowable discharge rate of 0.0842 m^3/s during all storm events, with the installation of a 160mmø outlet on the cast-in-place concrete storage tank.

- Catchment 201 will require 179.5m^3 of stormwater storage during the 100-year event, which can be accommodated by the proposed storage tank having a volume of 195m^3.

Water Quality Control

Catchment 201 consists of rooftop, grassed areas and pedestrian walk ways which does not require quality control. Therefore, quality control measures are not proposed.

2.3 SEDIMENT AND EROSION CONTROL

In order to minimize erosion during the grading and site servicing period of construction, the following measures will be implemented:

- Install silt fencing along the outer boundary of the site to ensure that sediment does not migrate to the adjacent properties;
- Install sediment control (silt sacks) in the proposed area drains as well as the nearby existing catchbasins to ensure that no untreated runoff enters the existing conveyance system;
- Stabilize all disturbed or landscaped areas with hydro seeding/sodding to minimize the opportunity for erosion.

For details on the proposed erosion and sediment control for the proposed site, see the Servicing, Grading & Erosion Control Plan included in the engineering drawings.

3.0 SANITARY SEWER SERVICING

3.1 EXISTING CONDITIONS

There is an existing 250mmø sanitary sewer located adjacent to the site along the south side of Plains Road East.

3.2 SANITARY DEMAND

Sanitary discharge from the proposed condition site has been estimated in accordance with Table 8.2.1.3.A of the 2020 Ontario Building Code. The occupancy type for the residential building is an apartment building and is broken down into one and two-bedroom units.

Sanitary demand for the proposed condition site has been summarized below in Table 3.1. Please refer to the Water Usage and Sanitary Discharge Report in Appendix B for details.

Table 3.1 – Proposed Sanitary Sewer Discharge	
Total Sanitary Demand (L/Day)	**299,750**
Total Sanitary Demand (m^3/Day)	**299.75**

3.3 PROPOSED SANITARY SERVICING AND CAPACITY ANALYSIS

The proposed site will be serviced by a 200mmø sanitary sewer, designed and constructed in accordance with City of Burlington and Region of Halton standards. Drainage from this sewer will discharge to the existing 250mmø sanitary sewer adjacent to the site along Plains Road East.

The minimum grade of the proposed 200mmø sanitary sewer will be 2.0%. At this minimum grade, the proposed sanitary sewer will have a capacity of 0.039 m^3/s (3,369.6 m^3/Day). Therefore, the proposed 200mmø sanitary sewer at a minimum grade of 2.0% is adequately sized to service the proposed development.

4.0 DOMESTIC AND FIRE WATER SUPPLY SERVICING

4.1 EXISTING CONDITIONS

The existing municipal water distribution system consists of a 400mmø watermain located on the south side of Plains Road East. An existing fire hydrant is located on the south side of Plains Road East within the proposed entrance to site. It is proposed to relocate this fire hydrant approx. 7m west so that it is located outside of the entrance.

4.2 DOMESTIC WATER DEMAND

Domestic water demand for the site has been estimated as being approximately equal to the sanitary demand, plus any irrigation water used within the landscaped areas of the proposed development. To be conservative all landscaped areas within the proposed site are considered to be sprinklered and are included in the domestic water demand calculations.

Domestic water demand for the proposed condition site has been summarized below in Table 4.1. Please refer to the Water Usage and Sanitary Discharge Report in Appendix B for details.

Table 4.1 – Proposed Domestic Water Demand	
Landscaped Area Demand (L/Day)	3,850
Total Water Demand (L/Day)	**303,600**
Total Water Demand (m^3/Day)	**303.6**

4.3 FIRE FLOW DEMAND

Fire flow demands for the proposed development are governed by a number of guidelines and criteria, such as the Water Supply for Public Fire Protection (Fire Underwriters Survey, 1999), Ontario Building Code (OBC), and various codes and standards published by the National Fire Protection Association (NFPA). Since FUS criteria provides adjustment for sprinklered buildings (OBC does not), the FUS method was used to determine the fire flow demand for the proposed development.

The proposed building is non-combustible construction (C=0.8), with limited combustible occupancy (-15% correction) and a fully supervised sprinkler system (-50% correction). Exposure components are based on the following:

North Face: 0% correction (>45m)
South Face: 20% correction (3.1m to 10.0m)
East Face: 20% correction (3.1m to 10.0m)
West Face: 15% correction (10.1m to 20.0m)

It is estimated that the required fire flow for the proposed development will be **450 l/s**. See the Fire Flow Demand Requirements in Appendix C for details.

The existing hydrant located along Plains Road East is located within the 90m separation from the building face adjacent to a street (as per Sentence 3.2.5.7 of the 2012 Ontario Building Code), no additional private hydrants are proposed for this development.

A hydrant flow test was performed by Jackson Waterworks on the public fire hydrant located at 40 Plains Road East to determine the performance of the existing water distribution system. The following hydrant flow test data has been analyzed to determine if the municipal system adjacent to the site is adequate to provide the required fire flow, with a minimum pressure of 20 psi. Table 4.2 summarizes the hydrant flow data, provided by Jackson Waterworks.

Table 4.2 - Hydrant Flow Test Data

Hydrant Location	40 Plains Road East
Test Date (mm/dd/yyyy)	09/29/2020
Test #1	
Static Pressure	70 psi
Residual Pressure During Test	66 psi
Test Flow Rate	1278 USGPM
Theoretical Flow @ 20 psi	**4998 USGPM (315 l/s)**
Test #2	
Static Pressure	67 psi
Residual Pressure During Test	65 psi
Test Flow Rate	1321 USGPM
Theoretical Flow @ 20 psi	**7267 USGPM (458 l/s)**

Based on the above hydrant flow test data, the theoretical maximum available flow rate is **458 l/s**, while the maximum required fire flow for the proposed development is only **450 l/s**. Therefore, the water distribution system has adequate pressure and capacity to service the proposed development.

4.4 PROPOSED WATER SERVICING AND ANALYSIS

Proposed water servicing for the site consists of connecting a 150mmø watermain to the existing 400mmø watermain adjacent to the site. The 150mmø watermain will split at property line to provide a 150mmø fire water service and 100mmø domestic water service for the proposed building. All proposed water services are to be designed and constructed in accordance with City of Burlington and Region of Halton standards.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided herein, it is concluded that the proposed development at 40-70 Plains Road East can be constructed to meet the requirements of the City of Burlington and Region of Halton. Therefore, it is recommended that:

- The development be graded and serviced in accordance with the Servicing, Grading & Erosion Control Plans prepared by S. Llewellyn & Associates Limited;
- A 160mmø outlet on the cast-in-place storage tank be installed as per the Servicing Plan and this report to achieve effective stormwater quantity control;
- A cast-in-place concrete storage tank be installed as per the Servicing Plan and this report to provide adequate stormwater storage;
- Erosion and sediment controls be installed as described in this report and shown on the Grading & Erosion Control Plan prepared by S. Llewellyn & Associates Limited;
- The proposed sanitary and water servicing system be installed as per the Servicing Plan, the Water Usage & Sanitary Discharge Report, and this report to adequately service the proposed development.

We trust the information enclosed herein is satisfactory. Should you have any questions please do not hesitate to contact our office.

Prepared by:

S. LLEWELLYN & ASSOCIATES LIMITED



S. Nelson, P.Eng.

APPENDIX A

STORMWATER MANAGEMENT INFORMATION

COOKE BLVD

PLAINS ROAD EAST

LEGEND

201 / 14.60 / 77 / 0.75	DRAINAGE AREA I.D. DRAINAGE AREA (ha) PERCENT IMPERVIOUS RUNOFF COEFFICENT
	DRAINAGE BOUNDARY
---Σ>	EXISTING DIRECTION OF SHEET FLOW

101 / 0.68 / 28 / 0.44

EXISTING CONDITION
STORM DRAINAGE AREA PLAN

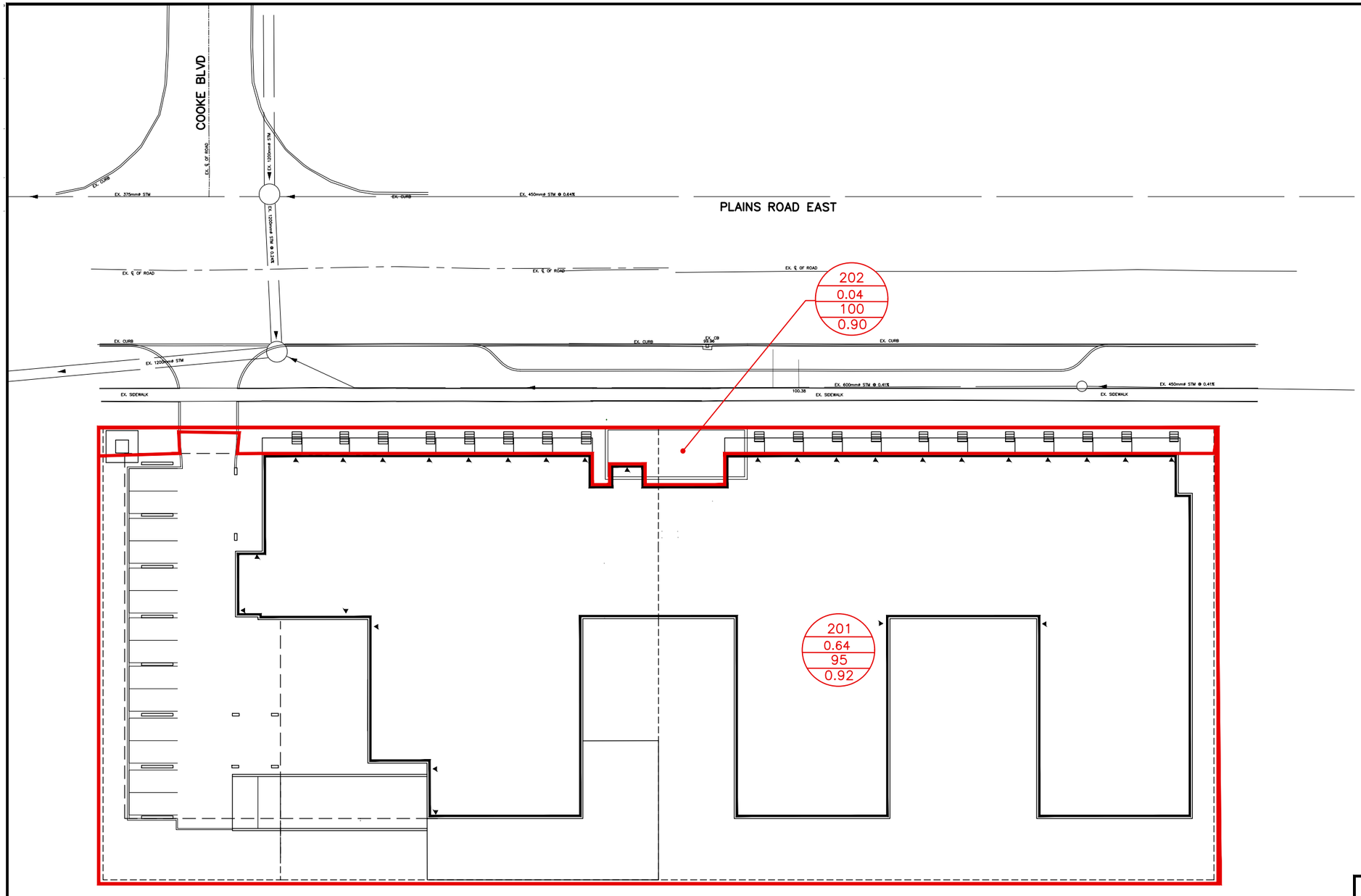
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PROJECT: 40-70 PLAINS ROAD, BURLINGTON, ON
PROJECT No.: 19121

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LEGEND

201
14.60
77
0.75

DRAINAGE AREA I.D.
DRAINAGE AREA (ha)
PERCENT IMPERVIOUS
RUNOFF COEFFICENT

DRAINAGE BOUNDARY

PROPOSED CONDITION

STORM DRAINAGE AREA PLAN

SCALE: 1:500

PROJECT: 40–70 PLAINS ROAD, BURLINGTON, ON
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Burlington, Ontario

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

STAGE-STORAGE-DISCHARGE CALCULATIONS

Catchment 201
Outlet Device No. 1 (Quantity)

Type:	Orifice
Diameter (mm)	**160**
Area (m^2)	0.02011
Invert Elev. (m)	98.30
C/L Elev. (m)	98.38
Disch. Coeff. (C_d)	0.6
Discharge (Q) =	$C_d A (2 g H)^{0.5}$
Number of Orifices:	1

		SWM Pond Volumes						Outlet No. 1	
	Elevation m	Area m^2	Tank Incremental Volume	Additional Incremental Underground	Additional Incremental Surface m^3	Cumulative Volume m^3	Active Storage Volume m^3	H m	Discharge m^3/s
Orifice Invert	98.30	122	0	0.0	0	0	0	0.000	0.0000
0.4m Deep	98.70	122	49	0.0	0	49	49	0.320	0.0302
0.8m Deep	99.10	122	49	0.0	0	97	97	0.720	0.0453
1.2m Deep	99.50	122	49	0.0	0	146	146	1.120	0.0566
Top of Tank	99.90	122	49	0.0	0	195	195	1.520	0.0659

2-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Burlington**	
Return Period:	**2**	Years
A =	**681.520**	
B =	**6.000**	
C=	**0.780**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post-development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	105.001	0.0000292	0.172	0.0	0.1717	51.52	29.66	21.87
10	600	78.391	0.0000218	0.128	0.0	0.1282	76.93	39.54	37.39
15	900	63.409	0.0000176	0.104	0.0	0.1037	93.34	49.43	43.91
20	1200	53.678	0.0000149	0.088	0.0	0.0878	105.35	59.31	46.04
25	1500	46.797	0.0000130	0.077	0.0	0.0765	114.81	69.20	45.61
30	1800	41.645	0.0000116	0.068	0.0	0.0681	122.60	79.08	43.52
35	2100	37.628	0.0000105	0.062	0.0	0.0615	129.24	88.97	40.27
40	2400	34.398	0.0000096	0.056	0.0	0.0563	135.02	98.85	36.17
45	2700	31.738	0.0000088	0.052	0.0	0.0519	140.15	108.74	31.42
50	3000	29.505	0.0000082	0.048	0.0	0.0483	144.77	118.62	26.15
55	3300	27.601	0.0000077	0.045	0.0	0.0451	148.97	128.51	20.47
60	3600	25.956	0.0000072	0.042	0.0	0.0425	152.83	138.39	14.44

Max. required storage volume = 46.04 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

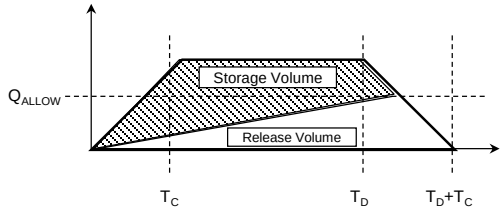
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



5-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Burlington**	
Return Period:	**5**	Years
A =	**802.040**	
B =	**5.000**	
C=	**0.764**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post-development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	138.101	0.0000384	0.226	0.0	0.2259	67.76	29.66	38.11
10	600	101.312	0.0000281	0.166	0.0	0.1657	99.42	39.54	59.88
15	900	81.322	0.0000226	0.133	0.0	0.1330	119.71	49.43	70.28
20	1200	68.576	0.0000190	0.112	0.0	0.1122	134.59	59.31	75.28
25	1500	59.659	0.0000166	0.098	0.0	0.0976	146.36	69.20	77.17
30	1800	53.031	0.0000147	0.087	0.0	0.0867	156.12	79.08	77.04
35	2100	47.888	0.0000133	0.078	0.0	0.0783	164.48	88.97	75.51
40	2400	43.766	0.0000122	0.072	0.0	0.0716	171.80	98.85	72.95
45	2700	40.382	0.0000112	0.066	0.0	0.0660	178.32	108.74	69.59
50	3000	37.546	0.0000104	0.061	0.0	0.0614	184.22	118.62	65.60
55	3300	35.131	0.0000098	0.057	0.0	0.0575	189.61	128.51	61.11
60	3600	33.047	0.0000092	0.054	0.0	0.0540	194.58	138.39	56.19

Max. required storage volume = 77.17 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

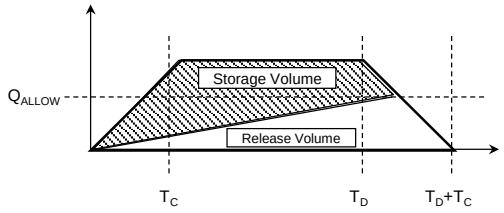
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



10-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Hamilton**	
Return Period:	**10**	Years
A =	**918.280**	
B =	**5.000**	
C=	**0.763**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post-development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	158.480	0.0000440	0.259	0.0	0.2592	77.76	29.66	48.11
10	600	116.310	0.0000323	0.190	0.0	0.1902	114.14	39.54	74.60
15	900	93.388	0.0000259	0.153	0.0	0.1527	137.47	49.43	88.04
20	1200	78.767	0.0000219	0.129	0.0	0.1288	154.59	59.31	95.28
25	1500	68.538	0.0000190	0.112	0.0	0.1121	168.15	69.20	98.95
30	1800	60.933	0.0000169	0.100	0.0	0.0997	179.39	79.08	100.31
35	2100	55.030	0.0000153	0.090	0.0	0.0900	189.01	88.97	100.05
40	2400	50.301	0.0000140	0.082	0.0	0.0823	197.45	98.85	98.60
45	2700	46.415	0.0000129	0.076	0.0	0.0759	204.97	108.74	96.23
50	3000	43.160	0.0000120	0.071	0.0	0.0706	211.77	118.62	93.15
55	3300	40.387	0.0000112	0.066	0.0	0.0661	217.98	128.51	89.48
60	3600	37.995	0.0000106	0.062	0.0	0.0621	223.71	138.39	85.32

Max. required storage volume = 100.31 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

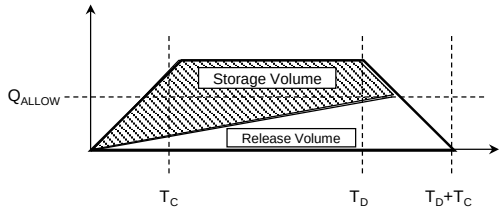
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



25-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Burlington**	
Return Period:	**25**	Years
A =	**1065.950**	
B =	**5.000**	
C=	**0.762**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post-development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	184.390	0.0000512	0.302	0.0	0.3016	90.47	29.66	60.82
10	600	135.380	0.0000376	0.221	0.0	0.2214	132.85	39.54	93.31
15	900	108.731	0.0000302	0.178	0.0	0.1778	160.05	49.43	110.63
20	1200	91.729	0.0000255	0.150	0.0	0.1500	180.03	59.31	120.72
25	1500	79.831	0.0000222	0.131	0.0	0.1306	195.85	69.20	126.66
30	1800	70.983	0.0000197	0.116	0.0	0.1161	208.98	79.08	129.90
35	2100	64.116	0.0000178	0.105	0.0	0.1049	220.22	88.97	131.25
40	2400	58.612	0.0000163	0.096	0.0	0.0959	230.07	98.85	131.22
45	2700	54.091	0.0000150	0.088	0.0	0.0885	238.86	108.74	130.13
50	3000	50.301	0.0000140	0.082	0.0	0.0823	246.81	118.62	128.19
55	3300	47.074	0.0000131	0.077	0.0	0.0770	254.08	128.51	125.57
60	3600	44.289	0.0000123	0.072	0.0	0.0724	260.77	138.39	122.38

Max. required storage volume = 131.25 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

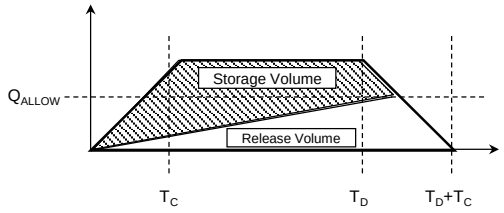
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



50-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Burlington**	
Return Period:	**50**	Years
A =	**1172.340**	
B =	**5.000**	
C=	**0.761**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post-development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	203.261	0.0000565	0.332	0.0	0.3324	99.73	29.66	70.08
10	600	149.296	0.0000415	0.244	0.0	0.2442	146.51	39.54	106.97
15	900	119.942	0.0000333	0.196	0.0	0.1962	176.55	49.43	127.13
20	1200	101.209	0.0000281	0.166	0.0	0.1655	198.64	59.31	139.33
25	1500	88.098	0.0000245	0.144	0.0	0.1441	216.13	69.20	146.94
30	1800	78.346	0.0000218	0.128	0.0	0.1281	230.65	79.08	151.57
35	2100	70.776	0.0000197	0.116	0.0	0.1158	243.09	88.97	154.13
40	2400	64.708	0.0000180	0.106	0.0	0.1058	254.00	98.85	155.15
45	2700	59.722	0.0000166	0.098	0.0	0.0977	263.73	108.74	155.00
50	3000	55.544	0.0000154	0.091	0.0	0.0908	272.54	118.62	153.92
55	3300	51.985	0.0000144	0.085	0.0	0.0850	280.58	128.51	152.08
60	3600	48.913	0.0000136	0.080	0.0	0.0800	288.00	138.39	149.61
65	3900	46.231	0.0000128	0.076	0.0	0.0756	294.89	148.28	146.62
70	4200	43.866	0.0000122	0.072	0.0	0.0717	301.33	158.16	143.17

Max. required storage volume = 155.15 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

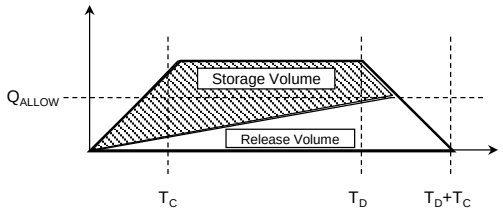
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



100-Year Storm - Modified Rational Method

Stormwater Storage Volume

Determination of required storage volume under proposed conditions to control the 100-year proposed conditions runoff to the 5-year allowable release rate. Storage volume calculated using the Modified Rational Method.

Storm Rainfall Information		
City/Town/Region:	**Burlington**	
Return Period:	**100**	Years
A =	**1281.340**	
B =	**5.000**	
C=	**0.761**	
Tc =	**10**	minutes
	600	seconds

Area of site being investigated (ha) =	**0.640**	(Lot Area)
Composite Runoff Coeff. (C) =	**0.92**	(Post development "C")
Release Rate - Q_{ALLOW} (m^3/s) =	**0.0659**	(Allowable discharge)

Flows from Lot area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)
5	300	222.159	0.0000617	0.363	0.0	0.3634	109.01	29.66	79.35
10	600	163.177	0.0000453	0.267	0.0	0.2669	160.13	39.54	120.59
15	900	131.093	0.0000364	0.214	0.0	0.2144	192.97	49.43	143.54
20	1200	110.620	0.0000307	0.181	0.0	0.1809	217.11	59.31	157.80
25	1500	96.289	0.0000267	0.157	0.0	0.1575	236.23	69.20	167.03
30	1800	85.631	0.0000238	0.140	0.0	0.1401	252.10	79.08	173.02
35	2100	77.356	0.0000215	0.127	0.0	0.1265	265.69	88.97	176.73
40	2400	70.724	0.0000196	0.116	0.0	0.1157	277.62	98.85	178.77
45	2700	65.275	0.0000181	0.107	0.0	0.1068	288.26	108.74	179.52
50	3000	60.708	0.0000169	0.099	0.0	0.0993	297.88	118.62	179.26
55	3300	56.819	0.0000158	0.093	0.0	0.0929	306.67	128.51	178.16
60	3600	53.461	0.0000149	0.087	0.0	0.0874	314.78	138.39	176.39
65	3900	50.529	0.0000140	0.083	0.0	0.0826	322.31	148.28	174.04
70	4200	47.945	0.0000133	0.078	0.0	0.0784	329.35	158.16	171.19

Max. required storage volume = 179.52 m^3

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

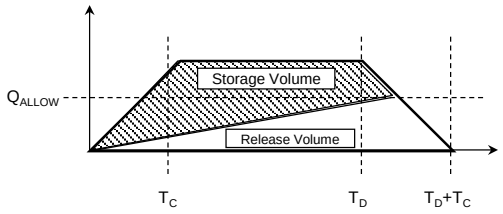
Runoff Volume = Area under trapezoidal hydrograph

= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph

= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



APPENDIX B

WATER USAGE & SANITARY DISCHARGE REPORT

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

April 13, 2021

File: 19121

Halton Region
1151 Bronte Road
Oakville, Ontario
L6M 3L1

Attention: Halton Region

RE: Water Usage & Wastewater Generation Report
40-70 Plains Road East
City of Burlington

The proposed development consists of constructing a nine-storey residential building including two levels of underground parking, an asphalt driveway/parking lot, concrete curb/sidewalk and landscaped areas. Refer to the Site Plan prepared by RAW Design for additional details.

1.0 Wastewater Generation

Wastewater generation for the site was calculated based on Table 8.2.1.3.A-Residential Occupancy of the 2020 Ontario Building Code. See Table 1 below for calculations.

Table 1 - Wastewater Generation Calculations		
Occupancy Type:	Apartments	
Domestic Flow (L/person):	275	
Type of Unit	Number of Units	Persons per type
One Bedroom Units:	175	350
Two Bedroom Units:	185	740
Three Bedroom Units:	0	0
Number of Persons Per Bedroom	2*	
Total Number of Persons	1090	
Total Wastewater Estimate (L/Day):	**299,750**	
Total Wastewater Estimate (m^3/Day):	**299.75**	

* Based on Sentence 3.1.17.1(1) (b) of the Ontario Building Code

2.0 Water Usage

Water usage for the site was calculated based on Table 8.2.1.3.A-Residential Occupancy of the 2012 Ontario Building Code (same as wastewater generation), and the additional water usage for the landscaped portion of the site. See Table 2 below for calculations.

Table 2 - Water Usage Calculations	
Nine-Storey Residential Building	
Total Water Usage Estimate (m^3/Day) [A]	**299.75**
Landscaped Area	
Landscaped Area (m^2)	1060
Flow (mm/week) [B]	25.4
Total Water Usage Estimate (m^3/week) [C]	26.92
Total Water Usage Estimate (m^3/Day)	**3.85**

[A] Total Water Usage Estimate for residential building is the same as the total calculated for the Wastewater Estimate
[B] Flow is assumed to be 25.4mm/week
[C] Total Water Usage Estimate for landscaped area = (Flow/1000) x Landscaped Area

Total Water Usage (m^3/Day): 303.6

We trust that the information provided addresses the Halton Region requirements.

Prepared by:

S.LLEWELLYN & ASSOCIATES LIMITED



S. Nelson, P.Eng.

APPENDIX C

FIRE FLOW ANALYSIS

FIRE FLOW DEMAND REQUIREMENTS - FIRE UNDERWRITERS SURVEY (FUS GUIDELINES)

Project Number: 19121
Project Name: 40-70 Plains Road East
Date: 13-Apr-21

Fire flow demands for the FUS method is based on information and guidance provided in "Water Supply for Public Protection" (Fire Underwriters Survey, 1999).

An estimate of the fire flow required is given by the following formula:

$$F = 220\,C\sqrt{A} \qquad \textbf{(1)}$$

where:

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = Total floor area in square metres

	Building Area				(1)		(2)			(3)		(4)		Final Adjusted Fire Flow	
Building / Location	Footprint Area (m^2)	# of Storeys	**Total GFA (m^2)**	Type of Construction	***Fire Flow "F"*** (l/min)	(l/s)	***Occupancy*** %	Adjustment (l/min)	**Adjusted Fire Flow (l/min)**	***Sprinkler*** %	Adjustment (l/min)	***Exposure*** %	Adjustment (l/min)	**(l/min)**	**(l/s)**
9-Storey Building	**28488.0**	**1**	**28488**	**0.8**	30000	500.0	**-15**	-4500.0	**25500.0**	**-50**	-12750.0	55	14025.0	**27000**	**450**

Total Area Calculation:

Floor	Area
1	3371
2	3313
3	3946
4	3748
5	3532
6	3316
7	2622
8	2420
9	2220
Total	28488

(2) Occupancy

Non-Combustible	-25%
Limited Combustible	-15%
Combustible	No charge
Free Burning	15%
Rapid Burning	25%

(3) Sprinkler

Minimum credit for systems designed to NFPA 13 is 30%.

If the domestic and fire services are supplied by the same municipal water system, then take an additional 10%.

If the sprinkler system is fully supervised (ie. annunciator panel that alerts the Fire Dept., such as a school), then an additional 10% can be taken. Maximum credit = 50%.

(4) Exposure

0 to 3m	25%	
3.1 to 10m	20%	Calculate for all
10.1 to 20m	15%	sides. Maximum
20.1 to 30m	10%	charge shall not
30.1 to 45m	5%	exceed 75%

Side	Exposure (m)	Charge (%)
North =	**>45**	**0**
South =	**3.1 to 10m**	**20**
East =	**3.1 to 10m**	**20**
West =	**10.1 to 20m**	**15**
Total Expoure =		***55***

JACKSON WATERWORKS

Telephone: 905.229.3176
Toll Free: 800.734.5732
email: jww@bellnet.ca
Website: www.jacksonwaterworks.ca

Mr. John Oreskovic
S. Llewellyn & Associates Limited
3228 South Service Road, East Wing, Suite 105
Burlington Ontario **L7N 3H8**

02 October 2020

Jackson Waterworks has recently completed fire hydrant flow testing at 40-50 Plains Road East in Burlington.

We define the Test Hydrants as the ones being flowed, and the Base Hydrant as the one where static and residual pressures are recorded. Wherever possible, we inspect the secondary valve for the Test Hydrants to make sure it is in the fully open position. Likewise, we count the number of turns needed to open the Test Hydrants (to make sure it is opening completely).

We do not use pitot conversion factors for different nozzle profiles. The Engineer may use these factors if desired and warranted.

Neither of the secondary valves for the Test Hydrants could be located for inspection at the time of test.

Testing was completed in accordance with NFPA 291 guidelines.

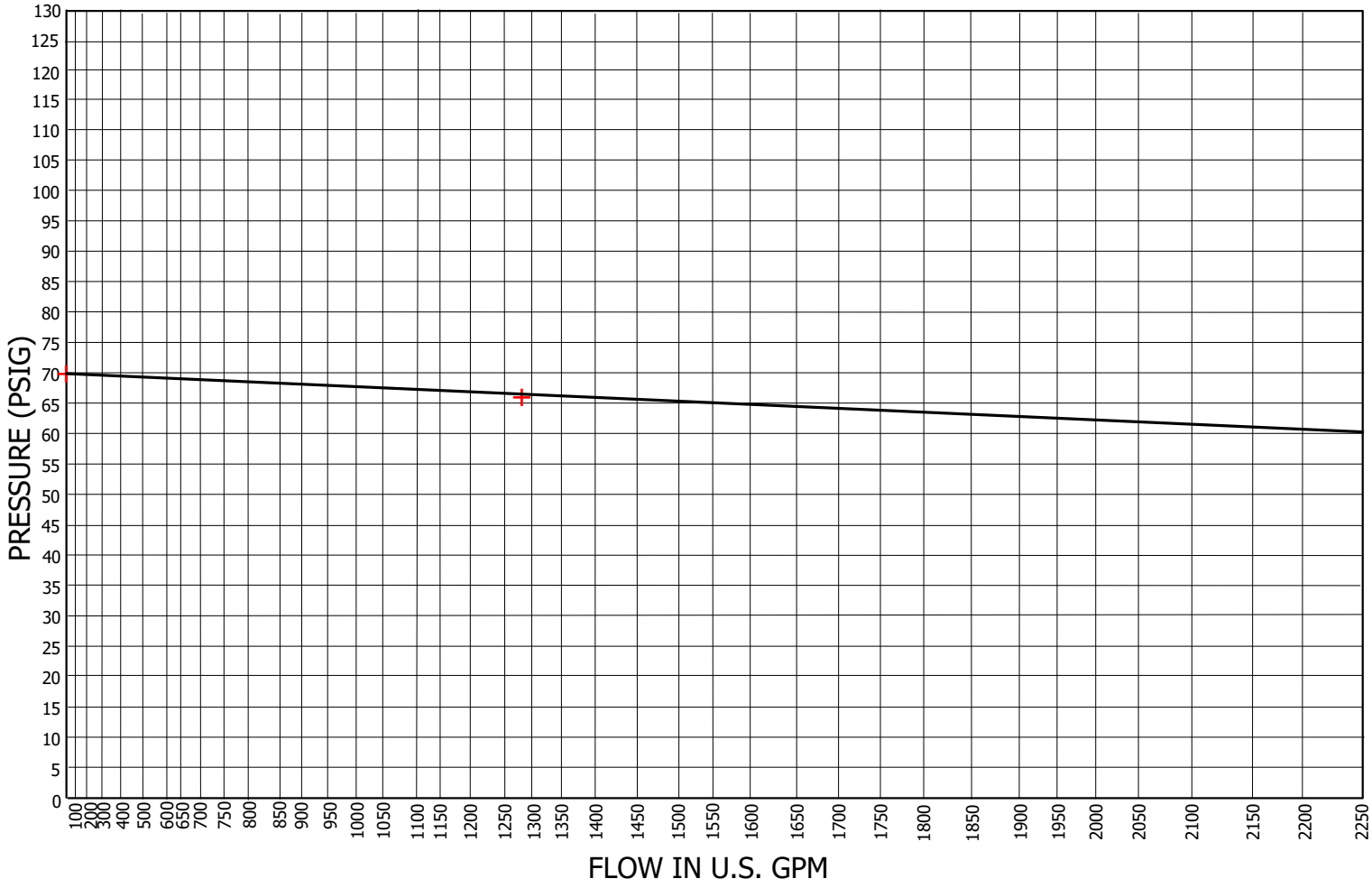
There were no irregularities to report.

Trusting this meets with your approval, we are...

Yours truly,



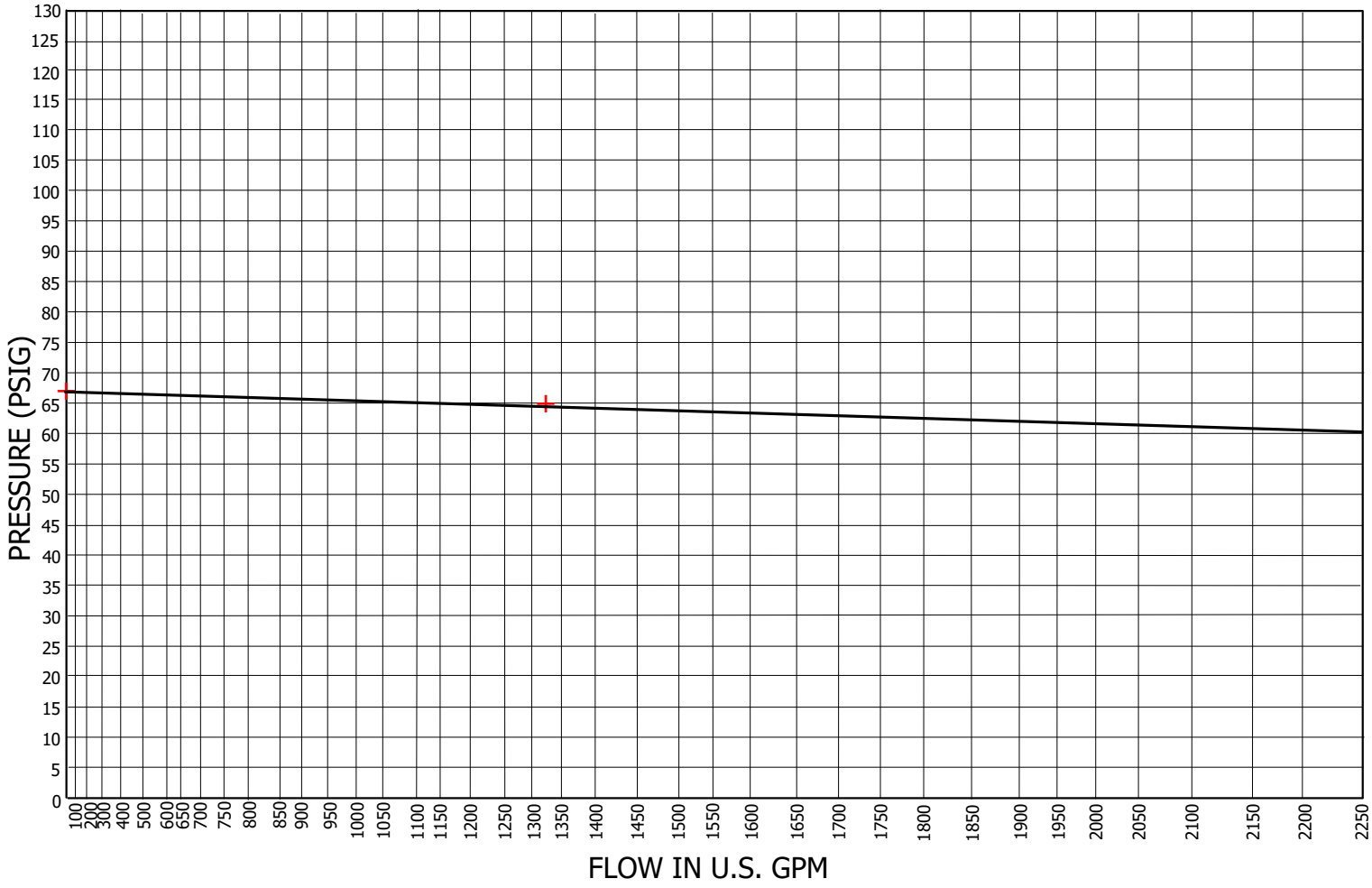
Mark Schmidt
Jackson Waterworks



# of Ports	PORT DIA. (in/mm)	PITOT (psig)	FLOW (usgpm)	RESIDUAL (psig)
1	2.50/63	58	1278	66
2	2.50/63	48/48	2326	60
THEORETICAL FLOW @ 20psi			4998	

General Data	
Test Date	29 September 2020
Test Time	1:15pm
Pipe Dia.	16"
Static	70

Site Information	
Site or Developer Name	S. Llewellyn & Associates Limited
Site Address/Municipality	40-50 Plains Road East, Burlington
Location of Test Hydrant	Front of 40 Plains Road East (Municipal ID H5750)
Location of Base Hydrant	Front of 126 Plains Road East (Municipal ID H5680)
Technician's Comments	No conversion factor used for flow calculation based on round and flush internal nozzle
	configuration. Flow testing has been conducted in accrodance with NFPA 291 guidelines
	wherever possible. Refer to attached report for further information.
	Verified By: Mark Schmidt



# of Ports	PORT DIA. (in/mm)	PITOT (psig)	FLOW (usgpm)	RESIDUAL (psig)
1	2.50/63	62	1321	65
2	2.50/63	47/47	2300	60
THEORETICAL FLOW @ 20psi			7267	

General Data	
Test Date	29 September 2020
Test Time	1:45pm
Pipe Dia.	16"
Static	67

Site Information	
Site or Developer Name	S. Llewellyn & Associates Limited
Site Address/Municipality	40-50 Plains Road East, Burlington
Location of Test Hydrant	Front of 40 Plains Road East (Municipal ID H5750)
Location of Base Hydrant	BirchwoodAvenue, 1st South of Plains Road East (Municipal ID H31217)
Technician's Comments	No conversion factor used for flow calculation based on round and flush internal nozzle
	configuration. Flow testing has been conducted in accrodance with NFPA 291 guidelines
	wherever possible. Refer to attached report for further information.
	Verified By: Mark Schmidt

APPENDIX D

GEOTECHNICAL INVESTIGATION

FISHER ENGINEERING

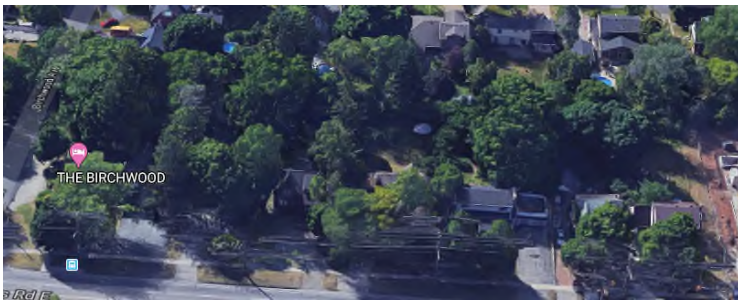
ENGINEERING

Professional Engineers Ontario

LABORATORY

CALA
Canadian Association for Laboratory Accreditation Inc.

GEOTECHNICAL INVESTIGATION



40-70 PLAINS ROAD EAST, BURLINGTON, ONTARIO

Prepared for:

Infinity Development Group

400 Esna Park Drive, Unit 15
Markham, ON
L3R 3K2

Tel: (905) 475-7755
Fax: (905) 475-7718
www.fisherenvironmental.com

Project No. FE-P 20-10328Geo.U

July 15, 2020; Updated April 16, 2021

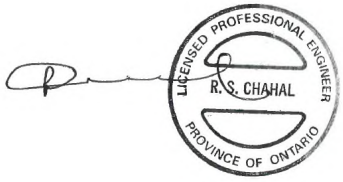
Issued to:	Infinity Development Group 2275 Upper Middle Road East Oakville, ON L6H 0C3
Contact:	Arjun Anand arjun.anand@infinitydevelopment.ca
Project Name:	Proposed New Development
Project Address:	40-70 Plains Road East, Burlington, ON.
Project Number:	FE-P 20-10328Geo.U
Issued on:	July 15, 2020; Updated April 16, 2021
Report Prepared by: **(Primary Contact)**	 Rajinder Chahal, P. Eng., Senior Projecst Engineer 647.227.8473 rajinder@fisherenvironmental.com
Project Manager:	 Sean Fisher, M.Sc. Eng., Project Manager, sean@fisherenvironmental.com
Reviewed By:	 Dave Fisher, C. Chem., P. Eng., President dave@fisherenvironmental.com

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1. INTRODUCTION

Fisher Engineering Limited was retained by Infinity Development Group to carry out a geotechnical subsurface investigation for the proposed new development at 40-70 Plains Road East in Burlington, Ontario.

The purpose of the geotechnical investigation was to determine the general subsurface conditions at the site and to provide geotechnical comments/recommendations for the design of the proposed development by means of six (6) boreholes.

This report presents the results of the tests performed in accordance with the general terms of reference outlined in the scope of work.

The report has been prepared specifically and solely for the proposed development in regards to geotechnical aspects of design & construction.

2. SITE AND PROJECT DESCRIPTION

The subject property is located on the south side of Plains Road East in the predominantly residential neighborhood south of Highway 403 and east of Waterdown Road in the City of Burlington.

Currently seven single family dwellings (nos. 40, 46, 50, 56, 62, 66 & 70) occupy the front portions of lots. A six-story building exists on the adjoining property on the west side. A single-story building was observed over the adjoining lot located at the corner of Birchwood Avenue & Plains Road East.

A large single-story Solid Gold Inn building was observed on the north side of Plains Road East.

Site grades drop slightly towards east direction in general. We were provided a previous report prepared by Landtek Limited. Five boreholes were drilled in the east portion of the site. However, the depth of exploration was limited to 8.2m and deeper boreholes were recommended. Borehole logs from this report along with site plan showing their locations are appended to this report.

The proposed development calls for a 10-story building with two levels underground parking. Details of the proposed development such as finished ground/lowest parking floor levels, finished grades, footing founding levels etc. were not available at the time of our investigation. We were recently provided with updated architectural drawings containing proposed P2 floor levels. This report has been updated to include the comments based on current/recent information available/provided.

3. SCOPE OF GEOTECHNICAL WORK

The geotechnical scope of work includes the following:

- Investigation of the subsurface conditions at the site by advancing boreholes, soil sampling and visual evaluation.

- Prepare a geotechnical report with comments and recommendations regarding:
  - Appropriate foundation depth, type and bearing capacity, and seismic classification.
  - Underground parking garage design/construction.
  - Excavation & shoring design parameters etc.

4. METHOD OF INVESTIGATION

The field work for this investigation was carried out on May 26, June 4, 5 & 18, 2020, in which a total of six (6) boreholes (BH1 – BH6), were drilled to approximate depths ranging between 6.25m & 13.56m below the prevailing grades. The approximate locations of the boreholes and elevations are shown on the attached Borehole Location Plan in Appendix A.

The ground surface elevation at each borehole was established by interpolation from the topographic survey plan provided.

All boreholes were advanced using hollow stem auguring. The subsurface strata were sampled at regular intervals of depth using a split-spoon sampler following the procedure as detailed in the ASTM Standard specification D1586 for the Standard Penetration Test. Field tests to determine the engineering parameters of the soil were carried out during drilling, which included Standard Penetration Tests (SPT).

Water level observations were made in each borehole upon its completion. Monitoring wells were installed in all boreholes for groundwater observations, water sampling and/or slug/pump testing purposes.

All soil samples were taken to our accredited laboratory for final visual assessment, classification and selected moisture content testing & grain size analyses. The samples were tested and classified in general accordance with the Unified Soil Classification System, ASTM D 2487, and Standard Practice for Classification of Soil for Engineering Purposes.

Soil Description and test results are given in the borehole Records attached to this report.

The soil samples recovered during the investigation will be stored in our laboratory for a period of 30 days after which they will be discarded unless further instructions are received.

5. SUBSURFACE CONDITIONS

The subsurface conditions encountered in the boreholes are shown on the Borehole Log Sheets provided in Appendix B.

The boreholes logs include soil stratification at the borehole locations along with detailed soil descriptions. Variations in the soil stratification may occur and should be expected between borehole locations and elsewhere on the site.

FILL

Fill soils were found below the above surficial layer of all boreholes.

Fill extended to the following approximate depths below the prevailing grades.

BH No.	1	2	3	4	5	6
Depth of Fill, m	0.76	1.52	1.37	0.76	1.52	1.98

The fill generally consisted of dark brown to brown silty sand with some to trace of topsoil/roots and trace of gravel.

Reddish Brown/Brown/Greyish Brown Sand/Silty Sand/Gravelly Sand/Gravel & Sand

Native soils of brown to reddish/greyish brown sand/silty sand/sand & gravel/gravelly sand were found underlying the fill soils. Frequent cobbles/boulders were encountered in the sand & gravel/gravelly sand deposit. Relative density of these soils generally varied from compact to very dense, occasionally loose. Boreholes 1 and 3 were terminated in these soils at the respective depths of 10.67m & 12.65m. Borehole 5 was terminated in the sand and gravel deposit at the depth of 6.25m because of refusal to auguring possibly due to boulder.

Greyish Brown/Grey Sand/Silty Sand

Greyish brown to grey sand/silty sand were found below the gravelly sand/sand & gravel of boreholes 2, 4 & 6. Relative density of these sandy layers varied from compact to dense. We consider that lower 'N' values indicating lower relative density may be due to the disturbance because of auguring and/or hydrostatic pressure.

6. GROUNDWATER CONDITIONS

Boreholes were advanced using dry auguring.

Monitoring wells were installed in all boreholes to monitor groundwater levels/water sampling.

Groundwater depths/elevations as measured on completion of boreholes and from the monitoring wells are summarized in the following table.

No.	Elev. at Ground (m)	Depth of Well, m bgs	On Completion		24-Jun-20		08-Jul-20		22-Jul-20	
			GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl
MW1	101.35	10.06	8.08	93.27	8.60	92.75	8.59	92.76	8.60	92.75
MW2	100.80	12.80	7.77	93.03	7.86	92.94	8.05	92.75	8.03	92.77
MW3	100.81	12.19	Dry	-	8.23	92.58	8.23	92.58	8.25	92.56
MW4	100.85	9.14	7.77	93.08	7.82	93.03	7.91	92.94	7.96	92.89
MW5	100.79	5.79	Cave in to 4.57m	-	Dry at 5.63	-	Dry at 5.70	-	Dry at 5.70	-
MW6	100.45	12.95	8.23	92.22	7.86	-	7.96	92.49	7.99	92.46

Based on the above information and visual examination of the soil samples, we conclude that groundwater exists in the wet sand/silty sand to gravelly sand layers encountered towards bottom of the boreholes. Perched water may also be encountered from the wet seams/pockets/layers trapped inside the soils. We consider the water level in the monitoring wells represents real ground water table. This groundwater table may fluctuate with seasonal weather conditions; climate change; change in the surrounding land use or the water shed area etc.

It should be noted that 'Fisher' also carried out a hydrogeological assessment in conjunction with this geotechnical investigation. Issues pertaining to the groundwater such as requirements for temporary dewatering, permanent drainage, amount/quality of water for discharge etc. have been discussed/addressed separately in the hydrogeological investigation report. These reports should be read in conjunction in finalizing the sub-structure design process.

7. GEOTECHNICAL DISCUSSIONS AND RECOMMENDATIONS

7.1 General Discussion

- We understand that the proposed development will comprise the construction of a medium rise (ten-storey) building with two levels of underground parking.

- Based on the updated lowest floor level of 95.0m provided, footing founding elevations are expected to vary between approximate elevations of 92.5m & 93.5m. it should be noted that foundation plan indicating the underside/founding levels of footings was not available at the time of update.

The following sections provide general geotechnical recommendations for design and construction.

7.2 Foundation Considerations

Boreholes indicate that dense to very dense undisturbed native soils of greyish brown to grey sand/silty sand/sand & silt/gravelly sand encountered between the elevations can be used for the building support using conventional strip and/or spread footing foundations.

For footings placed over undisturbed native soils between the elevations 92.0m and 94.0m, factored geotechnical resistance at ULS of 600kPa & geotechnical reaction at SLS of 400kPa can be used for foundation design purposes. SLS values are based on the current/general engineering practice of total settlement of 25mm and 19mm differential movements.

Based on the groundwater conditions encountered it appears that part of the site may require dewatering to maintain the stability of footing subgrades.as the footings will be located below the local groundwater table. We recommend that adequate dewatering system should be provided (as & where required), maintained & monitored to prevent any damage/disturbance of founding soils/subgrade due to uplift pressure until the construction of super structure is able to balance the uplift forces (usually recommended by the structural consultant. It should be noted that groundwater conditions sometimes can change suddenly especially for sandy soils and sudden change in the weather conditions.

A mud slab is always preferable to protect the integrity of the base and provide consistent earth cover. If the footings are not formed, then footing excavations should be over-sized or sides sloped so that the caved materials do not end up in/under the footing area.

For footings founded at different levels in the vicinity of each other or located adjacent to excavated and backfilled areas, such as sewer/utility trenches etc., the slope of the imaginary line joining the bottom of two footings or the bottom of footing and excavation should not be steeper than 1.5 horizontal to 1 vertical. Preferably footings at the lower levels be excavated/poured first to prevent undermining of footings located at higher elevations.

The base conditions at the footing founding levels should be observed by a soil engineer from our office prior to pouring concrete, to ensure that the design bearing pressures are being attained. During sub-zero temperatures founding soils and footings must be adequately protected to prevent damage due to freezing/adfreezing/frost penetration using insulated or thermal blankets or straw.

For frost protection, a minimum 900 mm soil cover should be provided for the interior/isolated footings located in the unheated two level of underground parking garage areas. For perimeter wall footings 600mm depth is a common practice in GTA. However, in the garage entrance areas and air shaft/ventilation locations, a minimum 1.2 m earth cover should be provided or a combination of earth cover and insulation should be provided.

7.3 Earthquake Considerations

The 2012 OBC Subsection 4.1.8.7 stipulates that earthquake design for building should be based on the average properties of the top 30 m soil profile.

The parameters for determining the Site Classification for Seismic Site Response are given in Table 4.1.8.4A of the 2012 OBC. The Site Classification for Seismic Site Response (Table 4.1.8.4.A) is based on the average shear wave velocity or Standard Penetration Resistance (N60), or the undrained shear strength of the soils (Su).

Based on the results of the current geotechnical investigation, the site designation for seismic analysis applicable for the proposed development is expected to be "**Class C**". However, shear wave velocity measurement may be required to confirm the classification.

7.4 Underground Parking Garage

The underground structure should be equipped with efficient drainage system, which includes the perimeter weeping tiles around the bottom of the garage wall footings and the interior weeping tiles below the floor slab. The perimeter weepers should be surrounded by clear stone or pea gravel encased in a granular filter or filter cloth. Both weepers should be connected to independently positive frost-free sump pits from where the water is constantly removed.

Where there is insufficient space for the installation of exterior perimeter weeping tiles, the drainage system can be modified by providing vertical drainage between the garage walls and the adjacent shoring. A series of drain holes should be precast through the walls below the garage

floor slab level, forming a complete drainage path to the interior weeping tiles placed beside the garage wall footings.

Underfloor weeping tile drainage system should be provided under the floor slab to release any potential uplift pressure on the slab-on-grade. Top of the underfloor drain should be located below the bottom of granular bedding layer. The drains should be encased in 150 mm of clear stone/pea gravel wrapped in geotextile filter and connected positively to sump pit. The geotextile filter should have equipment opening size of less than 60 µm. A filter fabric should be provided for separation and to prevent migration of the subgrade soils where groundwater is anticipated to rise above the subgrade levels.

Damp or water proofing of garage floor slab will be required depending upon the potential/anticipated highest groundwater table/elevations.

The entire drainage system should be designed by competent professionals, to ensure its capacity and effectiveness concerning the efficient transmittal of volume of water generated without any migration of fines from the surrounding soils.

In the event of power or mechanical failure, a backup system should be designed for pumping/dewatering operations. Water relief valves/plates may be installed in the garage floor slab to relieve any excess hydrostatic pressure in the event of malfunction of the drainage system. The floor slab should also be designed to accommodate the maximum allowable pressure for relief valves.

The lowest floor slab can be constructed as slab-on-grade. After excavating to the desired level, any loose or wet soil should be sub-excavated and replaced with granular material compacted to 98% of the Standard Proctor Maximum Dry Density. A 19 mm clear stone granular bedding of at least 200 mm in thickness should be provided.

The modulus of subgrade reaction for slab-on-grade design of 40MN/m^3 can be used provided the subgrade is undisturbed/adequately compacted & granular bedding is well compacted.

The parking garage walls under free drainage conditions, can be designed for a lateral earth pressure P, as given by the following expression:

$$P = K (\gamma h + q)$$

where K = Coefficient of earth pressure

γ = Unit weight of soil

Q = Surcharge load, if any

Design parameters K, γ are suggested in section 7.5 of this report.

If the perimeter/underfloor drainage systems are not feasible or permitted, water tight structure (bath tub) design (full or partial) is adopted then impacted lowest parking garage floor slab must be designed to resist hydrostatic/uplift pressures and water-proofed. Potential/anticipated highest groundwater level during the life of the structure should be used for determining the water pressures. Parking garage walls should be waterproofed to at least 1m above the highest water level.

For a waterproofed basement, the lateral earth pressures acting on basement walls may be calculated from the following expression:

$$p = K (\gamma h_1 + \gamma' h_2 + q) + \gamma_w h_2$$

where
- p = lateral earth pressure in kPa acting at depth h
- K = earth pressure coefficient, assumed to be 0.4 for vertical walls and horizontal backfill
- γ' = submerged unit weight of backfill of 12kN/m^3 may be assumed
- γ_w = Unit weight of water, a value of 10kN/m^3 can be used
- h_1 = depth to the highest groundwater table in metre
- h_2 = depth below water table in metres
- q = Equivalent value of surcharge on the ground surface in kPa

7.5 Excavation / Shoring

It is understood that the excavation for the proposed structure may extend to the depth of 10m or more. According to the Ontario Occupational Health and Safety Act, all excavations deeper than 1.2m should be adequately supported against ground collapse.

As the space will be limited for a safe excavation slope, we consider that a vertical shoring system would be appropriate for the overall parking garage system.

All structural members should be designed in accordance with relevant codes of practice.

The following soil parameters can be used in the evaluation of lateral earth pressures and design of the shoring system.

	FILL	COMPACT SILTY SAND	SILTY SAND/ SAND/GRAVELLY SAND
Unit weight, γ, kN/m^3	18	20.0	21.0
Coefficient of earth pressure at rest (K_0)	0.48	0.36	0.40
Coefficient of active earth pressure (Ka)	0.35	0.33	0.28
Coefficient of passive earth pressure (Kp)	2.86	3.00	3.57

Extra care will be required to install shoring support system due to anticipated ground water at/below the approximate depth of 7.5m. Furthermore, obstructions from cobbles/boulders will likely be encountered while auguring shaft holes for soldier pile installation.

Excavations extending into water bearing sand/silty sand should not proceed until the dewatering has carried out to bring the wet sand into moist state. We recommend that a dewatering consultant should be engaged/retained to design appropriate system for lowering the water table to the desired/anticipated elevations without migration of fines. Dewatering system should be kept in operation/maintained/monitored until the sub-structure is built up to the height to balance the uplift pressure.

The excavation sides should be protected to prevent any erosion/migration/flowing or washing out of soils from surface water ingress or water bearing wet pockets/layers. Provision of filler fabric may be required to prevent any migration of soils into the excavation. Any cavities behind the lagging should be filled up with compacted soils or unshrinkable fill to prevent their progression into surrounding areas.

Temporary shoring/tie-backs should be designed in accordance with the Canadian Foundation Engineering Manual, 4th Edition. An estimated bond stress value of 65kN/m can be used for preliminary design of soil anchors. It should be noted that inclination, method of grouting/installation etc. influence the bond stress values. Design bond stress should be confirmed by load testing to 200% design load.

Raker pads if required can be designed using soil bearing pressure of 200kPa. Subsoil conditions at the raker founding levels must be observed by our field staff to ensure that they are placed over undisturbed native soils and surrounding soils are not disturbed due to groundwater conditions/excavation operations.

It should also be noted that if raker pad option is adopted for shoring support system, dewatering will also be required for their foundations as typically these pads are 1.2m to 1.5m deep and are located below the building footing founding levels.

Due to presence of water bearing deposits/layers, tie-back holes should be cased during installation to minimize risk of caving. Shoring contractor must provide adequate measures to prevent any caving of loose soils or flow of soils due to ground water into the augured holes during soldier pile installation operations. Temporary safety liners must be used during soldier pile installation and the withdrawal of liner should be slow and coordinated with pouring of concrete/u-fill.

8. EXCAVATION / VIBRATION MONITORING

We understand that two stage tie backs are being proposed for the proposed soldier pile/lagging support purposes. It should be noted that encroachment agreements will be required with the adjacent property owners. If the above agreements are not feasible/achievable then raker pads may be used for the soldier pile support purposes.

Zone of influence for excavation wall movements/displacements can be estimated as 12m beyond the property lines. All the control network points should be located outside the above zone of influence. Reflective targets should be installed at the top of each soldier pile and for each tie-back to monitor the movement of shored walls during and after excavation. Precision targets should be installed on the neighbouring structures within the zone of influence to ensure they are not being impacted by the construction activities on the subject site.

Construction activities for the proposed development such as drilled caissons, soil compaction etc. may generate vibrations which could be perceptible to the nearby residents or sensitive to the adjacent structures. Construction activity vibrations must be limited to the maximum peak particle velocity (PPV) as outlined/regulated by the local/regional/provincial authorities or an expert/qualified person in vibration monitoring and control. Frequency & duration of monitoring and zone of influence due to vibration should also be established by or in accordance with the recommendations by the qualified person.

Pre and post construction surveys should be undertaken to document the existing conditions of properties/infrastructure/structures prior to the start of construction and at the end of project for determining/establishing any substantial changes resulting from construction within the zones of influence.

9. CHEMICAL ANALYSES

One soil sample was submitted to Fisher Environmental laboratories for chemical analyses related to potential sulphate attack on buried concrete. Results of testing are presented in Appendix C.

The chemical analyses that the sulphate concentration in the soil sample is 9.4ppm or 0.00094%. According to CSA-A23. 1-09 Table 3, the result indicates negligible degree of exposure to sulphate attack.

10. GENERAL CONSIDERATIONS

This report is limited in scope to those items specifically referenced in the text. No other testing and design calculations have been performed except as specifically reported.

The discussions and recommendations presented in this report are intended for the sole guidance of the client named and the design consultants. It should not be relied upon for any other purpose.

The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction.

The fact that localised variations in the subsurface conditions may be present between and beyond the boreholes and that those conditions may be significantly different from the general description provided for design purposes should be understood.

Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soils and the potential reuse of these soils on/off Site. Contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

It is strongly urged that Fisher be contacted to provide assistance in the interpretation of the borehole records by anyone undertaking work on/or below the ground surface at this site prior to this work being carried out.

The client expressly agrees that it has entered into this agreement with Fisher, both on its own behalf and as agent on behalf of its employees and principals.

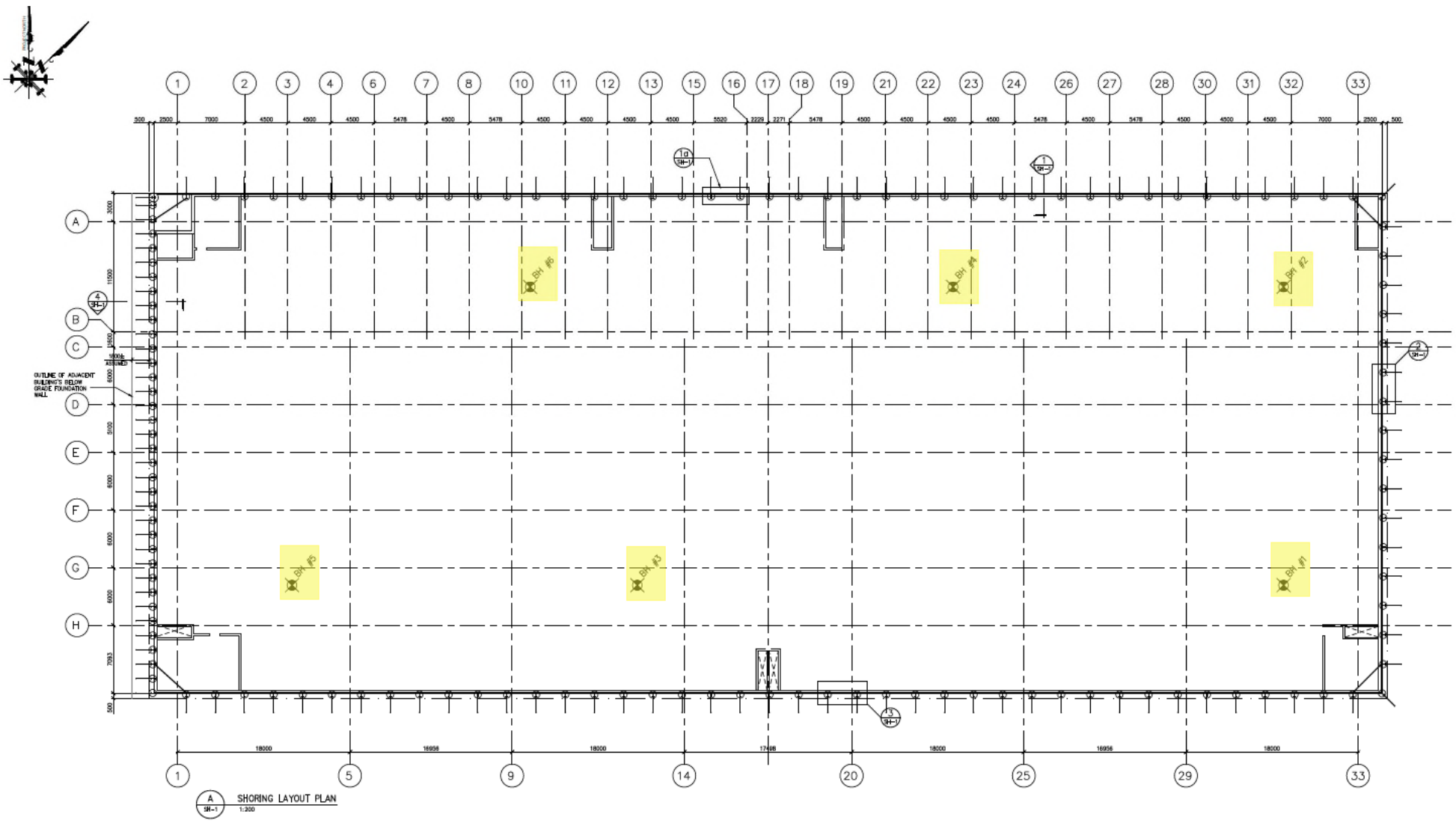
The client expressly agrees that Fisher's employees and principals shall have no personal liability to the client in respect of a claim, whether in contract, tort and/or any other cause of action in law.

Accordingly, the client expressly agrees that it will bring no proceedings and take no action in any court of law against any of Fisher's employees or principals in their personal capacity.

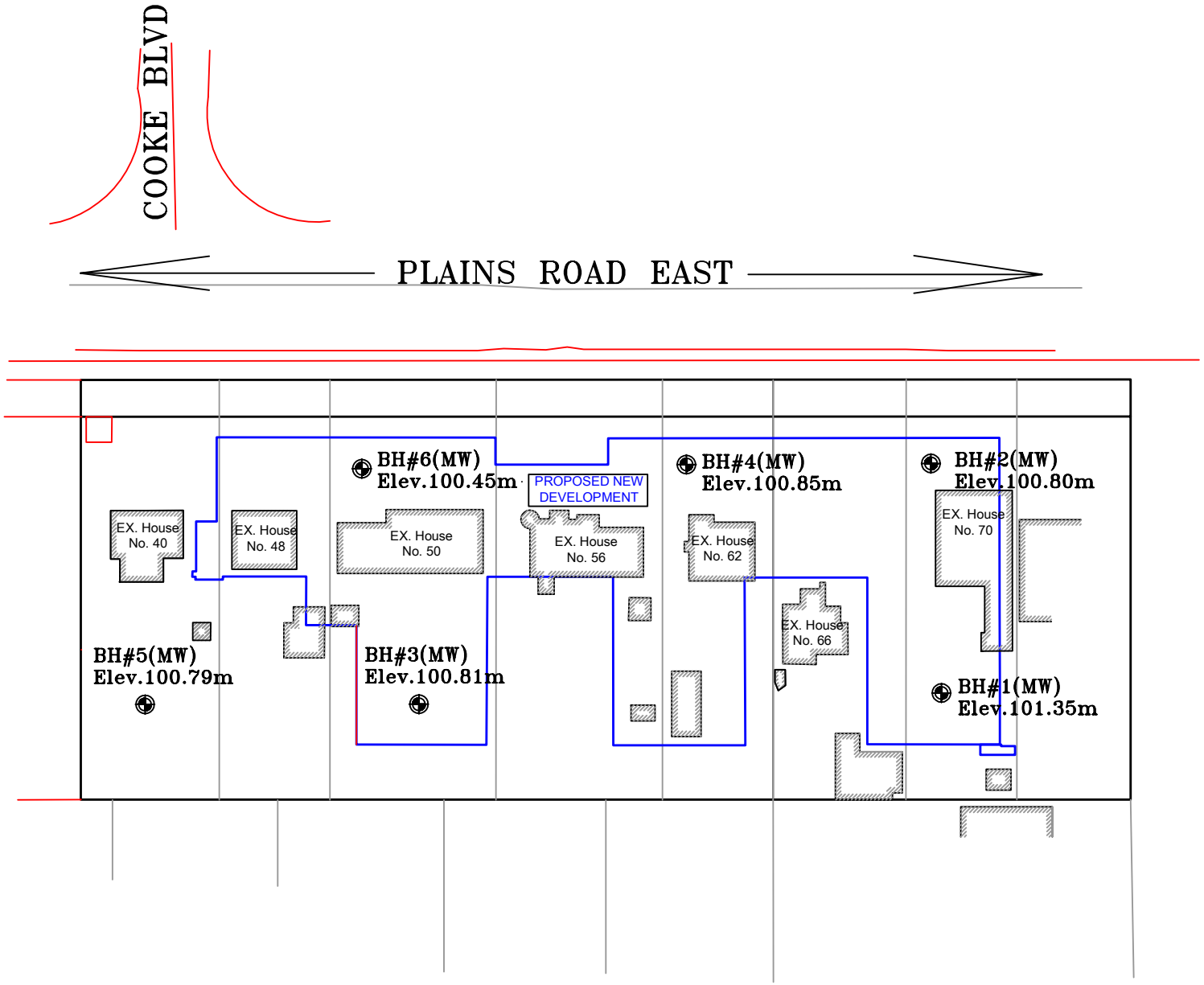
11. CLOSING

We trust that the foregoing information is sufficient for your present needs and will be pleased to review the contents of this report in greater detail should you so require. Should you require our services further in this regard, please do not hesitate to contact our office.

APPENDIX A – SITE PLAN



A SHORING LAYOUT PLAN
SH-1
1:200



FISHER ENGINEERING
400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2
Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

Borehole with Monitoring Well

PROJECT NAME AND ADDRESS

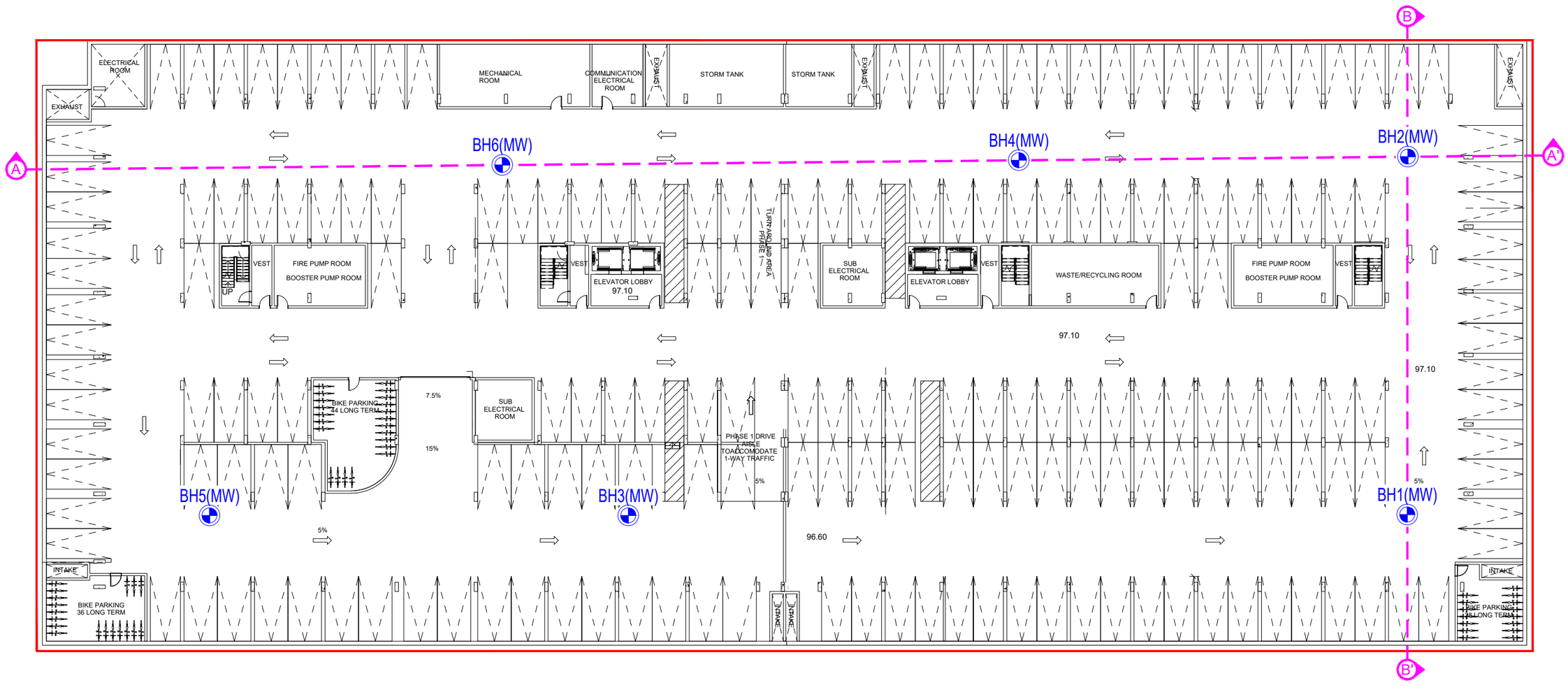
GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATIONS

40-70 PLAINS RD. E., BURLINGTON, ONTARIO

FIGURE 1:

SITE PLAN WITH APPROXIMATE BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE-P 20-10328/29	1
DATE: JUNE 2020	
SCALE: AS SHOWN	



FISHER ENGINEERING
400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2
Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

SITE BOUNDARY

BOREHOLE/ MONITORING WELL

CROSS SECTION MARK

PROJECT NAME AND ADDRESS

HYDROGEOLOGICAL & GEOTECHNICAL INVESTIGATIONS

40-70 Plains Rd. East,.
Burlington, Ontario

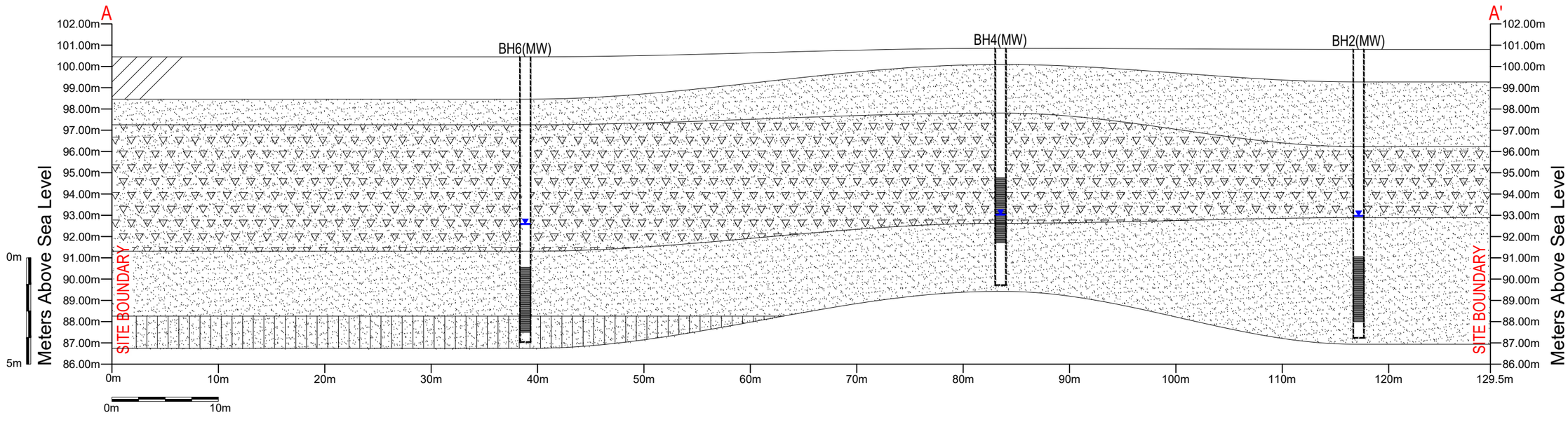
PROJECT NO. FE-P 20-10328

DATE. 11 March 2021

SCALE. AS SHOWN

FIGURE 1: Site Plan With Approximate Borehole Locations

SHEET NO. 1



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

FILL
SILT
SAND
GROUNDWATER POTENTIOMETRIC LEVEL
GRAVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION

40-70 Plains Rd. East,.
Burlington, Ontario

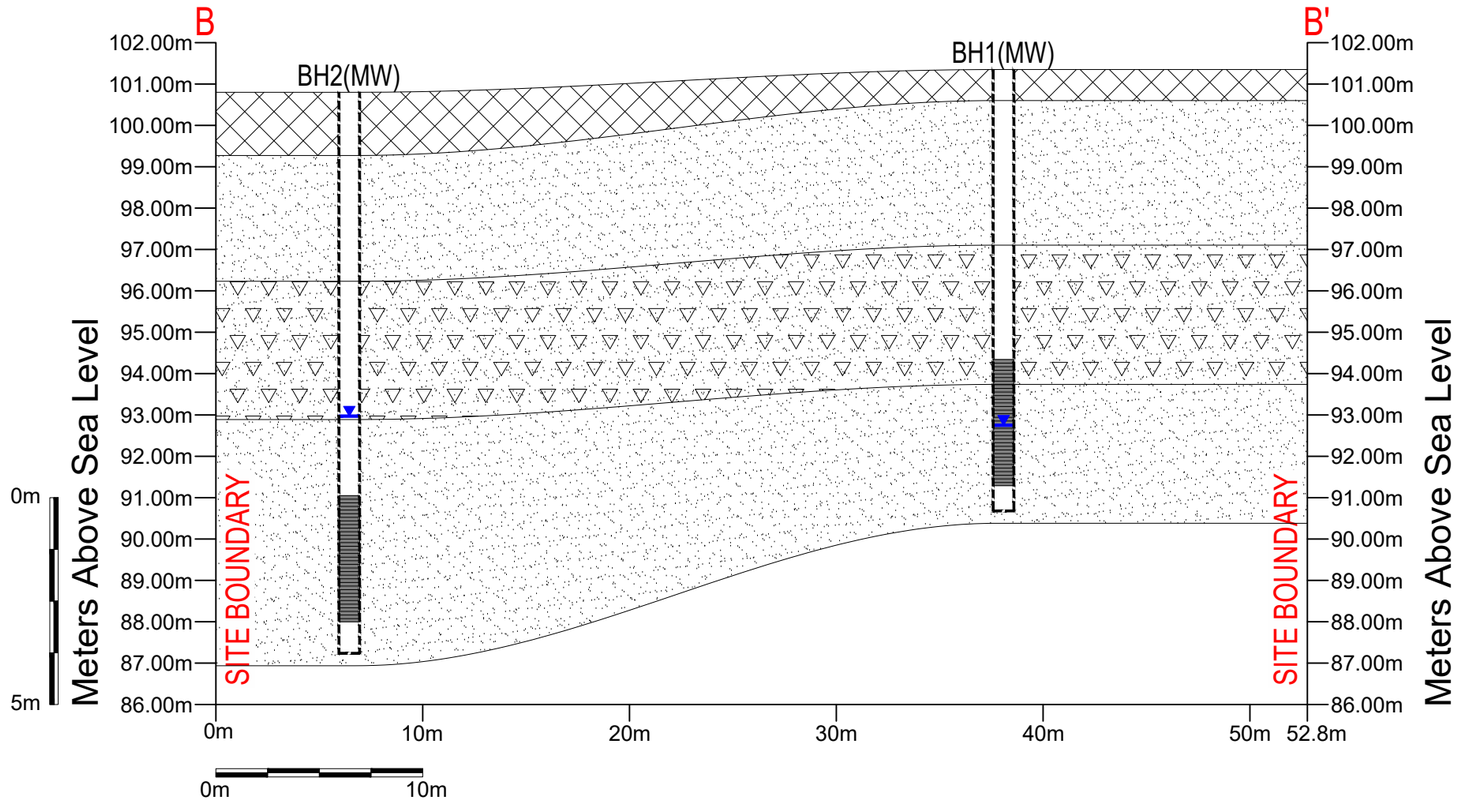
PROJECT NO.
FE-P 20-10328

DATE.
22 July 2020

SCALE.
AS SHOWN

FIGURE 2:
CROSS SECTION A-A'

SHEET NO.
2



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

FILL

SAND

GRAVEL

GROUNDWATER POTENTIOMETRIC LEVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION

40-70 Plains Rd. East,.
Burlington, Ontario

PROJECT NO.
FE-P 20-10328

DATE.
22 July 2020

SCALE.
AS SHOWN

FIGURE 3:
CROSS SECTION B-B'

SHEET NO.
3

COOKE BLVD

℄ OF ROAD

BACK OF CURB

GUTTER

STM MH
RIM=99.85
INV IN=97.55 #1.2
INV IN=97.03 #1.3

PLAINS ROAD EAST

(ROAD ALLOWANCE BETWEEN BROKEN FRONT CONCESSION AND CONCESSION 1)

PIN 07122-002

℄ OF ASPHALT

OVERHEAD WIRE

EDGE OF GUTTER

MSC. PLAN 153

SIDEWALK

PART 1
PLAN 20R-310

PART 11
PLAN 20R-789

PART 10
PLAN 20R-789

PART 9
PLAN 20R-789

PART 8
PLAN 20R-789

PART 7
PLAN 20R-789

PART 6
PLAN 20R-789

PART 5
PLAN 20R-789

PART 4
PLAN 20R-789

167.69

19.05

15.24

22.86

N43°34'30"E

22.91

15.24

18.29

15.54

144.67

52.73

1 1/2 STOREY BRICK & VINYL DWELLING # 40

1 1/2 STOREY BRICK & VINYL DWELLING # 46

1 1/2 STOREY BRICK & VINYL DWELLING # 50

1 1/2 STOREY BRICK & VINYL BUILDING # 50

2 STOREY STUCCO BUILDING # 56

1 STOREY STONE BUILDING # 62

1 STOREY STONE BUILDING # 66

1 1/2 STOREY BRICK BUILDING # 70

1 STOREY STONE BUILDING # 992

1 1/2 STOREY VINYL BUILDING # 982

PIN 07117-0050

PIN 07117-0051

PIN 07117-0052

PIN 07117-0053

PIN 07117-0054

PIN 07117-0055

PIN 07117-0056

PIN 07117-0003

PIN 07117-0004

PIN 07117-0005

LOT 16
PIN 07117-0065

LOT 15

LOT 14
PIN 07117-0067

LOT 13
PIN 07117-0068

LOT 12
PIN 07117-0069

LOT 1

LOT 2

LOT 3

PART OF LOT 6

BROKEN FRONT CONCESSION

REGISTERED PLAN 779 (PF)

BIRCHWOOD AVENUE

N46°25'30"W

N46°29'30"W

N46°20'05"E

N46°59'30"E

152.40

22.81

15.84

Benchmark Note:

CITY OF BURLINGTON BENCHMARK No. 298
ELEVATION = 97.915 METRES CGVD 1928:1978 ADJUSTMENT

BENCHMARK SET ON CITY PLATE N SOUTH FACE AT SOUTHEAST CORNER OF GLENVIEW PUBLIC SCHOOL, No. 143 TOWNSEND AVENUE.

Legend :

- ⌀ DENOTES ROUND
- ℄ DENOTES CENTRE LINE
- SAN MH DENOTES SANITARY MANHOLE
- STM MH DENOTES STORM MANHOLE
- CB DENOTES CATCH BASIN
- BMH DENOTES BELL MANHOLE
- LS DENOTES LIGHT STANDARD
- HP DENOTES HYDRO POLE
- GW DENOTES GUY WIRE
- WV DENOTES WATER VALVE
- AC DENOTES AIR CONDITIONER
- MB DENOTES MAIL BOXES
- MB DENOTES MAIL BOX
- FH DENOTES FIRE HYDRANT

FFE DENOTES FIRST FLOOR ELEVATION
GM DENOTES GAS MARKER
GMR DENOTES GAS METRE

DENOTES DECIDUOUS TREE

DENOTES CONIFER TREE

APPENDIX B – LOG OF BOREHOLES

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH1(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: D-50, Hollow Stem

DRILLING DATE: May 26, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
		GROUND SURFACE (m asl)		101.35			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	4
0.76m				100.59			
4	1					SS-2	11
6	2	REDDISH BROWN TO BROWN FINE TO MEDIUM SAND: trace to some silt, moist, compact.				SS-3	19
8	2					SS-4	29
10	3					SS-5	25
12	4						
4.27m				97.08			
16	5	BROWN SAND & GRAVEL TO GRAVELLY SAND: moist, very dense.				SS-6	100+
18							
20	6					SS-7	100+
22	7						
7.62m				93.73			
26	8	BROWN TO GREYISH BROWN SAND: some to trace of gravel/silt, moist, wet below 9.14m, very dense to compact.				SS-8	58
28	9						
30						SS-9	17
32	10						
10.67m				90.68			
36	11	End of Borehole					
38							
40	12						
42							
44	13						
46	14						
48							
50	15						
52	16						
54							
56							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✤ 40 80 120 160

(Possibly Disturbed)

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

5.6%

6.0%

3.4%

3.7%

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover

Bentonite Pellets

50mm blank PVC

50mm Slotted Pipe

Silica Sand

10.06m

Groundwater Depth on completion: 8.08m

LOGGED: FF

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH2(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

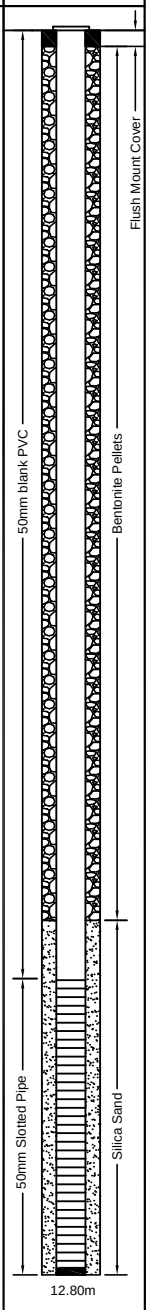
PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 4, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE	PENETRATION TESTING (SPT) ▲ 20 40 60 80 / SHEAR STRENGTH (Kpa) ✤ 40 80 120 160	VAPOUR READING (ppm) □ 20 40 60 80 / MOISTURE CONTENT (%) ● 10 20 30 40	PIEZOMETER OR WELL CONSTRUCTION
0	0	GROUND SURFACE (m asl)		100.80						
		FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	6			
2						SS-2	10			
4	1									
		1.52m		99.28						
6		BROWN FINE TO MEDIUM SAND: trace to some silt/gravel, occasional cobbles, moist, compact to very dense.				SS-3	11			
8	2					SS-4	37			
10						SS-5	100+			
12	3									
14	4									
		4.57m		96.23						
16		BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, moist, very dense.				SS-6	100+			
18	5									
20						SS-7	100+			
22	6									
24	7									
		7.92m		92.88						
26	8	GREYISH BROWN TO GREY SAND: trace to some silt/gravel, wet, dense to compact.				SS-8	42			
28										
30	9					SS-9	25			
32										
34	10									
36	11					SS-10	16	(Possibly Disturbed)		
38										
40	12					SS-11	15	(Possibly Disturbed)		
42										
44	13					SS-12	21	(Possibly Disturbed)		
		13.56m		87.24						
46	14	End of Borehole								
48										
50	15									
52	16									
54										
56										



Groundwater Depth on completion: 7.77m

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH3(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: Bombadier, Hollow Stem

DRILLING DATE: June 18, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
		GROUND SURFACE (m asl)		100.81			
		FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
						SS-2	4
4	1	1.37m		99.44			
		REDDISH BROWN TO BROWN SAND: trace to some silt, occasional seam of very moist/wet sandy silt, moist, compact.				SS-3	11
						SS-4	19
10	3	3.35m		97.46		SS-5	15
		BROWN SAND AND GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles, moist, compact to very dense.				SS-6	100+
						SS-7	100+
24	7	7.62m		93.19			
		BROWN SAND: trace to some silt/gravel, layers of silt/sandy silt below 9.14m, moist, wet below 9.14m, dense to compact.				SS-8	37
						SS-9	20
						SS-10	23
						SS-11	40
42	12	12.65m		88.16			
		End of Borehole					

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✙ 40 80 120 160
VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40

(Possibly Disturbed)
(Possibly Disturbed)

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover
50mm blank PVC
Bentonite Pellets
50mm Slotted Pipe
Silica Sand
12.19m

Groundwater Depth on completion: dry

LOGGED: CW CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH4(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 4, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		100.85			
		FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	5
		0.76m		100.09			
		BROWN FINE TO MEDIUM SAND: trace to some silt, occasional trace of gravel, moist, compact.				SS-2	12
						SS-3	18
						SS-4	13
		3.05m		97.80			
		BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles/boulders, dry to moist, very dense.				SS-5	52
						SS-6	100+
						SS-7	100+
						SS-8	100+
		8.23m		92.62			
		GREYISH BROWN TO GREY SAND: trace of gravel/silt, wet, compact.				SS-9	28
						SS-10	30
		11.13m		89.72			
		End of Borehole					

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover

Bentonite Pellets

50mm blank PVC

Silica Sand

50mm Slotted Pipe

9.14m

Groundwater Depth on completion: 7.77m

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH5(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: Bombadier, Hollow Stem

DRILLING DATE: June 18, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
0	0	GROUND SURFACE (m asl)		100.79			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
4	1					SS-2	2
5	1.52m			99.27			
6	2	REDDISH BROWN SAND: trace to some silt/gravel, moist, loose.				SS-3	9
8	2					SS-4	7
9	2.74m			98.05			
10	3	BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, layers of cobbles/boulders below 4.5m, moist, very dense.				SS-5	100+
14	4						
15	4.57m			96.22			
16	5	GRAVEL AND COBBLES: some brown sand, moist, very dense.				SS-6	100+
20	6					SS-7	79
20	6.25m			94.54			
22	7	End of Borehole					
24	7	Refusal to augering possibly due to boulder at 6.25m.					
26	8	BH caved in to 4.57m on completion.					
28	9						
30	9						
32	10						
34	10						
36	11						
38	11						
40	12						
42	13						
44	13						
46	14						
48	14						
50	15						
52	16						
54	16						
56							

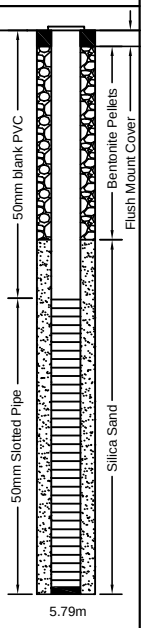
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth on completion:

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH6(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 5, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: LAB ID	SAMPLES: Type NO.	SAMPLES: "N" VALUE
		GROUND SURFACE (m asl)		100.45			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
2						SS-2	3
4	1						
6						SS-3	3
	2	1.98m		98.47			
8		BROWN SAND: trace of gravel, some silt, moist, compact.				SS-4	13
10	3	3.20m		97.25		SS-5	62
12		BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles, moist to very moist, very dense.					
	4						
14							
16						SS-6	100+
	5						
18							
20	6					SS-7	100+
22							
	7						
24							
26						SS-8	100+
	8						
28							
30	9	9.14m		91.31		SS-9	100+
32		GREYISH BROWN MEDIUM SAND: some silt, wet, very dense.					
	10						
34							
36	11					SS-10	69
38							
	12	12.19m		88.26			
40		GREY SILTY SAND: trace of gravel, wet, dense.				SS-11	48
42	13						
		13.41m		87.04		SS-12	44
44		End of Borehole					
46	14						
48							
50	15						
52	16						
54							
56							

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40

9.0%
5.2%
5.5%
13.0%

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover
50mm blank PVC
Bentonite Pellets
50mm Slotted Pipe
Silica Sand
12.95m

Groundwater Depth on completion: 8.23m

LOGGED: CW CHECKED: RC

APPENDIX C – MOISTURE CONTENT AND GRAIN SIZE ANALYSES RESULTS

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Client: 40-70 Plains Road
Address:

Tel.:
Email:
Attn.:

F.E. Job #: 20-4617
Project Name: 40-70 Plains Road
Project ID: FE-P 20-10328
Date Sampled: 5-Jun-2020
Date Received: 5-Jun-2020
Date Reported: 15-Jun-2020
Location: 40-70 Plains Road
Toronto, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
pH	Soil	1	9-Jun-20	9-Jun-20	pH-EC-SAR F-16	SW-846, 9045D
Chloride	Soil	1	N/A	15-Jun-20	Chloride F-20	SM 4500-Cl-E
Sulphate	Soil	1	9-Jun-20	15-Jun-20	Sulphate F-21	SM 4500-SO_4
Moisture Content	Soil	8	N/A	5-Jun-20	Support Procedures F-99	Carter (1993)
Grain Size	Soil	8	N/A	9-Jun-20	Grain Size F-28	ASTM D6913-04

Fisher Environmental Laboratories is accredited by CALA (the Canadian Association for Laboratory Accreditation Inc.) for specific parameters as required by Ontario Regulation 153/04. All analytical testing has been performed in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act published by Ontario Ministry of the Environment.

Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					**Soil Standards** *
pH *(pH unit)*	9.31					(5-11) 5-9

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

QA/QC Report

Parameter	**LCS**	**AR**	**Duplicate**	**AR**		
	Absolute Difference *(pH Unit)*					
pH *(pH unit)*	7.05	6.90-7.20	0.15	<0.3		

LEGEND:
LCS - Laboratory Control Sample
AR - Acceptable Range

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					
	Concentration (µg/g)					
Chloride in Soil	2.8					

< result obtained was below RL (Reporting Limit).

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/g)		**Recovery (%)**		**Recovery (%)**	
Chloride in Soil	<10	10	94	70-130	110	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chloride in Soil	3.6	0-20				

LEGEND:

RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					
Sulphate *(mg/kg)*	9.4					

QA/QC Report

Parameter	**Blank**	**RL**	**LCS/Spike**	**AR**	**Duplicate**	**AR**
	(mg/kg)		**Recovery (%)**		**RPD (%)**	
Sulphate	9.4	1	95	70-130	15	0-30

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-1*** MW6 1.50-1.95m	***20-4617-2*** MW6 3.00-3.45m	***20-4617-3*** MW6 4.55-5.00m	***20-4617-4*** MW6 7.55-8.05m	***20-4617-5*** BH1 SS3	***20-4617-6*** BH1 SS5
Moisture Content (%)	9.0	5.2	5.5	13	5.6	6.0

Parameter	***20-4617-7*** BH1 SS7	***20-4617-8*** BH1 SS8				
Moisture Content (%)	3.4	3.7				

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
Moisture Content (%)	<0.1	0.1	100	70-130	10.6	0-20

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-1*** MW6 1.50-1.95m	***20-4617-2*** MW6 3.00-3.45m	***20-4617-3*** MW6 4.55-5.00m	***20-4617-4*** MW6 7.55-8.05m	***20-4617-5*** BH1 SS3	***20-4617-6*** BH1 SS5
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0	0.0	0.0
9.5mm-19mm	9.3	0.0	2.0	2.9	0.0	0.0
4.75mm-9.5mm	5.0	3.1	10.3	3.2	0.7	1.5
1.18m-4.75mmm	7.8	6.7	34.3	4.6	2.7	1.9
300um-1.18mm	15.3	19.6	15.9	14.9	40.4	64.6
75um-300um	41.0	52.8	20.4	53.0	39.1	20.5
<75um	21.6	17.8	17.2	21.4	17.0	11.4
Clay & Silt	**22**	**18**	**17**	**21**	**17**	**11**
Sand	**64**	**79**	**70**	**72**	**82**	**87**
Gravel	**14**	**3**	**12**	**6**	**1**	**2**

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

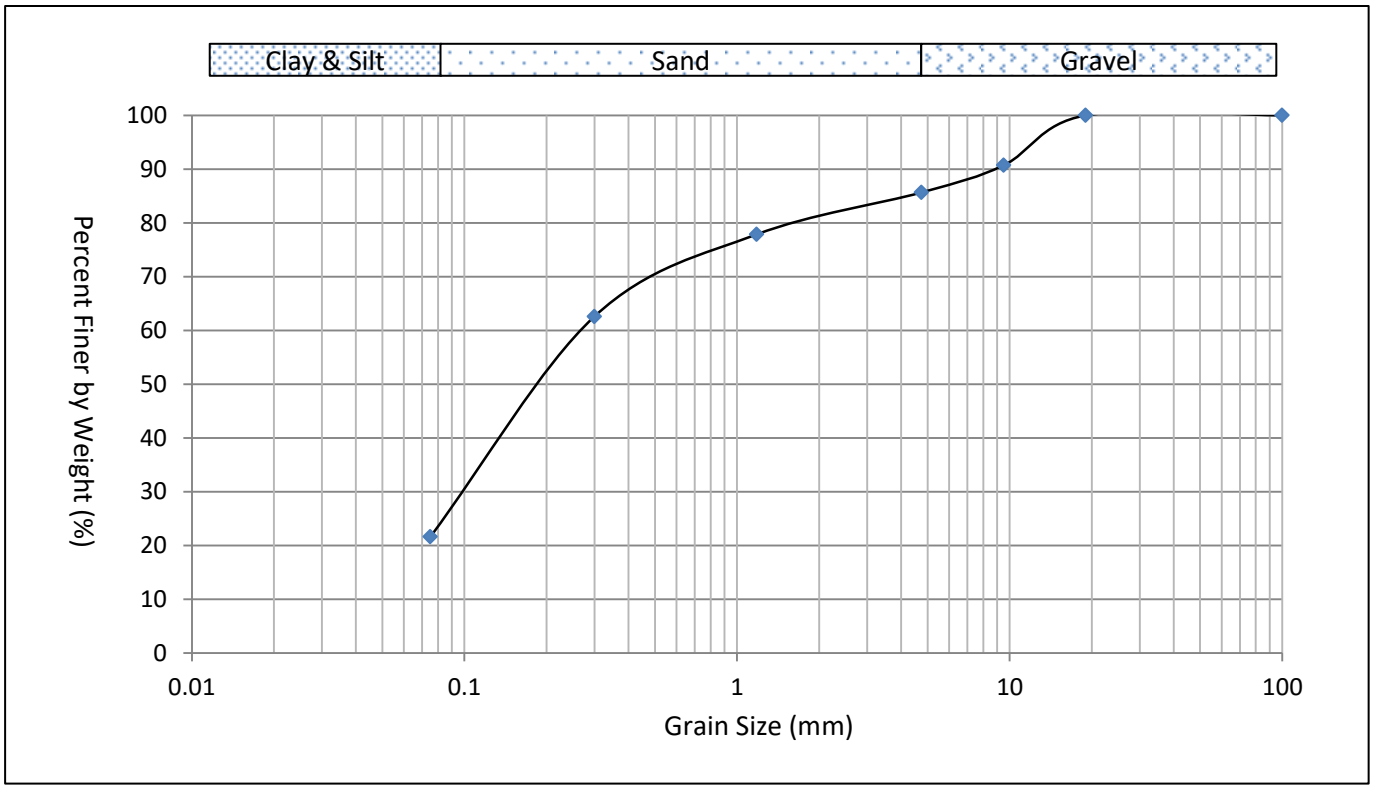
Parameter	***20-4617-7*** BH1 SS7	***20-4617-8*** BH1 SS8				
Grain Size (%)						
>19mm	0.0	0.0				
9.5mm-19mm	2.2	3.2				
4.75mm-9.5mm	16.8	10.9				
1.18m-4.75mmm	35.5	26.8				
300um-1.18mm	23.2	22.5				
75um-300um	7.4	24.7				
<75um	14.9	11.9				
Clay & Silt	**15**	**12**				
Sand	**66**	**74**				
Gravel	**19**	**14**				

Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-1 MW6 1.50-1.95m

Clay & Silt: 22% Sand: 64% Gravel: 14%

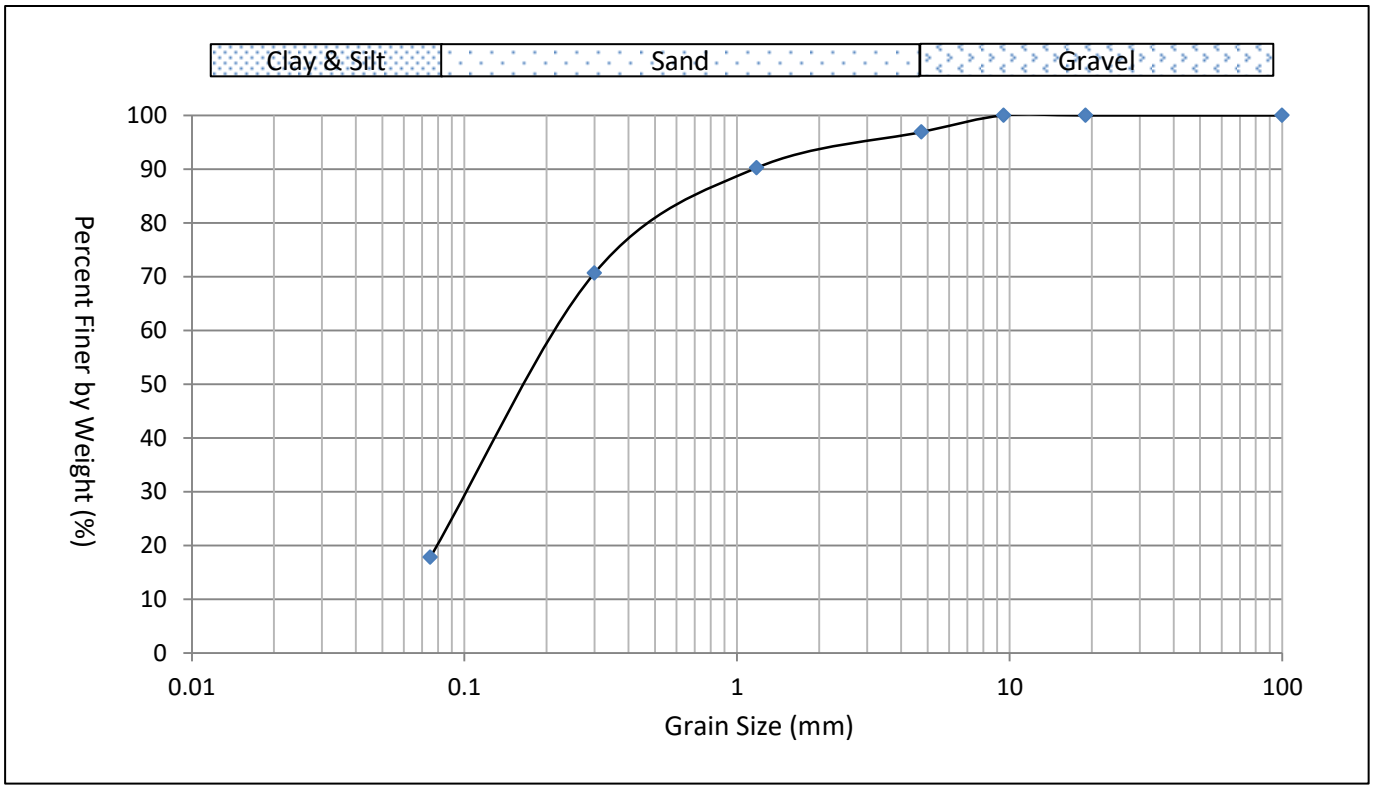


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-2 MW6 3.00-3.45m

Clay & Silt: 18% Sand: 79% Gravel: 3%

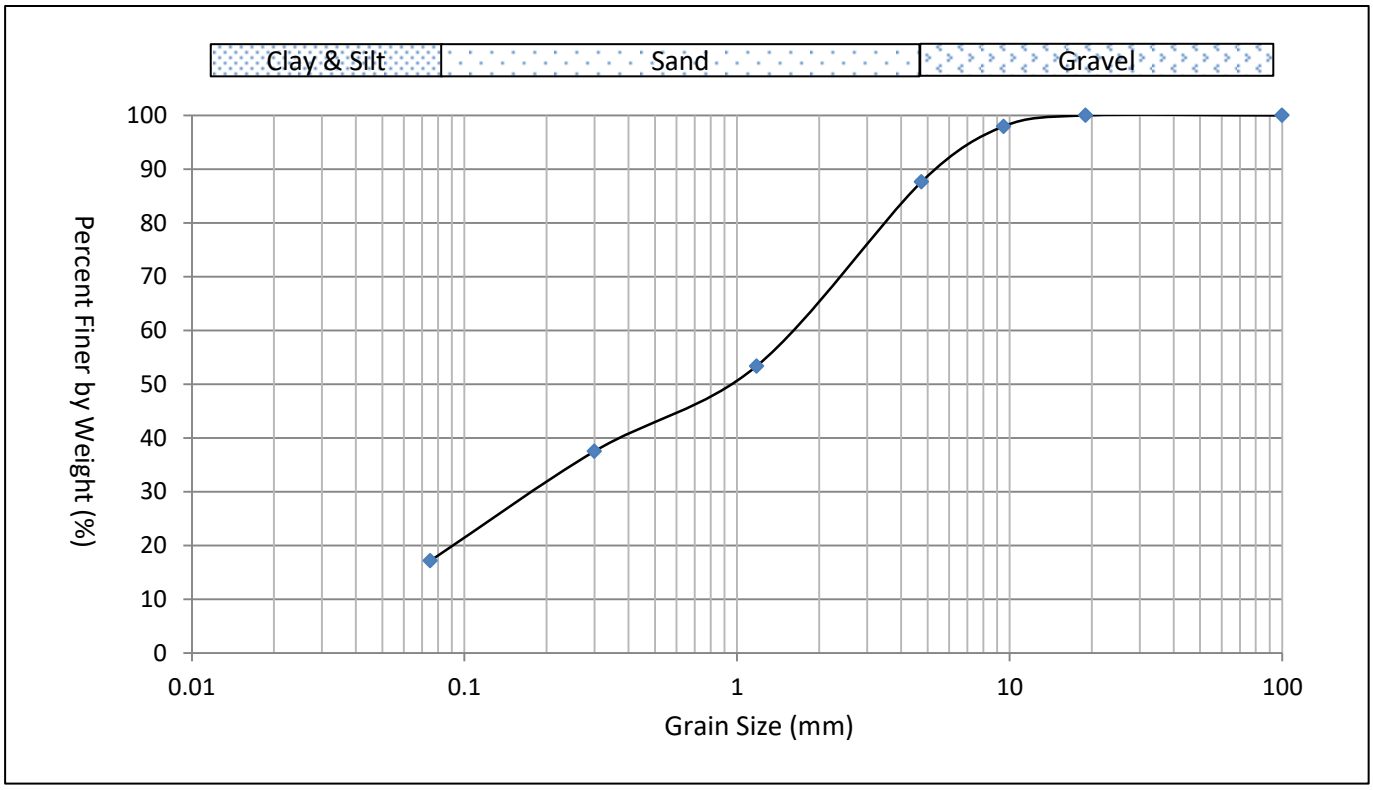


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-3 MW6 4.55-5.00m

Clay & Silt: 17% Sand: 70% Gravel: 12%

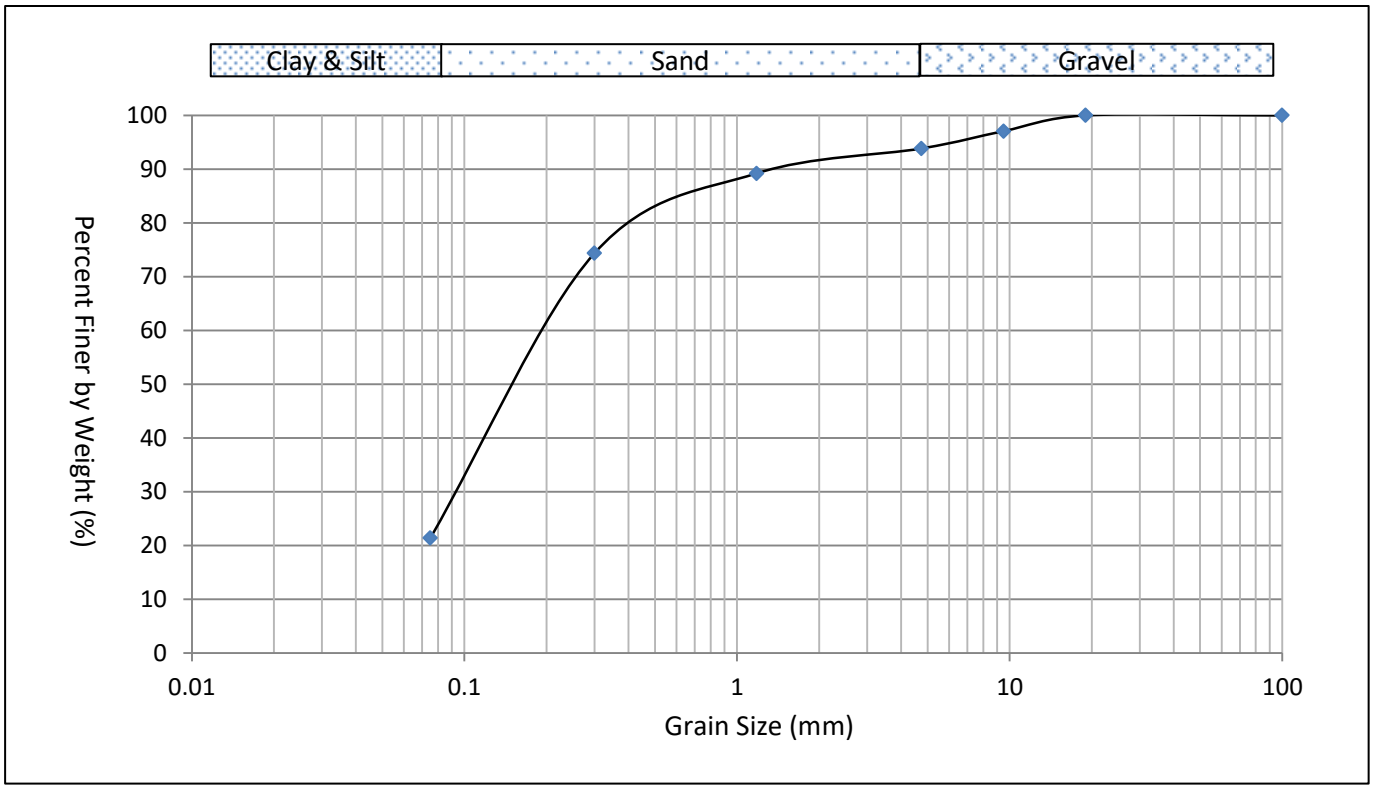


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-4 MW6 7.55-8.05m

Clay & Silt: 21% Sand: 72% Gravel: 6%

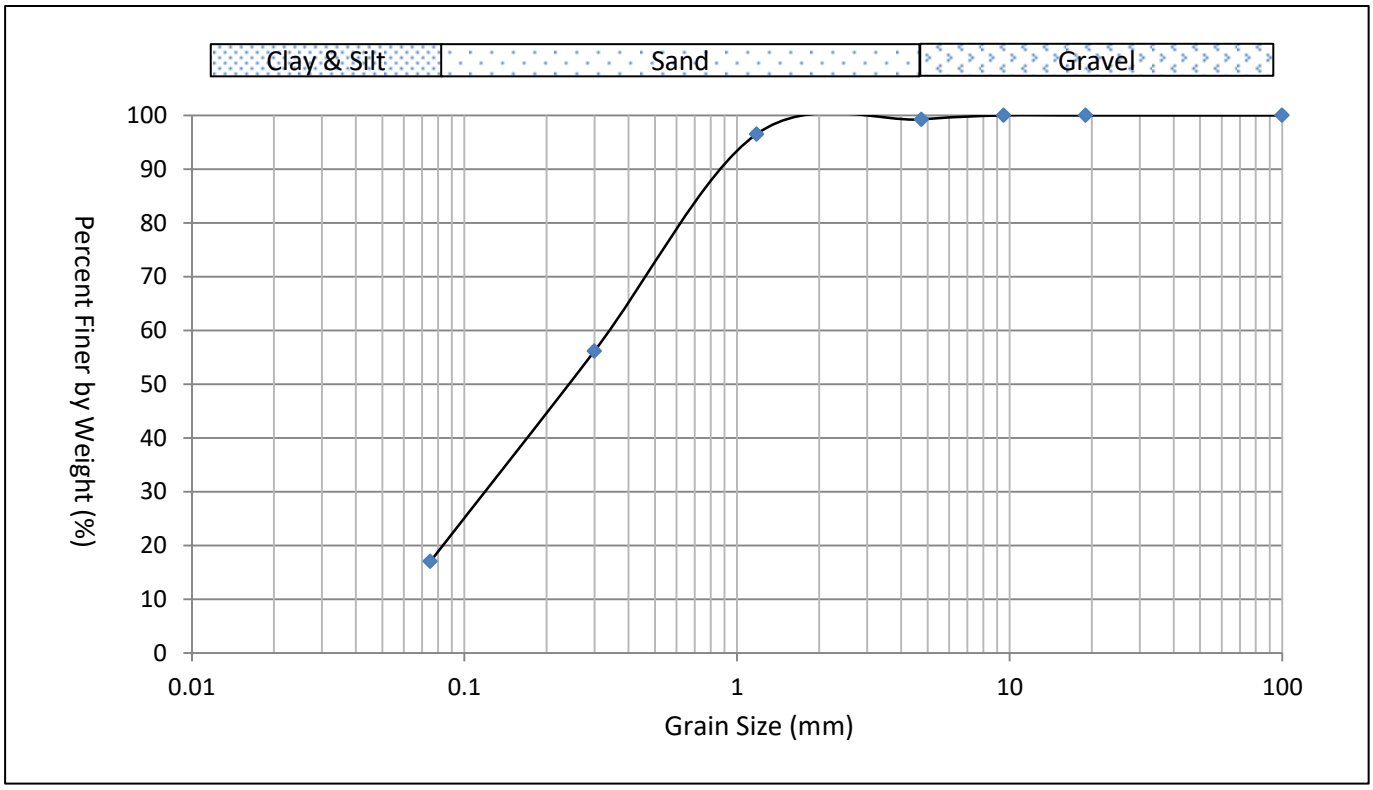


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-5 BH1 SS3

Clay & Silt: 17% Sand: 82% Gravel: 1%

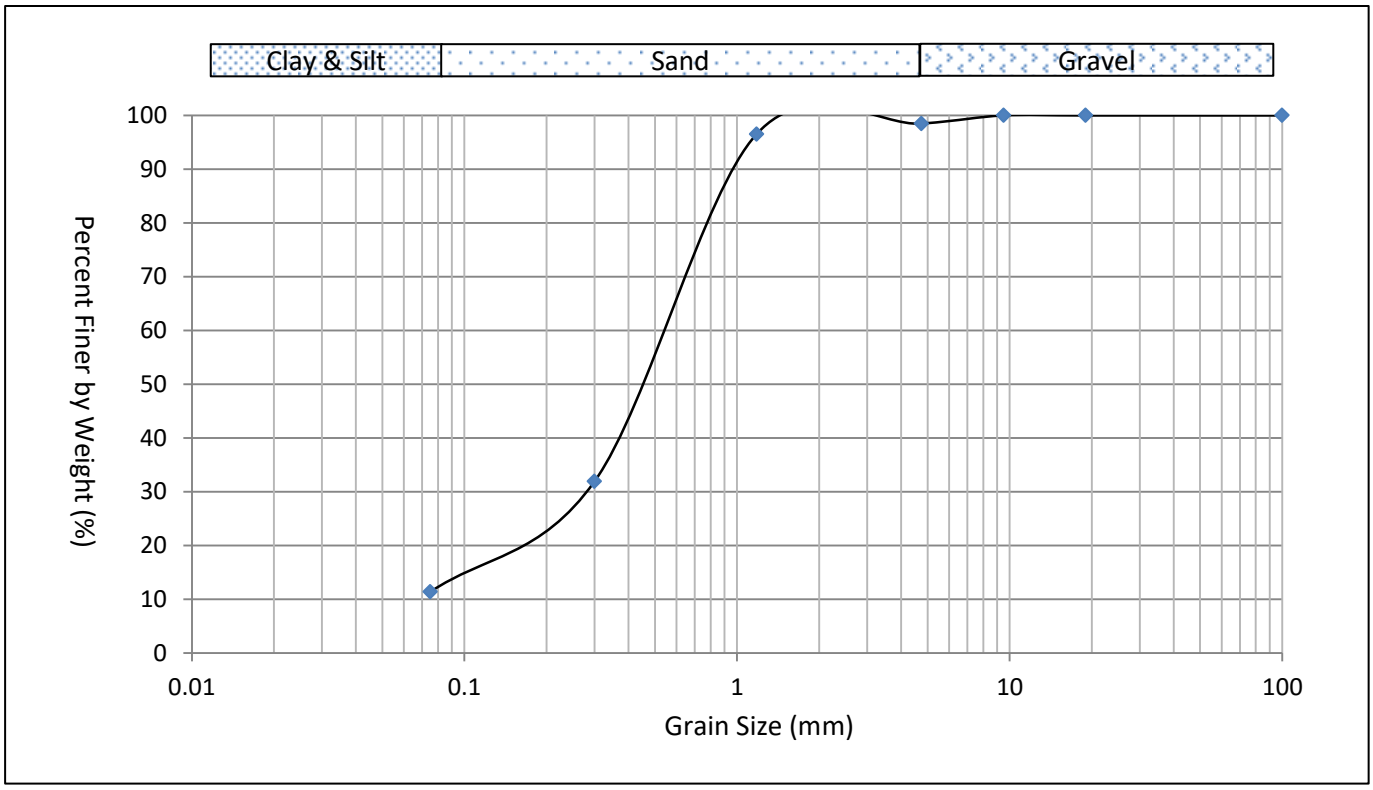


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-6 BH1 SS5

Clay & Silt: 11% Sand: 87% Gravel: 2%

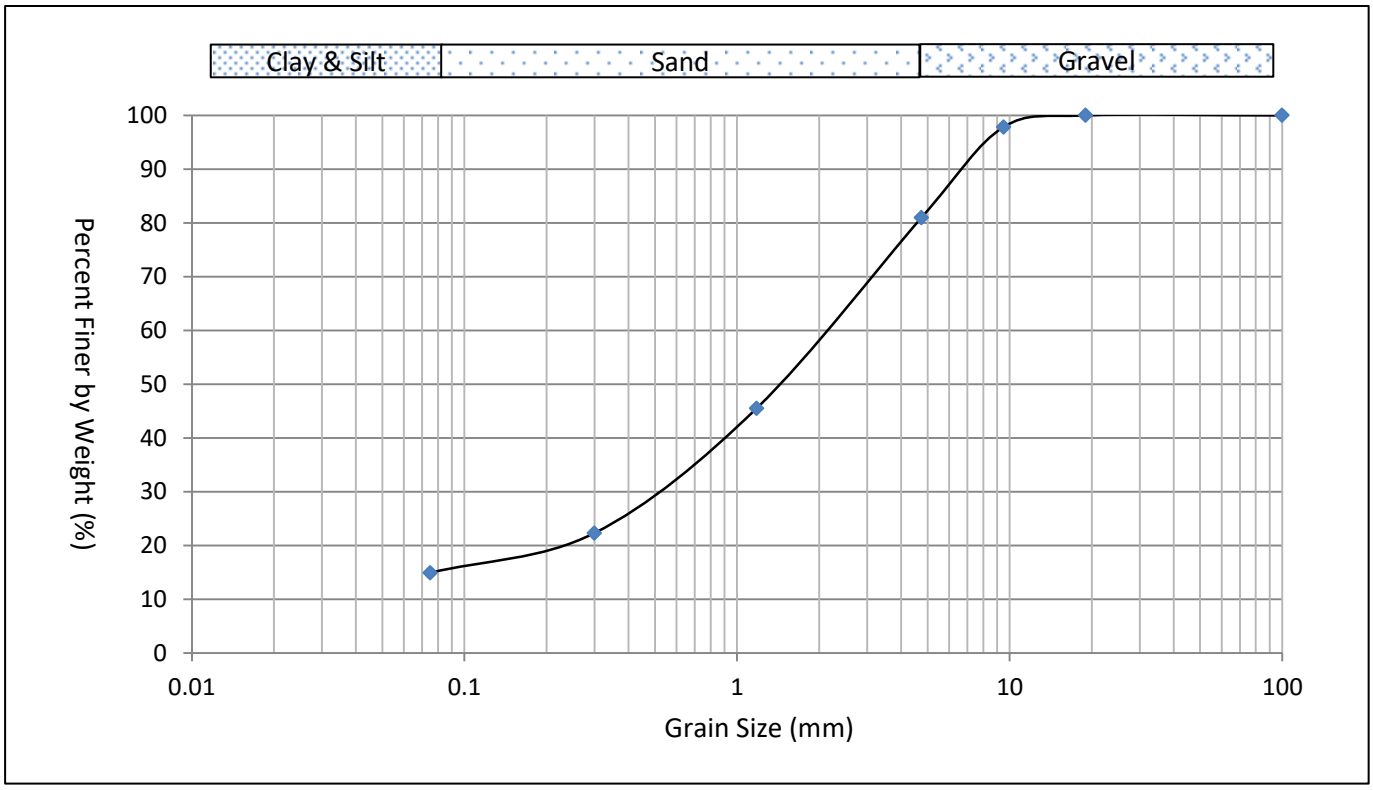


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-7 BH1 SS7

Clay & Silt: 66% Sand: 15% Gravel: 66%

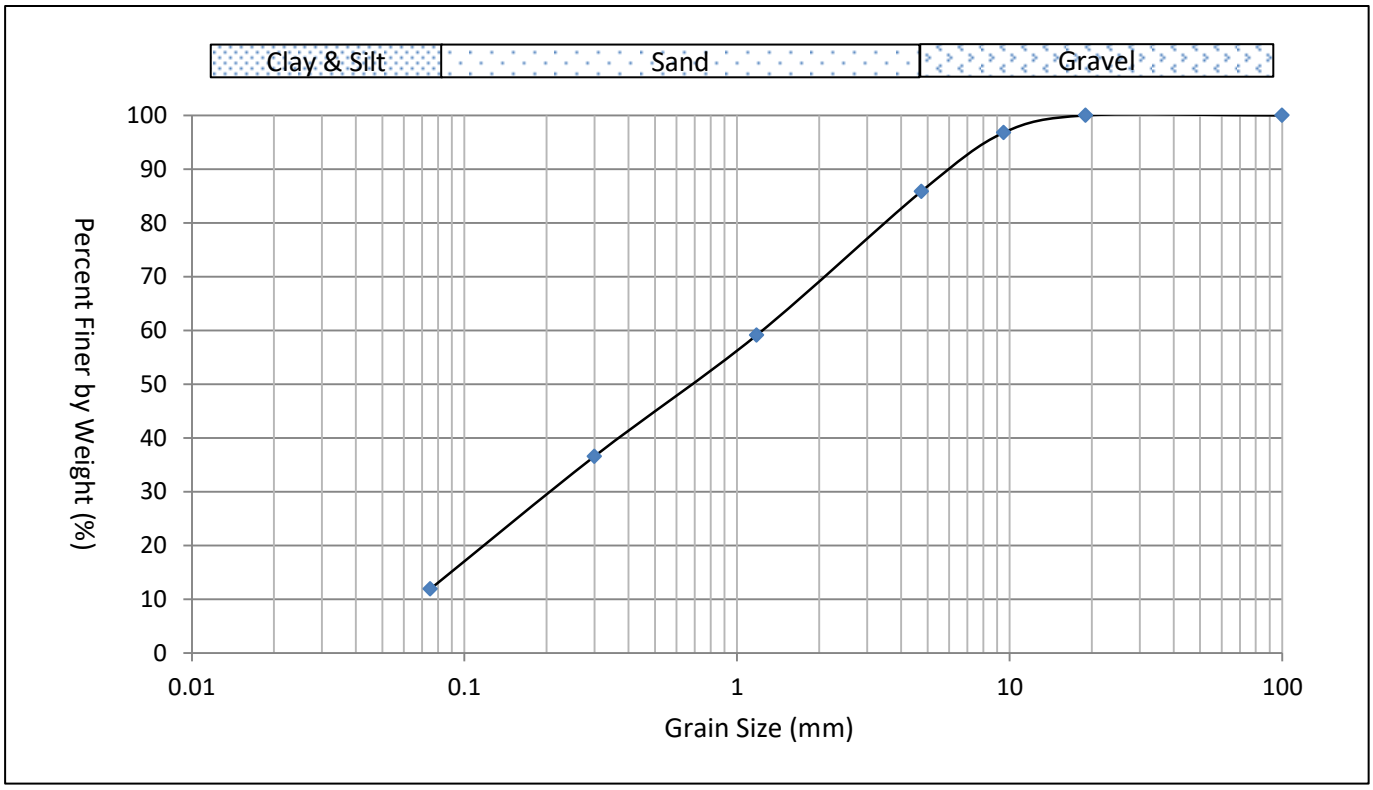


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-8 BH1 SS8

Clay & Silt: 12% Sand: 74% Gravel: 14%



Results related only to the items tested

APPENDIX D – SITE PLAN & BOREHOLE LOGS PREPARED BY LANDTEK LIMITED

SOUTH LIMIT OF KING'S HIGHWAY No. 2
AS ESTABLISHED BY DEPOSITED PLAN 153 MISC

PLAINS ROAD EAST
(WIDTH VARIES)
PIN 07122-0002 (LT)
PART 3, INST. 1431, PLAN P-1957-44
ORDER IN COUNCIL 4000/69 FORMERLY THE KING'S HIGHWAY No. 2

TBM

BH(MW) 2

BH(MW) 1

BH(MW) 3

BH 5

BH 4

Approximate Limits of Subject Site

PART 1 PLAN 20R-310

PART 11 PLAN 20R-789

PART 10 PLAN 20R-789

PART 9 PLAN 20R-789

PART 8 PLAN 20R-789

REFERENCE BEARING N43°34'30"E

1 1/2 STOREY BRICK & VINYL DWELLING # 40

CAR PORT

1 1/2 STOREY BRICK & VINYL DWELLING # 46

1 1/2 STOREY BRICK & VINYL DWELLING # 50

2 STOREY BRICK & VINYL DWELLING # 56

GARAGE

SHED

DECK

PORCH

ASPHALT DRIVEWAY

INTERLOCKING BRICK DRIVEWAY

CONCRETE WALK

RETAINING WALL

FENCE

CEDAR HEDGE

ROW OF CEDARS

TREE LINE

PIN 07117-0050 (LT)

PIN 07117-0051 (LT)

PIN 07117-0052 (LT)

PIN 07117-0053 (LT)

PIN 07117-0054 (LT)

PIN 07117-0065 (LT)

PIN 07117-0066 (LT)

PIN 07117-0067 (LT)

PIN 07117-0068 (LT)

B R O K E N F R O N T C O N C E S S I O N

G E O G R A P H I C T O W N S H I P O F E A S T F L A M B O R O U G H

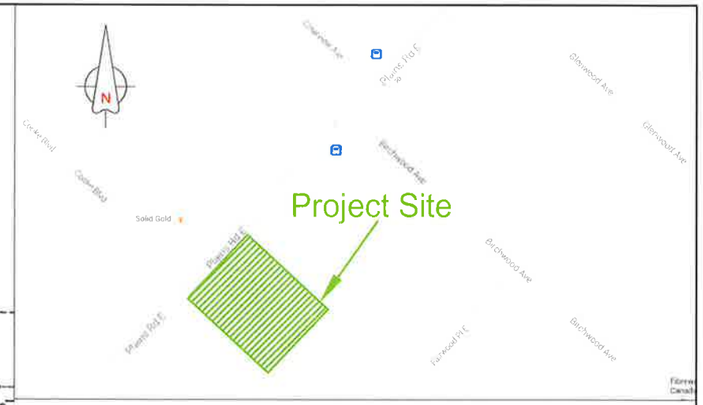
L O T 1 5

L O T 1 6

L O T 1 4

L O T 1 3

R E G I S T E R E D P L A N 7 7 9 (P F)



Key Plan

LEGEND:

Boreholes by Landtek Limited on August 16, 2013

Boreholes with Monitoring Wells by Landtek Limited on August 16, 2013

TBM; Temporary Benchmark, top of storm manhole cover in front of house # 40 Plains Road East, elevation of 100.03 m

NOTES:

1. Borehole and Monitoring Well locations are considered approximate.
2. Base plan taken from drawing by Mackay Mackay & Peters Limited dated November 27, 2012.

LANDTEK LIMITED
CONSULTING ENGINEERS
205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

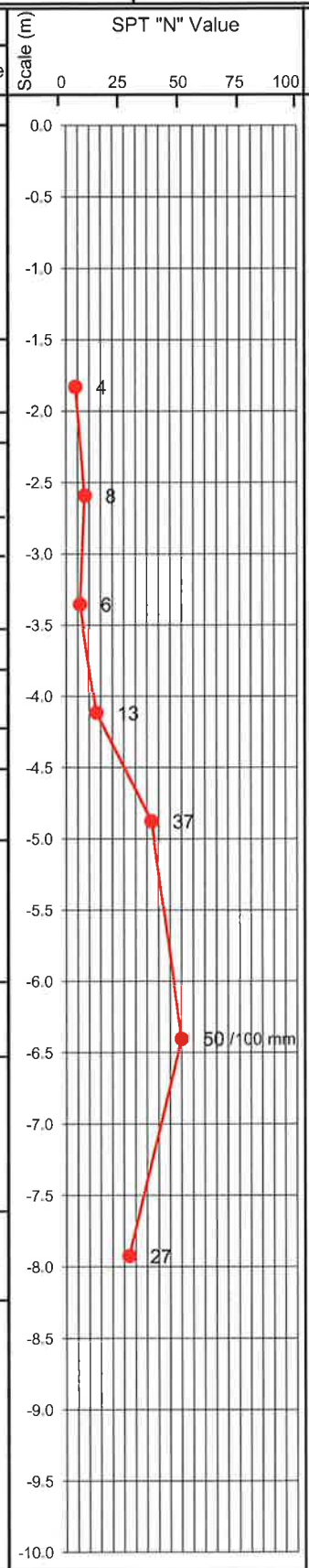
DRAWING:	Borehole and Monitoring Well Location Plan		
PROJECT:	Proposed Multi-Story Condominium Building 40, 46 & 50 Plains Road East, Burlington, Ontario.		
SCALE:	NTS	**PROJECT NO.**	13199
DATE:	September, 2013	**DRAWING NO.**	1

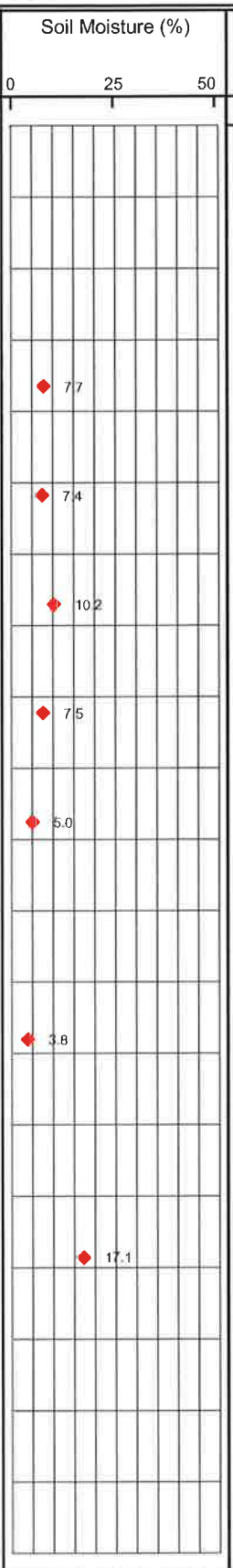
LANDTEK LIMITED

LOG OF BOREHOLE & MW NO. 1

Project No.:	13199	Drill Date:	August 16, 2013
Project:	Multi-Storey Condominium Building	Drill Method:	[ ] solid stem [x] hollow stem [ ] vibratory
Location:	40-50 Plains Road E., Burlington, Ontario	Datum:	Geodetic TBM

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type	Test Data
Ground Surface		100.8			
±125 mm Topsoil		0.0			
SAND medium to fine grain, some silt, scattered gravel, brown, moist, (Loose to Very Loose)			1	SS	
			2	SS	bentonite backfill
			3	SS	
		97.0			
		3.8	4	SS	
SAND AND GRAVEL medium to coarse sand & gravel, trace silt, brown, moist, (Compact to Dense)			5	SS	50 mm dia. PVC well screen
			6	SS	
- wet below ±8.0 m			7	SS	
		92.6			
BOREHOLE TERMINATED		8.2			





GWL

Monitor Details

Notes:
1. On completion, borehole is open to 7.6 m and water level at 7.3 m depth
2. Monitoring well was dry & open to 7.6 m on Aug. 23.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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205 Nebo Road, Unit 3
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www.landteklimited.com

LANDTEK LIMITED

LOG OF BOREHOLE & MW NO. 2

Project No.:	13199	Drill Date:	August 16, 2013
Project:	Multi-Storey Condominium Building	Drill Method:	[ ] solid stem [x] hollow stem [ ] vibratory
Location:	40-50 Plains Road E., Burlington, Ontario	Datum:	Geodetic TBM

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)
Ground Surface		100.7			
±150 mm Topsoil		0.0			
SAND medium to fine grain, some silt, scattered gravel, brown, moist, (Very Loose)			1	SS	
			2	SS	
		97.7			
		3.0	3	SS	
SAND AND GRAVEL medium to coarse sand & gravel, trace silt, brown, moist, (Compact to Dense)			4	SS	
			5	SS	
			6	SS	
- wet below ±8.0 m			7	SS	
		92.5			
BOREHOLE TERMINATED		8.2			

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

Depth (m)	SPT "N"	Soil Moisture (%)
-1.8	2	5.0
-2.5	3	3.7
-3.3	74	5.0
-4.1	42	2.7
-4.9	26	4.1
-6.4	42 /100 mm	5.8
-7.9	60	12.3

GWL

Monitor Details: bentonite backfill; 50 mm dia. PVC well screen

Test Data

Notes:
1. On completion, borehole is open to 7.5 m and water level at 7.3 m depth
2. Monitoring well was dry & open to 7.5 m on Aug. 23.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

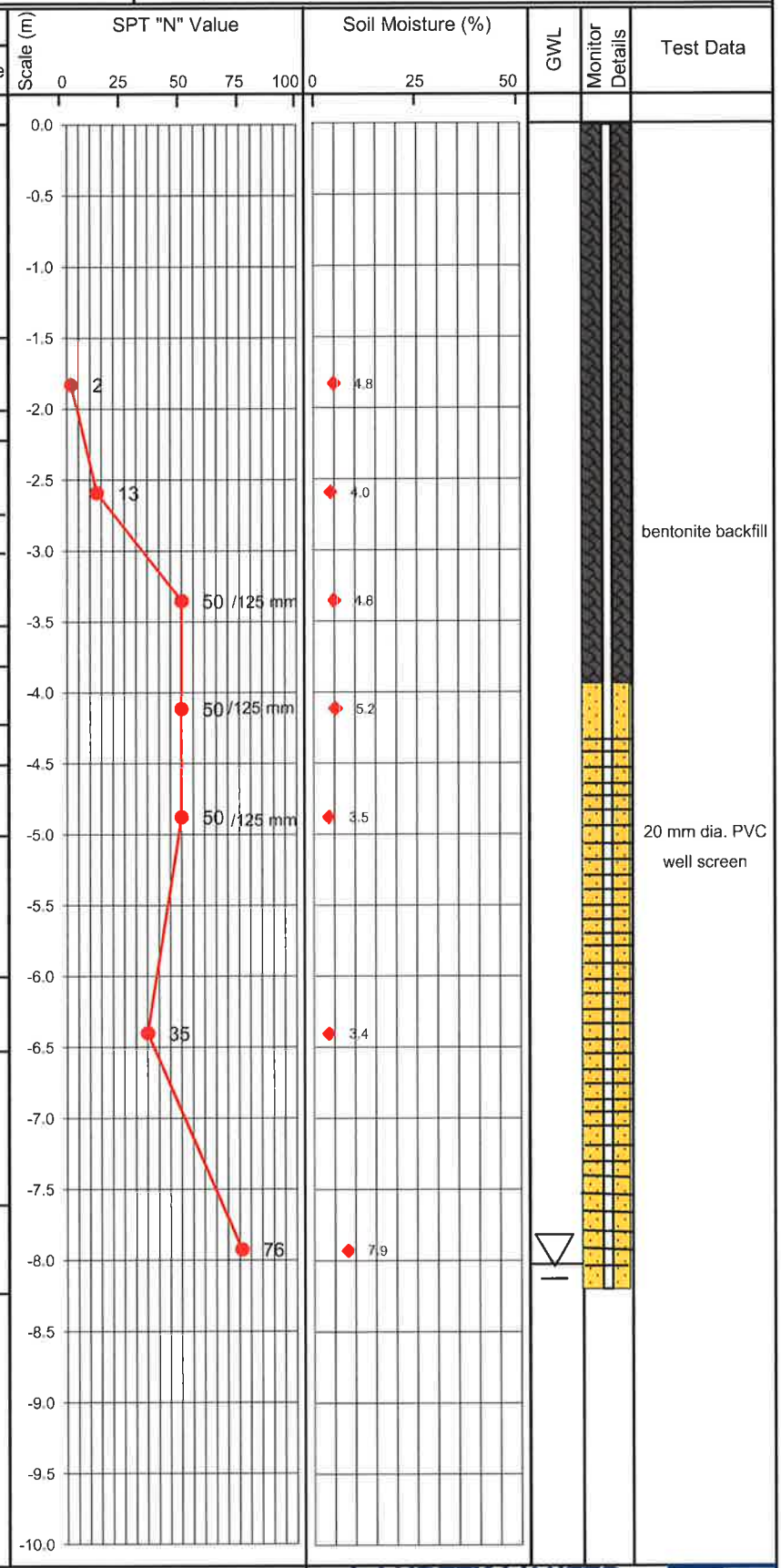
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LANDTEK LIMITED

LOG OF BOREHOLE & MW NO. 3

Project No.:	13199	Drill Date:	August 16, 2013
Project:	Multi-Storey Condominium Building	Drill Method:	[ ] solid stem [x] hollow stem [ ] vibratory
Location:	40-50 Plains Road E., Burlington, Ontario	Datum:	Geodetic TBM

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Test Data
Ground Surface		100.7			
±125 mm Topsoil		0.0			
SAND medium to fine grain, some silt, scattered gravel, brown, moist, (Very Loose to Compact)			1	SS	
			2	SS	
			3	SS	
		96.9			
		3.8	4	SS	
SAND AND GRAVEL medium to coarse sand & gravel, trace silt, brown, moist, (Dense)			5	SS	
			6	SS	
- wet below ±8.0 m			7	SS	
		92.5			
BOREHOLE TERMINATED		8.2			



Notes:
1. On completion, borehole is open to 8.2 m and water level at 7.7 m depth
2. Monitoring well was open to 8.2 m & W.L. @ 8.0 m on Aug. 23.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 4

Project No.:	13199	Drill Date:	August 16, 2013
Project:	Multi-Storey Condominium Building	Drill Method:	[ ] solid stem [x] hollow stem [ ] vibratory
Location:	40-50 Plains Road E., Burlington, Ontario	Datum:	Geodetic TBM

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value (Scale (m))	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		100.9							
±125 mm Topsoil		0.0							
SAND medium to fine grain, brown, moist, (Very Loose to Compact)			1	SS	4	3.0			
			2	SS	7	3.3			
			3	SS	13	3.7			
		97.1							
		3.8	4	SS	85	3.6			
SAND AND GRAVEL trace silt, cobbles, limestone fragements, medium to coarse grain, brown, moist (Dense)			5	SS	42	4.2			
			6	SS	62	5.9			
- wet below ±8.1 m		92.7	7	SS	50	13.4			
BOREHOLE TERMINATED		8.2							

SPT "N" Value scale: 0 25 50 75 100

Soil Moisture (%) scale: 0 25 50

Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0

Notes: 1. On completion, borehole open to 7.7 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 5

Project No.:	13199	Drill Date:	August 16, 2013
Project:	Multi-Storey Condominium Building	Drill Method:	[ ] solid stem [x] hollow stem [ ] vibratory
Location:	40-50 Plains Road E., Burlington, Ontario	Datum:	Geodetic TBM

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		100.8								
±100 mm Topsoil		0.0								
FILL sand, medium to fine grain, brown, moist										
± 300 mm Concrete		99.9								
		0.9	1	SS		9	7.7			
SAND medium to fine grain, brown, moist, (Loose to Compact)			2	SS		7	4.6			
			3	SS		18	4.4			
		97.8								
SAND AND GRAVEL - medium to coarse grain, rounded pebbles, trace silt, brown, moist, (Dense)		3.0	4	SS		81	9.7			
		97.3								
BOREHOLE TERMINATED		3.5								

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50 | Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0

Notes: 1. On completion, borehole open to 3.5 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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APPENDIX E – SHORING / ARCHITECTURAL PLAN PREPARED BY RAW DESIGN

18035 Plains Road

40-70 Plains Rd E, Burlington ON

Project: 18035
Date: APRIL 01, 2021
Issued for: REZONING



ARCHITECTURAL DRAWING LIST	
SHEET NUMBER	SHEET NAME
A001	COVER / DRAWING LIST
A002	3D VIEWS
A003	CONTEXT PLAN
A100	SITE PLAN
A101	PARKING LEVEL 01
A102	PARKING LEVEL 02
A201	GROUND FLOOR PLAN
A202	2ND FLOOR PLAN
A203	3RD FLOOR PLAN
A204	4TH FLOOR PLAN
A205	5TH FLOOR PLAN
A206	6TH FLOOR PLAN
A207	7TH FLOOR PLAN
A208	8TH FLOOR PLAN
A209	9TH FLOOR PLAN
A210	PH FLOOR PLAN
A211	ROOF PLAN
A401	NORTH ELEVATION
A402	EAST ELEVATION
A403	SOUTH ELEVATION
A404	WEST ELEVATION
A451	NORTH COLOURED ELEVATION
A452	EAST-WEST COLOURED ELEVATIONS
A453	SOUTH COLOURED ELEVATION
A501	BUILDING SECTIONS
A502	BUILDING SECTIONS
A503	BUILDING SECTIONS

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SITE STATISTICS **COMPLETE**
4 November 2020

18035
40-70 Plains Road East
Burlington ON

Official Plan	Medium Density		GROSS SITE AREA	6823.0	sq.m.	73,445	sq.ft.	
Avenue Width	20		WIDENING		sq.m.	0	sq.ft.	
Character Area	N/A		NET SITE AREA	6823.0	sq.m.	73,445	sq.ft.	
Policy Area			AVG UNIT SIZE	69.95	sq.m. NET	752.96312	sq.ft. NET	
Established District				82.29	sq.m. GROSS	885.83896	sq.ft. GROSS	
Current Zoning		FSI Retail		**0.00**	Residential **4.34**	Total	**4.34**	
By-Law		UPH		**527.527**				

AREA CALCULATIONS

FLOOR	UNITS STUDIO	1B	1B+D	2B	3B	TOTAL	GCA RETAIL sq.m.	RETAIL sq.ft.	RESIDENTIAL sq.m.	RESIDENTIAL sq.ft.	TOTAL sq.m.	TOTAL sq.ft.	NSA RETAIL sq.m.	RETAIL sq.ft.	RESIDENTIAL sq.m.	RESIDENTIAL sq.ft.	TOTAL sq.m.	TOTAL sq.ft.
1	5	17		14		**36**		-	**3,371**	36,286	3,371	36,286	-	-				
2	0	13		27		**40**			**3,315**	35,682	3,313	35,660		-				
3	1	13		34		**48**			**3,946**	42,476	3,946	42,476		-				
4	0	20		28		**48**			**3,748**	40,344	3,748	40,344		-				
5	0	28		20		**48**			**3,532**	38,019	3,532	38,019						
6	2	30		16		**48**			**3,316**	35,694	3,316	35,694						
7	0	24		12		**36**			**2,622**	28,224	2,622	28,224						
8	0	8		20		**28**			**2,420**	26,050	2,420	26,050		-				
9	0	14		14		**28**			**2,220**	23,897	2,220	23,897						
						0			**1138**	12,250	1,138	12,250						
TOTAL	**8**	**167**	**0**	**185**	**0**	**360**	**0**	-	**29,626**	318,902	**29,626**	318,902	**0**	-				
Mix	2%	46%	0%	51%	0%													

Common Amenity	Provided			
Indoor Amenity	1095	sq.m.	11,787	sq.ft.
Outdoor Amenity	1052	sq.m.	11,324	sq.ft.
Landscape Open Space	Provided			
	1060	sq.m.	11,410	sq.ft.

5.96 m2 Per Unit
2.94 m2 Per Unit

VEHICLE PARKING

					PROVIDED	Surface	P1	P2		Total
RATIO PROPOSED		0.25	1.00	TOTAL						
	RESIDENT		360		Resident	0	193	217		410
	VISITOR	90			Visitor	14	0	0		14
	TOTAL	90	360	450	**TOTAL**	14	193	217		**424**

BICYCLE PARKING

		REQUIRED	PROVIDED
RESIDENTIAL	ALL LEVELS	**180**	232
Long Term (0.5/UNIT)	*AT GRADE*		*58*
VISITOR	AT GRADE	18	20
Short term(0.05/UNIT)			
TOTAL		**198**	**252**

ISSUE RECORD

REVISION RECORD

North

RAW

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18035

18035 Plains Road

INFINITY GROUP

COVER / DRAWING LIST

A001

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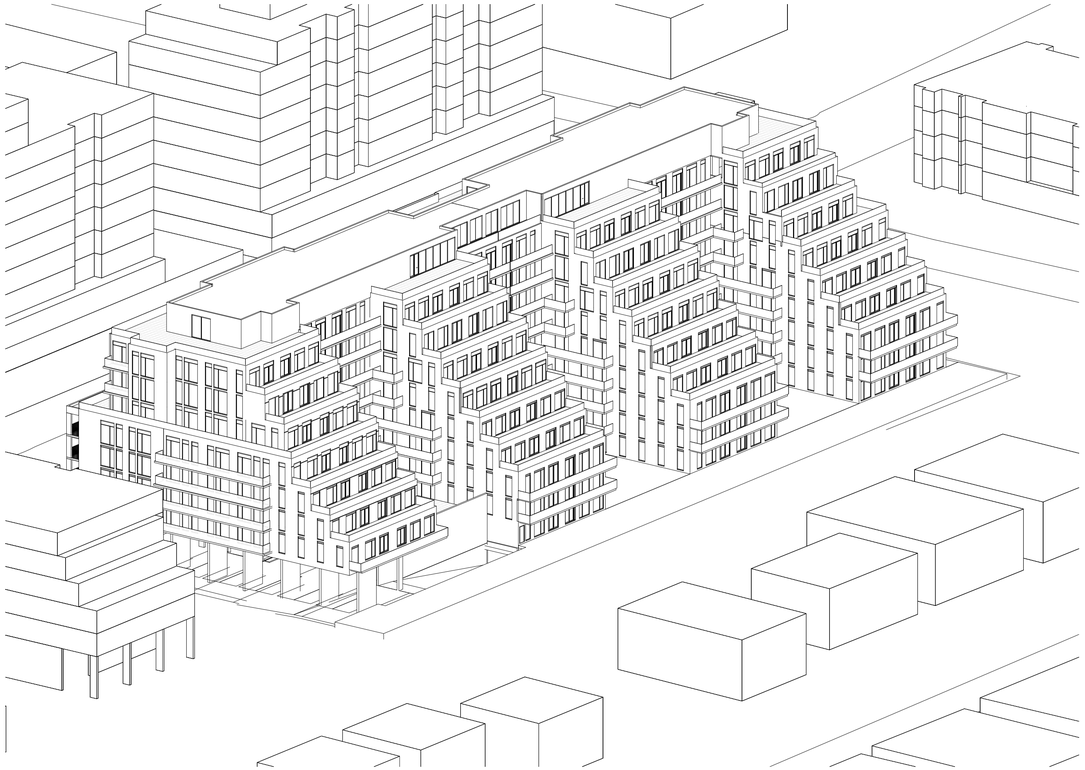
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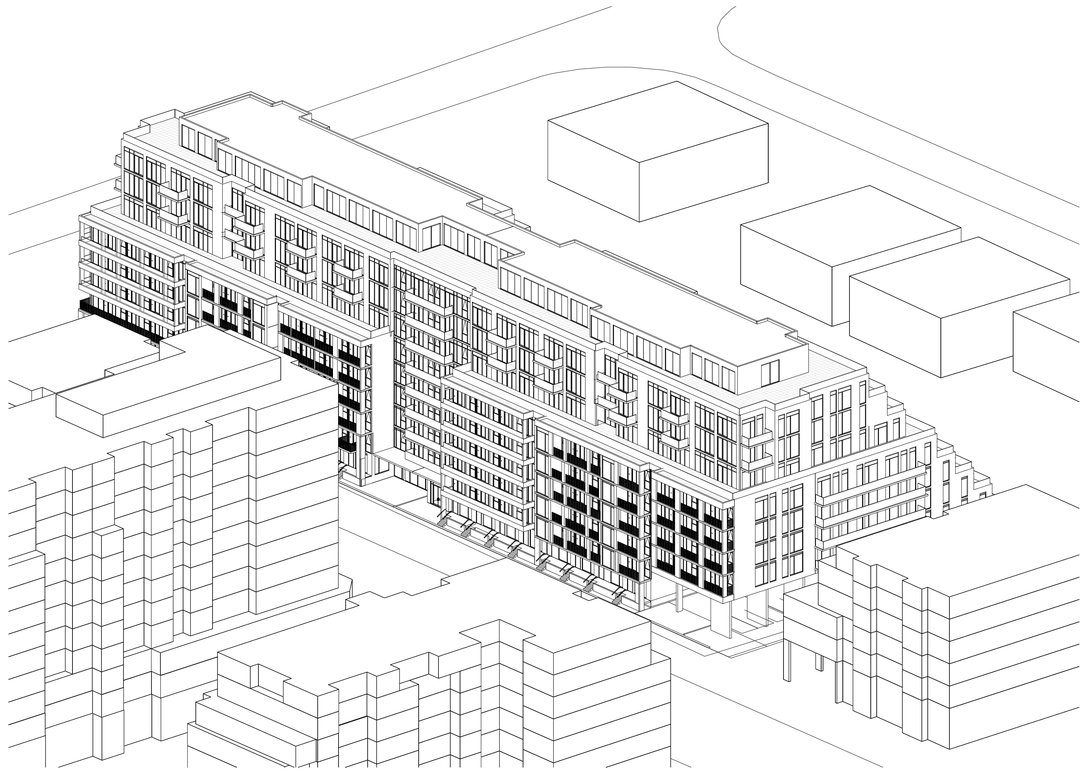
2 A002 NORTH-EAST AXO



1 A002 SOUTH-EAST AXO



3 A002 SOUTH-WEST AXO



4 A002 NORTH-WEST AXO

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3D VIEWS

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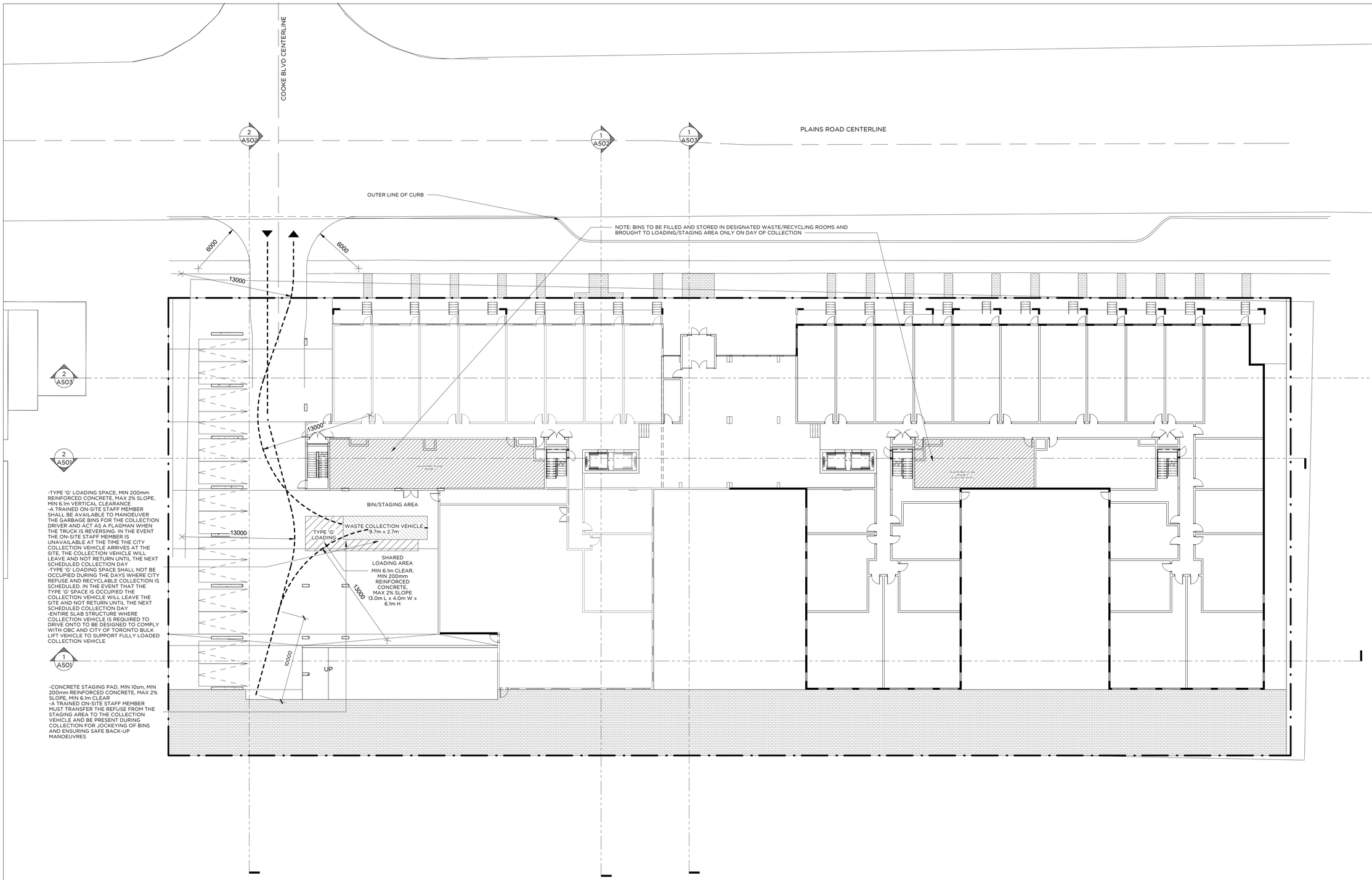
CONTEXT PLAN

1 : 1000

A003

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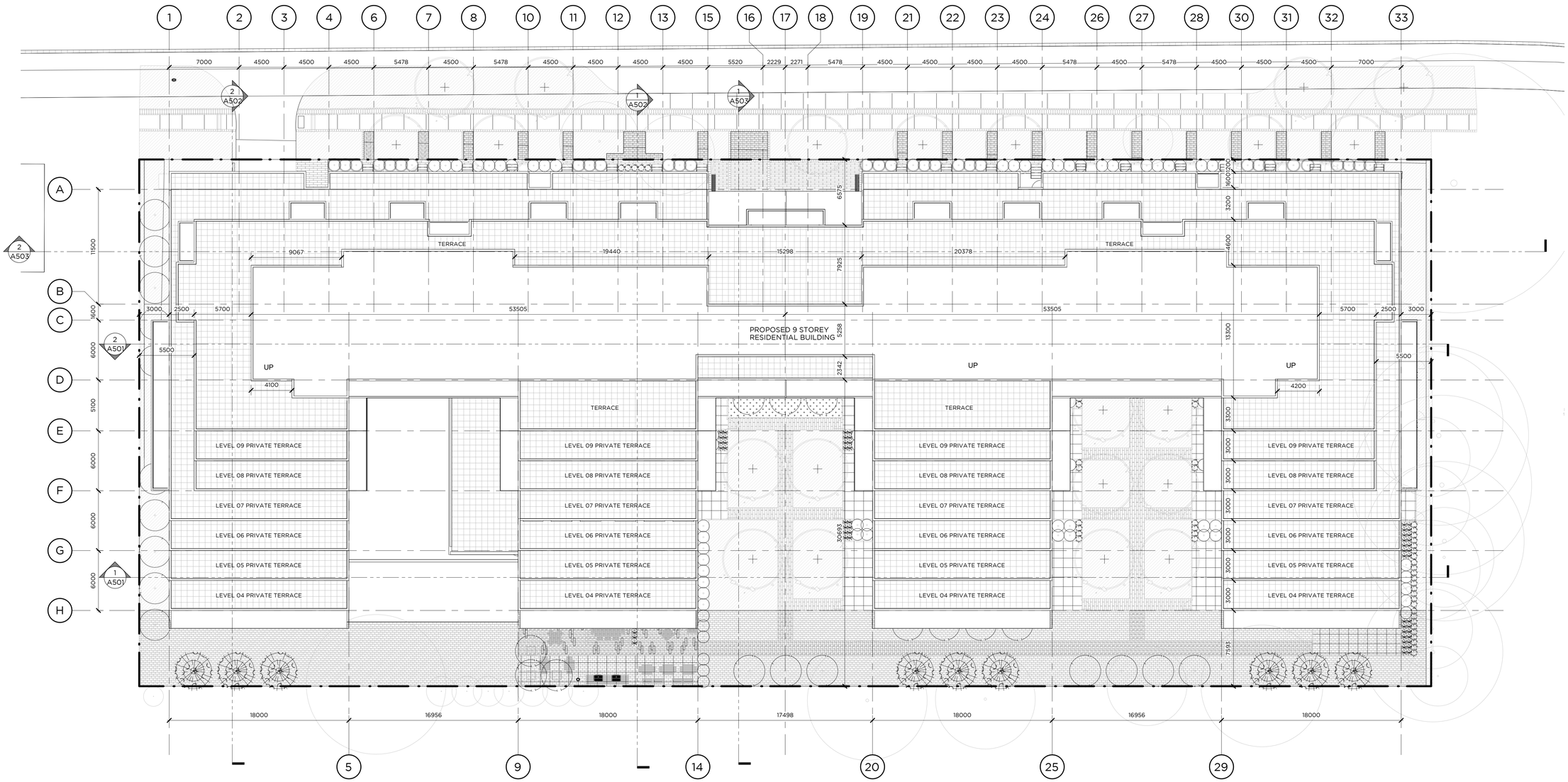
WASTE MANAGEMENT PLAN

1 : 200

A004

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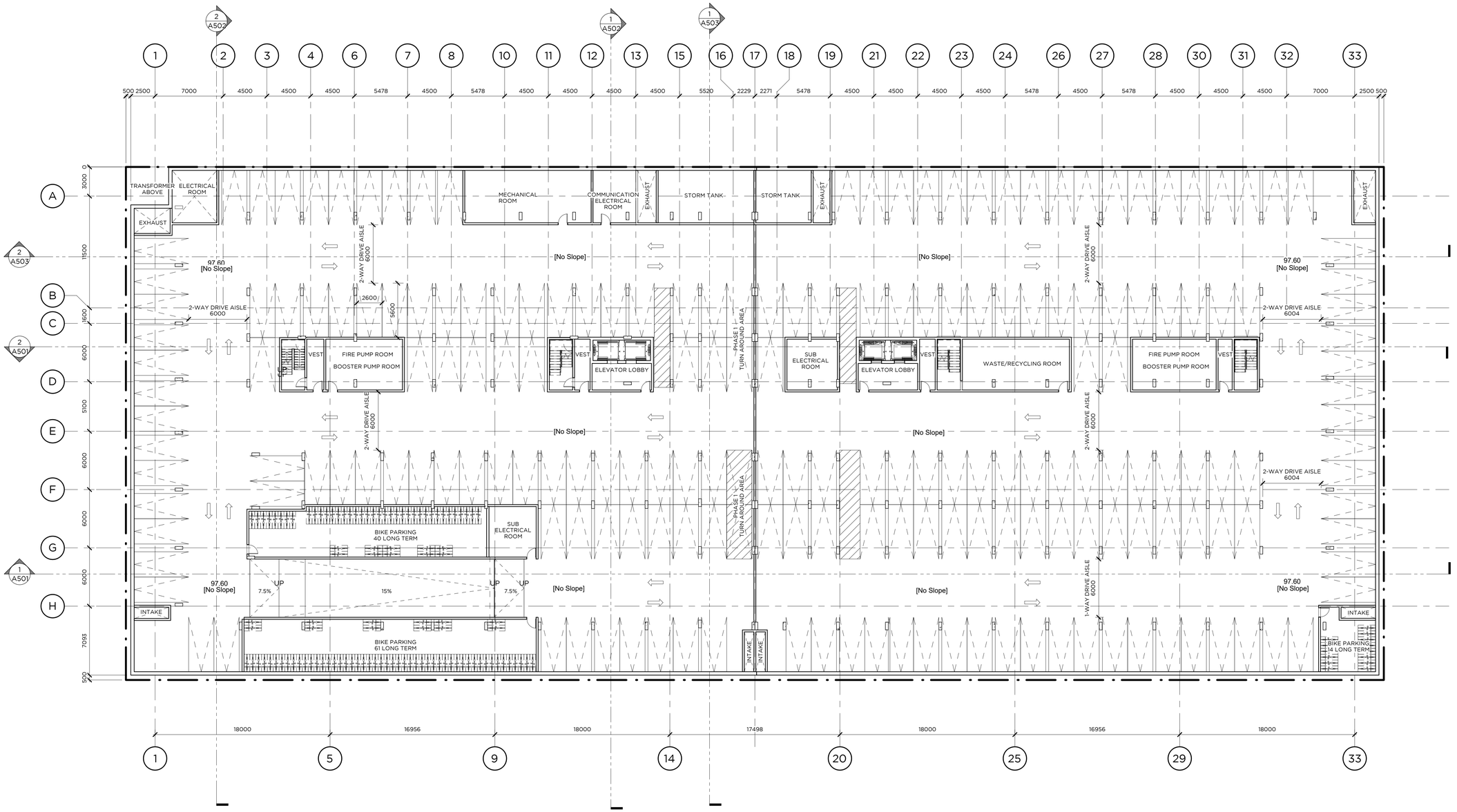
INFINITY ENT GROUP

SITE PLAN

1 : 200

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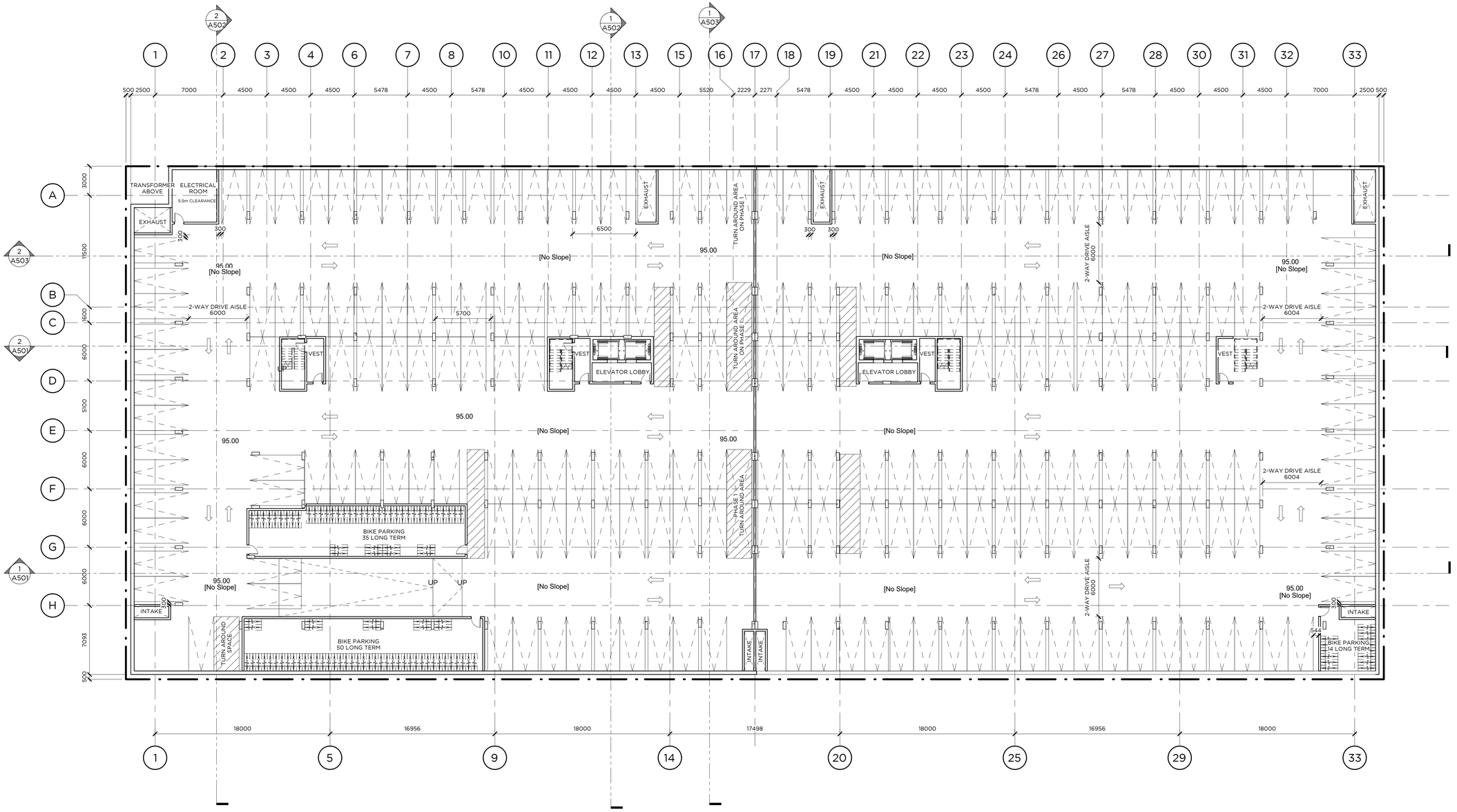
PARKING LEVEL 01

1 : 200

A101

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2021-04-05 9:41:55 AM

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INFINITY ENT GROUP

PARKING LEVEL 02

1 : 200

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COOKE BLVD CENTERLINE

PLAINS ROAD CENTERLINE

OUTER LINE OF CURB

INCOMING WATER FIRE, REFER TO CIVIL

RELOCATE EX. FIRE HYDRANT

INCOMING WATER FIRE, REFER TO CIVIL

INCOMING WATER DOMESTIC, REFER TO CIVIL

SANITARY CONTROL MANHOLE, REFER TO CIVIL

STORM CONTROL MANHOLE, REFER TO CIVIL

TRANSFORMER PAD

[No Slope]

[No Slope] 100.50

0.63%

100.45

[No Slope]

STAGING AREA, MAX 2% SLOPE MIN 200mm REINFORCED CONC.

[No Slope]

TYPE 'G' LOADING 13m L x 4m W x 6.1m H MAX 2% SLOPE MIN 200mm REINFORCED CONC.

2.45%

SHORT-TERM BIKE PARKING 20 SPACES

PARKING INTERCOM

UP 7.5%

15%

6000 2-WAY DRIVE AISLE

100.98 [No Slope]

BUILDING ABOVE

101.45

SERVICE 101.45

EXIT

INDOOR AMENITY 137 366.37 m² [3944 ft²] 101.25

101.25

OUTDOOR AMENITY 257.83 m² [2775 ft²] 101.45

101.45

MAIL ROOM

100.50 VEST

CACF

100.50

UP 101.45

UP 101.45

100.50

PIPE SPACE AIR SHAFT PIPE SPACE EC

PIPE SPACE AIR SHAFT PIPE SPACE EC

EXIT

EXIT

5885

5885

1B 103 52.90 m² [569 ft²]	2B 104 63.00 m² [678 ft²]	1B 105 51.75 m² [557 ft²]	2B 106 63.00 m² [678 ft²]	1B 107 51.75 m² [557 ft²]	1B 108 51.75 m² [557 ft²]	1B 109 51.75 m² [557 ft²]	1B 110 52.90 m² [569 ft²]	1B 111 52.90 m² [569 ft²]	1B 112 51.75 m² [557 ft²]	1B 113 51.75 m² [557 ft²]	1B 114 51.75 m² [557 ft²]	2B 115 63.00 m² [678 ft²]	1B 116 51.75 m² [557 ft²]	2B 117 63.00 m² [678 ft²]	1B 118 51.75 m² [557 ft²]	1B 119 51.75 m² [557 ft²]	1B 120 51.63 m² [556 ft²]	2B 121 87.12 m² [938 ft²]	2B 130 79.87 m² [860 ft²]	2B 129 81.87 m² [881 ft²]	1B 122 48.38 m² [521 ft²]	S 101 43.45 m² [468 ft²]	S 136 43.44 m² [468 ft²]	1B 131 51.66 m² [556 ft²]	1B 128 55.03 m² [592 ft²]	S 123 41.82 m² [450 ft²]	2B 102 71.56 m² [770 ft²]	2B 135 68.06 m² [733 ft²]	S 132 43.37 m² [467 ft²]	S 127 43.37 m² [467 ft²]	2B 124 68.06 m² [733 ft²]	2B 134 88.74 m² [955 ft²]	2B 133 88.74 m² [955 ft²]	2B 126 88.74 m² [955 ft²]	2B 125 88.74 m² [955 ft²]

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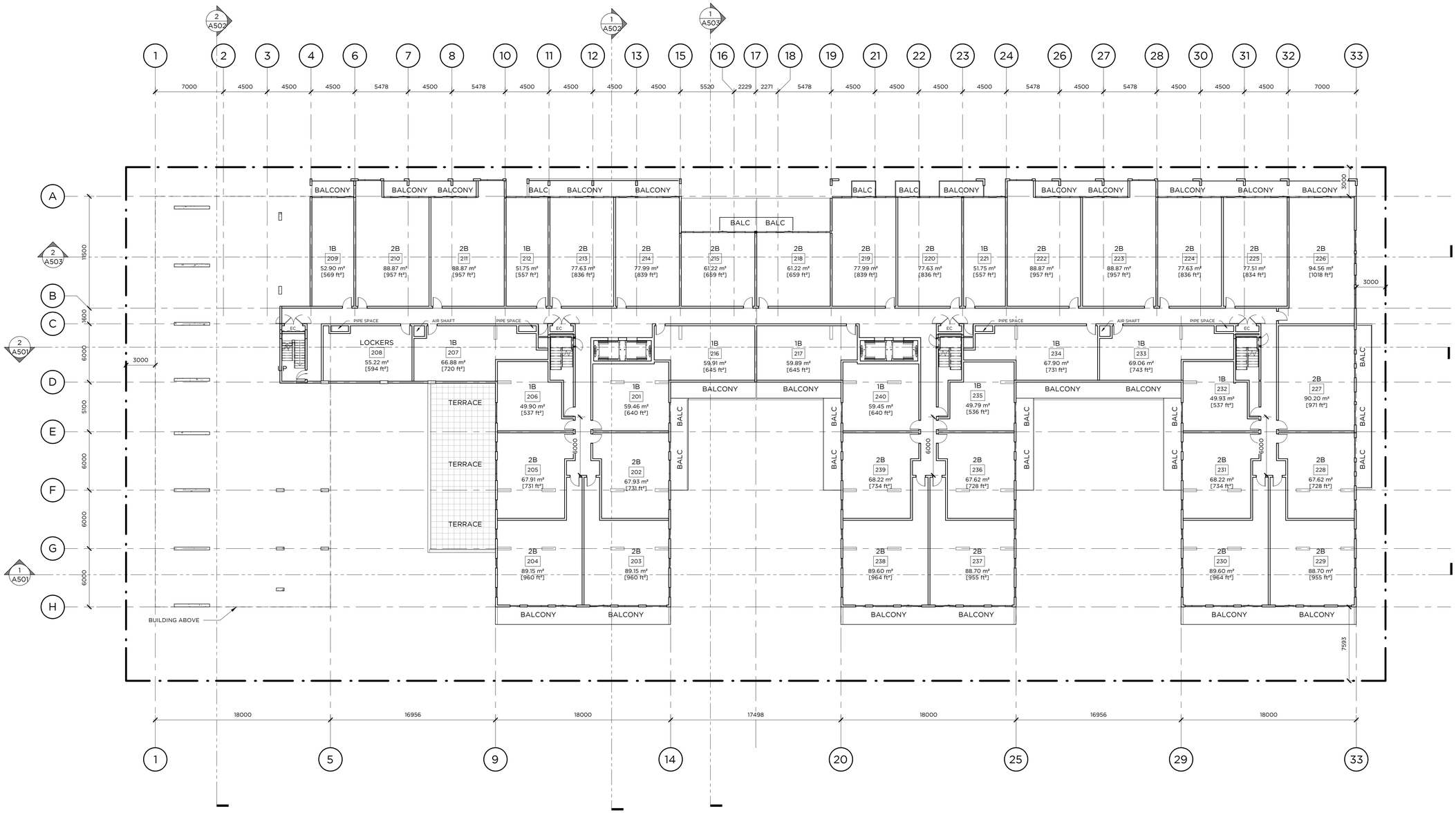
INFINITY GROUP

GROUND FLOOR PLAN

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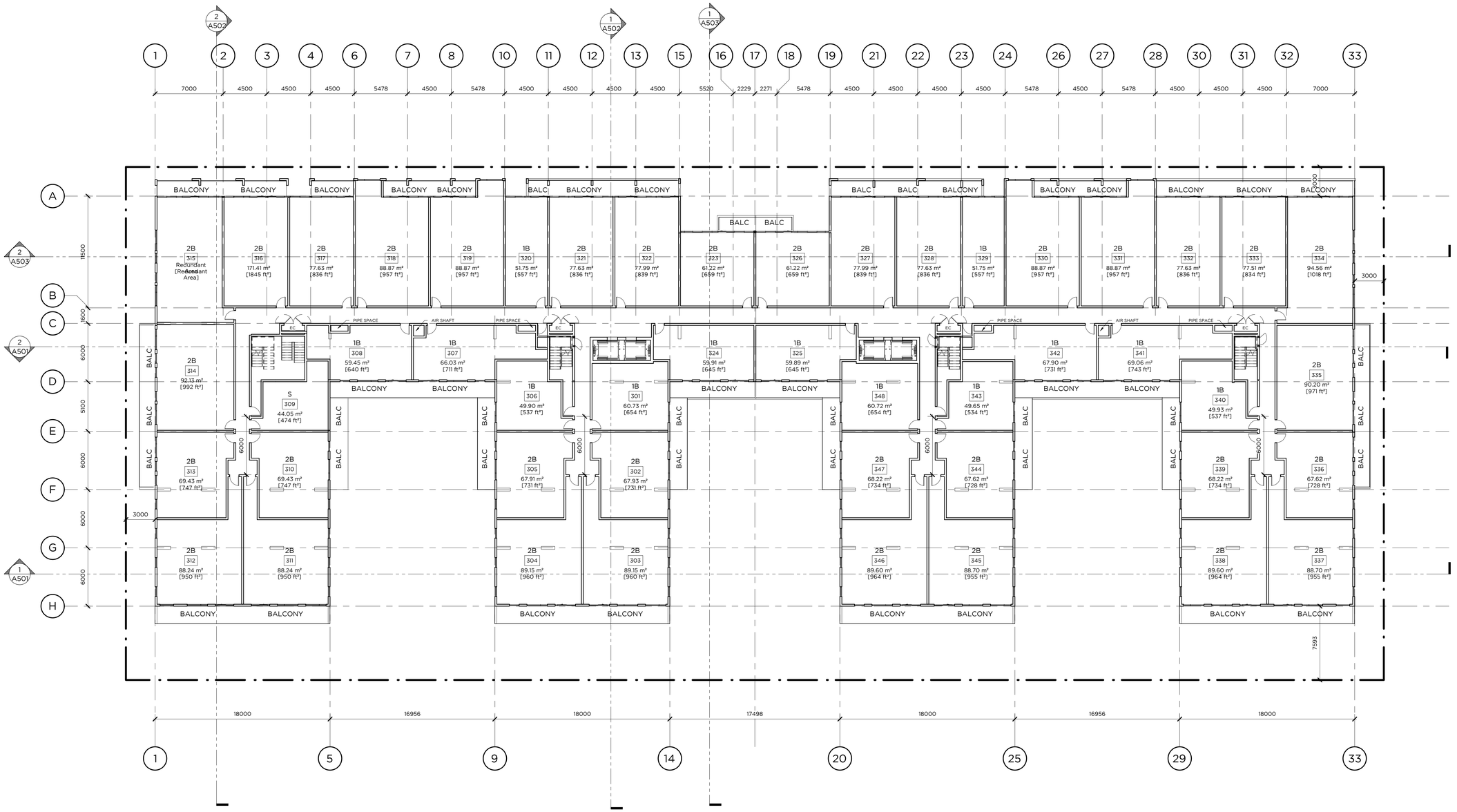
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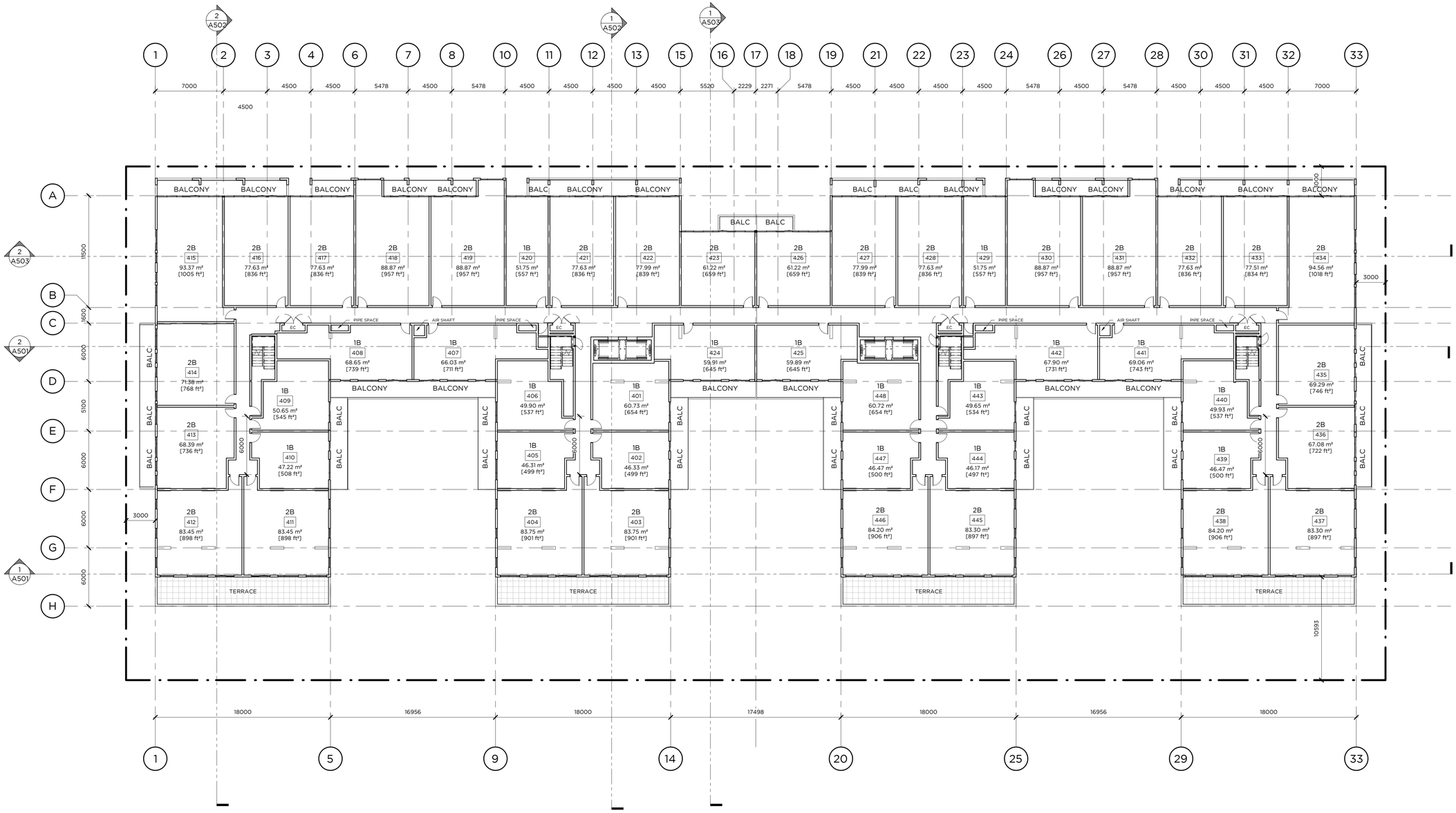
3RD FLOOR PLAN

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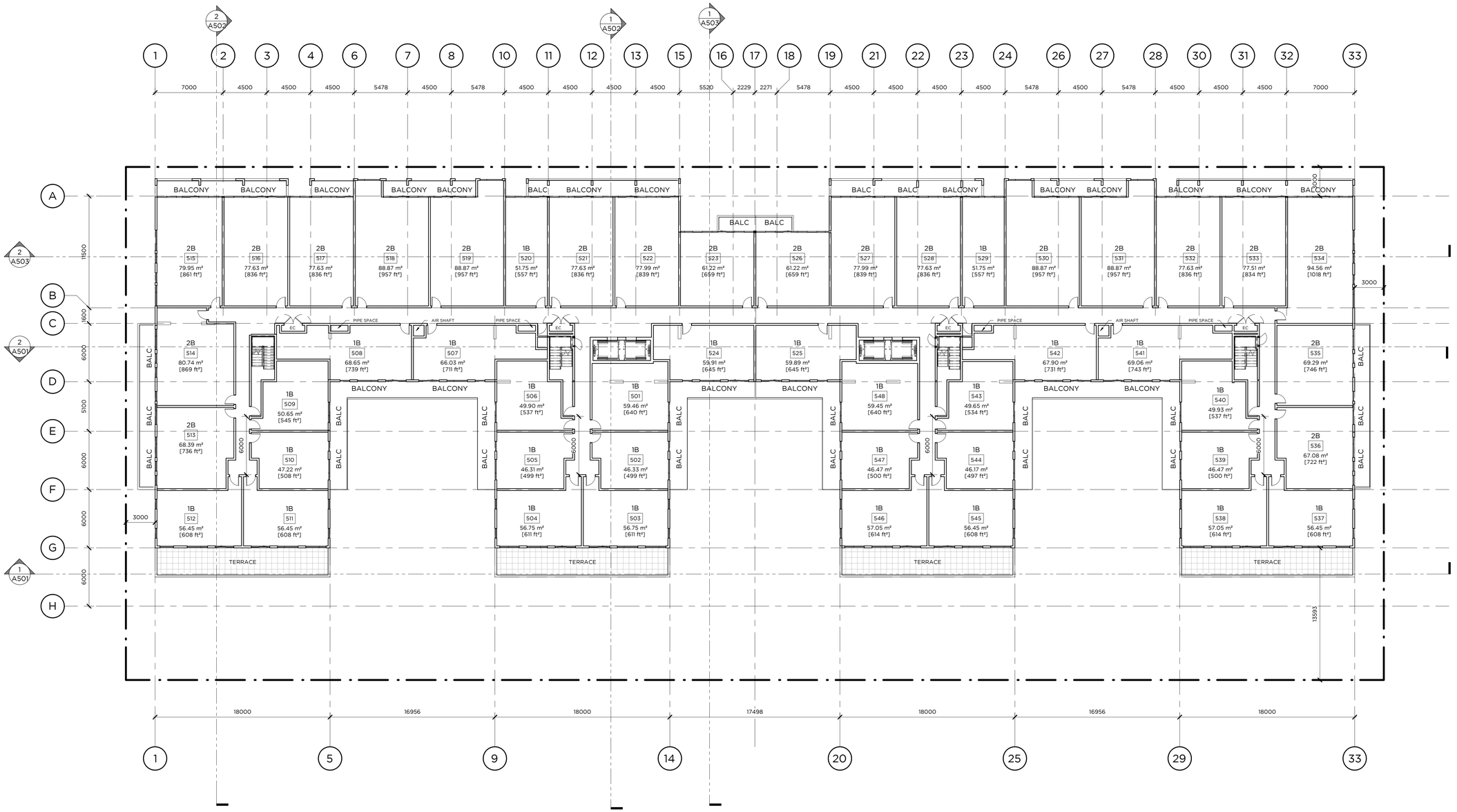
4TH FLOOR PLAN

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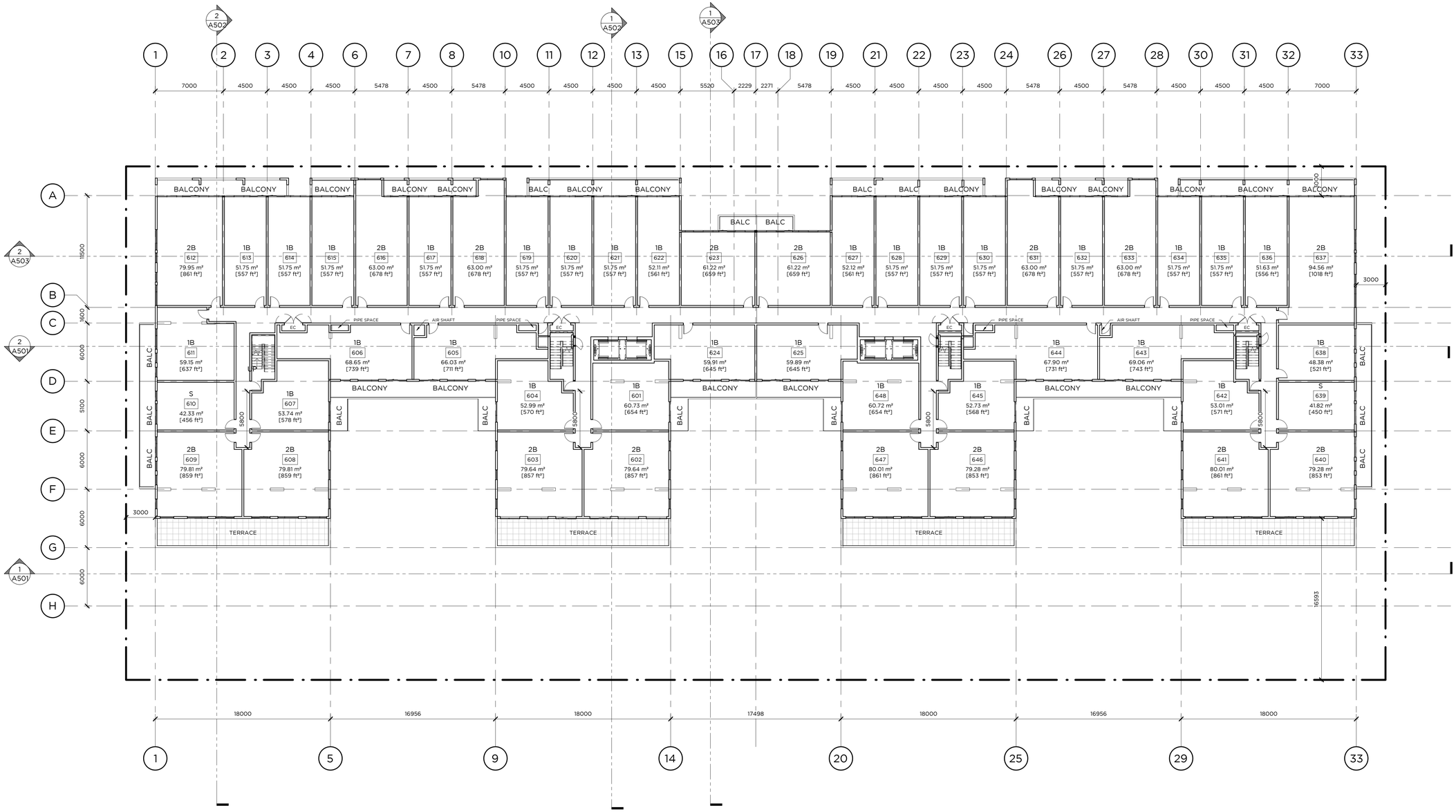
5TH FLOOR PLAN

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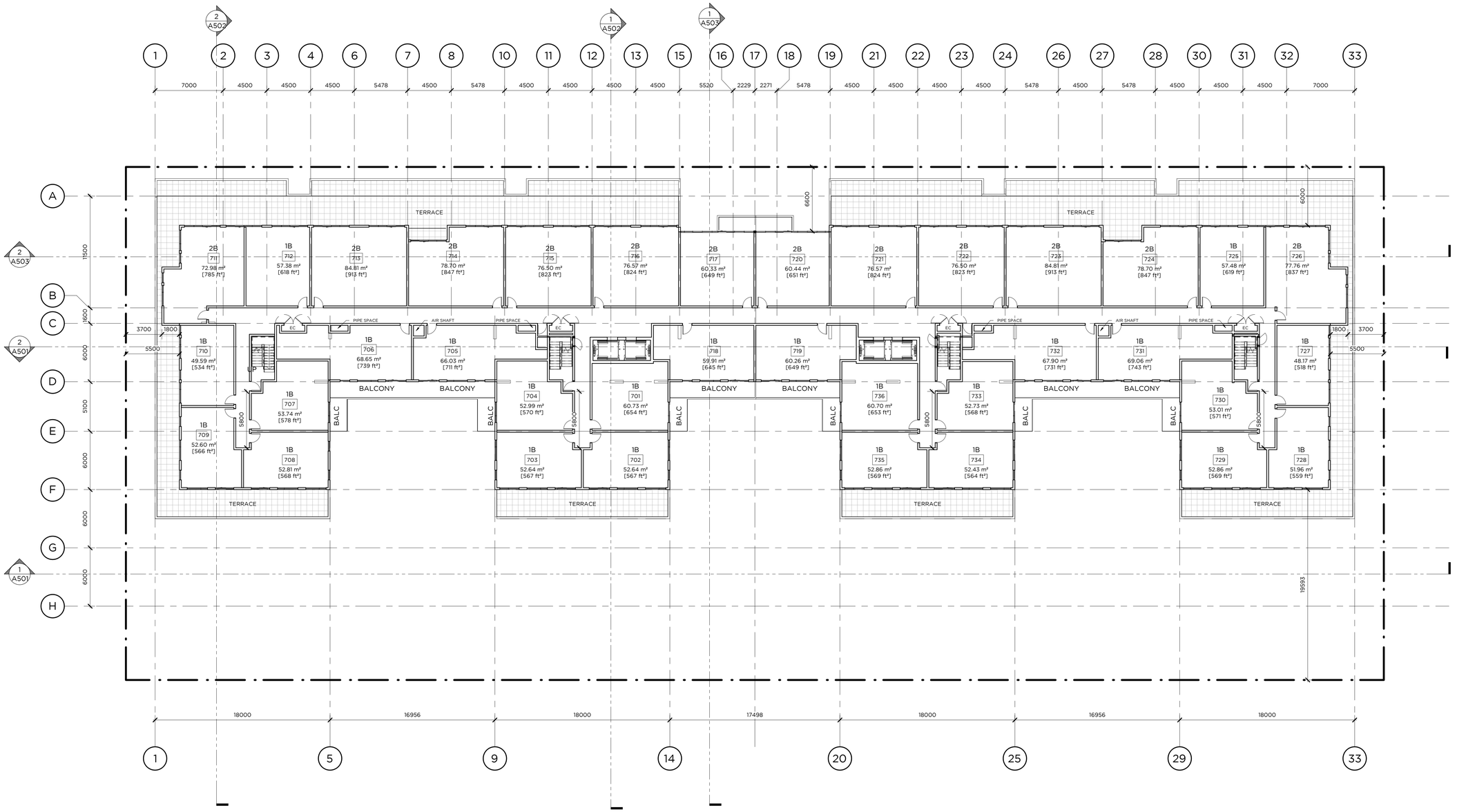
6TH FLOOR PLAN

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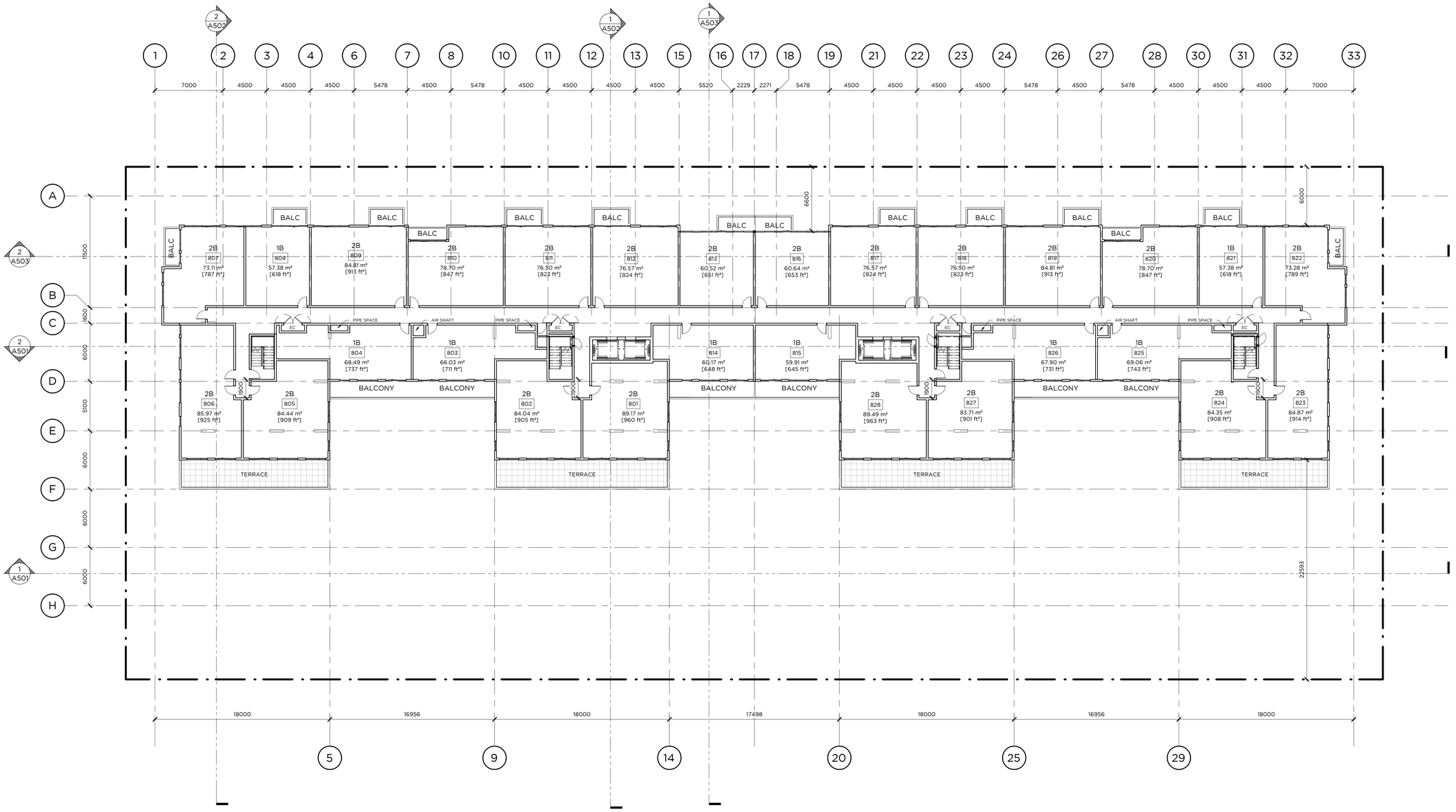
7TH FLOOR PLAN

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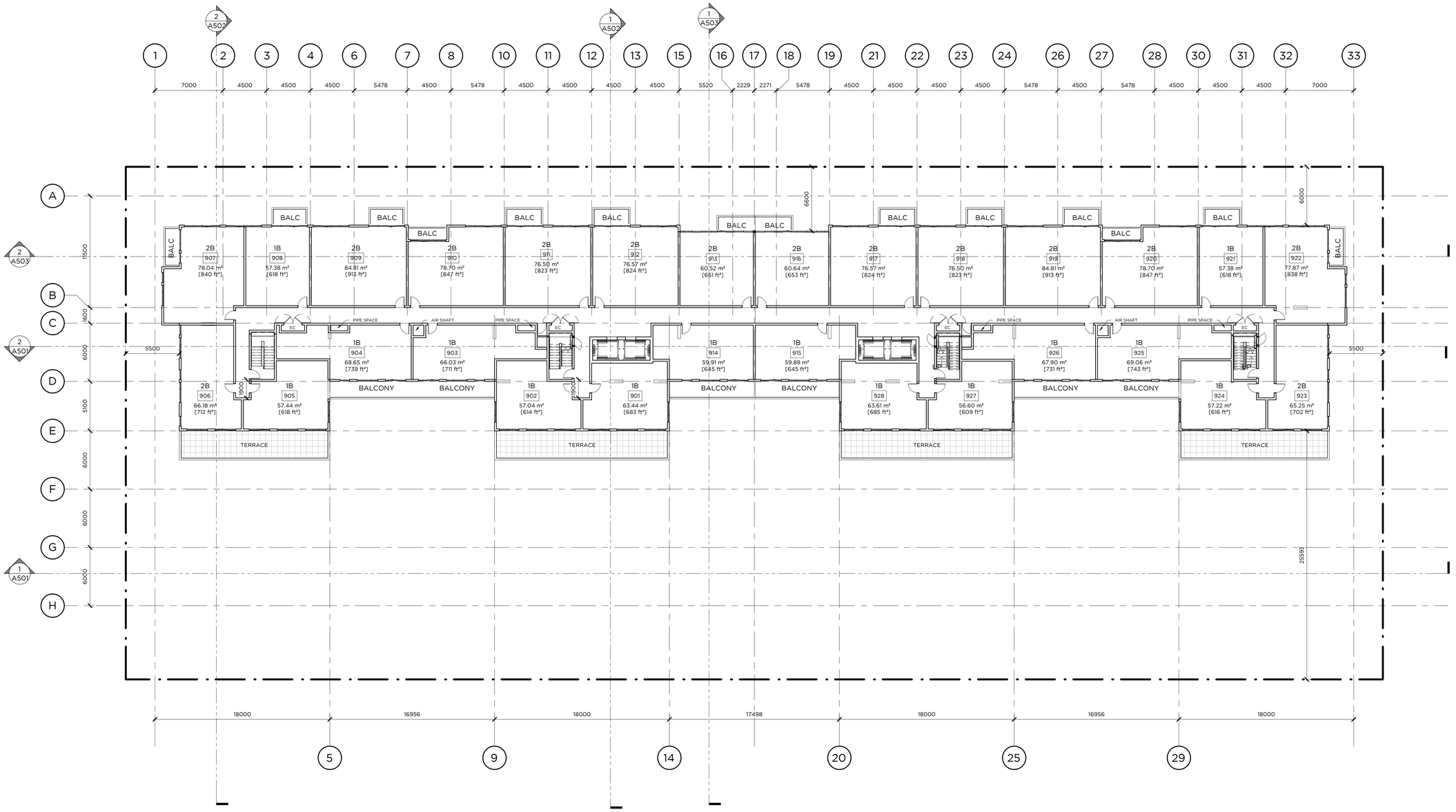
8TH FLOOR PLAN

1 : 200

A208

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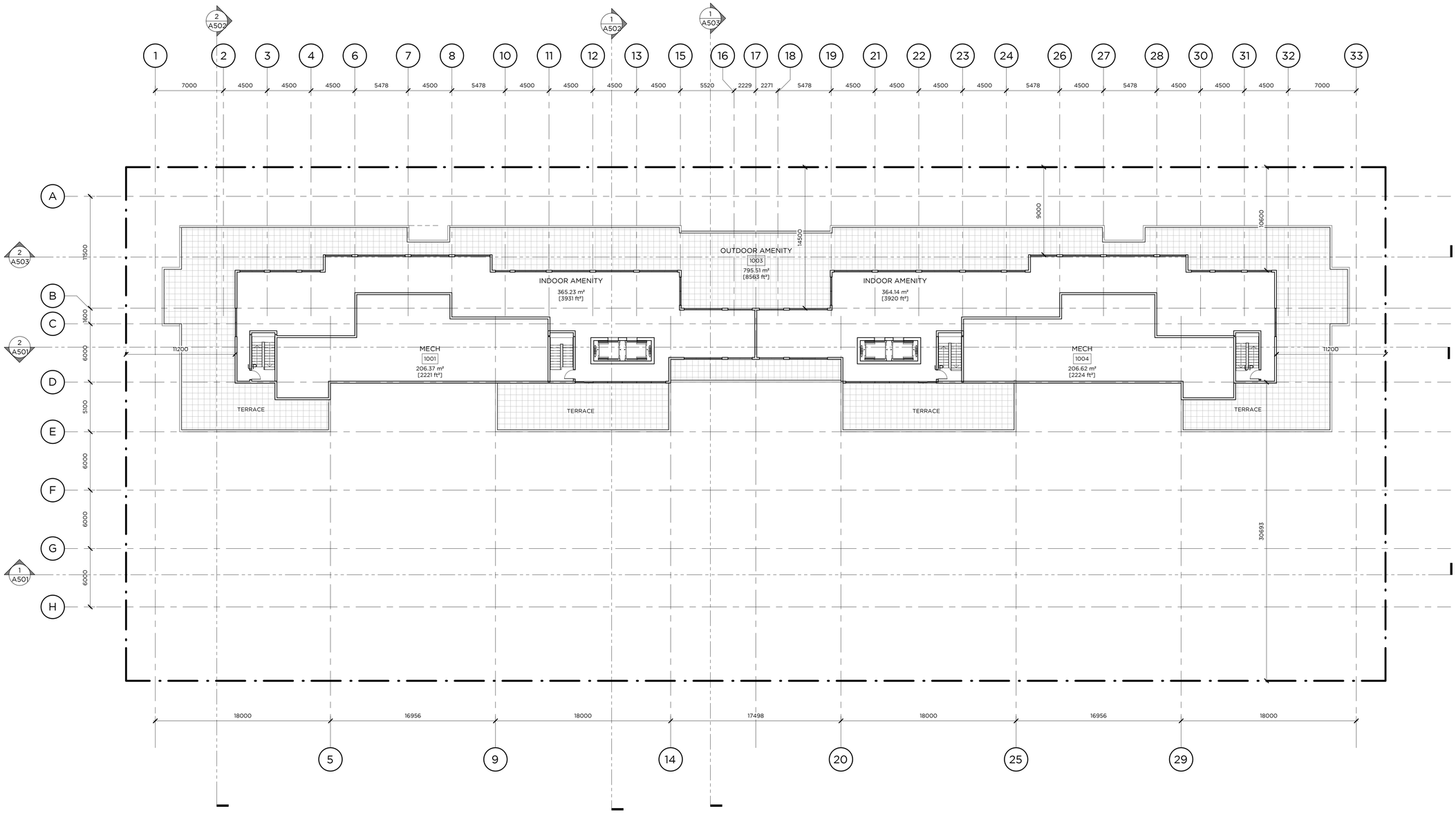
9TH FLOOR PLAN

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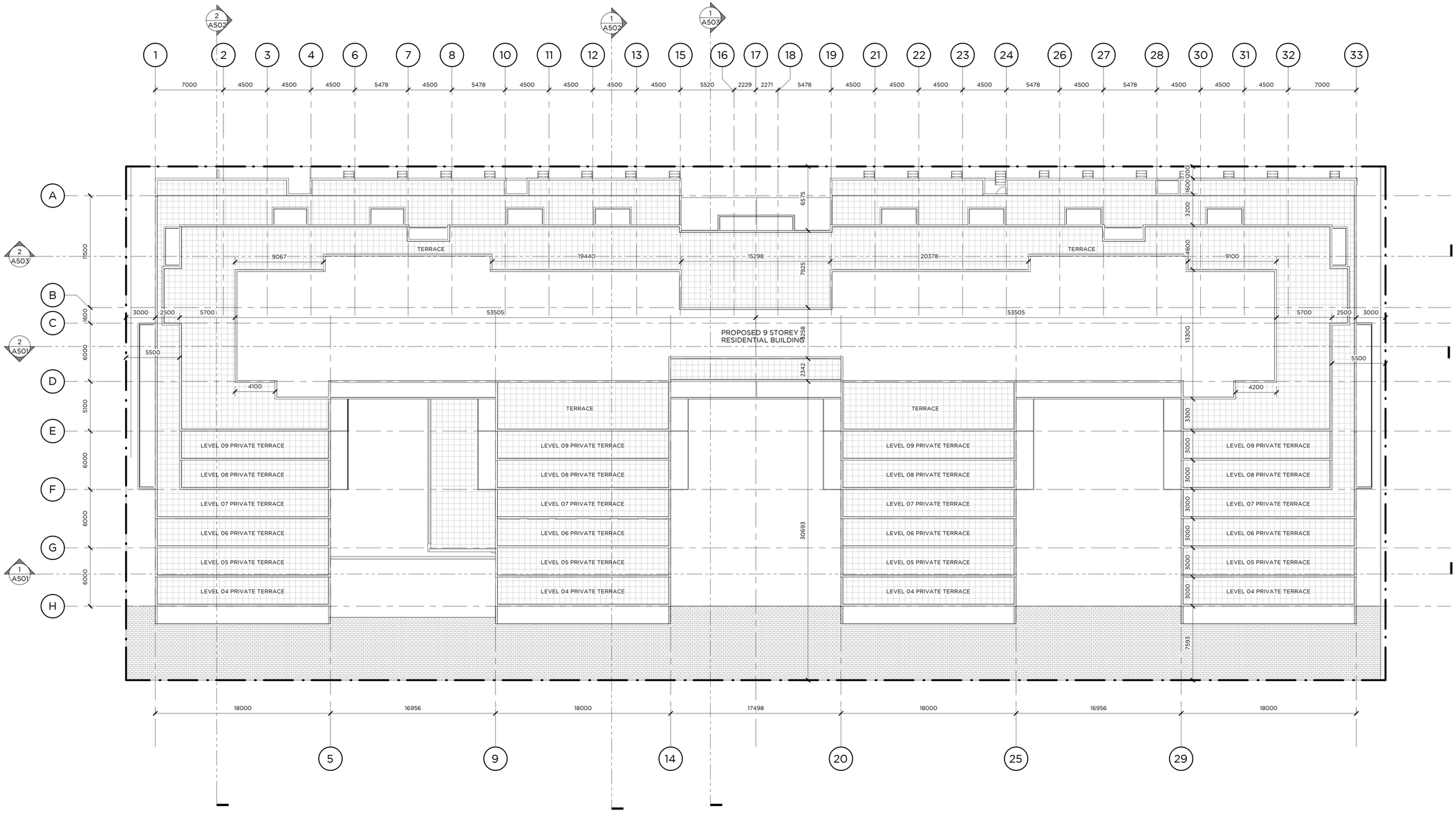
PH FLOOR PLAN

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ROOF PLAN

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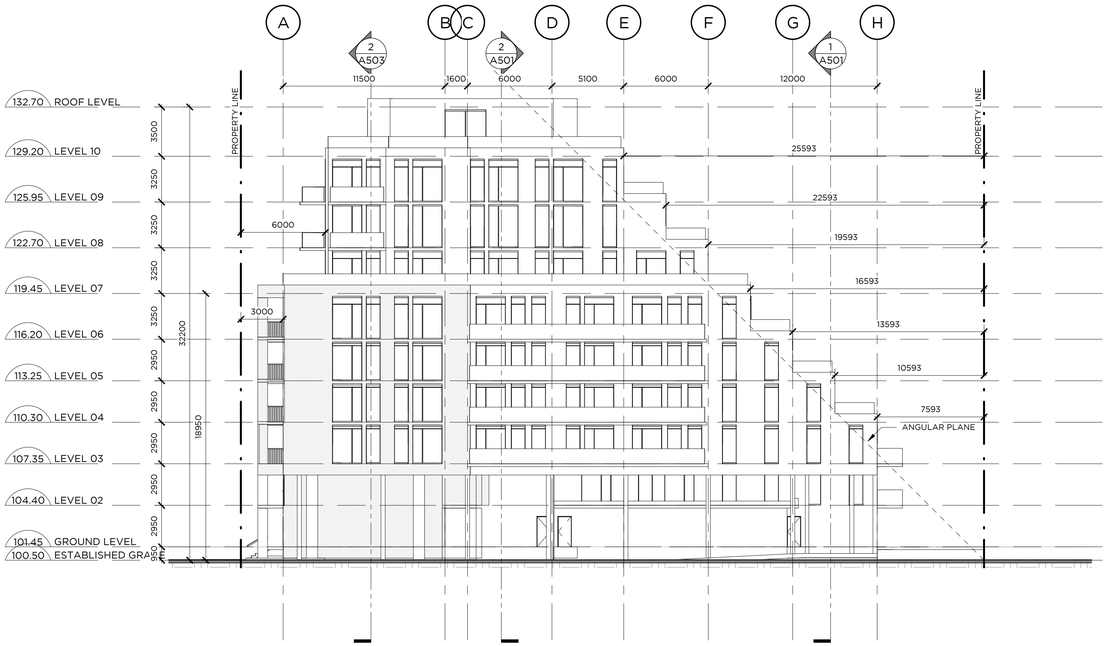
NORTH ELEVATION

1 : 200

A401

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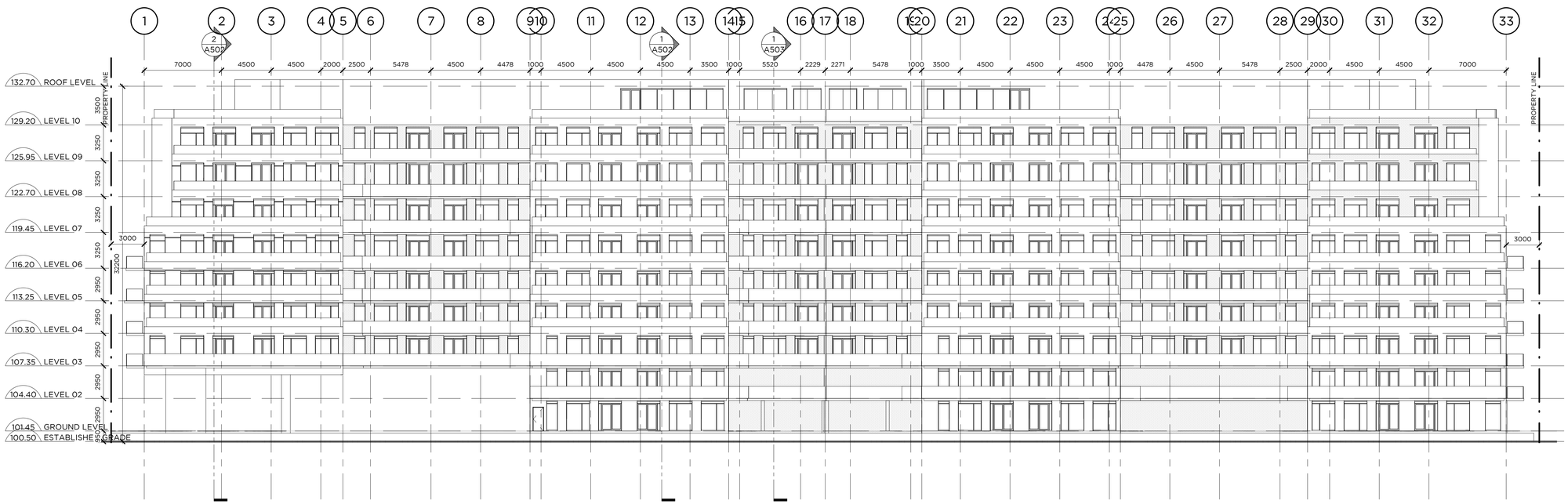
EAST ELEVATION

1 : 200

A402

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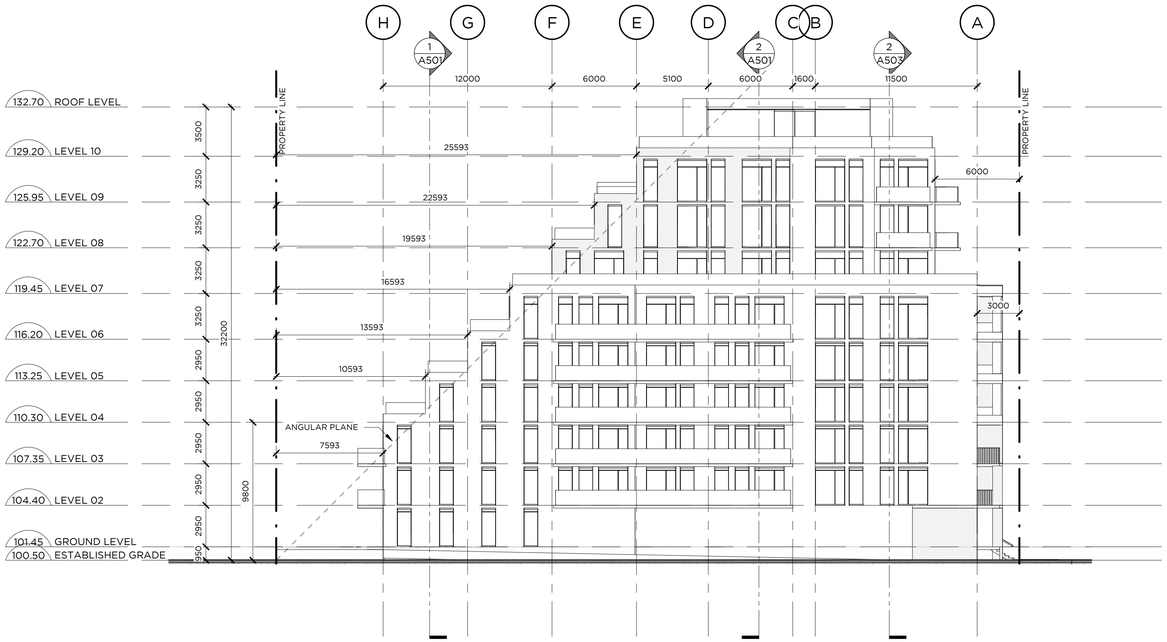
SOUTH ELEVATION

1 : 200

A403

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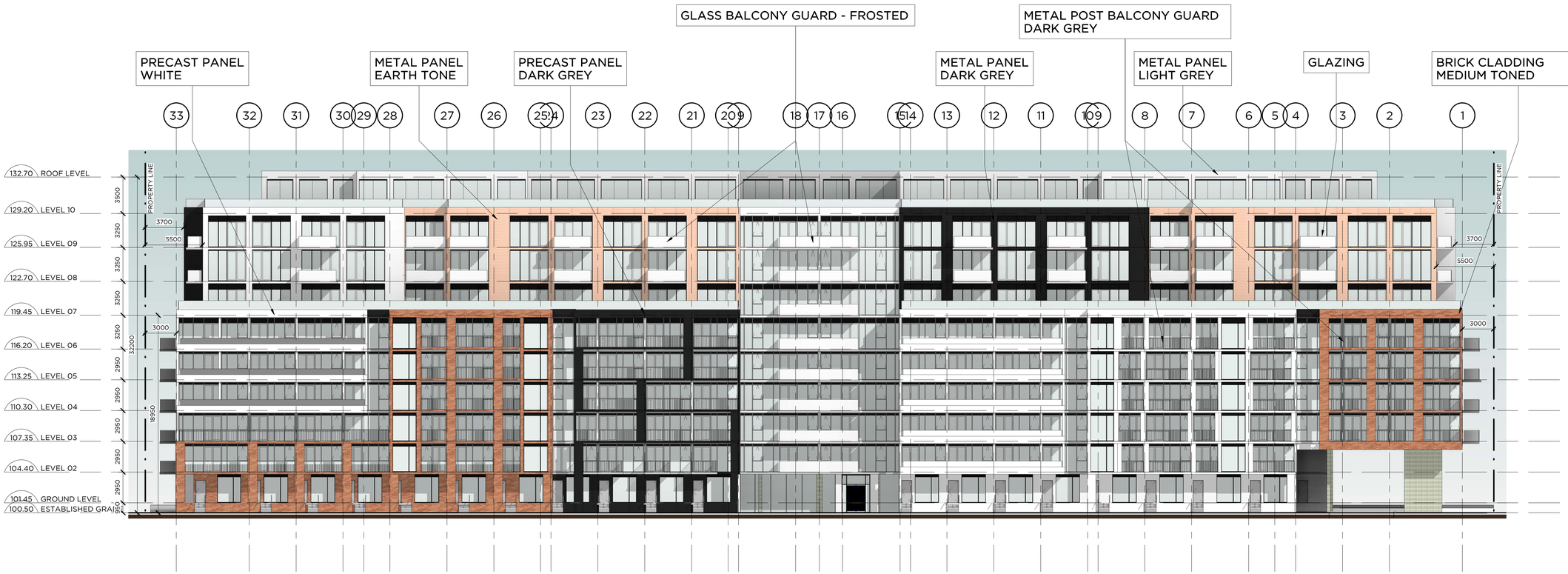
WEST ELEVATION

1 : 200

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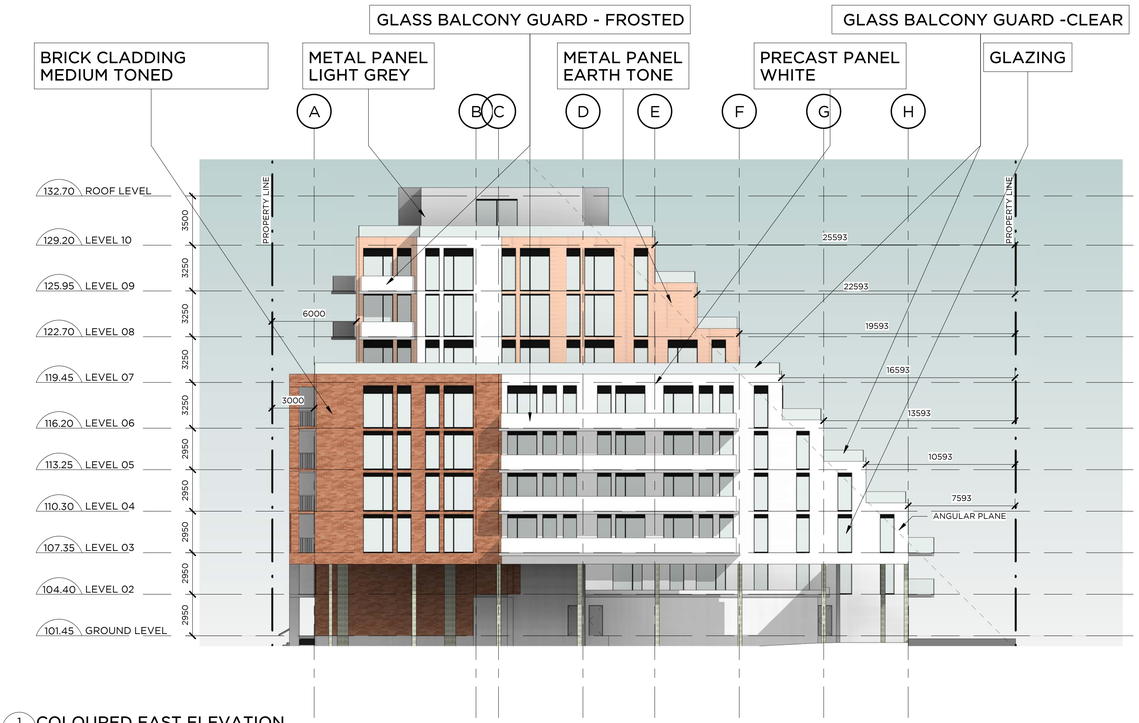
NORTH COLOURED ELEVATION

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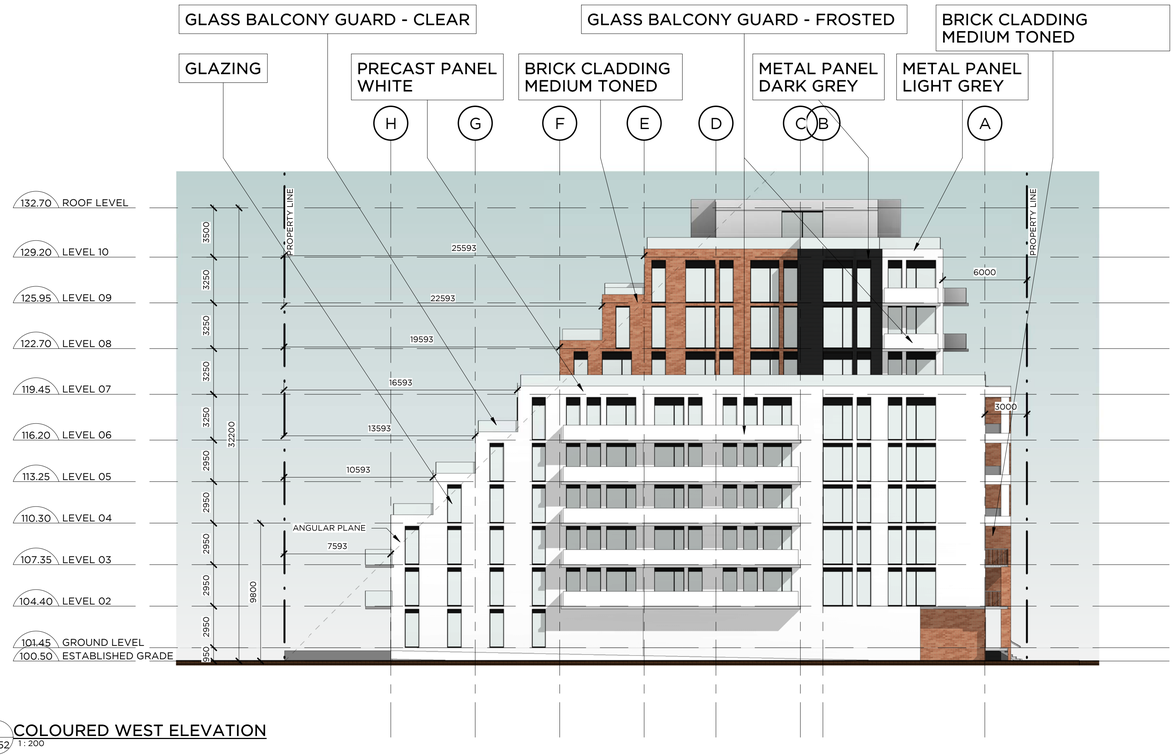
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1 A452 COLOURED EAST ELEVATION
1 : 200



2 A452 COLOURED WEST ELEVATION
1 : 200

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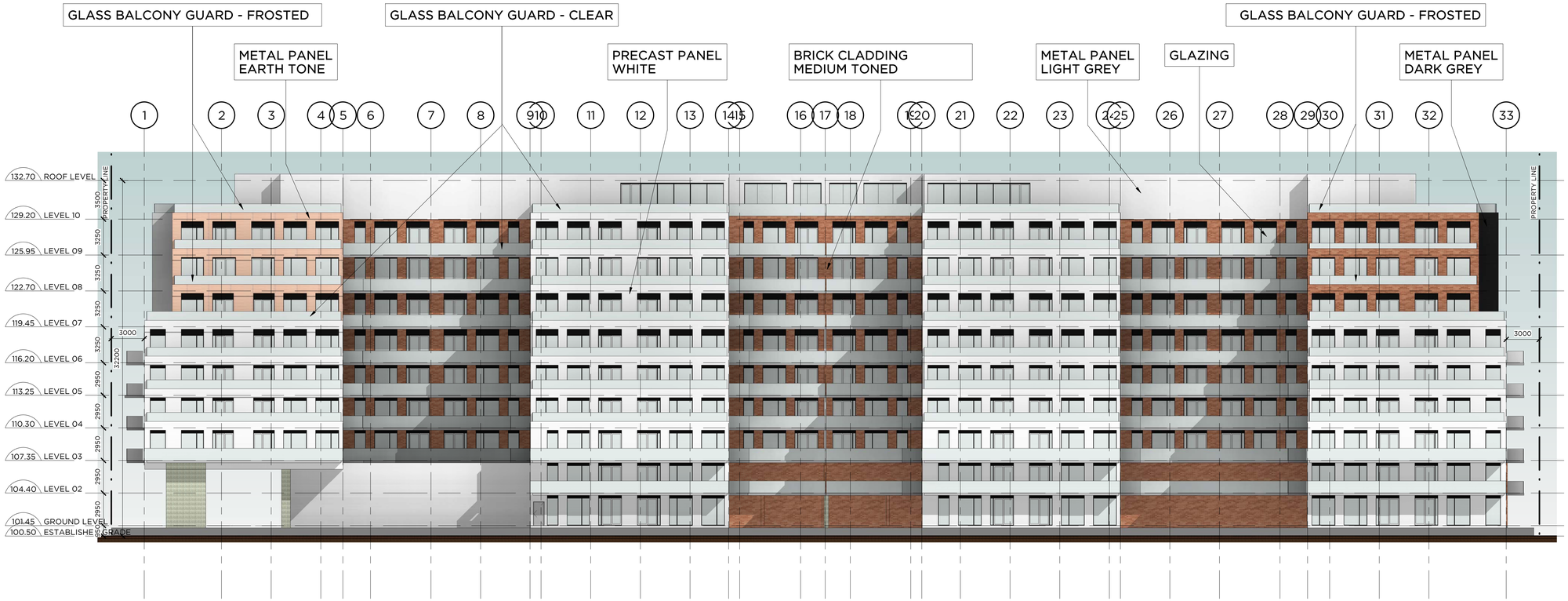
EAST-WEST
COLOURED
ELEVATIONS

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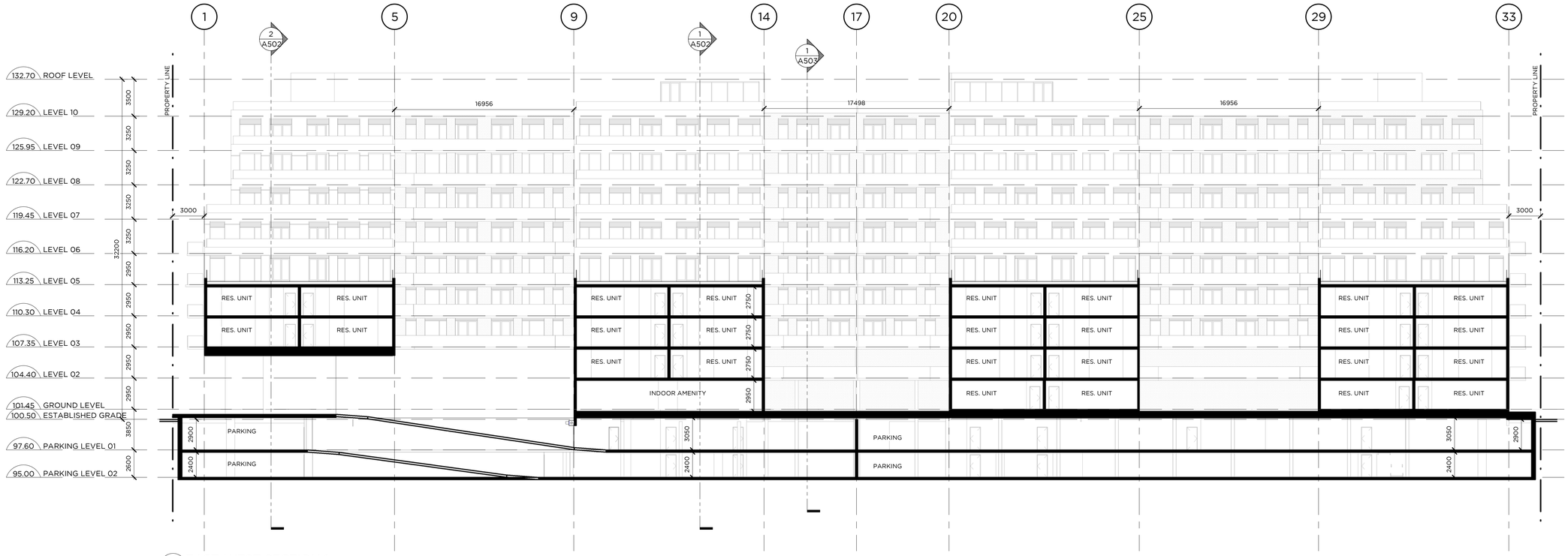
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1 : 200

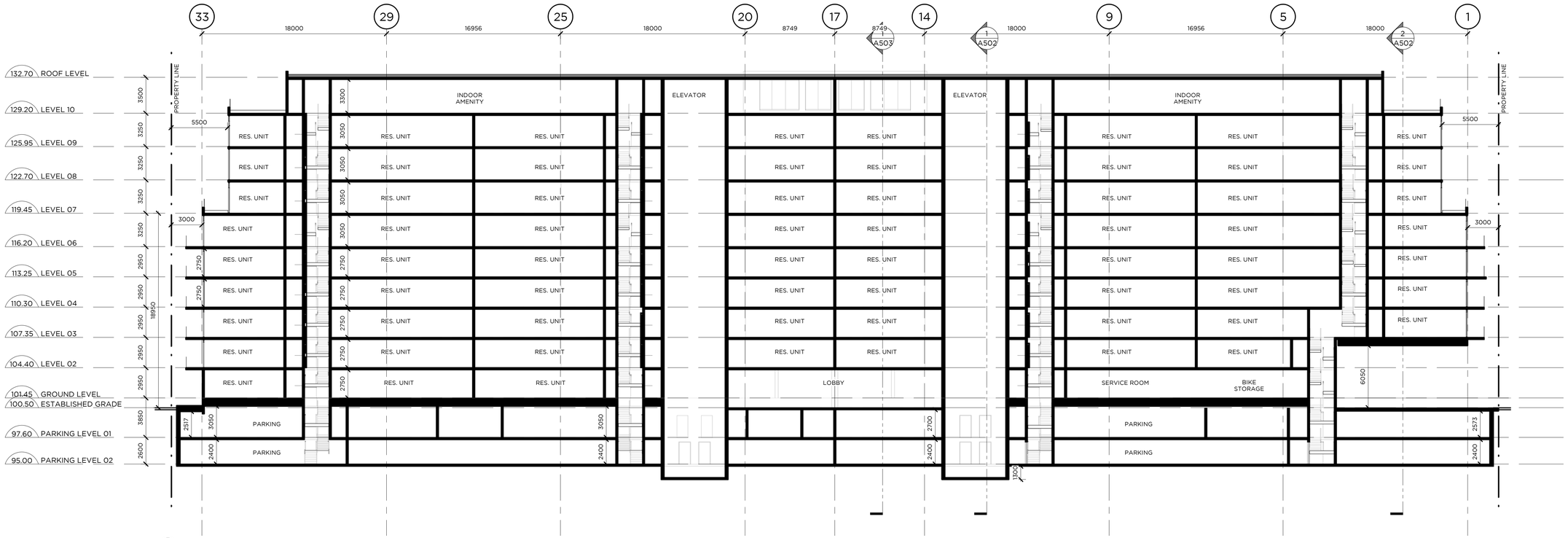
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1 A501 EAST-WEST SECTION 1
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2 A501 EAST-WEST SECTION 2
1 : 200

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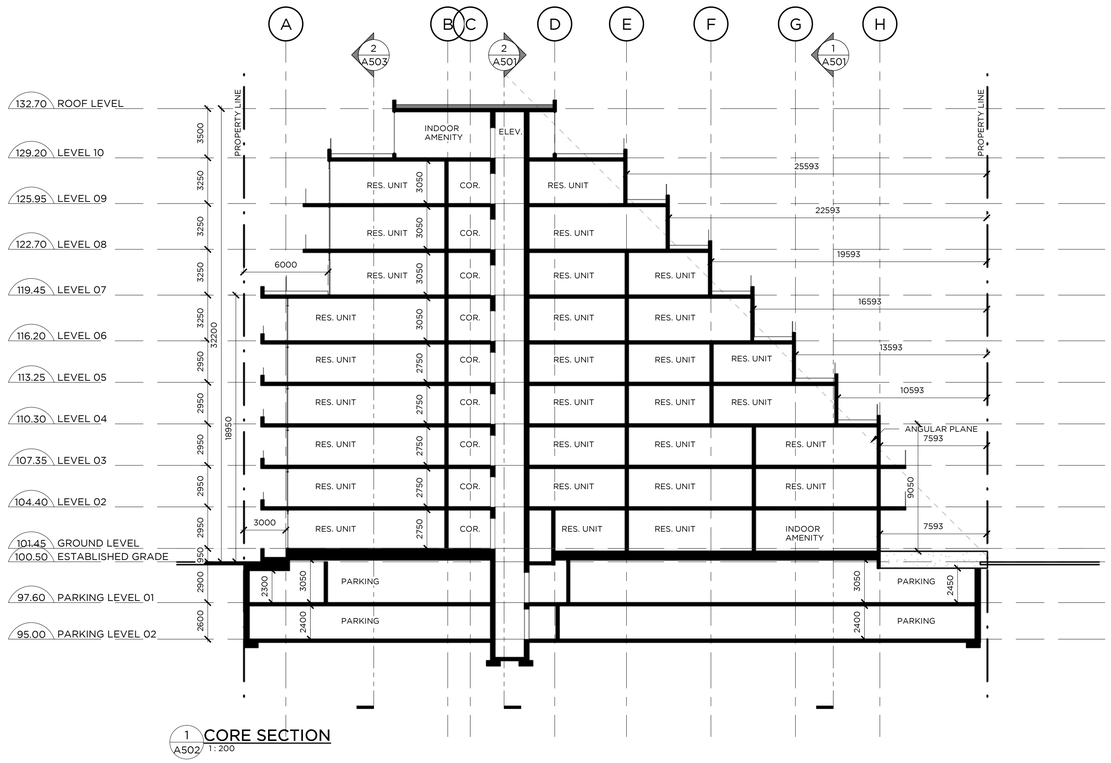
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BUILDING SECTIONS

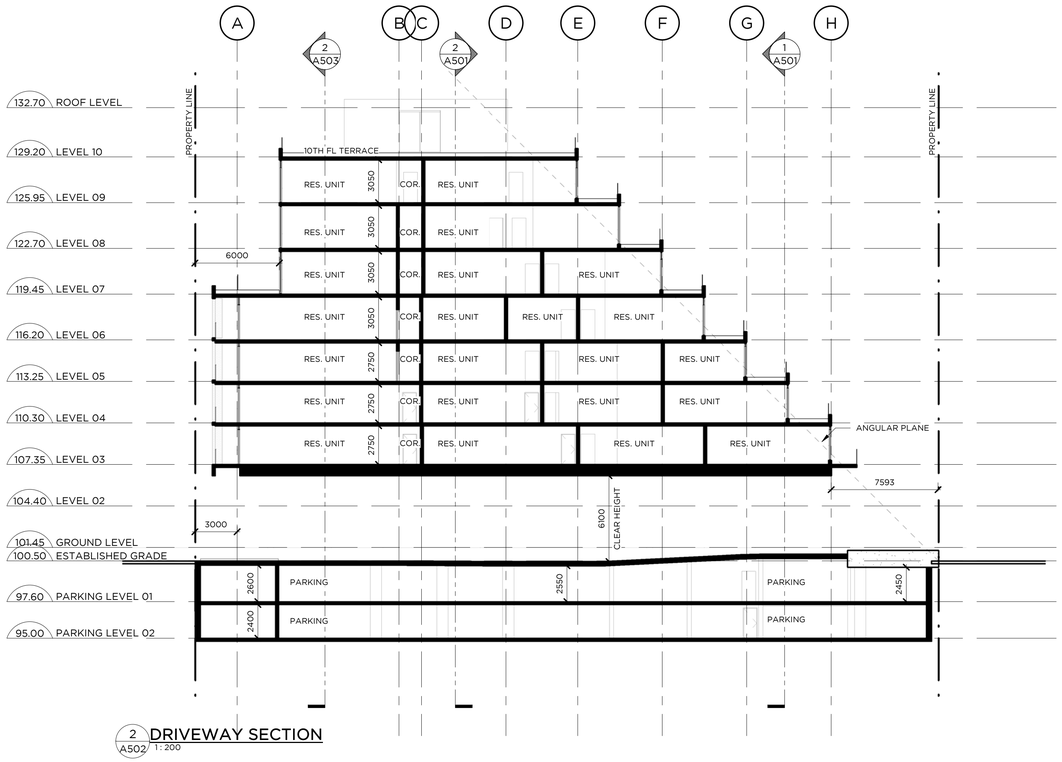
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1 A502 **CORE SECTION**
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2 A502 **DRIVEWAY SECTION**
1 : 200

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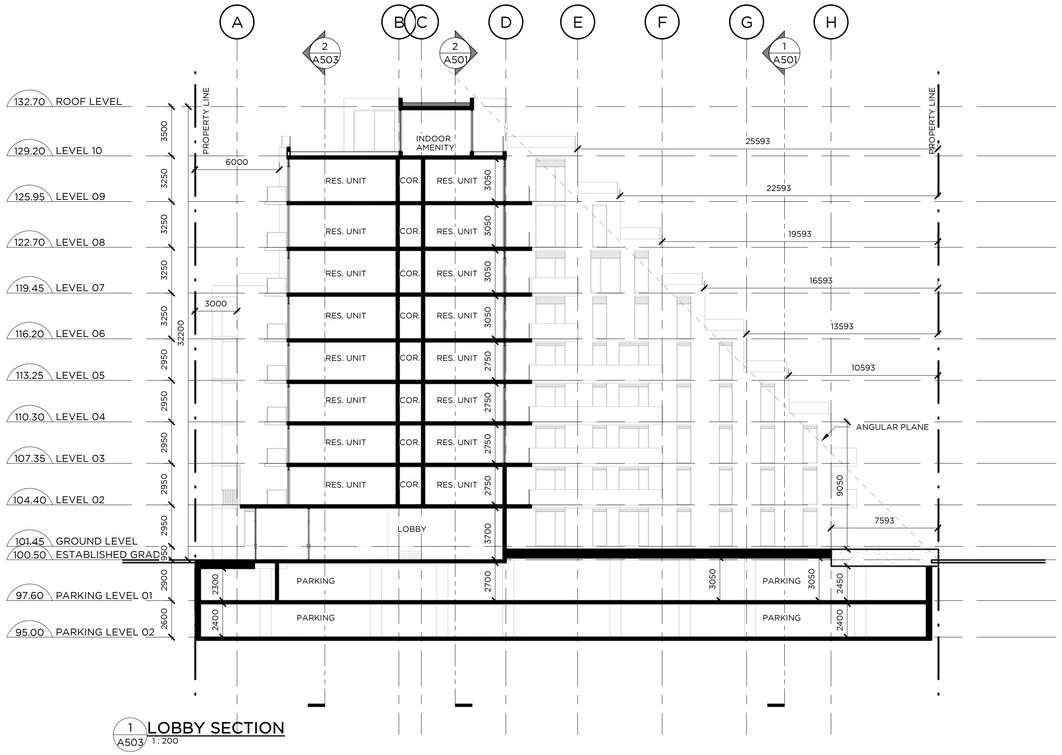
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BUILDING SECTIONS

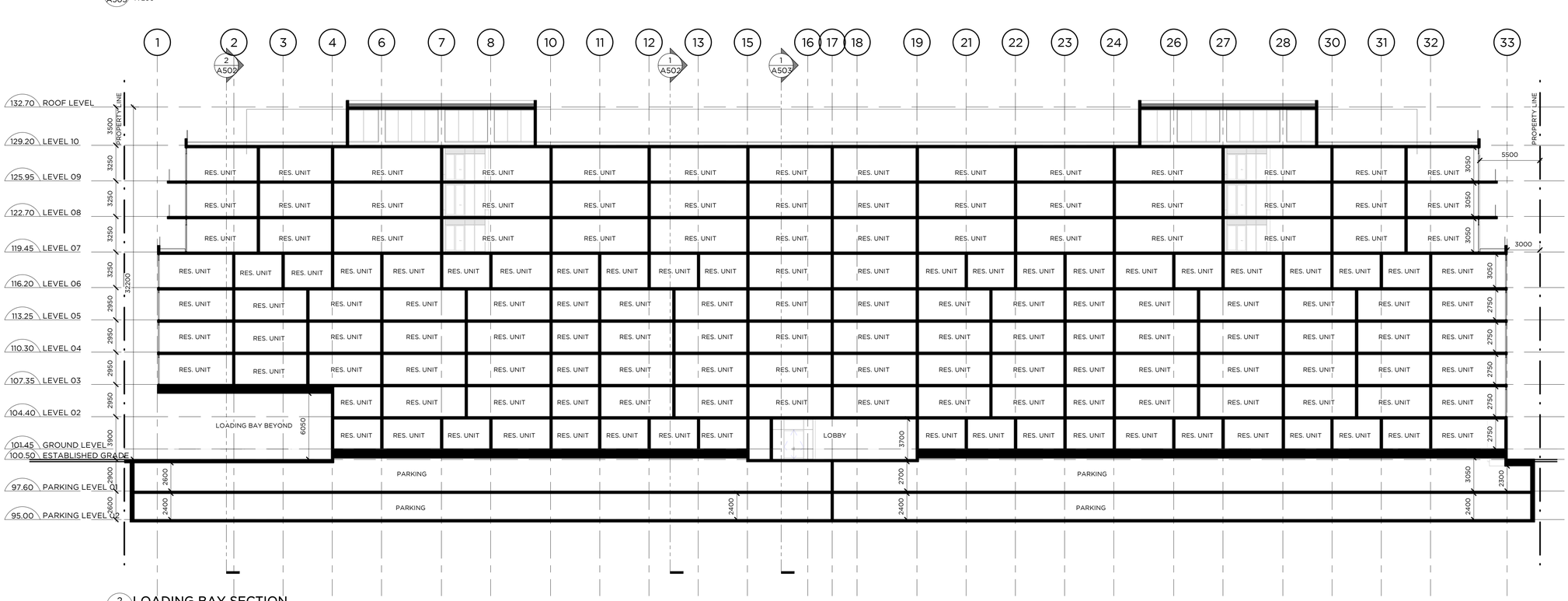
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1 A503 **LOBBY SECTION**
1 : 200



2 A503 **LOADING BAY SECTION**
1 : 200

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BUILDING SECTIONS

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APPENDIX E

HYDROGEOLOGICAL INVESTIGATION

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ENGINEERING

Professional Engineers Ontario

LABORATORY

CALA
Canadian Association for Laboratory Accreditation Inc.

HYDROGEOLOGICAL INVESTIGATION



40-70 PLAINS ROAD EAST, BURLINGTON, ONTARIO

400 Esna Park Drive, Unit 15
Markham, ON
L3R 3K2

Tel: (905) 475-7755
Fax: (905) 475-7718
www.fisherenvironmental.com

Prepared for:

Infinity Development Group

Project No. FE-P 20-10329H

August 17, 2020

Revised April 7, 2021

Issued to:	Infinity Development Group 2275 Upper Middle Road East Oakville, ON L6H 0C3
Contact:	Arjun Anand arjun.anand@infinitydevelopment.ca
Project Name:	Hydrogeological Investigation for Proposed New Development
Project Address:	40-70 Plains Road East, Burlington, ON.
Project Number:	FE-P 20-10329H
Issued on:	Revised April 7, 2021
Project Manager: **(Primary Contact)**	Sean Fisher, M.Sc. Eng., Project Manager, sean@fisherenvironmental.com
Report Prepared By:	Clive Wiggan. PhD., PMP., Geotechnical Technician clive@fisherenvironmental.com
Report Reviewed By:	Frank Fan, PEng., Geotechnical Engineer frank@fisherenvironmental.com

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APPENDIX G – BACKFILL AND DRAINAGE DESIGN ..... **G**

1. INTRODUCTION

Fisher Engineering Limited was retained by Infinity Development Group to carry out a Hydrogeological Investigation for the proposed redevelopment at the property located at 40-70 Plains Road East in Burlington, Ontario, hereinafter referred to as the 'Site'.

The purpose of the Hydrogeological Investigation was to evaluate the groundwater conditions with respect to the future redevelopment of the Site.

The report has been prepared specifically and solely for the proposed development regarding hydrogeological aspects for design & construction.

Updates in relation to previous versions of the report are summarized as follows:

- Revised architectural drawings, prepared by RAW, dated April 01, 2021 along with development correspondence indicate that the lowest finish floor elevation for P2 garage level was raised to 95.0m asl instead of 94.20m and 93.14m used in previous reports. Top of deepest footings is 93.60m asl.
- Revised construction groundwater dewatering flowrate of **85.70 m^3/day (85,700 L/day)** was estimated instead of 143.86 m^3/day (143,860 L/day) and 249.08 m^3/day (249,080 L/day) in previous reports.
- Average estimated permanent groundwater drainage flowrate is **26.17 m^3/day (26,170 L/day)** instead of **162.03 m^3/day (162,030 L/day)** and 54.66 m^3/day (54,660 L/day) calculated previously.

2. SITE AND PROJECT DESCRIPTIONS

Site Settings

The subject property is located on the south side of Plains Road East in the predominantly residential neighborhood, south of Highway 403 and east of Waterdown Road, in the City of Burlington and is bounded by a six-storey residential building to the west, residential building to the south and east and Plains Road East to the north. The Site has an approximate area of 6,823m^2 according to the Site Plan provided to Fisher.

At the time of investigation, the Site was occupied by single family dwellings. The property was generally landscaped with mature trees and paved driveways. Solid Gold Inn was observed on the north side of Plains Road East.

Topography

The Site is generally flat and is graded for drainage purposes from east to west along the gutter on Plains Road East as shown in the undated topo survey provided to Fisher.

Proposed Development

The proposed development will consist of the construction of a midrise residential building with two underground levels extending to the property boundaries. Established grade is 100.50m with P1 at 97.60m and P2 at 95.00m asl according to the Site plan, by RAW Architects, dated April 1, 2021, provided to Fisher for the updated report.

3. SCOPE OF HYDROGEOLOGICAL INVESTIGATION

The Hydrogeological Investigation works were required to:

1) Establish groundwater conditions for the design of dewatering works, if required, prior to construction of the proposed building.
2) Determine the need for permanent drainage and
3) Conduct calculations/analyses of the groundwater quantity and quality to be used for the necessary applications for permits prior to proceeding with construction dewatering and design of permanent drainage, if necessary.

The scope of this work generally consisted of the following:

- **Drilling/locating Monitoring Wells.** Drilling of monitoring wells and reviewing / compiling the borehole logs and onsite / laboratory testing.
- **Data Evaluation.** Evaluating the results of soil types, groundwater static levels, ground surface elevation, groundwater quality, flow direction and other available hydrogeological data for the Site and their potential impact on the proposed development.
- **Hydraulic Conductivity Tests.** Conduct single well response tests in four (4) monitoring wells and record groundwater level drawdown and recovery to model/calculate hydraulic conductivity.

- **Groundwater Quality Analysis.** Carry out laboratory analyses on groundwater to determine compliance with the Ontario Halton Sewer Use Bylaws No. 02-03 (Mar 2003) – Halton Sanitary Sewer and Halton Storm Sewer.
- **Groundwater Level Monitoring.** Conduct long-term monitoring of the groundwater levels to determine the seasonal high-water levels.
- **Hydrogeological Report.** Prepare and submit a report detailing the findings and recommendations of the Hydrogeological Investigation.

4. FIELD AND LABORATORY WORKS

Subsurface exploration for the Hydrogeological Investigation was conducted concurrent with drilling for the Geotechnical Investigation over the period May 26 to June 18, 2020 and consisted of six (6) boreholes advanced to depths of 6.25m to 13.56m below prevailing grades. The approximate locations of the boreholes and elevations are presented in Appendix A - Borehole Location Plan.

All boreholes were instrumented as monitoring wells (MW1 to MW6) with 2" diameter screens on completion of drilling. A clean silica sand pack was placed around the well screens and isolated with bentonite to depths below prevailing grades as shown in the borehole details in Appendix B.

A Track mounted drill rig equipped with hollow stem (for deeper holes) and solid stem augers, supplied by Terra Firma Services, was used for all drilling work.

Laboratory Analyses

Soil samples were taken to the Fisher Environmental laboratory for further visual assessment and classification. Eight (8) representative soil samples from BH1 and BH6 were submitted for moisture content and grain size analyses. One (1) soil sample from BH1 was submitted for pH, chloride and sulphate analyses. The laboratory samples were tested and classified in general accordance with the Unified Soil Classification System, ASTM D 2487, and Standard Practice for Classification of Soil for Engineering Purposes.

One groundwater sample from MW1 was submitted to ALS Environmental laboratory for analyses of water quality under the Ontario Halton Sewer Use Bylaws No. 02-03 (Mar 2003) – Halton Sanitary Sewer and Halton Storm Sewer. The results are presented in Appendix D.

The soil samples recovered during the investigation will be stored in the Fisher Environmental laboratory for a period of 30 days after submitting this report and will be discarded thereafter unless otherwise instructed by the client.

Site Survey

Ground surface elevation at each borehole location was established by interpolation from the topographic survey provided to Fisher during the investigation.

5. SUBSOIL CONDITIONS

Surface and subsurface conditions encountered at borehole locations are shown in Appendix B - Log of Boreholes, and are summarized as follows:

The boreholes logs include soil stratification at borehole locations along with detailed soil descriptions. Variations in the soil stratification may occur and should be expected between borehole locations and elsewhere on the Site.

FILL

Fill soils were found below surficial layer of all boreholes and extended to approximate depths below prevailing grades as shown in Table 1.

The fill generally consisted of dark brown to brown silty sand with some to trace of topsoil/roots and trace of gravel.

Table 1: Fill Depths and Elevations

Borehole No.	BH1	BH2	BH3	BH4	BH5	BH6
Surface Elevation (m asl)	101.35	100.80	100.81	100.85	100.79	100.45
Depth of Borehole (m)	10.67	13.56	12.65	11.13	6.25	13.41
Elevation at Bottom of Borehole (m asl)	90.68	87.24	88.16	89.72	94.54	87.04
Depth of Fill (m)	0.76	1.52	1.37	0.76	1.52	1.98
Elevation at Bottom of Fill (m asl)	100.59	99.28	99.44	100.09	99.27	98.47

Reddish Brown/Brown/Greyish Brown Sand/Silty Sand/Gravelly Sand/Gravel & Sand

Native soils of brown to reddish/greyish brown sand/silty sand/sand and gravel/gravelly sand were found underlying the fill materials. Frequent cobbles/boulders were encountered in the sand and gravel/gravelly sand deposits. Relative density of these soils generally varied from compact to very dense and occasionally loose. Boreholes BH1 and BH3 were terminated in these soils at depths of 10.67m and 12.65m bgs respectively. BH5 terminated in the sand and gravel deposit at 6.25m bgs due to refusal to auguring possibly on boulders/cobbles.

Greyish Brown/Grey Sand/Silty Sand

Greyish brown to grey sand/silty sand were found below the gravelly sand/sand and gravel of boreholes BH2, BH4 and BH6. Relative density of these sandy layers varied from compact to dense. The lower SPT 'N' values, indicating lower relative density, may be due to disturbance caused by auguring and/or hydrostatic pressure.

6. HYDROGEOLOGICAL STUDY

A hydrogeological study for the subject Site was conducted based on the boreholes/wells' exploration, observation and Site/Laboratory testing. Groundwater details from the six (6) newly installed monitoring wells were used in the Hydrogeological Study. The wells were constructed with 3.05m (10') long, 51mm diameter PVC slotted screen pipes, with the bases at approximate depths below existing grade as shown in Appendix B. Clean silica sand packs were placed around each well screen which was isolated with bentonite extending to slightly below existing grade.

Groundwater levels on completion of drilling varied from 7.77m to 8.23m below existing grade. MW5 was dry on completion however caving in of soils to 4.57m bgs was observed.

6.1 Hydrogeological Conditions

Review of the available surficial geological and hydrogeological information for the area shows that the Site is underlain generally with Coarse-textured glaciolacustrine deposits of sand, gravel, minor silt and clay. Underlying bedrock is represented by shale, limestone, dolostone and siltstone of the Queenston Formation and is generally less than 20m below prevailing grade. Surficial geology and bedrock maps are presented in Appendix A.

The subsoils and hydrogeological conditions were observed and recorded during both the Geotechnical and Hydrogeological Investigations. Based on the boreholes/wells' exploration, the saturated soil layers on the Site were dominated by brown sand and gravel to gravelly sand underlain by brown to greyish brown sand to borehole termination.

All monitoring wells were purged/developed and allowed to fully recover prior to carrying out groundwater level measurements and sampling. Measured groundwater depths and elevations are summarized in Table 2.

Table 2: Groundwater Depths and Elevations

No.	Elev. at Ground (m)	Depth of Well, m bgs	On Completion		24-Jun-20		08-Jul-20		22-Jul-20		08-Mar-21		24-Mar-21	
			GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl	GW level, m bgs	GW Ele, m asl
MW1	101.35	10.06	8.08	93.27	8.60	92.75	8.59	92.76	8.60	92.75	9.20	92.15	9.78	91.57
MW2	100.80	12.80	7.77	93.03	7.86	92.94	8.05	92.75	8.03	92.77	8.42	92.38	8.45	92.35
MW3	100.81	12.19	Dry	-	8.23	92.58	8.23	92.58	8.25	92.56	8.81	92.00	8.92	91.89
MW4	100.85	9.14	7.77	93.08	7.82	93.03	7.91	92.94	7.96	92.89	8.45	92.40	8.46	92.39
MW5	100.79	5.79	Cave in to 4.57m	-	Dry at 5.63	-	Dry at 5.70	-	Dry at 5.70	-	Dry at 5.70	-	Dry at 5.70	-
MW6	100.45	12.95	8.23	92.22	7.86	-	7.96	92.49	7.99	92.46	8.45	92.00	8.47	91.98

Comments on Table 2:

The following general comments regarding groundwater conditions at the Site are based on the groundwater level data and the Geotechnical Investigation:

- Static groundwater levels were observed at 7.82m to 9.78m below grade (elevations of 92.00m to 93.03m asl). MW5 (depth of 5.79m) was observed to be dry throughout the investigation.
- Pockets of perched water and seepage from more pervious soil may be expected on the Site.
- The nearest body of surface water is the Lake Ontario located approximately 800m southwest of the Site.
- The Site is located in a developed residential/commercial area, with no indication of active domestic wells within a 500m radius measured from the centre of the property. Water supply in the area is via municipal water system.
- Groundwater levels are being monitored over the period March to June 2021 covering the traditional rainy season to determine highwater levels at the site. The report will be updated on completion of the groundwater monitoring programme.

6.2 Hydraulic Conductivity K Modeling Results

Single Well Response Tests

Single well response tests (SWRT) were conducted in MW1, MW3 and MW4 on June 30, 2020. The aquifer mainly consisted of layers of brown sand and gravel to gravelly sand underlain by brown to greyish brown sand and was assumed to be unconfined, homogenous, isotropic and of uniform thickness. It was also assumed that the wells fully penetrated the aquifer. Data from the single well response tests were used to calculate the hydraulic conductivity values using Luthin's method.

Calculated values for hydraulic conductivity (K) are summarized in Table 3 and are representative of the water bearing soil characteristic consisting of sand/ gravelly sand at the screened depths. Details of the hydraulic conductivity analyses are presented in Appendix C.

Table 3: Summary of Single Well Response Tests and Hydraulic Conductivity Results

Test Wells	Well Surface Elevation (m asl)	Groundwater Depth (m)	Screen Elevation (m asl)	Variance of water head created (m)	30 Minutes/ Recovery Percentage	Hydraulic Conductivity, K (Luthin's Method)	
						m/s	m/day
MW1	101.35	8.65	91.29-94.34	0.87	5 min / 99.4%	1.21×10^{-4}	10.46
MW3	100.81	8.23	88.62-91.67	1.44	6.7 min / 90.8%	4.69×10^{-5}	4.053
MW4	100.85	8.92	91.71-94.76	1.04	5 min / 92.6%	5.75×10^{-5}	4.968

7. CONSTRUCTION DEWATERING & PERMANENT DRAINAGE

7.1 Construction Dewatering

It was understood that the development will consist of a proposed midrise residential building with two underground levels. Subsoil conditions were observed to be consistent across the Site. Lowest finished floor elevation for P2 level was taken as 95.00m with top of lowest footings at 93.60m asl. Conventional strip and/or spread footing foundations were recommended at elevations of 92.5m to 93.5m asl in the geotechnical investigation report.

This means that the footings will likely extend below the groundwater levels observed during the investigation. The groundwater level should therefore be lowered to 1m below the designed footing depths to protect the footing subgrade from hydraulic pressure disturbance during construction.

Construction dewatering flowrate of **85.70 m^3/day (85,700 L/day)** is recommended with two underground levels. Factored dewatering rate of **128.55 m^3/day (FS of 1.5)** should be used for planning purposes.

Seasonal High Groundwater Levels

Drilling and installation of the monitoring wells were undertaken during a particularly dry summer season and consequently the seasonal high groundwater levels at the Site were not ascertained during the investigation. The highest groundwater levels, observed during the field investigation, were therefore increased by 0.5m for the calculation of construction dewatering flowrates and by approximately 1m for calculation of permanent drainage rates. Dewatering and permanent drainage volumes will be revised on completion of the groundwater monitoring programme.

Accounting for Accumulated Precipitation

Provisions should be made to pump any accumulated water from the excavation areas during construction, particularly following a period of heavy rainfall. For example, 25mm rainfall in 24 hrs may result in accumulation of up to 170.55m^3 in the excavated area. Subsurface soils at the Site are dominated by sandy materials and consequently some amount of this water will infiltrate into the underlying soils and some will be lost otherwise. A conservative accumulated volume of **40 m^3/day** may therefore be assumed for planning purposes. Accumulated precipitation may be stored on Site for subsequent disposal to an MOECC-licensed facility. If the water is to be discharged into the public sewer system, then an application for the discharge of private water will have to be made to Halton Region. The water quality, at the time of the application, will need to be ascertained to ensure compliance with Ontario Sewer Use Bylaws – Halton Sanitary Sewer Bylaw No. 02-03.

Maximum construction discharge rate, taking into consideration accumulated precipitation volumes, is 125,700 L/day.

7.2 Permanent Drainage

Permanent drainage rate of **26.17 m^3/day (26,170 L/day)** was obtained for two underground levels with the lowest P2 elevation of 95.00m. Factored permanent drainage rate of **39.26 m^3/day (FS of 1.5)** should be used for planning purposes.

An application for permission to discharge to the municipal/regional sewer system will be required unless the subsurface structure of the building is designed as watertight or onsite disposal facilities are implemented.

It is further recommended that the subsurface portion of the elevator shaft, below the P2 level, be designed as watertight to prevent the need to have deeper sump pits for permanent drainage.

7.3 Permit to Take Water (PTTW)

As the calculated groundwater dewatering flowrate for the building is more than 50 m^3/day, registration on the MOECC Environmental Activity and Sector Registry (EASR) for Water Taking will be required. An application for permission to take water (PTTW) is not required as the daily flowrate is less than 400,000 litres.

7.4 Groundwater Quality

The results of analyses for groundwater quality under the Ontario Halton Sanitary Sewer Bylaw No. 02-03 (Mar 2003) show compliance with all parameters except as listed in Table 4.

Table 4: Results from Sewer Use Bylaw tests

Parameters	Guide Limits		Results
	Sanitary Sewer	Storm Sewer	MW1
Total Suspended Solids, mg/L	350	-	9290
Aluminum, mg/L	50	-	73.9
Iron, mg/L	50	-	185
Manganese, mg/L	5	-	17.8

Additional tests were conducted based on parameters and limits proposed for storm sewer guidelines by the Halton Region. The tests revealed compliance with all parameters except those listed in Table 5.

Table 5: Exceedances of Proposed Storm Sewer Limits

Parameters	Proposed Storm Limits	Results (MW1)
Arsenic (Total), mg/L	0.02	0.0479
Chromium (Total), mg/L	0.08	0.146
Copper (Total), mg/L	0.04	0.699
Lead (Total), mg/L	0.12	0.154
Manganese (Total), mg/L	0.05	17.8
Nickel (Total), mg/L	0.08	0.221
Phosphorus (Total), mg/L	0.4	1.81
Total Suspended Solids, mg/L	15	9290

Based on the results, presented in Tables 4 & 5, *pre-treatment of the groundwater will be required prior to discharging to the storm or sanitary sewer system*.

It should be noted however that testing of groundwater at the depths observed during the investigation would not be representative of the water that might accumulate during a high rainfall event. Any accumulation of precipitation occurring in the excavation during construction, that may require offsite discharge, will have to be tested at the time of the event to determine the quality of water for discharge.

7.5 Dewatering Influence Zone

The estimated construction dewatering quantities are based on the worst-case groundwater conditions that might occur during the construction period. Calculated dewatering influence zone is expected to be up to 14.74m from the edge of the dewatering point in the predominantly sandy soils. Based on the field investigation, the soils to the proposed excavation depths are dominated by varying layers of sand/gravely sand. Recharge was observed to be very fast during SWRT. Consequently, a dewatering system may be required if construction is to take place below the observed water table.

7.6 Hydrogeological Impact

During the investigation, it was determined that there will not be any negative impact to the natural environment, Halton Region Sewer works nor surrounding properties due to construction dewatering because of the depth at which groundwater was observed. No groundwater induced depression at surface level is expected. Consequently, it is not expected that construction will impact public infrastructure, the natural environment nor will there be any settlement issues.

8. DISCUSSION

Hydraulic conductivity values (k) calculated from onsite single well response tests are 4.69×10^{-5} to 1.21×10^{-4} m/s (4.053 to 10.460 m/day) in the wells screened within the sand/gravelly sand. These are representative of the water bearing soils comprising sandy material at the expected excavation depths for footings based on the Geotechnical and Hydrogeological field Investigations.

An approximate construction dewatering discharge rate of 85.70 m^3/day will be required for the recommended footing depths for two underground level (lowest at of 93.60). Permanent drainage of 26.17 m^3/day will be required with the lowest P2 TOS at 95.0m asl.

Registration on the MOECP's EASR Website for water taking will be required however an application for PTTW will not be required under conditions observed on the Site during the investigation.

The groundwater quality determined by laboratory analyses revealed exceedances of some parameters of the existing sanitary sewer limits and the proposed storm limits and consequently pre-treatment of the water will be required before it can be discharged to the public storm or sanitary sewer.

It should be noted that if it is intended that any accumulated water, following periods of heavy rainfall, be discharged into the public sewer, then a permit to discharge would be required along with laboratory analyses to ensure compliance with relevant sewer bylaws.

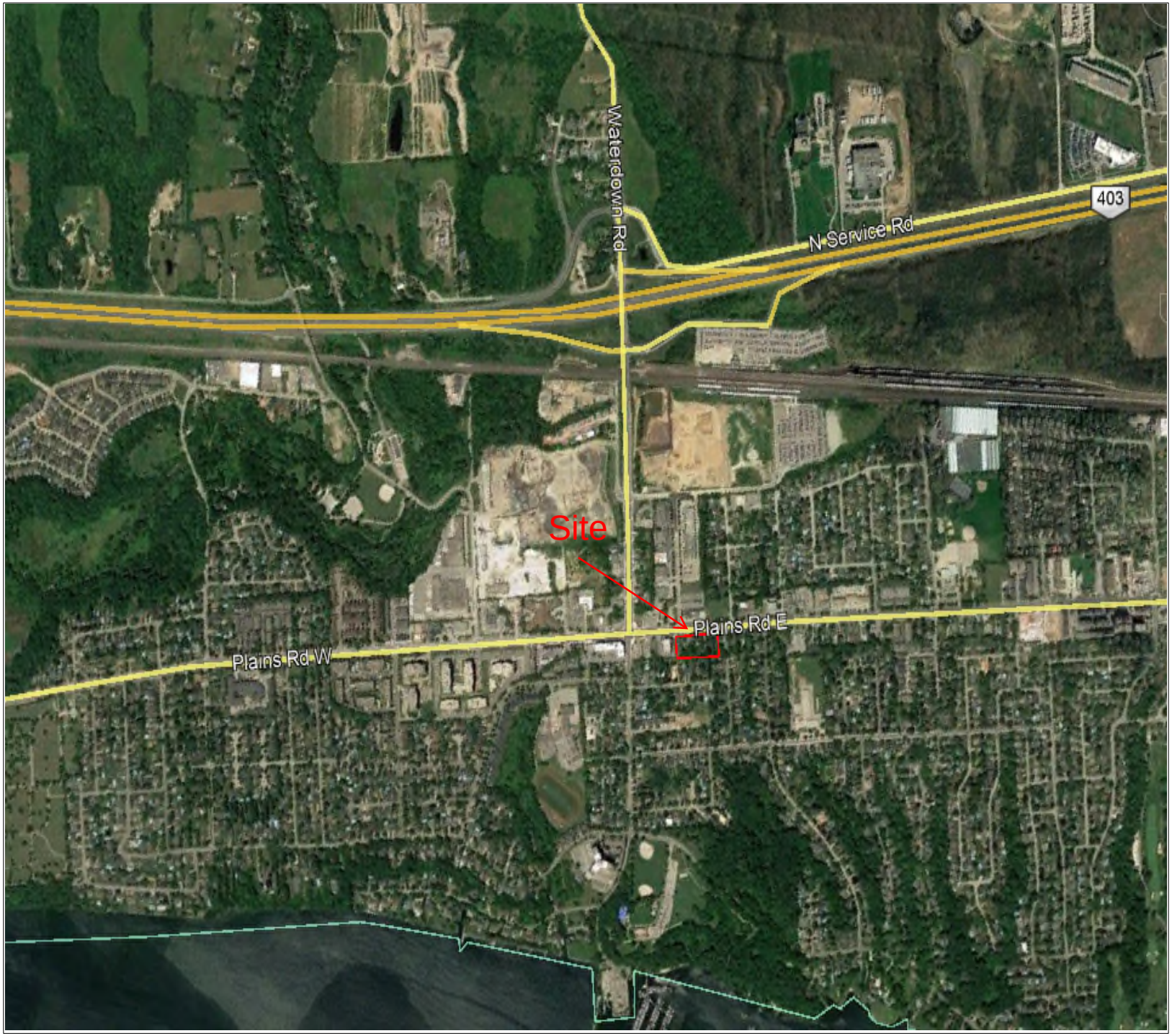
The discharge rates for construction dewatering and permanent drainage, given in the preceding, are based on common practice and reasonable assumption for excavation depths and are subject to further modifications if details of the structures change.

9. LIMITATIONS

This report is limited in scope to those items specifically referenced in the text. The discussions and recommendations presented in this report are intended only as guidance for the named client, design engineers and those directly associated with implementing, regulating and monitoring of the project. The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction. Localized variations in the subsoil conditions may be present between and beyond the boreholes and should be verified during construction.

As more specific subsurface information becomes available during excavations on the Site, this report should be updated. Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soil and the potential reuse of these soils on/off Site. Contractors should draw their own conclusions as to how the near surface and subsurface conditions may affect them.

APPENDIX A – SITE AND LOCATION MAPS AND PLAN



FISHER ENGINEERING

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Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

SITE BOUNDARY

PROJECT NAME AND ADDRESS

HYDROGEOLOGICAL INVESTIGATION

40-70 Plains Road,
BURLINGTON,ONTARIO

FIGURE 1:

SITE LOCATION PLAN

SHEET NO.

A

PROJECT NO.

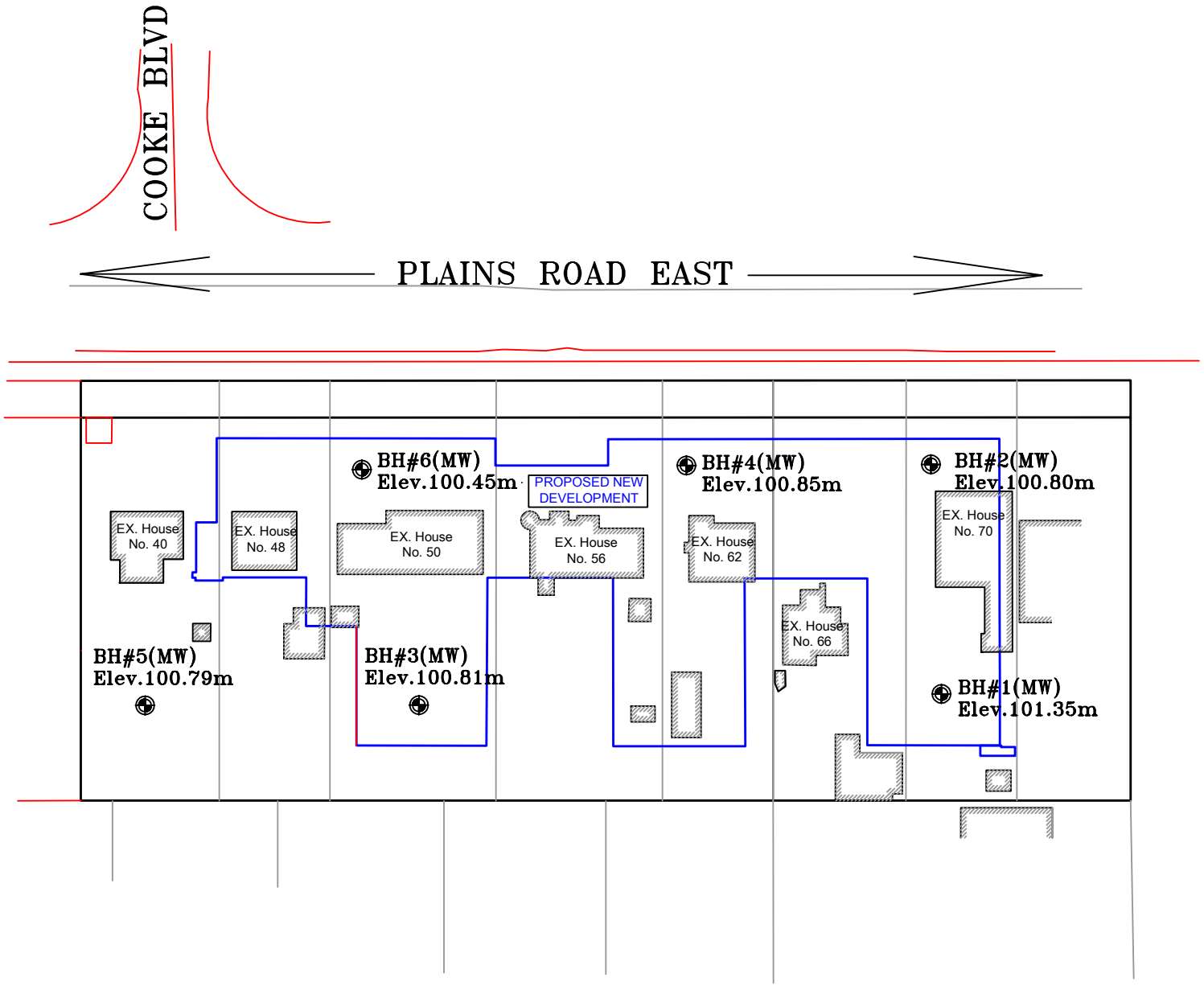
FE-P20-10062

DATE

APRIL 2020

SCALE

AS SHOWN



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
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NORTH

LEGEND

Borehole with Monitoring Well

PROJECT NAME AND ADDRESS

GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATIONS

40-70 PLAINS RD. E.,
BURLINGTON, ONTARIO

FIGURE 1:

SITE PLAN WITH APPROXIMATE BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE-P 20-10328/29	1
DATE: JUNE 2020	
SCALE: AS SHOWN	

COOKE BLVD

℄ OF ROAD

BACK OF CURB

GUTTER

STM MH
RIM=99.85
INV IN=97.55 #1.2
INV IN=97.03 #1.3

PLAINS ROAD EAST

(ROAD ALLOWANCE BETWEEN BROKEN FRONT CONCESSION AND CONCESSION 1)

PIN 07122-002

℄ OF ASPHALT

OVERHEAD WIRE

EDGE OF GUTTER

MSC. PLAN 153

SIDEWALK

PART 1
PLAN 20R-310

PART 11
PLAN 20R-789

PART 10
PLAN 20R-789

PART 9
PLAN 20R-789

PART 8
PLAN 20R-789

PART 7
PLAN 20R-789

PART 6
PLAN 20R-789

PART 5
PLAN 20R-789

PART 4
PLAN 20R-789

167.69

19.05

15.24

22.86

N43°34'30"E

22.91

15.24

18.29

15.54

144.67

52.73

1 1/2 STOREY BRICK & VINYL DWELLING # 40

1 1/2 STOREY BRICK & VINYL DWELLING # 46

1 1/2 STOREY BRICK & VINYL DWELLING # 50

1 1/2 STOREY BRICK & VINYL BUILDING # 50

2 STOREY STUCCO BUILDING # 56

1 STOREY STONE BUILDING # 62

1 STOREY STONE BUILDING # 66

1 1/2 STOREY BRICK BUILDING # 70

1 STOREY STONE BUILDING # 992

1 1/2 STOREY VINYL BUILDING # 982

PIN 07117-0050

PIN 07117-0051

PIN 07117-0052

PIN 07117-0053

PIN 07117-0054

PIN 07117-0055

PIN 07117-0056

PIN 07117-0003

PIN 07117-0004

PIN 07117-0005

LOT 16
PIN 07117-0065

LOT 15
PIN 07117-0066

LOT 14
PIN 07117-0067

LOT 13
PIN 07117-0068

LOT 12
PIN 07117-0069

LOT 1

LOT 2

LOT 3

PART OF LOT 6

BROKEN FRONT CONCESSION

REGISTERED PLAN 779 (PF)

BIRCHWOOD AVENUE

Benchmark Note:

CITY OF BURLINGTON BENCHMARK No. 298
ELEVATION = 97.915 METRES CGVD 1928:1978 ADJUSTMENT

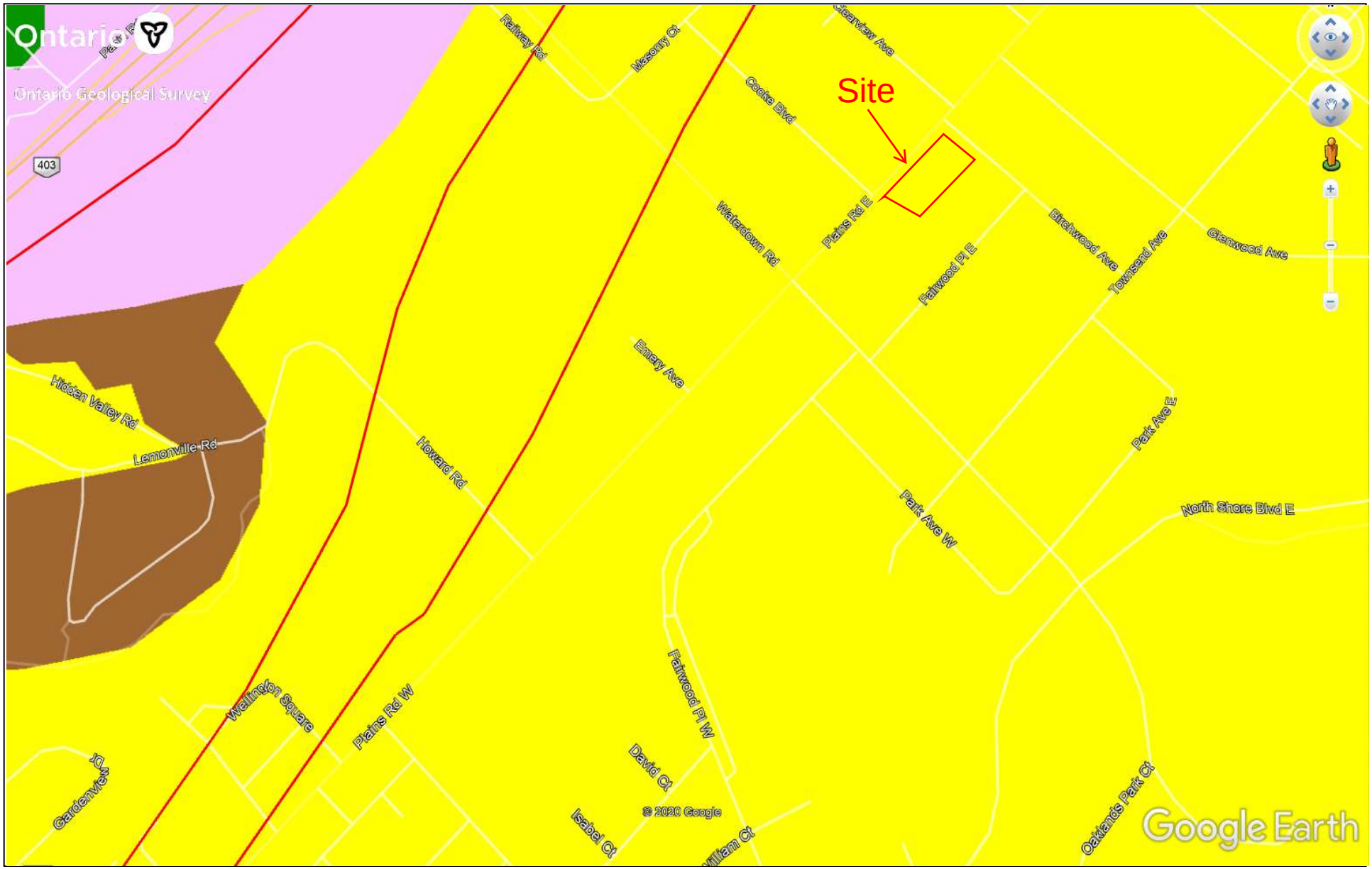
BENCHMARK SET ON CITY PLATE N SOUTH FACE AT SOUTHEAST CORNER OF GLENVIEW PUBLIC SCHOOL, No. 143 TOWNSEND AVENUE.

Legend :

- IB DENOTES FOUND
- ℄ DENOTES CENTRE LINE
- SAN MH DENOTES SANITARY MANHOLE
- STM MH DENOTES STORM MANHOLE
- CB DENOTES CATCH BASIN
- BMH DENOTES BELL MANHOLE
- LS DENOTES LIGHT STANDARD
- HP DENOTES HYDRO POLE
- GW DENOTES GUY WIRE
- WV DENOTES WATER VALVE
- AC DENOTES AIR CONDITIONER
- MB DENOTES MAIL BOX
- MB DENOTES MAIL BOX
- FH DENOTES FIRE HYDRANT

- FFE DENOTES FIRST FLOOR ELEVATION
- GM DENOTES GAS MARKER
- GMR DENOTES GAS METRE

- DENOTES DECIDUOUS TREE
- DENOTES CONIFER TREE



Fisher Environmental Ltd.

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KEY PLAN

N

LEGEND

Coarse-textured glaciolacustrine deposits: sand, gravel, minor silt and clay

PROJECT NAME AND ADDRESS

HYDROGEOLOGICAL INVESTIGATION

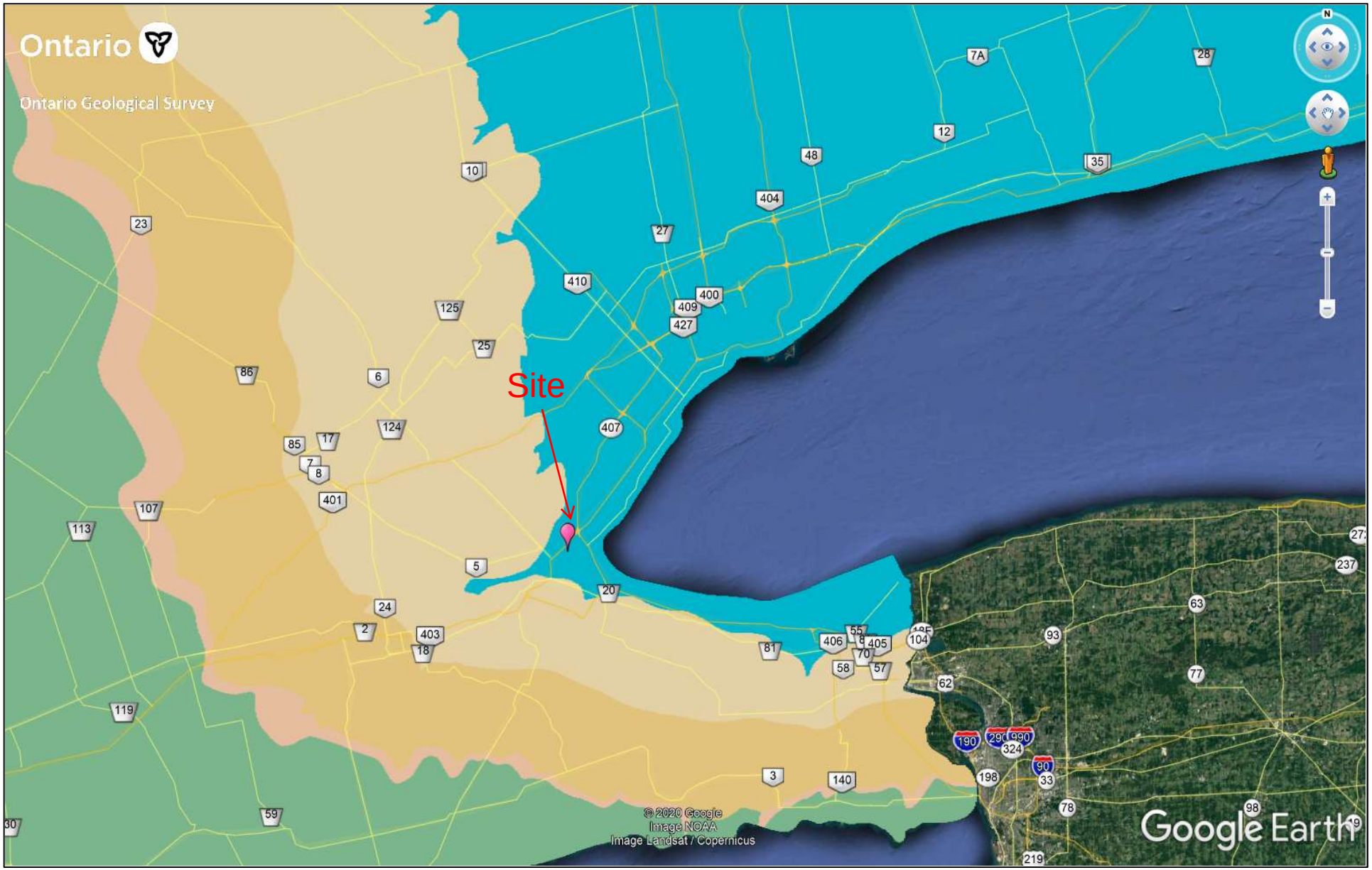
40-70 Plains Road,
Burlington, Ontario

PROJECT NO.
FE-P 20-10329-H

DATE
AUGUST 17, 2020

SCALE

Surficial Geology Map



Fisher Environmental Ltd.
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Fax: 905 475-7718

KEY PLAN

LEGEND

PROJECT NAME AND ADDRESS

HYDROGEOLOGICAL INVESTIGATION

40-70 Plains Road,
Burlington, Ontario

PROJECT NO.
FE-P 20-10329-H

DATE
AUGUST 17, 2020

SCALE

Bedrock Geology Map

18035 Plains Road

40-70 Plains Rd E, Burlington ON

Project: 18035
Date: APRIL 01, 2021
Issued for: REZONING



ARCHITECTURAL DRAWING LIST	
SHEET NUMBER	SHEET NAME
A001	COVER / DRAWING LIST
A002	3D VIEWS
A003	CONTEXT PLAN
A100	SITE PLAN
A101	PARKING LEVEL 01
A102	PARKING LEVEL 02
A201	GROUND FLOOR PLAN
A202	2ND FLOOR PLAN
A203	3RD FLOOR PLAN
A204	4TH FLOOR PLAN
A205	5TH FLOOR PLAN
A206	6TH FLOOR PLAN
A207	7TH FLOOR PLAN
A208	8TH FLOOR PLAN
A209	9TH FLOOR PLAN
A210	PH FLOOR PLAN
A211	ROOF PLAN
A401	NORTH ELEVATION
A402	EAST ELEVATION
A403	SOUTH ELEVATION
A404	WEST ELEVATION
A451	NORTH COLOURED ELEVATION
A452	EAST-WEST COLOURED ELEVATIONS
A453	SOUTH COLOURED ELEVATION
A501	BUILDING SECTIONS
A502	BUILDING SECTIONS
A503	BUILDING SECTIONS

405-317 ADELAIDE ST. W.
TORONTO CANADA M5V 1P9
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SITE STATISTICS **COMPLETE**
4 November 2020

18035
40-70 Plains Road East
Burlington ON

Official Plan	Medium Density		GROSS SITE AREA	6823.0	sq.m.	73,445	sq.ft.
Avenue Width	20		WIDENING		sq.m.	0	sq.ft.
Character Area	N/A		NET SITE AREA	6823.0	sq.m.	73,445	sq.ft.
Policy Area			AVG UNIT SIZE	69.95	sq.m. NET	752.96312	sq.ft. NET
Established District				82.29	sq.m. GROSS	885.83896	sq.ft. GROSS
Current Zoning		FSI Retail	**0.00**	Residential	**4.34** Total	**4.34**	
By-Law		UPH	**527.527**				

AREA CALCULATIONS

FLOOR	UNITS STUDIO	1B	1B+D	2B	3B	TOTAL	GCA RETAIL sq.m.	RETAIL sq.ft.	RESIDENTIAL sq.m.	RESIDENTIAL sq.ft.	TOTAL sq.m.	TOTAL sq.ft.	NSA RETAIL sq.m.	RETAIL sq.ft.	RESIDENTIAL sq.m.	RESIDENTIAL sq.ft.	TOTAL sq.m.	TOTAL sq.ft.
1	5	17		14		**36**		-	**3,371**	36,286	3,371	36,286	-	-				
2	0	13		27		**40**			**3,315**	35,682	3,313	35,660		-				
3	1	13		34		**48**			**3,946**	42,476	3,946	42,476		-				
4	0	20		28		**48**			**3,748**	40,344	3,748	40,344		-				
5	0	28		20		**48**			**3,532**	38,019	3,532	38,019						
6	2	30		16		**48**			**3,316**	35,694	3,316	35,694						
7	0	24		12		**36**			**2,622**	28,224	2,622	28,224						
8	0	8		20		**28**			**2,420**	26,050	2,420	26,050		-				
9	0	14		14		**28**			**2,220**	23,897	2,220	23,897						
						0			**1138**	12,250	1,138	12,250						
TOTAL	**8**	**167**	**0**	**185**	**0**	**360**	**0**	-	**29,626**	318,902	**29,626**	318,902	**0**	-				
Mix	2%	46%	0%	51%	0%													

Common Amenity	Provided			
Indoor Amenity	1095	sq.m.	11,787	sq.ft.
Outdoor Amenity	1052	sq.m.	11,324	sq.ft.
Landscape Open Space	Provided			
	1060	sq.m.	11,410	sq.ft.

5.96 m2 Per Unit

2.94 m2 Per Unit

VEHICLE PARKING

RATIO PROPOSED		0.25	1.00	TOTAL		PROVIDED	Surface	P1	P2	Total
	RESIDENT		360			Resident	0	193	217	410
	VISITOR	90				Visitor	14	0	0	14
	TOTAL	90	360	450		**TOTAL**	14	193	217	**424**

BICYCLE PARKING

		REQUIRED	PROVIDED
RESIDENTIAL	ALL LEVELS	**180**	232
Long Term (0.5/UNIT)	*AT GRADE*		*58*
VISITOR	AT GRADE	18	20
Short term(0.05/UNIT)			
TOTAL		**198**	**252**

ISSUE RECORD

REVISION RECORD

North

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18035

18035 Plains Road

INFINITY GROUP

COVER / DRAWING LIST

A001

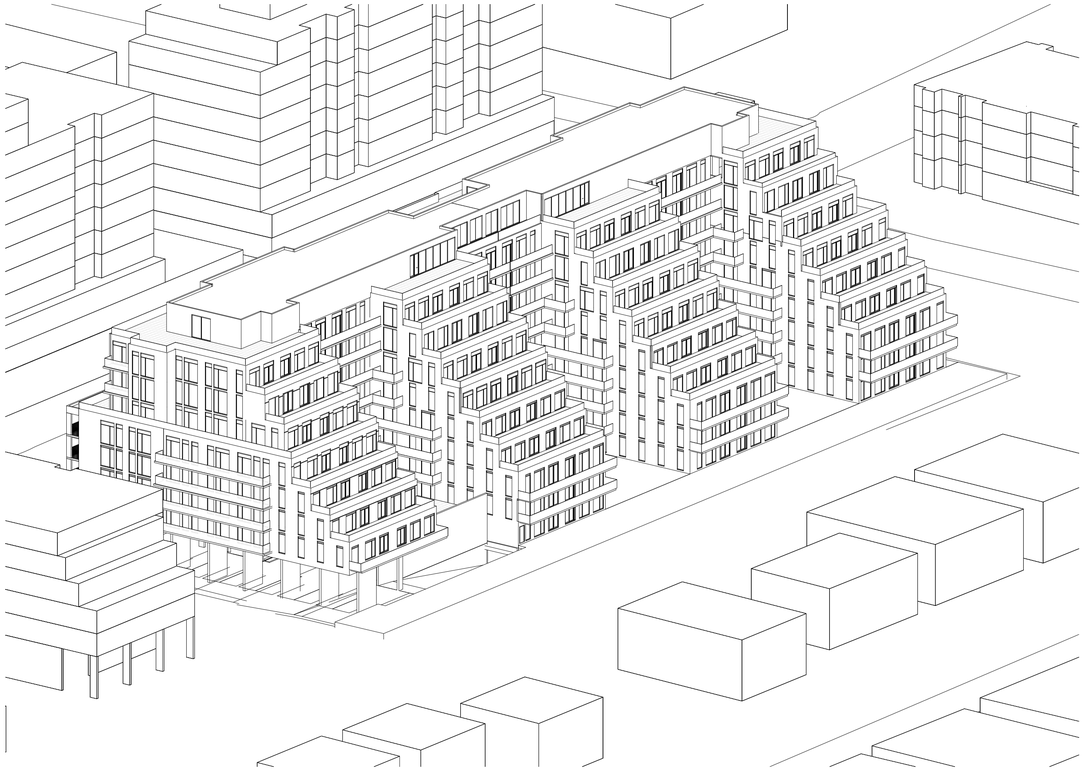
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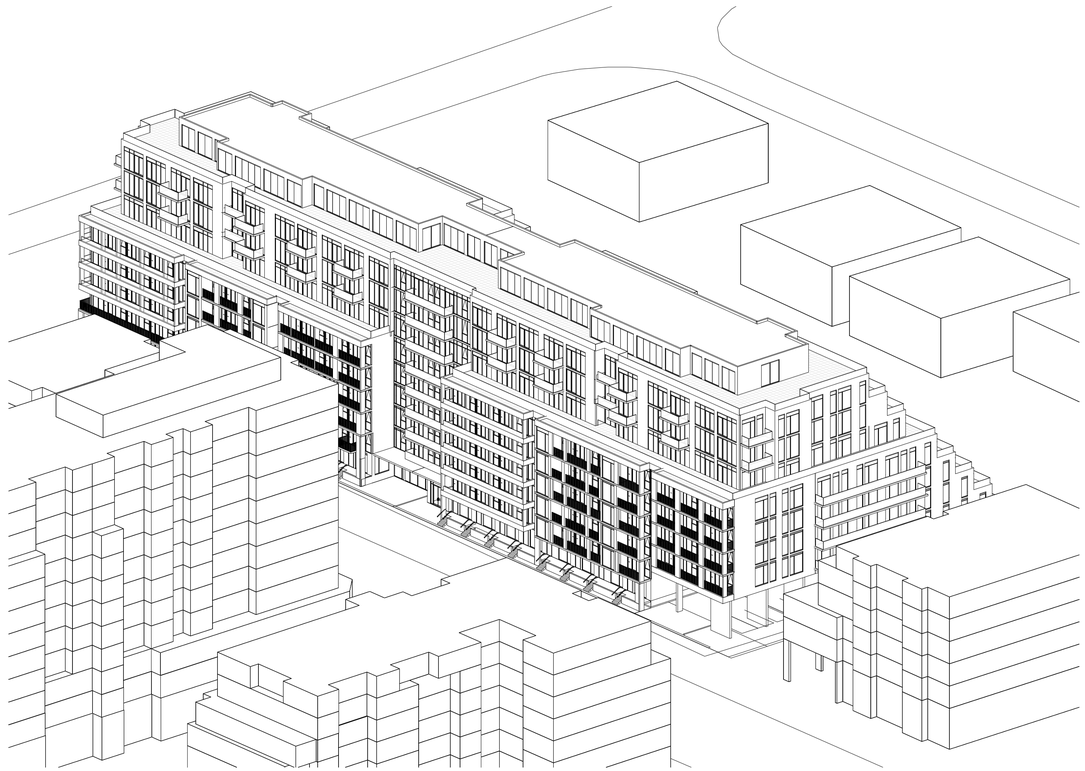
2 A002 NORTH-EAST AXO



1 A002 SOUTH-EAST AXO



3 A002 SOUTH-WEST AXO



4 A002 NORTH-WEST AXO

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INFINITY 2NT GROUP

3D VIEWS

A002

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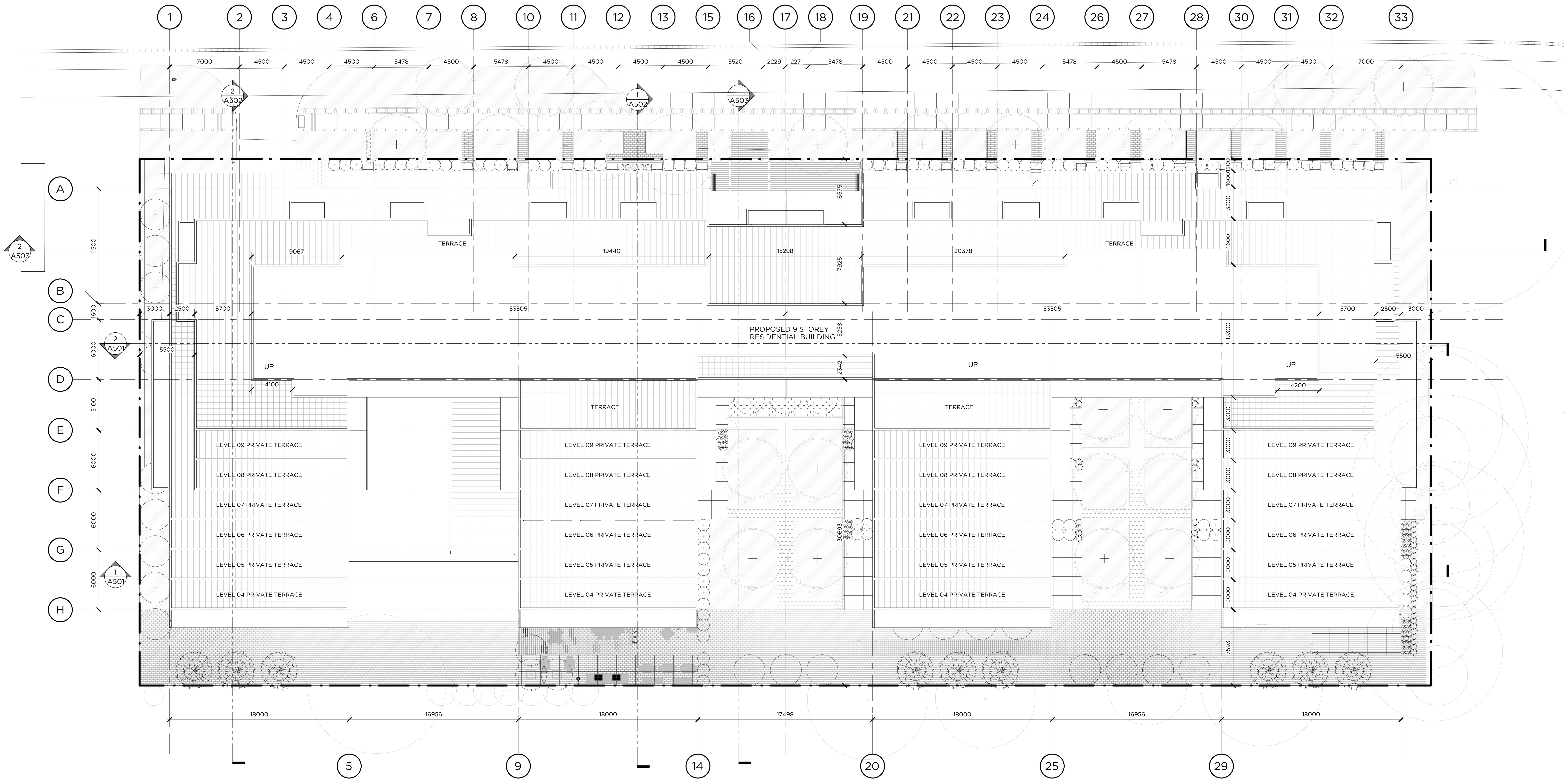
CONTEXT PLAN

1 : 1000

A003

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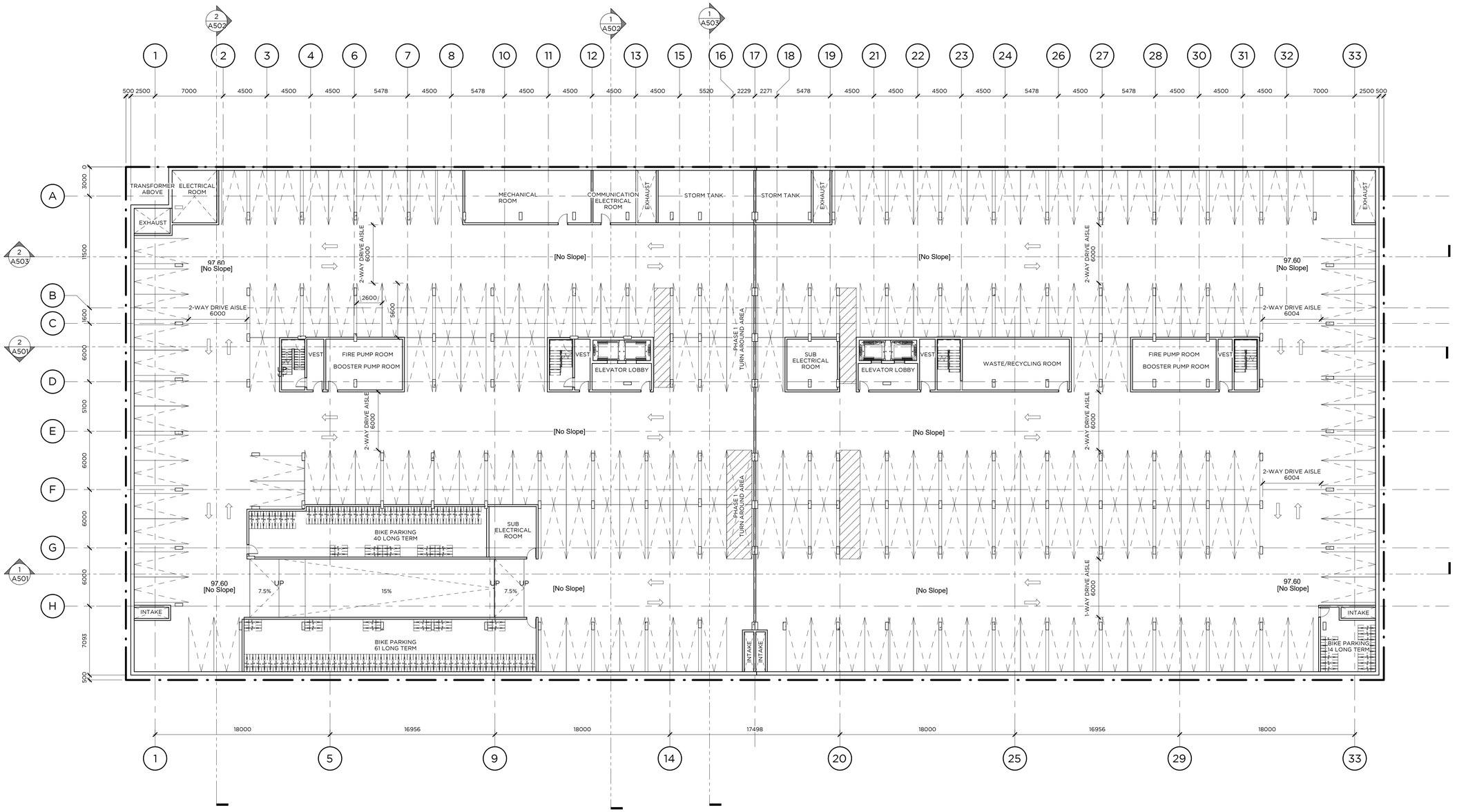
SITE PLAN

1 : 200

A100

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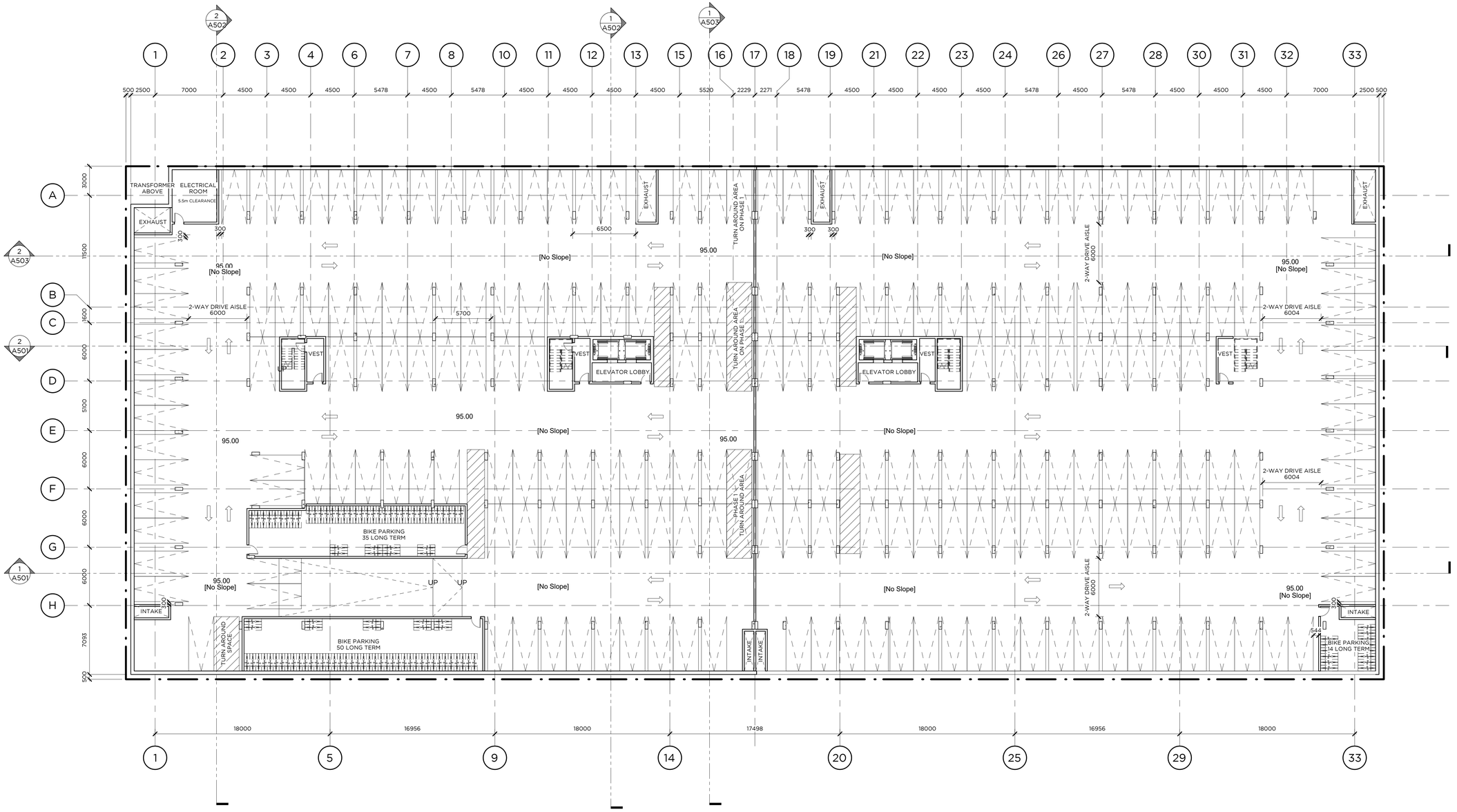
PARKING LEVEL 01

1 : 200

A101

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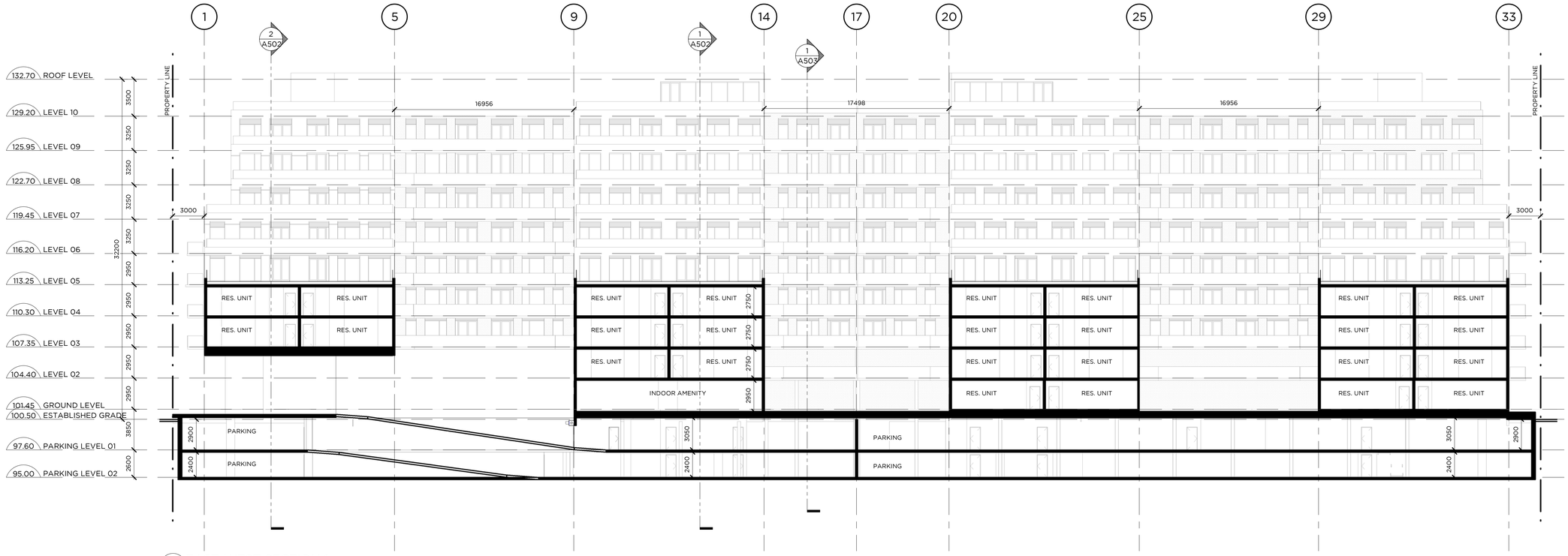
PARKING LEVEL 02

1 : 200

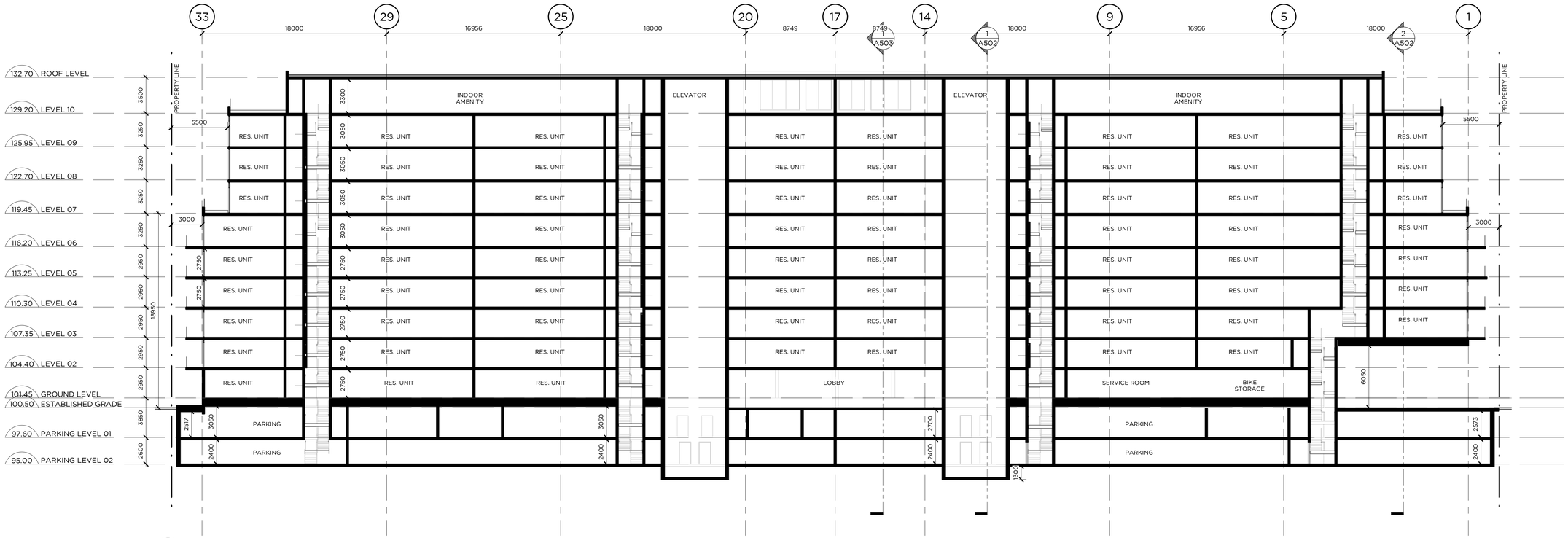
A102

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1 A501 EAST-WEST SECTION 1
1 : 200



2 A501 EAST-WEST SECTION 2
1 : 200

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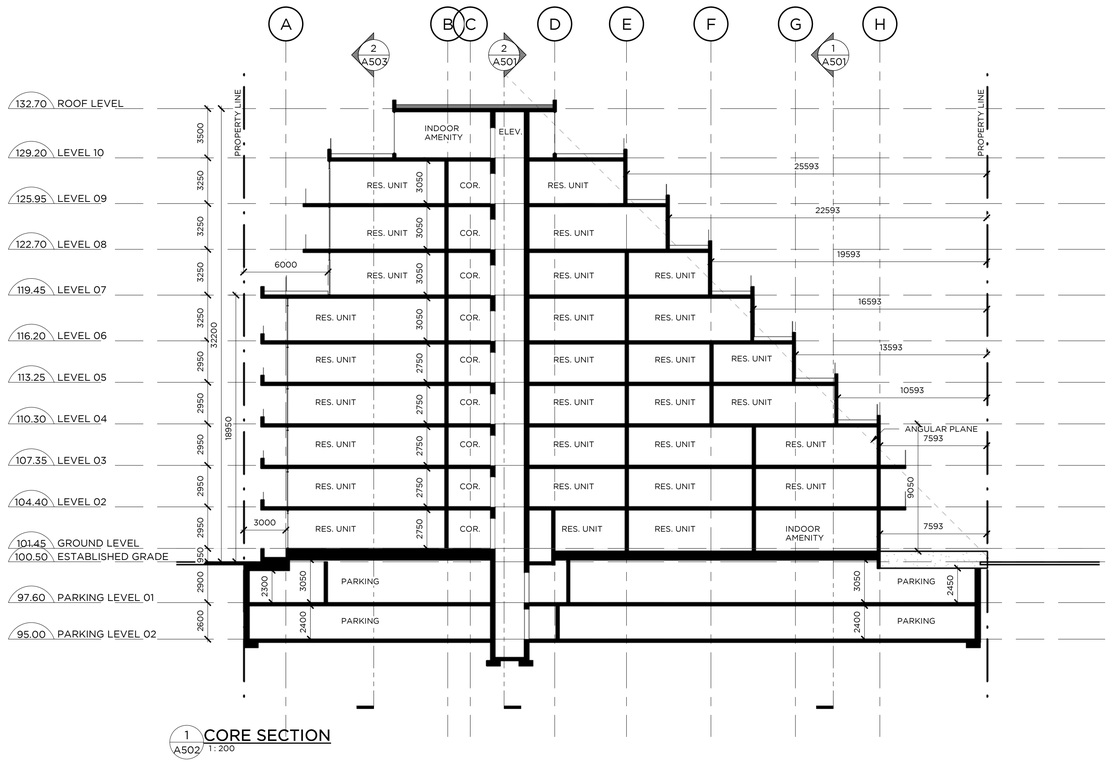
INFINITY GROUP

BUILDING SECTIONS

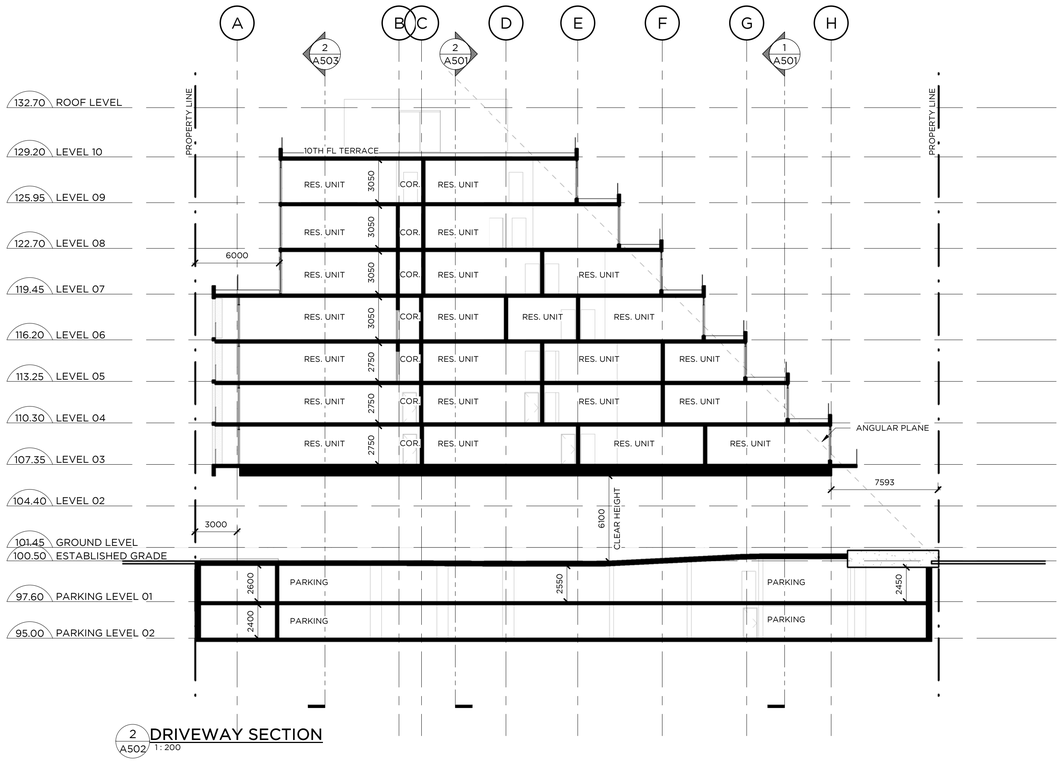
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A501

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1 A502 **CORE SECTION**
1 : 200



2 A502 **DRIVEWAY SECTION**
1 : 200

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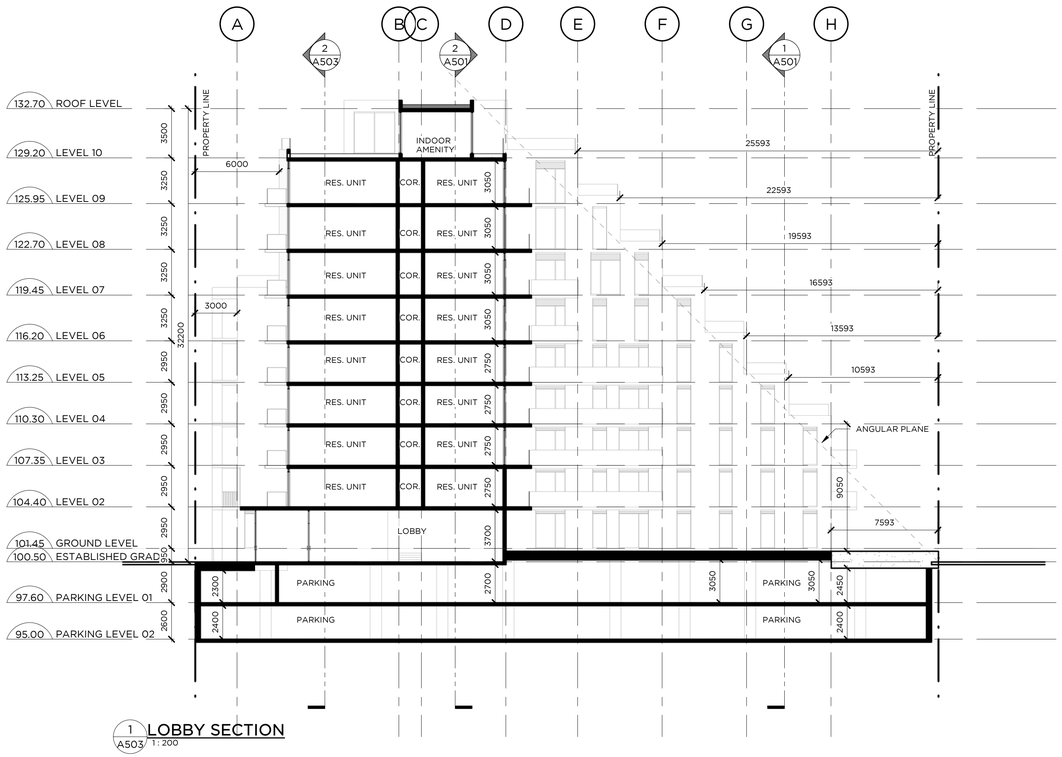
BUILDING SECTIONS

1 : 200

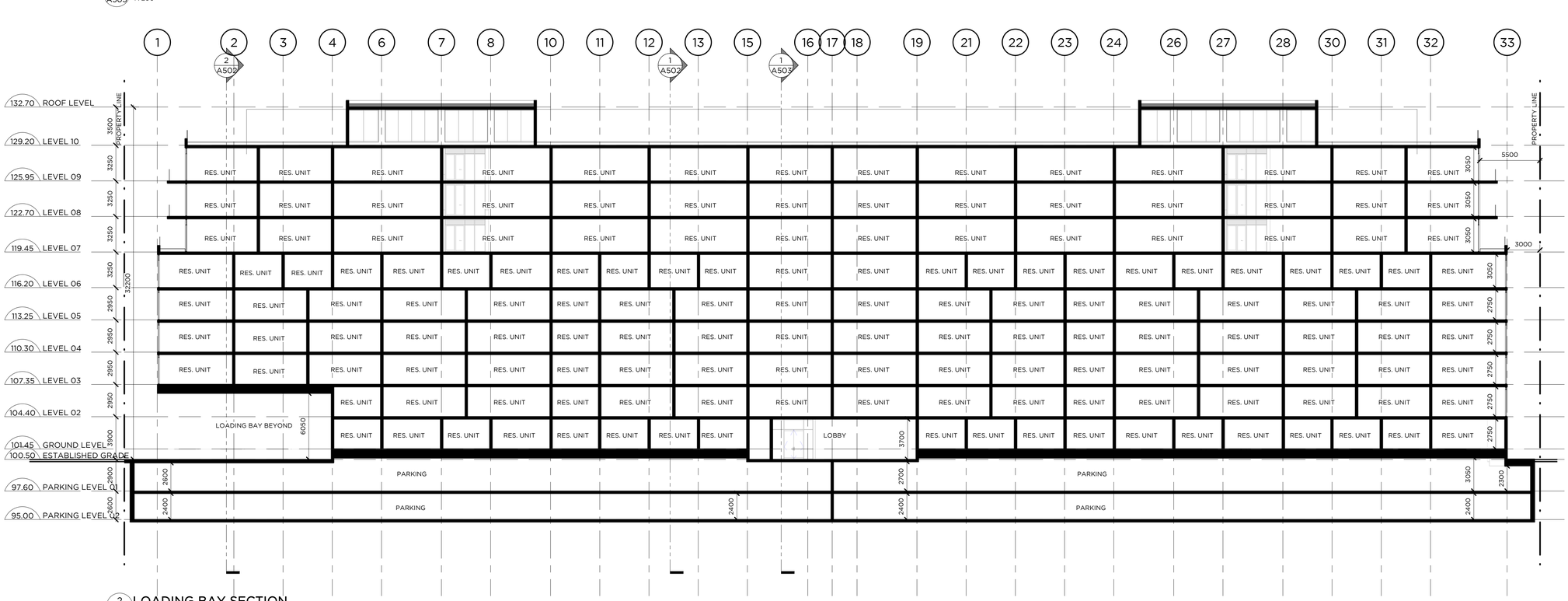
A502

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1 A503 LOBBY SECTION
1 : 200



2 A503 LOADING BAY SECTION
1 : 200

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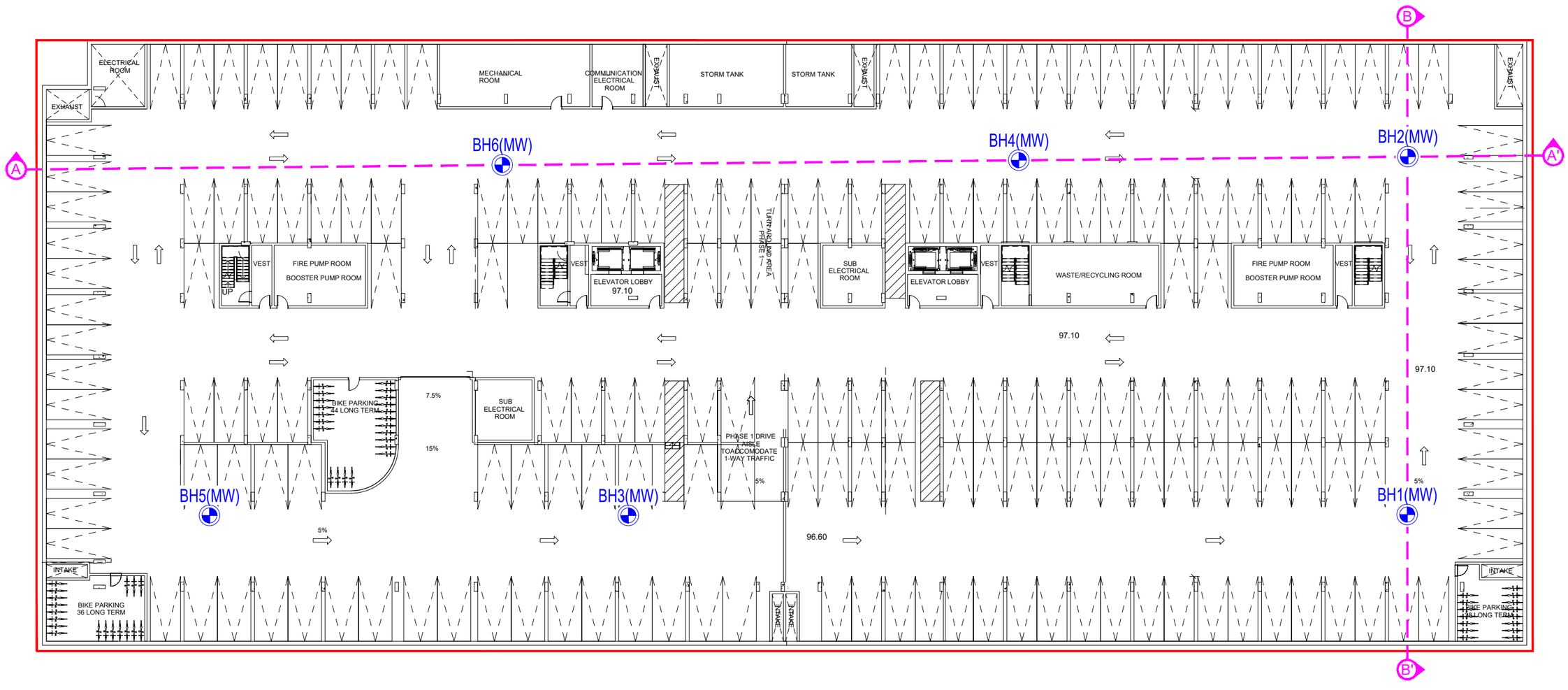
BUILDING SECTIONS

1 : 200

A503

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FISHER ENGINEERING
400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2
Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

SITE BOUNDARY

BOREHOLE/ MONITORING WELL

CROSS SECTION MARK

PROJECT NAME AND ADDRESS

HYDROGEOLOGICAL & GEOTECHNICAL INVESTIGATIONS

40-70 Plains Rd. East,.
Burlington, Ontario

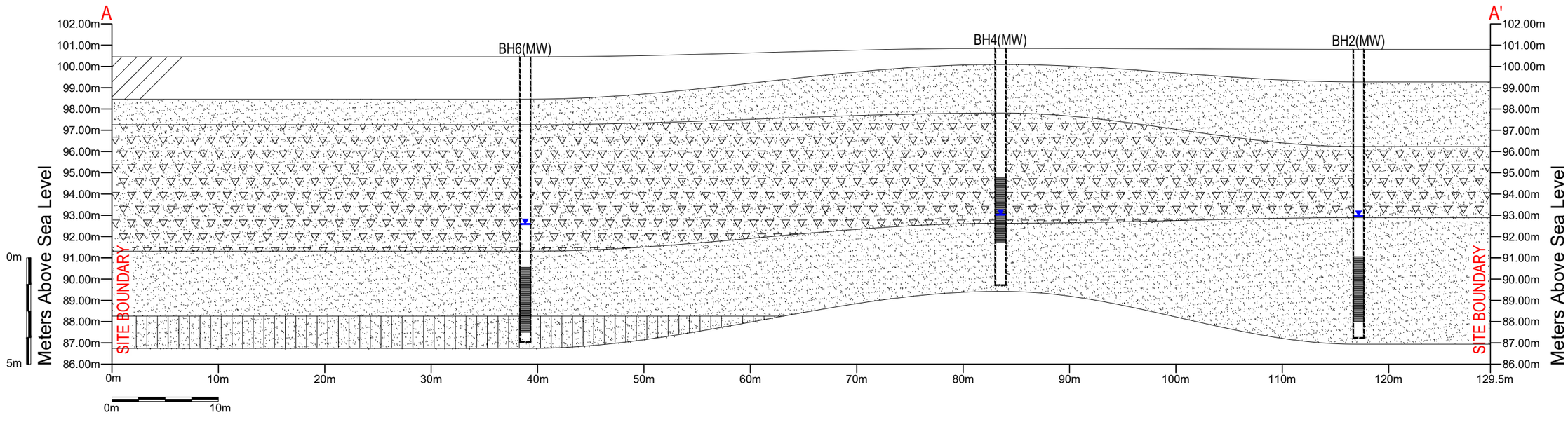
PROJECT NO. FE-P 20-10328

DATE. 11 March 2021

SCALE. AS SHOWN

FIGURE 1: Site Plan With Approximate Borehole Locations

SHEET NO. 1



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

FILL
SILT
SAND
GROUNDWATER POTENTIOMETRIC LEVEL
GRAVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION

40-70 Plains Rd. East,.
Burlington, Ontario

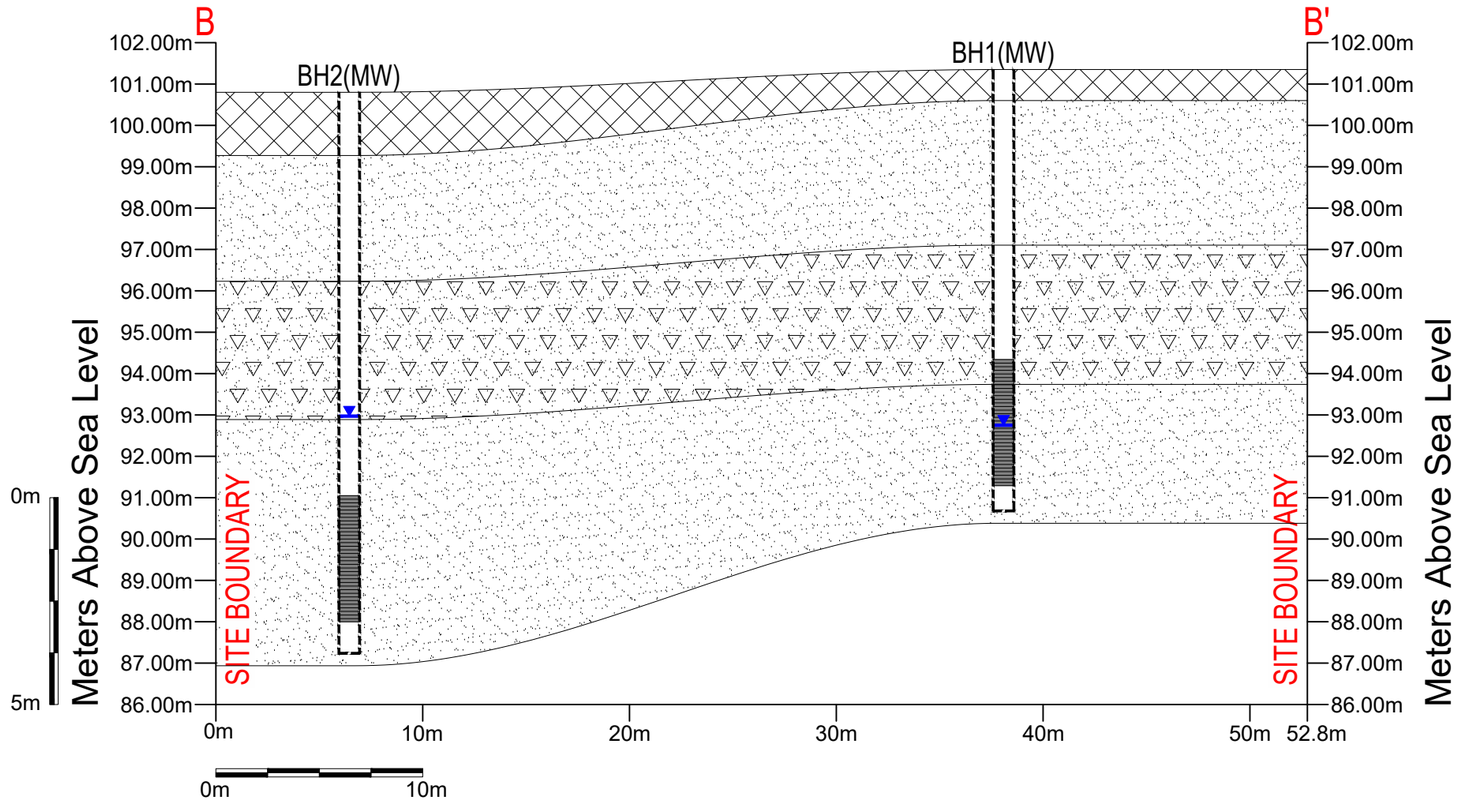
PROJECT NO.
FE-P 20-10328

DATE.
22 July 2020

SCALE.
AS SHOWN

FIGURE 2:
CROSS SECTION A-A'

SHEET NO.
2



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

NORTH

LEGEND

FILL

SAND

GRAVEL

GROUNDWATER POTENTIOMETRIC LEVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION

40-70 Plains Rd. East,.
Burlington, Ontario

PROJECT NO.
FE-P 20-10328

DATE.
22 July 2020

SCALE.
AS SHOWN

FIGURE 3:
CROSS SECTION B-B'

SHEET NO.
3

APPENDIX B – LOG OF BOREHOLES

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH1(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: D-50, Hollow Stem

DRILLING DATE: May 26, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
0	0	GROUND SURFACE (m asl)		101.35			
		FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	4
		0.76m		100.59			
						SS-2	11
		REDDISH BROWN TO BROWN FINE TO MEDIUM SAND: trace to some silt, moist, compact.				SS-3	19
						SS-4	29
						SS-5	25
		4.27m		97.08			
		BROWN SAND & GRAVEL TO GRAVELLY SAND: moist, very dense.				SS-6	100+
						SS-7	100+
		7.62m		93.73			
		BROWN TO GREYISH BROWN SAND: some to trace of gravel/silt, moist, wet below 9.14m, very dense to compact.				SS-8	58
						SS-9	17
		10.67m		90.68			
		End of Borehole					

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✤ 40 80 120 160
(Possibly Disturbed)

VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40
5.6%
6.0%
3.4%
3.7%

PIEZOMETER OR WELL CONSTRUCTION
Flush Mount Cover
Bentonite Pellets
50mm blank PVC
50mm Slotted Pipe
Silica Sand
10.06m

Groundwater Depth on completion: 8.08m; on June 24, 2020: 8.60m, on July 8, 2020: 8.59m; on July 22, 2020: 8.60m

LOGGED: FF CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH2(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 4, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE	PENETRATION TESTING (SPT) ▲ 20 40 60 80 / SHEAR STRENGTH (Kpa) ✤ 40 80 120 160	VAPOUR READING (ppm) □ 20 40 60 80 / MOISTURE CONTENT (%) ● 10 20 30 40	PIEZOMETER OR WELL CONSTRUCTION
		GROUND SURFACE (m asl)		100.80						
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	6			
2										
4	1					SS-2	10			
		1.52m		99.28						
6	2	BROWN FINE TO MEDIUM SAND: trace to some silt/gravel, occasional cobbles, moist, compact to very dense.				SS-3	11			
8						SS-4	37			
10	3					SS-5	100+			
12										
14	4									
		4.57m		96.23						
16	5	BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, moist, very dense.				SS-6	100+			
18										
20	6					SS-7	100+			
22										
24	7									
		7.92m		92.88						
26	8	GREYISH BROWN TO GREY SAND: trace to some silt/gravel, wet, dense to compact.				SS-8	42			
28										
30	9					SS-9	25			
32										
34	10									
36	11					SS-10	16	(Possibly Disturbed)		
38										
40	12					SS-11	15	(Possibly Disturbed)		
42										
44	13					SS-12	21	(Possibly Disturbed)		
		13.56m		87.24						
46	14	End of Borehole								
48										
50	15									
52	16									
54										
56										

PIEZOMETER OR WELL CONSTRUCTION: Flush Mount Cover; Bentonite Pellets; 50mm blank PVC; 8.03; 50mm Slotted Pipe; Silica Sand; 12.80m

Groundwater Depth on completion: 7.77m; on June 24, 2020: 7.86m; on July 8, 2020: 8.05; on July 22, 2020: 8.03m

LOGGED: CW CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH3(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: Bombadier, Hollow Stem

DRILLING DATE: June 18, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
		GROUND SURFACE (m asl)		100.81			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
4	1					SS-2	4
4	1	1.37m		99.44			
6	2	REDDISH BROWN TO BROWN SAND: trace to some silt, occasional seam of very moist/wet sandy silt, moist, compact.				SS-3	11
8	2					SS-4	19
10	3					SS-5	15
10	3	3.35m		97.46			
12	4	BROWN SAND AND GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles, moist, compact to very dense.					
14	4						
16	5					SS-6	100+
18	5						
20	6					SS-7	100+
22	7						
24	7	7.62m		93.19			
26	8	BROWN SAND: trace to some silt/gravel, layers of silt/sandy silt below 9.14m, moist, wet below 9.14m, dense to compact.				SS-8	37
28	9						
30	9					SS-9	20
32	10						
34	10						
36	11					SS-10	23
38	12						
40	12					SS-11	40
42	13	12.65m		88.16			
42	13	End of Borehole					
44	13						
46	14						
48	15						
50	15						
52	16						
54	16						
56							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

(Possibly Disturbed)

(Possibly Disturbed)

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover

50mm blank PVC

Bentonite Pellets

8.25

50mm Slotted Pipe

Silica Sand

12.19m

Groundwater Depth on completion: dry; on June 24, 2020: 8.23m; on July 8, 2020: 8.23m; on July 22, 2020: 8.25m

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH4(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 4, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES LAB ID	SAMPLES Type NO.	SAMPLES "N" VALUE
0	0	GROUND SURFACE (m asl)		100.85			
		FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	5
0.76m				100.09			
2							
4	1	BROWN FINE TO MEDIUM SAND: trace to some silt, occasional trace of gravel, moist, compact.				SS-2	12
6	2					SS-3	18
8						SS-4	13
10	3						
3.05m				97.80			
		BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles/boulders, dry to moist, very dense.				SS-5	52
12	4						
14							
16	5					SS-6	100+
18							
20	6					SS-7	100+
22	7						
24							
26	8					SS-8	100+
8.23m				92.62			
28		GREYISH BROWN TO GREY SAND: trace of gravel/silt, wet, compact.					
30	9					SS-9	28
32	10						
34							
36	11					SS-10	30
11.13m				89.72			
		End of Borehole					
38	12						
40							
42	13						
44							
46	14						
48							
50	15						
52	16						
54							
56							

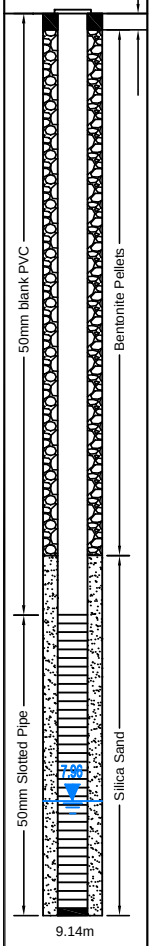
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✤ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth on completion: 7.77m; on June 24, 2020: 7.82m; on July 8, 2020: 7.91m; on July 22, 2020: 7.96m

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH5(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: Bombadier, Hollow Stem

DRILLING DATE: June 18, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
0	0	GROUND SURFACE (m asl)		100.79			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
4	1					SS-2	2
5	1.52m			99.27			
6	2	REDDISH BROWN SAND: trace to some silt/gravel, moist, loose.				SS-3	9
8	2.74m			98.05		SS-4	7
10	3	BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, layers of cobbles/boulders below 4.5m, moist, very dense.				SS-5	100+
14	4.57m			96.22			
16	5	GRAVEL AND COBBLES: some brown sand, moist, very dense.				SS-6	100+
20	6.25m			94.54		SS-7	79
		End of Borehole					
		Refusal to augering possibly due to boulder at 6.25m.					
		BH caved in to 4.57m on completion.					

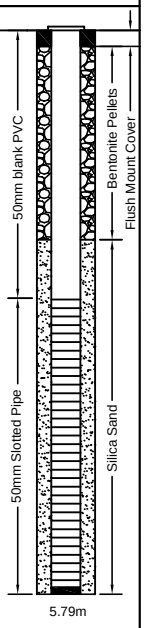
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth on completion:

LOGGED: CW

CHECKED: RC

FISHER ENGINEERING

LOG OF BOREHOLE NO. BH6(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 20-10328 & 20-10329

PROJECT NAME: Geotechnical and Hydrogeological Investigations

LOCATION: 40-70 Plains Road. E., Burlington, ON.

DRILLING METHOD: CME-75, Hollow Stem

DRILLING DATE: June 5, 2020

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	SAMPLES Type NO.	"N" VALUE
		GROUND SURFACE (m asl)		100.45			
0	0	FILL: dark brown to brown silty sand, some to trace of topsoil/roots, moist.				SS-1	7
4	1					SS-2	3
6	2					SS-3	3
		1.98m		98.47			
8	2	BROWN SAND: trace of gravel, some silt, moist, compact.				SS-4	13
10	3					SS-5	62
		3.20m		97.25			
12	4	BROWN SAND & GRAVEL TO GRAVELLY SAND: trace to some silt, occasional cobbles, moist to very moist, very dense.					
14	4						
16	5					SS-6	100+
18	5						
20	6					SS-7	100+
22	7						
24	7						
26	8					SS-8	100+
28	8						
30	9					SS-9	100+
		9.14m		91.31			
32	10	GREYISH BROWN MEDIUM SAND: some silt, wet, very dense.					
34	10						
36	11					SS-10	69
38	11						
40	12						
		12.19m		88.26			
42	13	GREY SILTY SAND: trace of gravel, wet, dense.				SS-11	48
		13.41m		87.04			
44	13	End of Borehole				SS-12	44
46	14						
48	14						
50	15						
52	16						
54	16						
56							

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✙ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40

9.0%
5.2%
5.5%
13.0%

PIEZOMETER OR WELL CONSTRUCTION

Flush Mount Cover
50mm blank PVC
Bentonite Pellets
7.99
50mm Slotted Pipe
Silica Sand
12.95m

Groundwater Depth on completion: 8.23m; on June 24, 2020: 7.86m; on July 8, 2020: 7.96m; on July 22, 2020: 7.99m

LOGGED: CW CHECKED: RC

APPENDIX C – MOISTURE CONTENT AND GRAIN SIZE DISTRIBUTION ANALYSES

FISHER ENVIRONMENTAL LABORATORIES

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Client: 40-70 Plains Road
Address:

Tel.:
Email:
Attn.:

F.E. Job #: 20-4617
Project Name: 40-70 Plains Road
Project ID: FE-P 20-10328
Date Sampled: 5-Jun-2020
Date Received: 5-Jun-2020
Date Reported: 15-Jun-2020
Location: 40-70 Plains Road
Toronto, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
pH	Soil	1	9-Jun-20	9-Jun-20	pH-EC-SAR F-16	SW-846, 9045D
Chloride	Soil	1	N/A	15-Jun-20	Chloride F-20	SM 4500-Cl-E
Sulphate	Soil	1	9-Jun-20	15-Jun-20	Sulphate F-21	SM 4500-SO_4
Moisture Content	Soil	8	N/A	5-Jun-20	Support Procedures F-99	Carter (1993)
Grain Size	Soil	8	N/A	9-Jun-20	Grain Size F-28	ASTM D6913-04

Fisher Environmental Laboratories is accredited by CALA (the Canadian Association for Laboratory Accreditation Inc.) for specific parameters as required by Ontario Regulation 153/04. All analytical testing has been performed in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act published by Ontario Ministry of the Environment.

Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					**Soil Standards** *
pH *(pH unit)*	9.31					(5-11) 5-9

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

QA/QC Report

Parameter	**LCS**	**AR**	**Duplicate**	**AR**		
	Absolute Difference *(pH Unit)*					
pH *(pH unit)*	7.05	6.90-7.20	0.15	<0.3		

LEGEND:
LCS - Laboratory Control Sample
AR - Acceptable Range

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					
	Concentration (µg/g)					
Chloride in Soil	2.8					

< result obtained was below RL (Reporting Limit).

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/g)		**Recovery (%)**		**Recovery (%)**	
Chloride in Soil	<10	10	94	70-130	110	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chloride in Soil	3.6	0-20				

LEGEND:

RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-6*** BH1 SS5					
Sulphate *(mg/kg)*	9.4					

QA/QC Report

Parameter	**Blank**	**RL**	**LCS/Spike**	**AR**	**Duplicate**	**AR**
	(mg/kg)		**Recovery (%)**		**RPD (%)**	
Sulphate	9.4	1	95	70-130	15	0-30

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-1*** MW6 1.50-1.95m	***20-4617-2*** MW6 3.00-3.45m	***20-4617-3*** MW6 4.55-5.00m	***20-4617-4*** MW6 7.55-8.05m	***20-4617-5*** BH1 SS3	***20-4617-6*** BH1 SS5
Moisture Content (%)	9.0	5.2	5.5	13	5.6	6.0

Parameter	***20-4617-7*** BH1 SS7	***20-4617-8*** BH1 SS8				
Moisture Content (%)	3.4	3.7				

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
Moisture Content (%)	<0.1	0.1	100	70-130	10.6	0-20

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

Parameter	***20-4617-1*** MW6 1.50-1.95m	***20-4617-2*** MW6 3.00-3.45m	***20-4617-3*** MW6 4.55-5.00m	***20-4617-4*** MW6 7.55-8.05m	***20-4617-5*** BH1 SS3	***20-4617-6*** BH1 SS5
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0	0.0	0.0
9.5mm-19mm	9.3	0.0	2.0	2.9	0.0	0.0
4.75mm-9.5mm	5.0	3.1	10.3	3.2	0.7	1.5
1.18m-4.75mmm	7.8	6.7	34.3	4.6	2.7	1.9
300um-1.18mm	15.3	19.6	15.9	14.9	40.4	64.6
75um-300um	41.0	52.8	20.4	53.0	39.1	20.5
<75um	21.6	17.8	17.2	21.4	17.0	11.4
Clay & Silt	**22**	**18**	**17**	**21**	**17**	**11**
Sand	**64**	**79**	**70**	**72**	**82**	**87**
Gravel	**14**	**3**	**12**	**6**	**1**	**2**

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Sulphate, Chloride, pH, Moisture Content, Grain Size
Sample Description:	8 Soil Samples

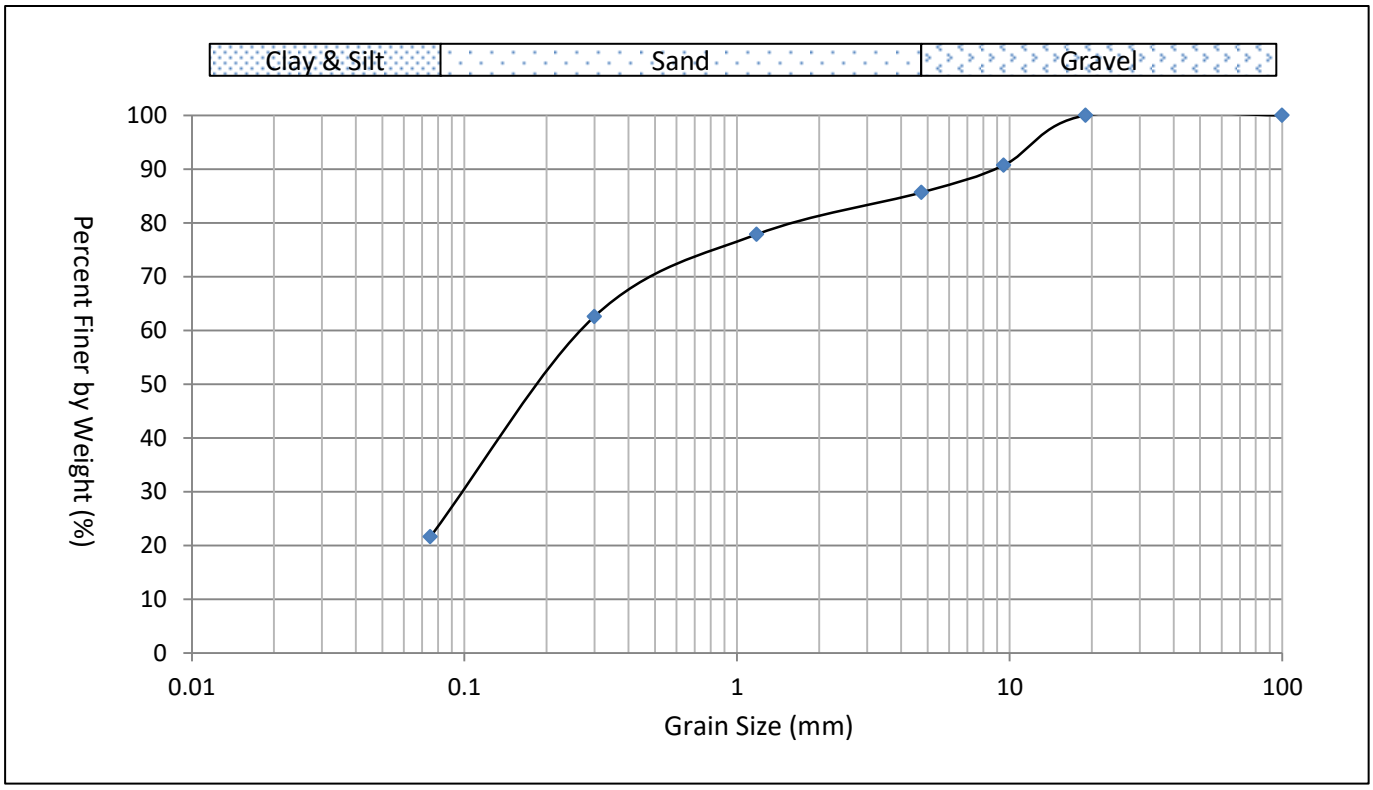
Parameter	***20-4617-7*** BH1 SS7	***20-4617-8*** BH1 SS8				
Grain Size (%)						
>19mm	0.0	0.0				
9.5mm-19mm	2.2	3.2				
4.75mm-9.5mm	16.8	10.9				
1.18m-4.75mmm	35.5	26.8				
300um-1.18mm	23.2	22.5				
75um-300um	7.4	24.7				
<75um	14.9	11.9				
Clay & Silt	**15**	**12**				
Sand	**66**	**74**				
Gravel	**19**	**14**				

Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-1 MW6 1.50-1.95m

Clay & Silt: 22% Sand: 64% Gravel: 14%

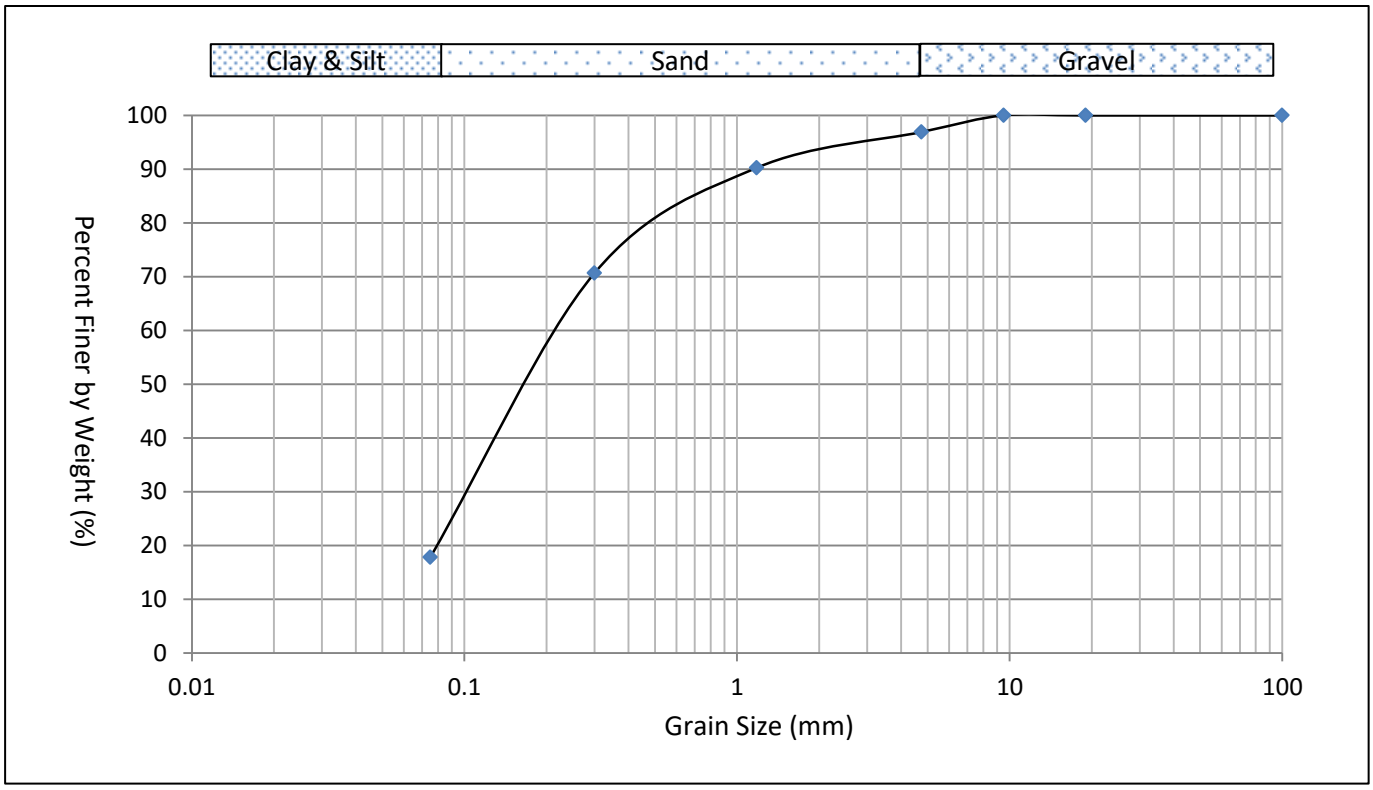


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-2 MW6 3.00-3.45m

Clay & Silt: 18% Sand: 79% Gravel: 3%

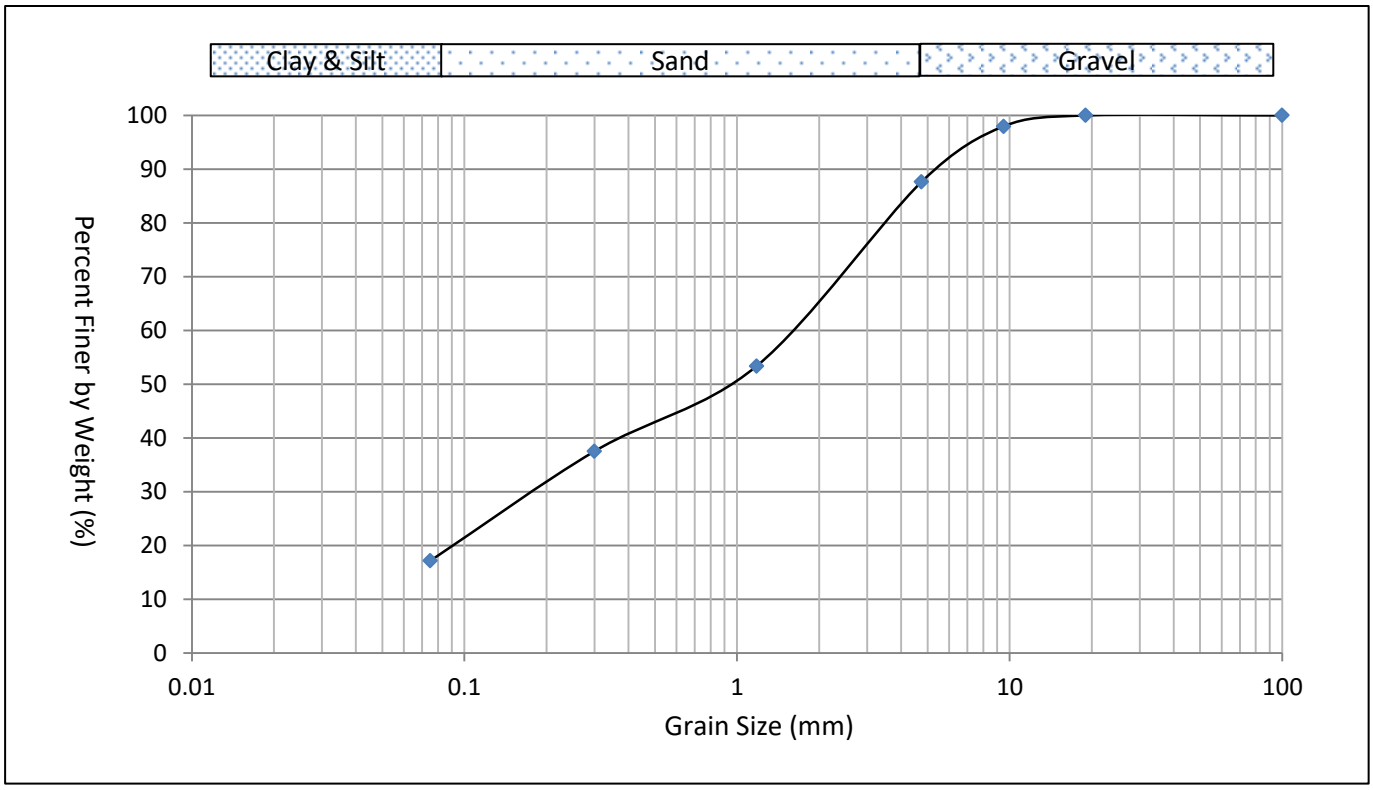


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-3 MW6 4.55-5.00m

Clay & Silt: 17% Sand: 70% Gravel: 12%

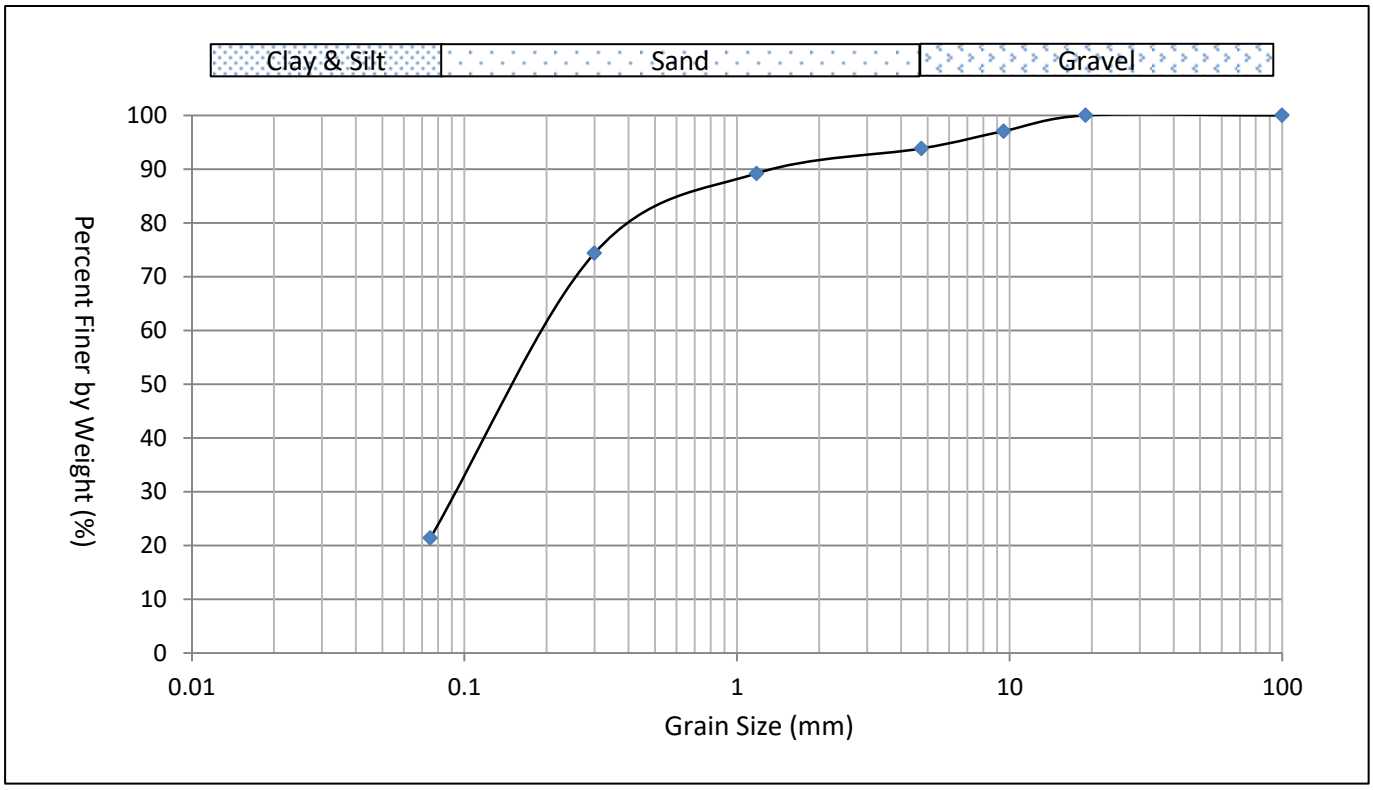


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-4 MW6 7.55-8.05m

Clay & Silt: 21% Sand: 72% Gravel: 6%

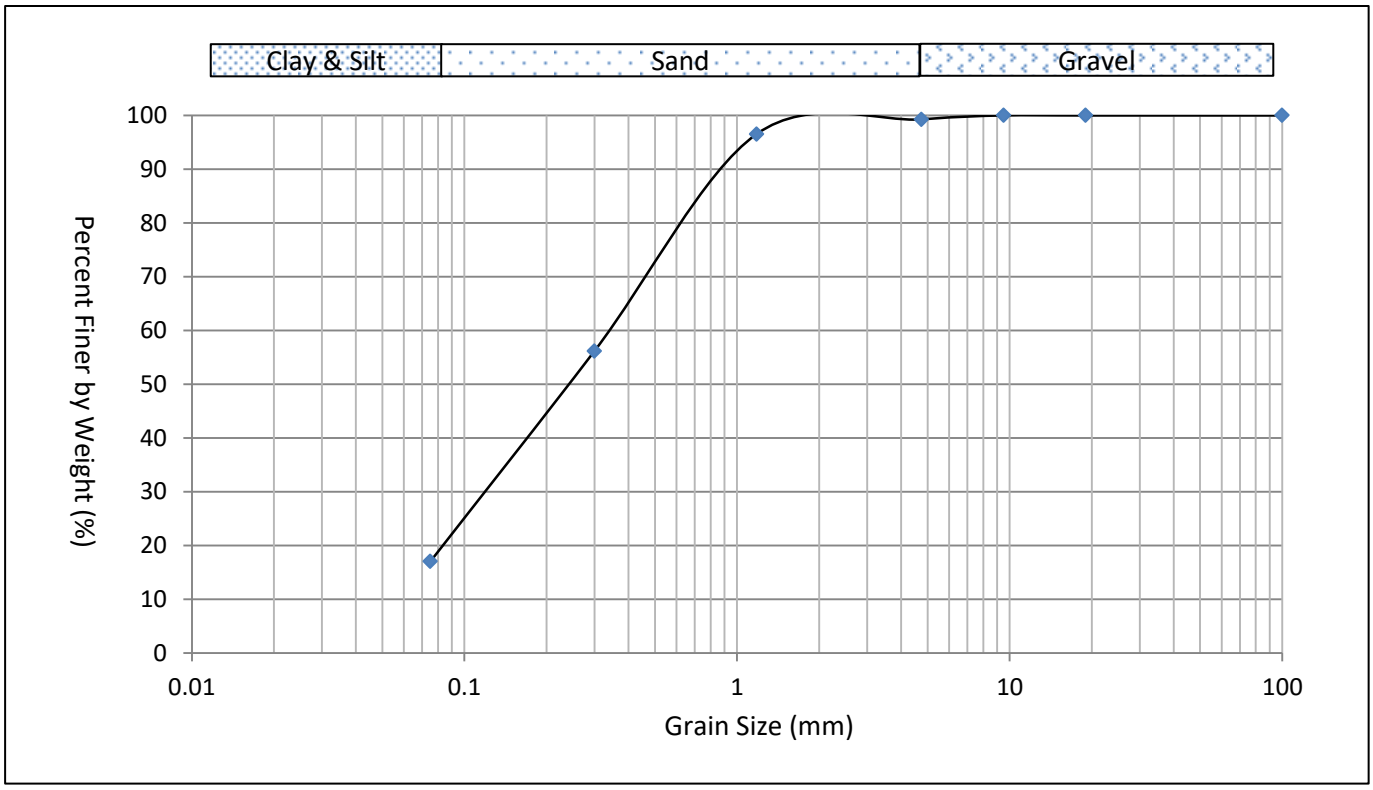


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-5 BH1 SS3

Clay & Silt: 17% Sand: 82% Gravel: 1%

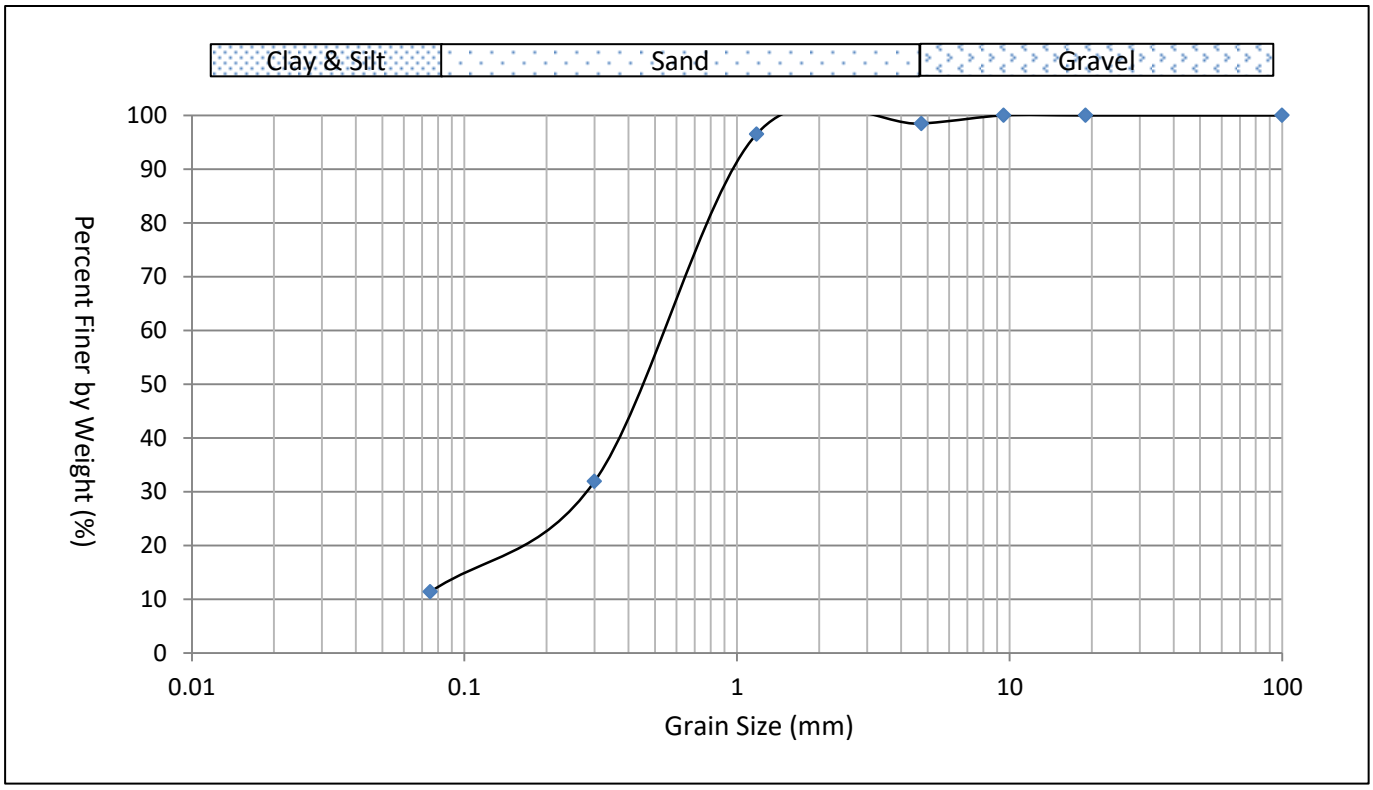


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-6 BH1 SS5

Clay & Silt: 11% Sand: 87% Gravel: 2%

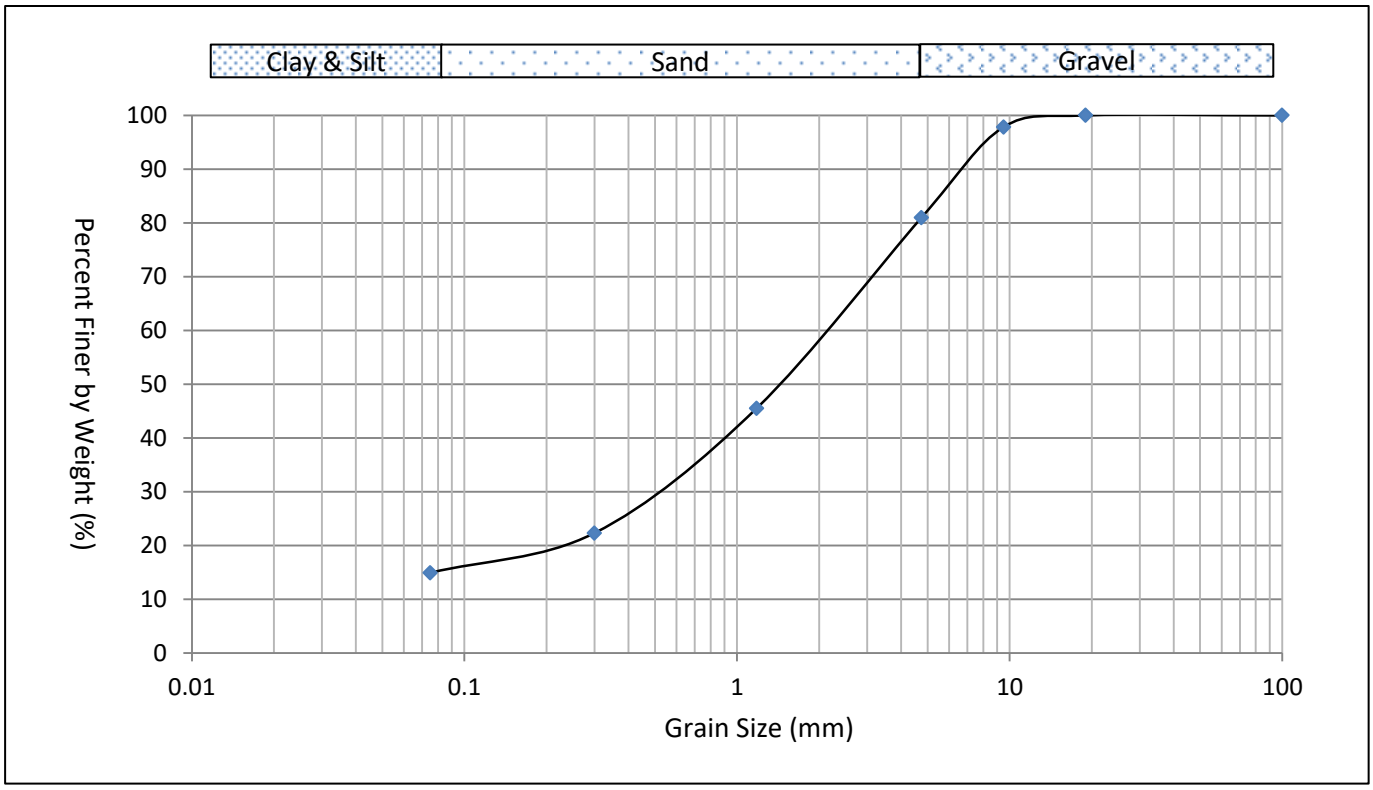


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-7 BH1 SS7

Clay & Silt: 66% Sand: 15% Gravel: 66%

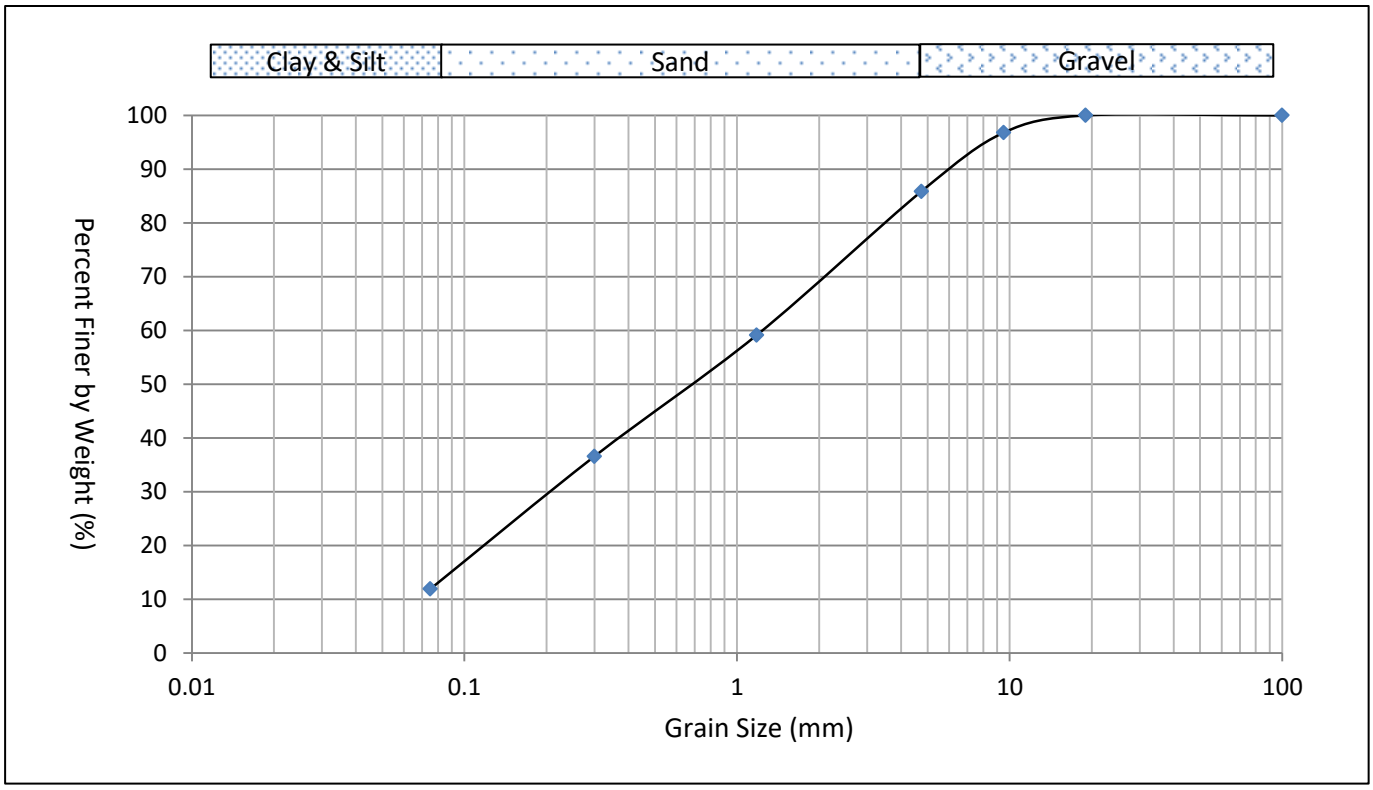


Results related only to the items tested

Grain Size Distribution

Sample ID: 20-4617-8 BH1 SS8

Clay & Silt: 12% Sand: 74% Gravel: 14%



Results related only to the items tested

APPENDIX D – SEWER BYLAW RESULTS

FISHER ENVIRONMENTAL
ATTN: Frank/Clive
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Date Received: 22-JUN-20
Report Date: 30-JUN-20 08:42 (MT)
Version: FINAL REV. 2

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2464585

Project P.O. #: NOT SUBMITTED
Job Reference: 20-10329H
C of C Numbers: 17-796667
Legal Site Desc:

Emily Hansen
Account Manager

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Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Sanitary Sewer By-Law No. 02-03						
L2464585-1	40-70 PLAINS RD. BURLINGTON	Physical Tests	Total Suspended Solids	9290	350	mg/L
		Total Metals	Aluminum (Al)-Total	73.9	50	mg/L
			Iron (Fe)-Total	185	50	mg/L
			Manganese (Mn)-Total	17.8	5	mg/L
Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Storm Sewer By-Law No, 02-03						
(No parameter exceedances)						

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

ANALYTICAL REPORT

Physical Tests - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2464585-1 Sample Date: 22-JUN-20 Sample ID: 40-70 PLAINS RD. BURLINGTON
pH	pH units	6.00-10.0	6.5-8.5	7.52
Total Suspended Solids	mg/L	350	-	9290 DLHC

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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

Anions and Nutrients - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2464585-1 Sample Date: 22-JUN-20 Sample ID: 40-70 PLAINS RD. BURLINGTON
Fluoride (F)	mg/L	10	-	<0.10 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	1.34
Phosphorus, Total	mg/L	10.0	-	1.81 DLHC
Sulfate (SO4)	mg/L	1500	-	57.0 DLDS

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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

Cyanides - WATER

			Lab ID	L2464585-1
			Sample Date	22-JUN-20
			Sample ID	40-70 PLAINS RD. BURLINGTON
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Cyanide, Total	mg/L	2	-	<0.0020

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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

Bacteriological Tests - WATER

			Lab ID	L2464585-1
			Sample Date	22-JUN-20
			Sample ID	40-70 PLAINS RD. BURLINGTON
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
E. Coli	CFU/100mL	-	200	0

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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.

Total Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2464585-1 Sample Date: 22-JUN-20 Sample ID: 40-70 PLAINS RD. BURLINGTON
Aluminum (Al)-Total	mg/L	50	-	73.9 DLHC
Antimony (Sb)-Total	mg/L	5	-	<0.0010 DLHC
Arsenic (As)-Total	mg/L	1	-	0.0479 DLHC
Beryllium (Be)-Total	mg/L	5	-	0.0046 DLHC
Cadmium (Cd)-Total	mg/L	1	-	0.00119 DLHC
Chromium (Cr)-Total	mg/L	3	-	0.146 DLHC
Cobalt (Co)-Total	mg/L	5	-	0.116 DLHC
Copper (Cu)-Total	mg/L	3	-	0.699 DLHC
Iron (Fe)-Total	mg/L	50	-	185 DLHC
Lead (Pb)-Total	mg/L	3	-	0.154 DLHC
Manganese (Mn)-Total	mg/L	5	-	17.8 DLHC
Mercury (Hg)-Total	mg/L	0.05	-	0.0000294
Molybdenum (Mo)-Total	mg/L	5	-	0.00190 DLHC
Nickel (Ni)-Total	mg/L	3	-	0.221 DLHC
Selenium (Se)-Total	mg/L	5	-	0.00097 DLHC
Silver (Ag)-Total	mg/L	5	-	<0.00050 DLHC
Tin (Sn)-Total	mg/L	5	-	0.0017 DLHC
Titanium (Ti)-Total	mg/L	5	-	0.410 DLHC
Zinc (Zn)-Total	mg/L	3	-	0.538 DLHC

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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.

Aggregate Organics - WATER

			Lab ID	L2464585-1
			Sample Date	22-JUN-20
			Sample ID	40-70 PLAINS RD. BURLINGTON
Analyte	**Unit**	**Guide Limits #1**	**#2**	
BOD Carbonaceous	mg/L	300	-	<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	-	<0.0010

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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.

Volatile Organic Compounds - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2464585-1 Sample Date: 22-JUN-20 Sample ID: 40-70 PLAINS RD. BURLINGTON
Benzene	ug/L	10	-	<0.50 OWP
Chloroform	ug/L	40	-	<1.0 OWP
1,4-Dichlorobenzene	ug/L	80	-	<0.50 OWP
Dichloromethane	ug/L	2000	-	<2.0 OWP
Ethylbenzene	ug/L	160	-	<0.50 OWP
Tetrachloroethylene	ug/L	1000	-	<0.50 OWP
Toluene	ug/L	16	-	0.57 OWP
Trichloroethylene	ug/L	400	-	<0.50 OWP
Surrogate: 4-Bromofluorobenzene	%	-	-	95.7
Surrogate: 1,4-Difluorobenzene	%	-	-	97.9

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2464585-1
			Sample Date	22-JUN-20
			Sample ID	40-70 PLAINS RD. BURLINGTON
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Naphthalene	ug/L	140	-	<0.020
Surrogate: d8-Naphthalene	%	-	-	107.5

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

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

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.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

Reference Information

sediment.

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)

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

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)

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).

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
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 deteremined colourimetrically after persulphate digestion of the sample.			
PAH-NAPHTHALENE-WT	Water	Polyaromatic Hydrocarbons (PAHs)	SW846 8270
Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and 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
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.			
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
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-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.			
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
Aqueous samples are analyzed by headspace-GC/MS.			

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

Chain of Custody Numbers:

17-796667

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

Reference Information

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 wwt - 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: L2464585 Report Date: 30-JUN-20

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-C-WT	**Water**							
Batch R5135940								
WG3349154-2 DUP		**L2464132-2**						
BOD Carbonaceous		<3.0	<3.0	RPD-NA	mg/L	N/A	30	24-JUN-20
WG3349154-3 LCS								
BOD Carbonaceous			88.9		%		85-115	24-JUN-20
WG3349154-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	24-JUN-20
CN-TOT-WT	**Water**							
Batch R5131678								
WG3349098-3 DUP		**L2464585-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	24-JUN-20
WG3349098-2 LCS								
Cyanide, Total			94.6		%		80-120	24-JUN-20
WG3349098-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	24-JUN-20
WG3349098-4 MS		**L2464585-1**						
Cyanide, Total			96.1		%		70-130	24-JUN-20
EC-WW-MF-WT	**Water**							
Batch R5131775								
WG3348917-3 DUP		**L2464458-1**						
E. Coli		0	0		CFU/100mL	0.0	65	24-JUN-20
WG3348917-4 DUP		**L2464441-1**						
E. Coli		0	<10	RPD-NA	CFU/100mL	N/A	65	24-JUN-20
WG3348917-1 MB								
E. Coli			0		CFU/100mL		1	24-JUN-20
F-IC-N-WT	**Water**							
Batch R5134337								
WG3350386-10 DUP		**WG3350386-8**						
Fluoride (F)		0.087	0.089		mg/L	2.6	20	25-JUN-20
WG3350386-7 LCS								
Fluoride (F)			102.6		%		90-110	25-JUN-20
WG3350386-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	25-JUN-20
WG3350386-9 MS		**WG3350386-8**						
Fluoride (F)			100.2		%		75-125	25-JUN-20
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R5131148								
WG3348841-3 DUP		**L2464778-1**						
Mercury (Hg)-Total		0.0000070	0.0000067		mg/L	4.4	20	24-JUN-20
WG3348841-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	24-JUN-20
WG3348841-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	24-JUN-20
WG3348841-5 MS		**L2461690-1**						
Mercury (Hg)-Total			99.6		%		70-130	24-JUN-20
MET-T-CCMS-WT	**Water**							
Batch R5131002								
WG3348601-4 DUP		**WG3348601-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-JUN-20
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
Cadmium (Cd)-Total		0.000138	0.000121		mg/L	13	20	24-JUN-20
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	24-JUN-20
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
Copper (Cu)-Total		0.0145	0.0145		mg/L	0.2	20	24-JUN-20
Iron (Fe)-Total		0.18	0.18		mg/L	2.1	20	24-JUN-20
Lead (Pb)-Total		0.00563	0.00548		mg/L	2.6	20	24-JUN-20
Manganese (Mn)-Total		0.0471	0.0449		mg/L	4.8	20	24-JUN-20
Molybdenum (Mo)-Total		0.00596	0.00590		mg/L	1.0	20	24-JUN-20
Nickel (Ni)-Total		0.0051	<0.0050	RPD-NA	mg/L	N/A	20	24-JUN-20
Selenium (Se)-Total		0.00196	0.00181		mg/L	7.8	20	24-JUN-20
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-JUN-20
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	24-JUN-20
Zinc (Zn)-Total		0.235	0.236		mg/L	0.5	20	24-JUN-20
WG3348601-2 LCS								
Aluminum (Al)-Total			101.8		%		80-120	24-JUN-20
Antimony (Sb)-Total			100.7		%		80-120	24-JUN-20
Arsenic (As)-Total			99.4		%		80-120	24-JUN-20
Beryllium (Be)-Total			101.3		%		80-120	24-JUN-20
Cadmium (Cd)-Total			99.3		%		80-120	24-JUN-20

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5131002								
WG3348601-2 LCS								
Chromium (Cr)-Total			101.5		%		80-120	24-JUN-20
Cobalt (Co)-Total			99.8		%		80-120	24-JUN-20
Copper (Cu)-Total			100.3		%		80-120	24-JUN-20
Iron (Fe)-Total			100.4		%		80-120	24-JUN-20
Lead (Pb)-Total			99.7		%		80-120	24-JUN-20
Manganese (Mn)-Total			100.7		%		80-120	24-JUN-20
Molybdenum (Mo)-Total			98.1		%		80-120	24-JUN-20
Nickel (Ni)-Total			99.9		%		80-120	24-JUN-20
Selenium (Se)-Total			97.3		%		80-120	24-JUN-20
Silver (Ag)-Total			96.4		%		80-120	24-JUN-20
Tin (Sn)-Total			95.8		%		80-120	24-JUN-20
Titanium (Ti)-Total			94.4		%		80-120	24-JUN-20
Zinc (Zn)-Total			99.9		%		80-120	24-JUN-20
WG3348601-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	24-JUN-20
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	24-JUN-20
Arsenic (As)-Total			<0.00010		mg/L		0.0001	24-JUN-20
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	24-JUN-20
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	24-JUN-20
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	24-JUN-20
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	24-JUN-20
Copper (Cu)-Total			<0.00050		mg/L		0.0005	24-JUN-20
Iron (Fe)-Total			<0.010		mg/L		0.01	24-JUN-20
Lead (Pb)-Total			<0.000050		mg/L		0.00005	24-JUN-20
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	24-JUN-20
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	24-JUN-20
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	24-JUN-20
Selenium (Se)-Total			<0.000050		mg/L		0.00005	24-JUN-20
Silver (Ag)-Total			<0.000050		mg/L		0.00005	24-JUN-20
Tin (Sn)-Total			<0.00010		mg/L		0.0001	24-JUN-20
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	24-JUN-20
Zinc (Zn)-Total			<0.0030		mg/L		0.003	24-JUN-20
WG3348601-5 MS		**WG3348601-3**						
Aluminum (Al)-Total			111.3		%		70-130	24-JUN-20

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5131002								
WG3348601-5 MS		**WG3348601-3**						
Antimony (Sb)-Total			96.5		%		70-130	24-JUN-20
Arsenic (As)-Total			100.8		%		70-130	24-JUN-20
Beryllium (Be)-Total			107.8		%		70-130	24-JUN-20
Cadmium (Cd)-Total			98.2		%		70-130	24-JUN-20
Chromium (Cr)-Total			99.1		%		70-130	24-JUN-20
Cobalt (Co)-Total			99.9		%		70-130	24-JUN-20
Copper (Cu)-Total			N/A	MS-B	%		-	24-JUN-20
Iron (Fe)-Total			N/A	MS-B	%		-	24-JUN-20
Lead (Pb)-Total			94.3		%		70-130	24-JUN-20
Manganese (Mn)-Total			N/A	MS-B	%		-	24-JUN-20
Molybdenum (Mo)-Total			99.1		%		70-130	24-JUN-20
Nickel (Ni)-Total			95.7		%		70-130	24-JUN-20
Selenium (Se)-Total			95.9		%		70-130	24-JUN-20
Silver (Ag)-Total			92.8		%		70-130	24-JUN-20
Tin (Sn)-Total			95.4		%		70-130	24-JUN-20
Titanium (Ti)-Total			102.0		%		70-130	24-JUN-20
Zinc (Zn)-Total			N/A	MS-B	%		-	24-JUN-20
OGG-SPEC-WT	**Water**							
Batch R5131544								
WG3348557-2 LCS								
Oil and Grease, Total			90.3		%		70-130	24-JUN-20
Mineral Oil and Grease			87.0		%		70-130	24-JUN-20
WG3348557-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	24-JUN-20
Mineral Oil and Grease			<2.5		mg/L		2.5	24-JUN-20
P-T-COL-WT	**Water**							
Batch R5133741								
WG3349311-3 DUP		**L2464706-2**						
Phosphorus, Total		2.04	2.01		mg/L	1.2	20	26-JUN-20
WG3349311-2 LCS								
Phosphorus, Total			100.4		%		80-120	26-JUN-20
WG3349311-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	26-JUN-20
WG3349311-4 MS		**L2464706-2**						
Phosphorus, Total			N/A	MS-B	%		-	26-JUN-20

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-NAPHTHALENE-WT	**Water**							
Batch R5135574								
WG3350074-2 LCS								
Naphthalene			92.7		%		50-130	29-JUN-20
WG3350074-1 MB								
Naphthalene			<0.020		ug/L		0.02	29-JUN-20
Surrogate: d8-Naphthalene			98.6		%		60-140	29-JUN-20
PH-WT	**Water**							
Batch R5131856								
WG3349180-4 DUP		**WG3349180-3**						
pH		8.03	8.02	J	pH units	0.01	0.2	24-JUN-20
WG3349180-2 LCS								
pH			7.03		pH units		6.9-7.1	24-JUN-20
PHENOLS-4AAP-WT	**Water**							
Batch R5131531								
WG3349330-3 DUP		**L2464575-2**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-JUN-20
WG3349330-2 LCS								
Phenols (4AAP)			102.0		%		85-115	24-JUN-20
WG3349330-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	24-JUN-20
WG3349330-4 MS		**L2464575-2**						
Phenols (4AAP)			104.3		%		75-125	24-JUN-20
SO4-IC-N-WT	**Water**							
Batch R5134337								
WG3350386-10 DUP		**WG3350386-8**						
Sulfate (SO4)		10.9	10.9		mg/L	0.3	20	25-JUN-20
WG3350386-7 LCS								
Sulfate (SO4)			102.0		%		90-110	25-JUN-20
WG3350386-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	25-JUN-20
WG3350386-9 MS		**WG3350386-8**						
Sulfate (SO4)			106.4		%		75-125	25-JUN-20
SOLIDS-TSS-WT	**Water**							
Batch R5133018								
WG3348760-3 DUP		**WG3348760-4**						
Total Suspended Solids		4940	4920		mg/L	0.3	20	26-JUN-20
WG3348760-2 LCS								
Total Suspended Solids			98.0		%		85-115	26-JUN-20

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-WT	**Water**							
Batch R5133018								
WG3348760-1 MB								
Total Suspended Solids			<2.0		mg/L		2	26-JUN-20
TKN-WT	**Water**							
Batch R5132248								
WG3349334-3 DUP		**L2464700-3**						
Total Kjeldahl Nitrogen		7.54	8.35		mg/L	10	20	25-JUN-20
WG3349334-2 LCS								
Total Kjeldahl Nitrogen			120.6		%		75-125	25-JUN-20
WG3349334-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	25-JUN-20
WG3349334-4 MS		**L2464700-3**						
Total Kjeldahl Nitrogen			N/A	MS-B	%		-	25-JUN-20
VOC-ROU-HS-WT	**Water**							
Batch R5135488								
WG3351276-4 DUP		**WG3351276-3**						
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-JUN-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-JUN-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	29-JUN-20
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	29-JUN-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-JUN-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-JUN-20
Toluene		<0.40	<0.40	RPD-NA	ug/L	N/A	30	29-JUN-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-JUN-20
WG3351276-1 LCS								
1,4-Dichlorobenzene			109.8		%		70-130	29-JUN-20
Benzene			115.1		%		70-130	29-JUN-20
Chloroform			123.7		%		70-130	29-JUN-20
Dichloromethane			117.9		%		70-130	29-JUN-20
Ethylbenzene			113.0		%		70-130	29-JUN-20
Tetrachloroethylene			111.1		%		70-130	29-JUN-20
Toluene			113.5		%		70-130	29-JUN-20
Trichloroethylene			113.2		%		70-130	29-JUN-20
WG3351276-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	29-JUN-20
Benzene			<0.50		ug/L		0.5	29-JUN-20

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R5135488								
WG3351276-2 MB								
Chloroform			<1.0		ug/L		1	29-JUN-20
Dichloromethane			<2.0		ug/L		2	29-JUN-20
Ethylbenzene			<0.50		ug/L		0.5	29-JUN-20
Tetrachloroethylene			<0.50		ug/L		0.5	29-JUN-20
Toluene			<0.40		ug/L		0.4	29-JUN-20
Trichloroethylene			<0.50		ug/L		0.5	29-JUN-20
Surrogate: 1,4-Difluorobenzene			99.3		%		70-130	29-JUN-20
Surrogate: 4-Bromofluorobenzene			95.4		%		70-130	29-JUN-20
WG3351276-5 MS		**WG3351276-3**						
1,4-Dichlorobenzene			109.4		%		50-150	29-JUN-20
Benzene			115.3		%		50-150	29-JUN-20
Chloroform			124.1		%		50-150	29-JUN-20
Dichloromethane			117.9		%		50-150	29-JUN-20
Ethylbenzene			112.4		%		50-150	29-JUN-20
Tetrachloroethylene			110.4		%		50-150	29-JUN-20
Toluene			113.4		%		50-150	29-JUN-20
Trichloroethylene			112.2		%		50-150	29-JUN-20

Quality Control Report

Workorder: L2464585 Report Date: 30-JUN-20

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: Frank/Clive

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
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
J	Duplicate results and limits are expressed in terms of absolute difference.
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.

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.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analyti Request Form

Canada Toll Free: 1 800 668 9878

L2464585-COFC

COC Number: 17 - 796667

Page of

MA

Report To	Contact and company name below will appear on the final report
Company:	Fisher Environmental
Contact:	Frank / Clive
Phone:	416 738 0716
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	

Invoice To		
	Same as Report To	[X] YES [ ] NO
	Copy of Invoice with Report	[X] YES [ ] NO
Company:		
Contact:		

Project Information	
ALS Account # / Quote #:	
Job #:	
PO / AFE:	
LSD:	

ALS Lab Work Order # (lab use only): L2464585 MA

Report Format / Distribution

Select Report Format: [ ] PDF [ ] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [ ] YES [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [ ] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax

Email 2 Frank@FisherEnvironmental.com cc to clive.

Email 3

Invoice Distribution

Select Invoice Distribution: [ ] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax

Email 2

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: EH **Sampler:**

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

NUMBER OF CONTAINERS — Sewer bylaws

SAMPLES ON HOLD

SUSPECTED HAZARD (see Special Instructions)

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type
	40-70 Plains Rd. Burlington Job # 20-10329 H	22/6/2020	2:30Pm	Water

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO

Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.1				8.9			

SHIPMENT RELEASE (client use)

Released by: Frank Date: June 22.2020 Time: 3:40pm

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: JS Date: June 22/20 Time: 15:40

FINAL SHIPMENT RECEPTION (lab use only)

Received by: MA Date: June 22/20 Time: 1906

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

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

SIF

APPENDIX E – HYDRAULIC CONDUCTIVITY ANALYSES

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Test Date: *2020-06-30*
Well No. *MW1*

Equilibrium Water level (from top of pipe) HE	*865*	*cm*
Initial Water level (from top of pipe) Ho	*952*	*cm*
Monitoring well inner diameter d	*0.05*	*m*
Initial Time offset To	*5*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*87.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*8.00E-03*	
G = Ru / (HT - HE)		

Hydraulic conductivity computed k =

0.0121064	**cm/s**
1.21E-04	**m/s**
10.460	**m/day**

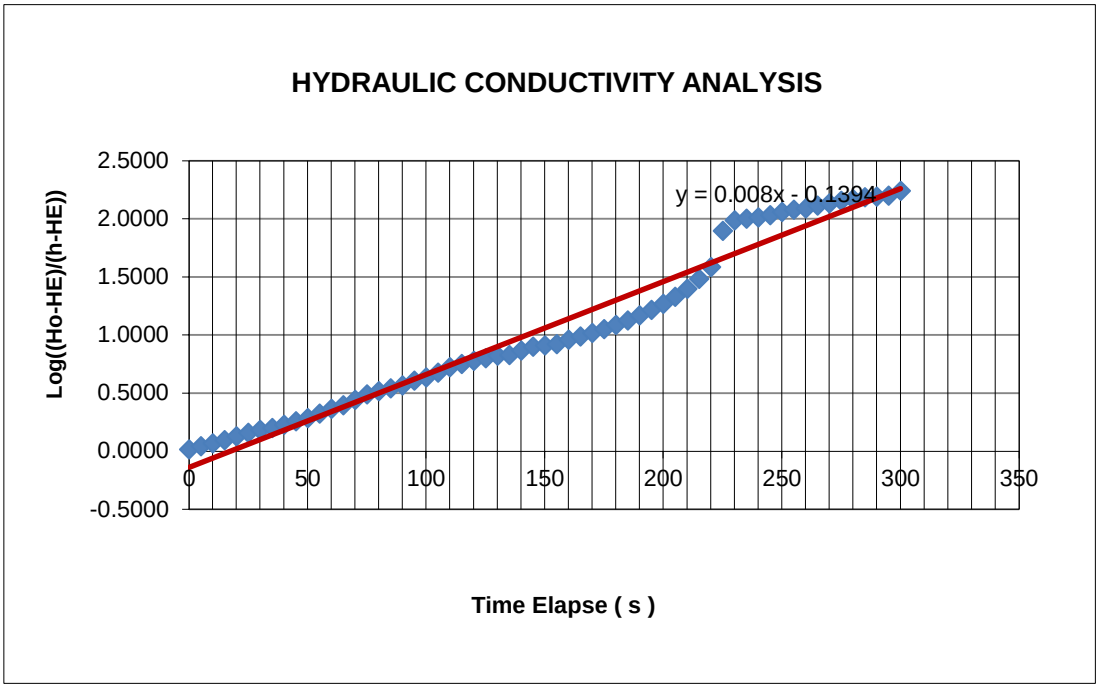
Time		HT (Water Drop)		G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
5	**0**	9.520	952.000	1.0000	0.0147
5	5	9.442	944.200	1.0985	0.0408
5	10	9.395	939.500	1.1678	0.0674
5	15	9.352	935.200	1.2393	0.0932
5	20	9.299	929.900	1.3405	0.1273
5	25	9.255	925.500	1.4380	0.1578
5	30	9.224	922.350	1.5170	0.1810
5	35	9.200	920.010	1.5815	0.1991
5	40	9.166	916.550	1.6877	0.2273
5	45	9.133	913.250	1.8031	0.2560
5	50	9.101	910.120	1.9282	0.2852
5	55	9.065	906.500	2.0964	0.3215
5	60	9.028	902.750	2.3046	0.3626
5	65	9.000	900.000	2.4857	0.3955
5	70	8.965	896.500	2.7619	0.4412
5	75	8.934	893.350	3.0688	0.4870
5	80	8.915	891.500	3.2830	0.5163
5	85	8.902	890.150	3.4592	0.5390
5	90	8.887	888.650	3.6786	0.5657
5	95	8.866	886.550	4.0371	0.6061
5	100	8.853	885.250	4.2963	0.6331
5	105	8.833	883.330	4.7463	0.6764
5	110	8.816	881.550	5.2568	0.7207
5	115	8.805	880.500	5.6129	0.7492
5	120	8.796	879.550	5.9794	0.7767
5	125	8.789	878.850	6.2816	0.7981
5	130	8.782	878.150	6.6160	0.8206
5	135	8.780	877.950	6.7181	0.8272

5	140	8.769	876.850	7.3418	0.8658
5	145	8.760	876.010	7.9019	0.8977
5	150	8.758	875.750	8.0930	0.9081
5	155	8.755	875.450	8.3254	0.9204
5	160	8.746	874.572	9.0890	0.9585
5	165	8.740	873.962	9.7077	0.9871
5	170	8.734	873.352	10.4167	1.0177
5	175	8.727	872.742	11.2374	1.0507
5	180	8.721	872.132	12.1985	1.0863
5	185	8.715	871.522	13.3395	1.1251
5	190	8.709	870.912	14.7158	1.1678
5	195	8.703	870.302	16.4089	1.2151
5	200	8.697	869.690	18.5501	1.2683
5	205	8.691	869.089	21.2766	1.3279
5	210	8.685	868.480	25.0000	1.3979
5	215	8.679	867.870	30.3136	1.4816
5	220	8.673	867.260	38.4956	1.5854
5	225	8.661	866.110	78.3784	1.8942
5	230	8.659	865.900	96.6667	1.9853
5	235	8.659	865.870	100.0000	2.0000
5	240	8.659	865.850	102.3529	2.0101
5	245	8.658	865.810	107.4074	2.0310
5	250	8.658	865.760	114.4737	2.0587
5	255	8.657	865.730	119.1781	2.0762
5	260	8.657	865.710	122.5352	2.0883
5	265	8.657	865.670	129.8507	2.1134
5	270	8.656	865.640	135.9375	2.1333
5	275	8.656	865.610	142.6230	2.1542
5	280	8.656	865.590	147.4576	2.1687
5	285	8.656	865.570	152.6316	2.1836
5	290	8.656	865.560	155.3571	2.1913
5	295	8.656	865.550	158.1818	2.1992
5	300	8.655	865.500	174.0000	2.2405

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Test Date: *2020-06-30*
Well No. *MW1*



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Test Date: *2020-06-30*
Well No. *MW3*

Equilibrium Water level (from top of pipe) HE	*823*	*cm*
Initial Water level (from top of pipe) Ho	*967*	*cm*
Monitoring well inner diameter d	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*144.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*3.10E-03*	
G = Ru / (HT - HE)		

Hydraulic conductivity computed k =

0.0046912	**cm/s**
4.69E-05	**m/s**
4.053	**m/day**

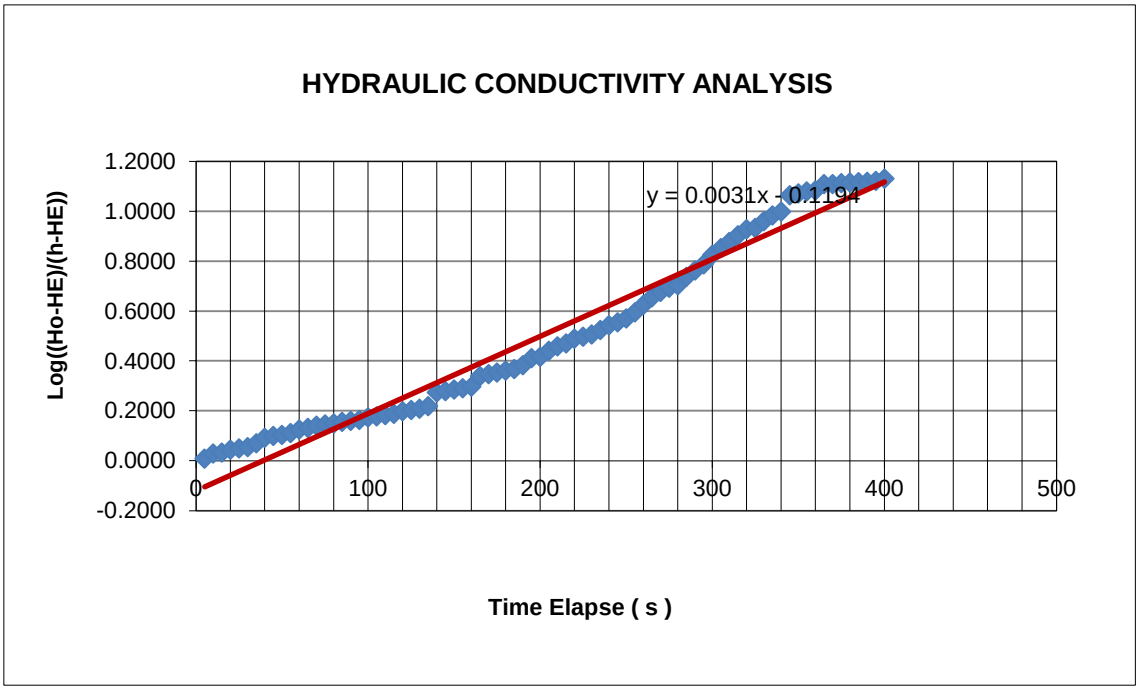
Time		HT (Water Drop)		G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
5	0	9.670			
5	5	9.644	964.43	1.0182	0.0078
5	10	9.577	957.74	1.0687	0.0289
5	15	9.567	956.67	1.0772	0.0323
5	20	9.530	953.00	1.1077	0.0444
5	25	9.516	951.56	1.1201	0.0493
5	30	9.502	950.15	1.1325	0.0540
5	35	9.456	945.64	1.1742	0.0697
5	40	9.398	939.75	1.2334	0.0911
5	45	9.378	937.75	1.2549	0.0986
5	50	9.366	936.56	1.2680	0.1031
5	55	9.345	934.51	1.2913	0.1110
5	60	9.311	931.12	1.3319	0.1245
5	65	9.293	929.35	1.3541	0.1316
5	70	9.273	927.29	1.3807	0.1401
5	75	9.259	925.91	1.3992	0.1459
5	80	9.252	925.17	1.4094	0.1490
5	85	9.236	923.58	1.4318	0.1559
5	90	9.229	922.86	1.4421	0.1590
5	95	9.220	921.95	1.4552	0.1629
5	100	9.197	919.66	1.4898	0.1731
5	105	9.188	918.76	1.5038	0.1772
5	110	9.177	917.65	1.5214	0.1822
5	115	9.165	916.52	1.5397	0.1874
5	120	9.143	914.26	1.5780	0.1981
5	125	9.132	913.20	1.5965	0.2032
5	130	9.122	912.20	1.6144	0.2080
5	135	9.102	910.20	1.6515	0.2179

5	140	8.997	899.70	1.8776	0.2736
5	145	8.988	898.80	1.8998	0.2787
5	150	8.977	897.70	1.9278	0.2851
5	155	8.967	896.70	1.9540	0.2909
5	160	8.957	895.66	1.9820	0.2971
5	165	8.890	888.96	2.1830	0.3391
5	170	8.879	887.88	2.2196	0.3463
5	175	8.868	886.84	2.2557	0.3533
5	180	8.857	885.74	2.2953	0.3608
5	185	8.847	884.74	2.3325	0.3678
5	190	8.827	882.65	2.4141	0.3828
5	195	8.789	878.93	2.5748	0.4107
5	200	8.783	878.27	2.6056	0.4159
5	205	8.753	875.29	2.7541	0.4400
5	210	8.731	873.13	2.8726	0.4583
5	215	8.718	871.82	2.9497	0.4698
5	220	8.697	869.68	3.0846	0.4892
5	225	8.689	868.89	3.1377	0.4966
5	230	8.679	867.89	3.2076	0.5062
5	235	8.661	866.13	3.3387	0.5236
5	240	8.643	864.30	3.4870	0.5425
5	245	8.632	863.20	3.5823	0.5542
5	250	8.618	861.76	3.7149	0.5699
5	255	8.596	859.63	3.9312	0.5945
5	260	8.572	857.18	4.2130	0.6246
5	265	8.549	854.94	4.5085	0.6540
5	270	8.533	853.30	4.7531	0.6770
5	275	8.522	852.22	4.9285	0.6927
5	280	8.515	851.49	5.0537	0.7036
5	285	8.494	849.42	5.4508	0.7365
5	290	8.479	847.87	5.7901	0.7627
5	295	8.465	846.53	6.1193	0.7867
5	300	8.446	844.56	6.6784	0.8247
5	305	8.432	843.22	7.1221	0.8526
5	310	8.421	842.12	7.5326	0.8769
5	315	8.410	841.01	7.9963	0.9029
5	320	8.400	840.00	8.4715	0.9280
5	325	8.398	839.80	8.5711	0.9330
5	330	8.388	838.78	9.1237	0.9602
5	335	8.380	837.99	9.6092	0.9827
5	340	8.375	837.47	9.9537	0.9980
5	345	8.354	835.43	11.5821	1.0638
5	350	8.352	835.23	11.7737	1.0709
5	355	8.350	834.99	12.0080	1.0795
5	360	8.349	834.89	12.1110	1.0832
5	365	8.342	834.22	12.8331	1.1083
5	370	8.342	834.20	12.8583	1.1092
5	375	8.341	834.11	12.9601	1.1126
5	380	8.341	834.07	13.0128	1.1144
5	385	8.340	834.02	13.0660	1.1161
5	390	8.340	833.99	13.1028	1.1174
5	395	8.339	833.89	13.2231	1.1213
5	400	8.337	833.68	13.4831	1.1298

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Test Date: *2020-06-30*
Well No. *MW3*



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Test Date: *2020-06-30*
Well No. *MW4*

Equilibrium Water level (from top of pipe) HE	*788*	*cm*
Initial Water level (from top of pipe) Ho	*892*	*cm*
Monitoring well inner diameter d	*0.05*	*m*
Initial Time offset To	*5*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*104.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*3.80E-03*	
G = Ru / (HT - HE)		

Hydraulic conductivity computed k =

0.0057505	**cm/s**
5.75E-05	**m/s**
4.968	**m/day**

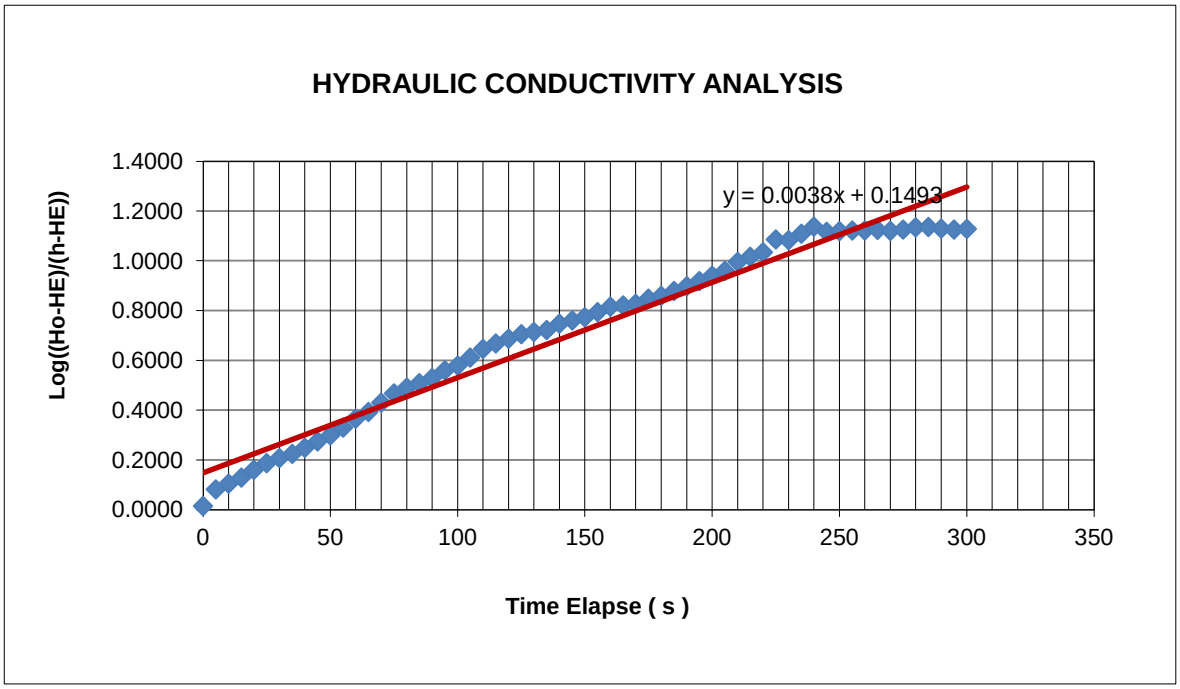
Time		HT (Water Drop)		G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
5	**0**	8.920	892.000	1.0000	0.0147
5	5	8.743	874.343	1.2045	0.0808
5	10	8.696	869.643	1.2738	0.1051
5	15	8.653	865.343	1.3447	0.1286
5	20	8.600	860.043	1.4436	0.1594
5	25	8.556	855.643	1.5375	0.1868
5	30	8.525	852.493	1.6126	0.2075
5	35	8.502	850.153	1.6733	0.2236
5	40	8.467	846.693	1.7719	0.2484
5	45	8.434	843.393	1.8775	0.2736
5	50	8.403	840.263	1.9899	0.2988
5	55	8.366	836.643	2.1380	0.3300
5	60	8.329	832.893	2.3166	0.3649
5	65	8.301	830.143	2.4678	0.3923
5	70	8.266	826.643	2.6913	0.4300
5	75	8.235	823.493	2.9302	0.4669
5	80	8.216	821.643	3.0913	0.4901
5	85	8.203	820.293	3.2205	0.5079
5	90	8.188	818.793	3.3774	0.5286
5	95	8.167	816.693	3.6246	0.5593
5	100	8.154	815.393	3.7966	0.5794
5	105	8.135	813.473	4.0828	0.6110
5	110	8.115	811.493	4.4269	0.6461
5	115	8.103	810.343	4.6547	0.6679
5	120	8.094	809.393	4.8614	0.6868
5	125	8.085	808.493	5.0749	0.7054
5	130	8.081	808.103	5.1734	0.7138

5	135	8.077	807.730	5.2712	0.7219
5	140	8.066	806.613	5.5875	0.7472
5	145	8.060	806.043	5.7640	0.7607
5	150	8.056	805.553	5.9249	0.7727
5	155	8.047	804.713	6.2227	0.7940
5	160	8.039	803.905	6.5388	0.8155
5	165	8.037	803.740	6.6073	0.8200
5	170	8.035	803.495	6.7118	0.8268
5	175	8.028	802.785	7.0342	0.8472
5	180	8.024	802.375	7.2348	0.8594
5	185	8.018	801.765	7.5554	0.8783
5	190	8.012	801.155	7.9057	0.8979
5	195	8.005	800.545	8.2902	0.9186
5	200	7.999	799.933	8.7153	0.9403
5	205	7.994	799.432	9.0973	0.9589
5	210	7.985	798.523	9.8831	0.9949
5	215	7.980	798.013	10.3865	1.0165
5	220	7.976	797.603	10.8299	1.0346
5	225	7.966	796.553	12.1595	1.0849
5	230	7.966	796.604	12.0870	1.0823
5	235	7.961	796.101	12.8374	1.1085
5	240	7.956	795.599	13.6855	1.1363
5	245	7.960	795.953	13.0768	1.1165
5	250	7.959	795.903	13.1596	1.1192
5	255	7.959	795.873	13.2097	1.1209
5	260	7.959	795.853	13.2433	1.1220
5	265	7.958	795.813	13.3111	1.1242
5	270	7.959	795.883	13.1929	1.1203
5	275	7.958	795.783	13.3625	1.1259
5	280	7.956	795.633	13.6250	1.1343
5	285	7.956	795.613	13.6608	1.1355
5	290	7.957	795.730	13.4536	1.1288
5	295	7.958	795.793	13.3453	1.1253
5	300	7.957	795.743	13.4315	1.1281

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***40-70 Plains Rd E, Burlington***
Project: ***FE-P-20-10329 HydroGeo***
Test Date: ***2020-06-30***
Well No. ***MW4***



APPENDIX F – CONSTRUCTION DEWATERING AND PERMANENT DRAINAGE

Construction Dewatering Calculation

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Date: *2021-03-11*

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Lowest P2 elevation (m asl)	Established Grade (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Static water level		Well base elevation	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q, (m^3/s)	Q, (m^3/day)
					BGS (m)	Elevation (m asl)	(m)				Model	Adjusted								
Midrise building with Two Underground Levels	94.80	100.50	93.60	92.60		93.27	92.40	0.87	0.2	0.67	14.74	61.34	46.60	6822	1.21E-04	0.72	4.12	3.84	9.92E-04	85.70

Dupuit Forcheimer Equation

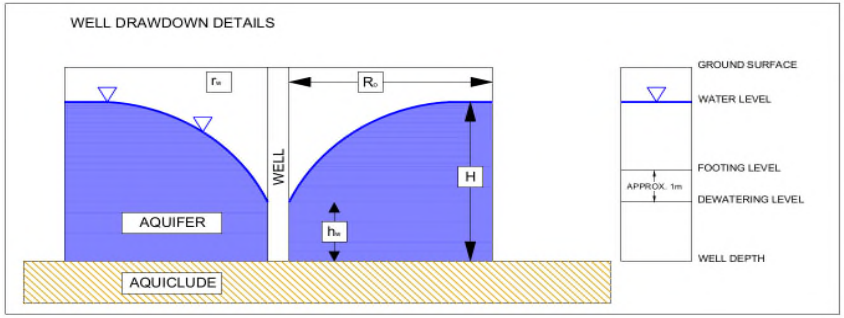
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$



Whe

r_w = equivalent radius of the well in m,

H = hydraulic head of the original water table (total saturated aquifer thickness) in m,

h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,

R_0 = radius of influence in m, calculated from Sichardt's equation, and

K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

Permanent Drainage Rates

Location: *40-70 Plains Rd E, Burlington*
Project: *FE-P-20-10329 HydroGeo*
Date: *2020-07-17*

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Underside of P2 elevation (m asl)	Ground Surface Elev. (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Static water level		Well base elevation (m asl)	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q, (m^3/s)	Q, (m^3/day)
					BGS (m)	Elevation (m asl)					Model	Adjusted								
Midrise building with Two Underground Levels	94.80	100.50	93.60	94.20	-	94.27	94.05	0.22	0.15	0.07	1.54	48.14	46.60	6822	1.21E-04	0.03	3.87	3.84	3.03E-04	26.17

Dupuit Forcheimer Equation

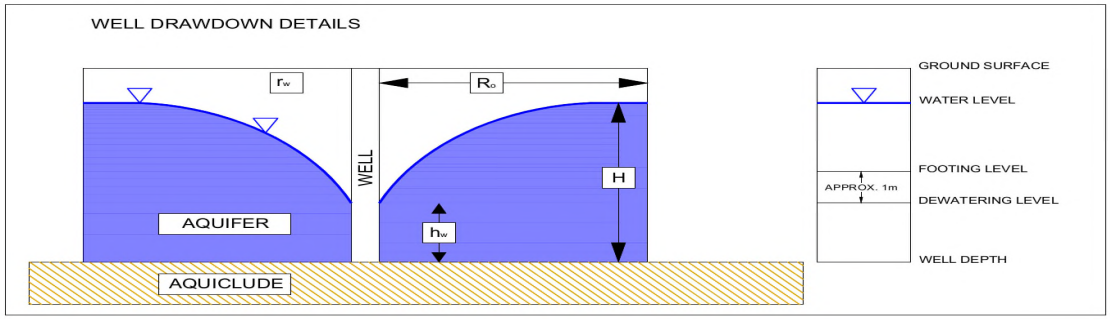
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$

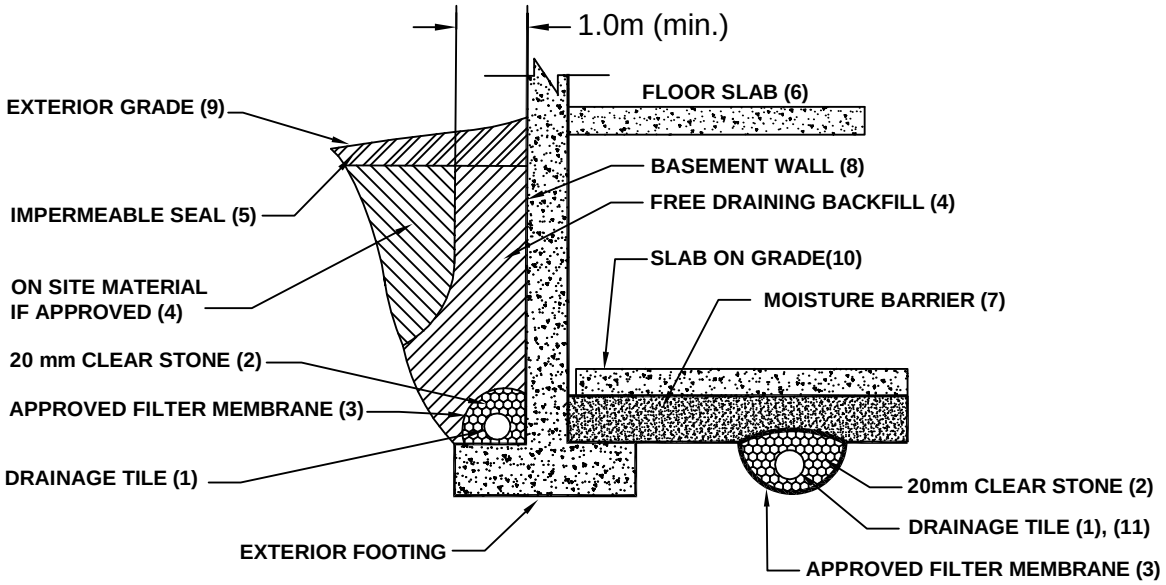


Whe

r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

APPENDIX G – BACKFILL AND DRAINAGE DESIGN

FISHER ENGINEERING



NOTES:

(1) DRAINAGE TILE TO CONSIST OF 100mm (4") DIAMETER WEEPING TILE OR EQUIVALENT PERFORATED PIPE LEADING TO A POSITIVE SUMP OR OUTLET.

(2) 20mm (3/4") CLEAR STONE - 150mm (6") TOP AND SIDE OF DRAIN. IF DRAIN IS NOT ON FOOTING, PLACE 100mm (4") OF STONE BELOW DRAIN.

(3) WRAP THE CLEAR STONE WITH AN APPROVED FILTER MEMBRANE (TERRAFIX 279R OR EQUIVALENT).

(4) FREE DRAINING BACKFILL - OPSS GRANULAR B OR EQUIVALENT COMPACTED TO THE SPECIFIED DENSITY. DO NOT USE HEAVY COMPACTION EQUIPMENT WITHIN 1.8m (6') OF WALL.

(5) IMPERMEABLE BACKFILL SEAL - COMPACTED CLAY, CLAYEY SILT OR EQUIVALENT. IF ORIGINAL SOIL IS FREE-DRAINING, SEAL MAY BE OMITTED. MAXIMUM THICKNESS OF SEAL TO BE 0.5m.

(6) DO NOT BACKFILL UNTIL WALL IS SUPPORTED BY BASEMENT AND FLOOR SLABS OR ADEQUATE BRACING.

(7) MOISTURE BARRIER TO BE AT LEAST 200mm (8") OF COMPACTED CLEAR 20mm (3/4") STONE OR EQUIVALENT FREE DRAINING MATERIAL. A VAPOUR BARRIER MAY BE REQUIRED FOR SPECIALTY FLOORS.

(8) BASEMENT WALL TO BE DAMP PROOFED.

(9) EXTERIOR GRADE TO SLOPE AWAY FROM BUILDING.

(10) SLAB ON GRADE SHOULD NOT BE STRUCTURALLY CONNECTED TO THE WALL OR FOOTING

(11) UNDERFLOOR DRAIN INVERT TO BE AT LEAST 300mm (12") BELOW UNDERSIDE OF FLOOR SLAB. DRAINAGE TILE PLACED IN PARALLEL ROWS 6 TO 8m (20-25') CENTERS ONE WAY. PLACE DRAIN ON 100mm (4") CLEAR STONE WITH 150mm (6") OF CLEAR STONE ON TOP AND SIDES. ENCLOSE STONE WITH FILTER FABRIC AS NOTED IN (3)

(12) THE ENTIRE SUBGRADE TO BE SEALED WITH APPROVED FILER FABRIC (TERRAFIX 270R OR EQUIVALENT) IF NON-COHESIVE(SANDY) SOILS BELOW GROUND WATER TABLE ENCOUNTERED.

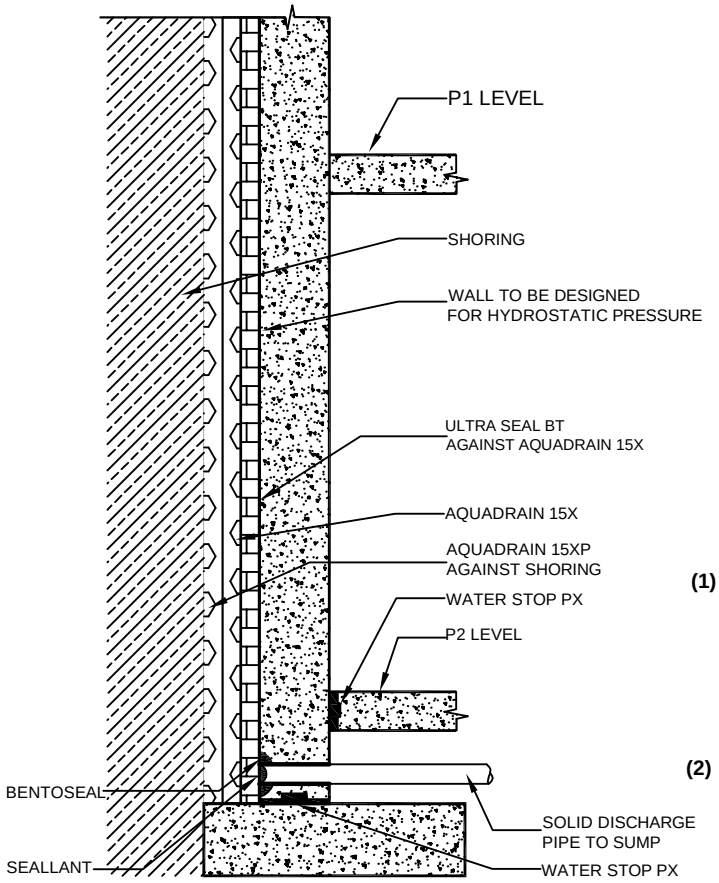
(13) DO NOT CONNECT THE UNDERFLOOR DRAINS TO PERIMETER DRAINS.

(14) REVIEW THE GEOTECHNICAL REPORT FOR SPECIFIC DETAILS.

DRAINAGE AND BACKFILL RECOMMENDATIONS

BASEMENT WITH UNDERFLOOR DRAINAGE

(NOT TO SCALE)



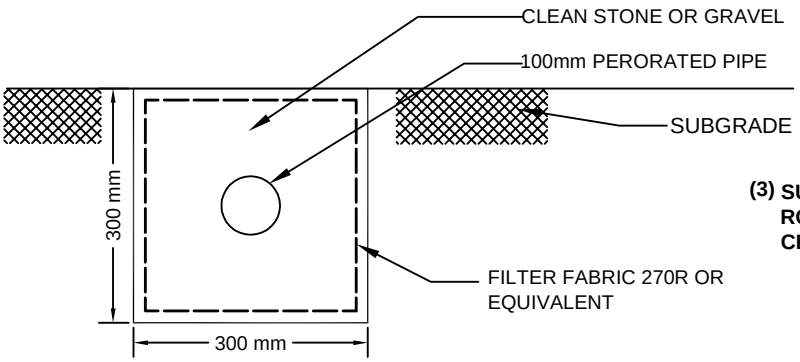
NOTES:

(1) ALL PERMANENT DRAINAGE PIPES MUST HAVE GEOTEXTILE FILTER SLEEVE TO PREVENT LONG TERM SILTING. TO FURTHER MINIMIZE SILTATION OF THE DRAINAGE SYSTEM, ALL DRAINAGE PIPE CONNECTION MUST BE SOLID PVC ELBOWS AND Ts. NO "BUTT" END CONNECTIONS SHOULD BE PERMITTED.

(2) PERIMETER COLLECTION PIPE TO BE SOLID PIPE,

SUGGESTED EXTERIOR DRAINAGE AGAINST SHORING

(NOT TO SCALE)



(3) SUBGRADE DRAIN TO BE PLACED IN PARALLEL ROWS 6-8 m (20'-25'), FROM CENTERLINE TO CENTERLINE.

DETAIL OF SUBGRADE DRAIN

(NOT TO SCALE)

APPENDIX F

ENGINEERING PLANS

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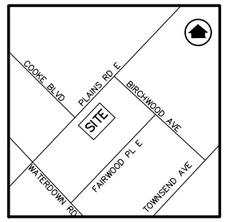
NOTES TO CONTRACTOR:

1. INSPECTION
CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.

2. CONFIRMATION OF EXISTING INVERTS
72 HOURS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS TO LOCATE, EXPOSE AND VERIFY INVERTS OF EXISTING UTILITIES AND EXISTING SEWERS AT CONNECTION POINTS. SHOULD THE CONTRACTOR PROCEED WITHOUT COMPLETING THESE LOCATES, EXTRA COSTS RESULTING FROM DELAYS AND STANDBY TIME WILL NOT BE CONSIDERED.

LEGEND:

- 209.00 — EXISTING GROUND ELEVATION
- x(209.00) — PROPOSED GROUND ELEVATION
- 209.00EX — PROPOSED ELEVATION TO MATCH EXISTING
- (209.00)TW — PROPOSED ELEVATION TO MATCH TOP OF WALL
- 2.0% — PROPOSED DIRECTION OF SHEET FLOW
- EXISTING CATCHBASIN
- EXISTING STORM/SANITARY MANHOLE
- PROPOSED AREA DRAIN
- PROPOSED STORM/SANITARY MANHOLE
- PROPOSED SILTATION CONTROL FENCE
- PROPOSED CATCHBASIN SILT SACK
- OVERLAND FLOW ROUTE
- PROPOSED GATE VALVE
- PROPOSED DRAINAGE BREAK LINE
- EXISTING DIRECTION OF DRAINAGE
- 100.46 — PROPOSED SWALE



KEY MAP
N.T.S.

COOKE BLVD

PLAINS ROAD EAST

NOTE:
EXISTING SERVICES FOR 40, 46, 50, 56, 62 AND 70 PLAINS ROAD EAST TO BE ABANDONED AS PER CITY OF BURLINGTON AND HALTON REGION STANDARDS

RELOCATE EX. FIRE HYDRANT (BY REGION OF HALTON FORCES ONLY)

450mmø NYLOPLAST INSPECTION PORT C/W SUMP INSERT T/G=100.38 (CONTRACTOR TO PROVIDE SHOP DRAWINGS)

450mmø NYLOPLAST INSPECTION PORT C/W SUMP INSERT T/G=100.38 (CONTRACTOR TO PROVIDE SHOP DRAWINGS)

PROP. DEPRESSED CURB & GUTTER AS PER OPSD 600.040

PROP. CURB & GUTTER AS PER OPSD 600.040

PROP. TRANSFORMER AND PAD

PROPOSED 9-STOREY RESIDENTIAL BUILDING FFE=100.50 1ST PARKING LEVEL=97.60 2ND PARKING LEVEL=95.00

AREA DRAINS TO CONNECT TO INTERNAL MECHANICAL SYSTEM

PROP. BARRIER CURB AS PER OPSD 600.110

PROP. SILT FENCE (AS PER DETAIL)

PROP. RETAINING WALL C/W RAILING (DESIGN BY OTHERS)

PROP. CONCRETE RAMP (TO BE HEATED)

OUTDOOR AMENITY AREA

BUILDING OVERHANG

PROP. TOE WALL (PER OPSD 3120.100)

MATCH EXISTING GRADES AT PROPERTY LINE

LIMIT OF UNDERGROUND

FFE=101.45

FFE=101.25

BENCH MARK NOTE:

CITY OF BURLINGTON BENCHMARK No. 298
ELEVATION = 97.915 METRES CGVD 1928:1978 ADJUSTMENT
BENCHMARK SET ON CITY PLATE ON SOUTH FACE AT SOUTHEAST CORNER OF GLENVIEW PUBLIC SCHOOL, No. 143 TOWNSEND AVENUE

NO.	DATE	BY	REVISIONS
01	APR.19/21	SN	REVISED PER CITY COMMENTS

NOTES TO CONTRACTOR:
1. CONTRACTORS AND SUBCONTRACTORS SHALL NOT SCALE FROM THIS DRAWING.
2. ANY INCONSISTENCIES AND OMISSIONS FOUND ON THE DRAWINGS MUST BE REPORTED TO THE ENGINEER FOR CLARIFICATION BEFORE COMMENCING THE WORK.
3. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ALL FINDINGS TO THE ENGINEER. ONCE CONSTRUCTION HAS COMMENCED, THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL DIMENSIONS, ELEVATIONS, AND SITE CONDITIONS.
4. THE POSITIONS OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVER-GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS. WHERE SHOWN ON THE DRAWING, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
5. ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED, REUSED, OR REVISED WITHOUT THE WRITTEN CONSENT OF S. LLEWELLYN AND ASSOCIATES LIMITED.

DESIGN	LVF	CHK'D	SF	DATE NOV 12, 2020
DRAWN	LVF	CHK'D	SF	

SCALE 1:200 (0, 5, 10, 20)

APPROVALS

STAMP
LICENSED PROFESSIONAL ENGINEER
Scott Nelson
S. J. NELSON
100228748
April 19/21
PROVINCE OF ONTARIO

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS
Tel. (905) 631-6978
Fax (905) 631-8927
email: info@sla.on.ca
3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

CLIENT
INFINITY DEVELOPMENT GROUP
2275 UPPER MIDDLE RD E, OAKVILLE, ON

PROJECT NAME
40-70 PLAINS ROAD EAST
BURLINGTON, ON

TITLE
PRELIMINARY GRADING & EROSION CONTROL PLAN

PROJECT No. 19121
DRAWING No. C101

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Plotted: April 19, 2021 8:53:33 PM By: Scott Nelson

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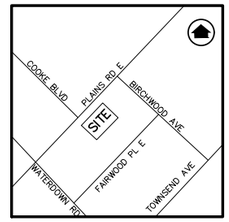
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2. CONFIRMATION OF EXISTING INVERTS
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LEGEND:

- EXISTING CATCHBASIN
- EXISTING STORM/SANITARY MANHOLE
- PROPOSED AREA DRAIN
- PROPOSED STORM/SANITARY MANHOLE
- PROPOSED GATE VALVE
- PROPOSED WATER METER
- PROPOSED BACKFLOW PREVENTER
- PROPOSED ROAD RESTORATION



KEY MAP
N.T.S.

COOKE BLVD

PLAINS ROAD EAST

REMOVE & REPLACE CONCRETE SIDEWALK TO EXISTING CONDITION OR BETTER (AS PER CITY OF BURLINGTON STANDARD S-121)

CONNECT PROP. 150mmø PVC FIRE HYDRANT LEAD TO EX. 400mmø WATERMAIN (TAP BY REGION OF HALTON FORCES ONLY)

RELOCATE EX. FIRE HYDRANT (BY REGION OF HALTON FORCES ONLY)

CONNECT PROP. 150mmø PVC WATER SERVICE TO EX. 400mmø WATERMAIN (BY HALTON REGION FORCES ONLY)

SAWCUT, REMOVE & RESTORE EX. ASPHALT, CONCRETE & LANDSCAPED AREAS TO EXISTING CONDITION OR BETTER (TYP.) (AS PER CITY OF BURLINGTON STANDARD S-114, S114A & S114B OR S-115 & S-115A IF CONCRETE ROAD BASE IS PRESENT)

450mmø NYLOPLAST INSPECTION PORT C/W SUMP INSERT T/G=100.38 INV. 96.77 (CONTRACTOR TO PROVIDE SHOP DRAWINGS)

CONNECT PROP. 4.5m-250mmø PVC STM @ 1.1% TO EX. 600mmø STM PROP. INV. 98.25 EX. INV. 97.81

NOTE:
EXISTING SERVICES FOR 40, 46 AND 50 PLAINS ROAD EAST TO BE ABANDONED AS PER CITY OF BURLINGTON AND HALTON REGION STANDARDS

REMOVE & REPLACE CONCRETE SIDEWALK TO EXISTING CONDITION OR BETTER (AS PER CITY OF BURLINGTON STANDARD S-121)

150mmø PVC WATER SERVICE (FIRE)

100mmø PVC WATER SERVICE (DOM.)

CONNECT PROP. 3.0m-200mmø PVC SAN @ 2.0% TO EX. 250mmø SAN PROP. INV. 96.75 EX. INV. 96.46

450mmø NYLOPLAST INSPECTION PORT C/W SUMP INSERT T/G=100.35 INV. 98.28 (CONTRACTOR TO PROVIDE SHOP DRAWINGS)

CAST-IN-PLACE STORAGE VAULT TANK VOLUME = 195m³ (C/W 160mmø OUTLET & PUMP) (CONTRACTOR TO PROVIDE SHOP DWG'S) (REFER TO DETAIL)

PROP. DEPRESSED CURB & GUTTER AS PER OPSD 600.040

PROP. CURB & GUTTER AS PER OPSD 600.040

PROP. TRANSFORMER AND PAD

PROP. 3.0m-200mmø PVC SAN @ 2.0% INV. 96.81

PROP. 4.5m-250mmø PVC STM @ 1.1% INV. 98.30

REMOVE & REPLACE CONCRETE SIDEWALK TO EXISTING CONDITION OR BETTER (AS PER CITY OF BURLINGTON STANDARD S-121)

PROPOSED 9-STOREY RESIDENTIAL BUILDING FFE=100.50 1ST PARKING LEVEL=97.60 2ND PARKING LEVEL=95.00

AREA DRAINS TO CONNECT TO INTERNAL MECHANICAL SYSTEM

PROP. BARRIER CURB AS PER OPSD 600.110

PROP. RETAINING WALL C/W RAILING (DESIGN BY OTHERS)

BUILDING OVERHANG

PROP. TOE WALL (PER OPSD 3120.100)

OUTDOOR AMENITY AREA

LIMIT OF UNDERGROUND

FFE=101.45

FFE=101.25

AD1 100.10
AD2 100.10
AD3 100.10
AD4 100.10
AD5 100.10
AD6 100.85
AD7 101.00
AD8 101.00
AD9 101.00
AD10 101.00
AD11 101.05
AD12 101.20
AD13 101.20
AD14 101.20
AD15 101.30
AD16 101.00
AD17 100.40

BENCH MARK NOTE:

CITY OF BURLINGTON BENCHMARK No. 298
ELEVATION = 97.915 METRES CGVD 1928:1978 ADJUSTMENT
BENCHMARK SET ON CITY PLATE ON SOUTH FACE AT SOUTHEAST CORNER OF GLENVIEW PUBLIC SCHOOL, No. 143 TOWNSEND AVENUE

NO.	DATE	BY	REVISIONS
01	APR.19/21	SN	REVISED PER CITY COMMENTS

NOTES TO CONTRACTOR:

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DESIGN	LVF	CHK'D	SF
DRAWN	LVF	CHK'D	SF

DATE: NOV 12, 2020

SCALE 1:200 (0, 5, 10, 20)

APPROVALS

STAMP: LICENSED PROFESSIONAL ENGINEER — S. J. NELSON — 100228748 — April 19/21 — PROVINCE OF ONTARIO

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS
Tel. (905) 631-6978
Fax (905) 631-8927
email: info@sla.on.ca
3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

CLIENT
INFINITY DEVELOPMENT GROUP
2275 UPPER MIDDLE RD E, OAKVILLE, ON

PROJECT NAME
40-70 PLAINS ROAD EAST
BURLINGTON, ON

TITLE
PRELIMINARY SERVICING PLAN

PROJECT No. 19121
DRAWING No. C102

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Plotted: April 19, 2021 8:53:38 PM By: Scott Nelson

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GENERAL NOTES:

1. CONSTRUCTION OF SEWERS, AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS OF THE CITY OF BURLINGTON, THE REGIONAL MUNICIPALITY OF HALTON AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD). THE TOWN AND THE REGION'S DRAWINGS SHALL TAKE PRECEDENCE OVER THE OPSD DRAWINGS.
2. ONTARIO PROVINCIAL STANDARD DRAWINGS TO BE READ IN CONJUNCTION WITH THE REGION OF HALTON REVISIONS.
3. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
5. FOR ALL SEWERS AND WATERMAIN IN FILL SECTIONS, THE COMPACTION SHALL BE VERIFIED PRIOR TO LAYING OF PIPE.
6. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE REGIONAL ENGINEER, CITY OF BURLINGTON OR THE ENGINEER.
7. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% SPD.
8. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
9. TREE PROTECTION PROCEDURES TO BE IMPLEMENTED IN ACCORDANCE WITH CITY OF BURLINGTON STANDARDS.
10. THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL SEALED BY THE ENGINEER AND INDICATED ISSUED FOR CONSTRUCTION ON THE DRAWING.
11. THIS/THESE PLAN(S) IS/ARE NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF S. LLEWELLYN AND ASSOCIATES LIMITED.
12. INFORMATION REGARDING ANY EXISTING SERVICES AND/OR UTILITIES SHOWN ON THE APPROVED SET OF CONSTRUCTION DRAWINGS ARE FURNISHED AS THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS HE SEES FIT WITH THE UNDERSTANDING THAT THE OWNER AND HIS AGENTS DISCLAIM ALL RESPONSIBILITY FOR ITS ACCURACY AND /OR SUFFICIENCY. THE CONTRACTOR SHALL ASSUME LIABILITY FOR ANY DAMAGE TO EXISTING WORKS.
13. SITE PLAN INFORMATION TAKEN FROM PLANS PREPARED BY RAW DESIGN, DATED APRIL 1, 2021.
14. THIS/THESE PLAN(S) TO BE READ IN CONJUNCTION WITH THE FUNCTIONAL SERVICING REPORT (FSR) PREPARED BY S. LLEWELLYN AND ASSOCIATES LIMITED.
15. THIS PLAN TO BE USED FOR SERVICING AND GRADING ONLY, FOR BUILDING LOCATION REFER TO TO THE SITE PLAN.
16. MUNICIPAL APPROVAL OF THESE DRAWINGS IS FOR MATERIAL AND COMPLIANCE WITH CITY OF BURLINGTON AND PROVINCIAL SPECIFICATIONS AND STANDARDS ONLY. APPROVAL AND INSPECTION OF THE WORKS BY THE CITY OF BURLINGTON STAFF DOES NOT CERTIFIY THE LINE AND GRADE OF THE WORKS NOR RELIEVE THE CONTRACTOR OF CERTIFICATION OF ALL WORKS BY THE OWNER'S ENGINEER.
17. ALTERNATE MATERIALS MAY BE ACCEPTABLE PROVIDED WRITTEN APPROVAL HAS FIRST BEEN OBTAINED FROM THE CITY OF BURLINGTON AND THE THE ENGINEER.
18. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER'S BONDED CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS NORMALLY REQUIRED TO COMPLETE A CONSTRUCTION PROJECT, SUCH AS, BUT NOT LIMITED TO THE FOLLOWING:
    - ROAD CUT PERMITS
    - SEWER PERMITS
    - APPROACH APPROVAL PERMITS
    - RELOCATION OF SERVICES
    - COMMITTEE OF ADJUSTMENT
    - ENCROACHMENT AGREEMENTS
20. PRIOR TO CONSTRUCTION THE CONTRACTOR MUST:
    i. CHECK AND VERIFIY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDE BUT ARE NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS, EXISTING INVERTS AND REPORT FINDING IN WRITING TO THE ENGINEER.
    ii. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.
    iii. VERIFY ALL FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS WHICH MY APPEAR ON THESE PLANS COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.
    iv. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.
    v. NOTIFY THE ENGINEER OF THE PROPOSED CONSTRUCTION SCHEDULE FOR COORDINATION OF NECESSARY INSPECTIONS.
21. **THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE ENGINEER 48 HOURS PRIOR TO THE COMMENCING SITE WORKS TO ARRANGE FOR INSPECTION. THE ENGINEER SHALL DETERMINE THE EXTENT OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF THE UNDERGROUND SERVICE INSTALLATION AS MANDATED BY THE ONTARIO BUILDING CODE DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO MAKE SUITABLE ARRANGEMENTS FOR INSPECTION WILL LEAD TO POST CONSTRUCTION TESTING AND INSPECTION AS DETERMINED BY THE ENGINEER, THE COSTS OF WHICH INCLUDING ANY DELAYS IN CONSTRUCTION SHALL BE BOURNE BY THE CONTRACTOR. FULL PAYMENT FOR UN-INSPECTED WORKS MAY BE WITHHELD UNTIL THE COMPLETION OF THE POST CONSTRUCTION INSPECTION AND TESTING TO THE SATISFACTION OF THE ENGINEER.**
22. INSPECTION BY THE OWNER'S ENGINEER IS FOR CERTIFICATION AND GENERAL CONFORMANCE PURPOSES AND DOES NOT CERTIFY LINE AND GRADE OR IMPLY AN ASSURANCE OF QUALITY CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THE INSTALLATION OF THE WORKS TO PROPER LINE, GRADE AND QUALITY TO CURRENT INDUSTRY STANDARDS.
23. ANY UTILITY RELOCATIONS AND RESTORATIONS DUE TO THE DEVELOPMENT TO BE UNDERTAKEN AT THE EXPENSE OF THE OWNER/DEVELOPER AND SHALL BE COORDINATED BY THE CONTRACTOR.
24. ALL RESTORATIONS AND RECONSTRUCTIONS SHALL BE TO COMPLETED TO MATCH EXISTING CONDITIONS OR BETTER AND ARE TO BE PERFORMED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF BURLINGTON.
25. SERVICING CONTRACTOR TO MAINTAIN A "CONFINED TRENCH CONDITION" IN ALL SEWER AND WATERMAIN INSTALLATION TRENCHES.
26. THE SITE SERVICING CONTRACTOR SHALL TERMINATE ALL SERVICES 1.0m FROM THE BUILDING FACE.
27. NO BLASTING WILL BE PERMITTED.

ROADWORKS:

1. APPROVED FILL, FREE OF DELETERIOUS AND ORGANIC MATERIAL AND BOULDERS SHALL BE COMPACTED TO A DRY DENSITY NOT LESS THAN 95% THAN THE STANDARD PROCTOR DENSITY. AFTER COMPACTION, SOIL DENSITY TESTS SHALL BE CONDUCTED TO ENSURE ADEQUATE COMPACTION AND STABILITY OF THE FILL AND TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER.
2. SUBGRADE TO BE PROOF ROLLED PRIOR TO PLACEMENT OF SUB BASE. UNSUITABLE MATERIAL TO BE REMOVED AND REPLACED WITH SELECT FILL OR GRANULAR "B" AND COMPACTED TO 98% SPD.
3. ASPHALTIC CONCRETE TO BE COMPACTED TO 97% MARSHALL DENSITY.
4. PAVEMENT STRUCTURE FOR INTERNAL ROADS SHALL CONSIST OF COMPACTED THICKNESSES OF: 40mm HL3 SURFACE ASPHALT 60mm HL8 BASE BINDER ASPHALT 150mm GRANULAR "A" BASE COURSE 250mm GRANULAR "B" SUB-BASE COURSE
5. BOULEVARDS TO BE SODDED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF SELECT TOPSOIL.
6. MANHOLE FRAMES AND COVERS AND WATER VALVE BOXES SHALL BE SET FLUSH WITH BASE COURSE ASPHALT AND ADJUSTED TO FINAL GRADE AFTER INSTALLATION OF SURFACE ASPHALT AS PER CITY OF BURLINGTON STANDARD DRAWINGS S-130.
7. TRAFFIC CONTROL SHALL BE MAINTAINED AT ALL TIMES FOR WORKS ON EXISTING ROADWAYS TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING. THE EXPENSE FOR THE ERECTION OF SIGNS, DELINEATORS AND OTHER TRAFFIC CONTROL DEVICES SHALL BE BORNE BY THE CONTRACTOR.
8. STANDARD PARKING SPACES SHALL BE 2.6mx5.6m.

GRADING NOTES

1. ALONG ADJOINING PROPERTIES GRADE TO MEET EXISTING OR PROPOSED ELEVATIONS WITH SODDED SLOPES (MIN. 3H TO 1V) AND/OR RETAINING WALLS AS SPECIFIED.
2. ALL RETAINING WALLS, WALKWAYS, CURBS, ETC., SHALL BE PLACED A MIN. OF 0.3m OFF THE PROPERTY LINE. ALL WALLS 1.0m OR HIGHER SHALL BE DESIGNED BY A P.ENG.
3. SHOULD A RETAINING WALL BE REQUIRED, THE TOP OF WALL ELEVATIONS SHALL BE SET 150mm ABOVE THE PROPOSED SIDE YARD SWALES.
4. RETAINING WALLS 0.6m IN HEIGHT OR GREATER REQUIRE CONSTRUCTION OF A FENCE OR GUARD RAIL AT THE TOP OF THE REAR OF THE WALL. GUARDS FOR RETAINING WALLS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF EXTERIOR GUARDS AS CONTAINED IN THE ONTARIO BUILDING CODE.
5. TOP OF FOUNDATION WALLS FOR BUILDINGS SHALL BE 150mm (MIN) ABOVE FINISHED GRADE.
6. DRIVEWAY SLOPES SHALL NOT BE LESS THAN 2% AND NOT MORE THAN 7.0% REVERSED SLOPED DRIVEWAYS IN NEW DEVELOPMENTS ARE NOT PERMITTED.
7. IF GRADING IS REQUIRED ON LANDS ADJACENT TO THE DEVELOPMENT WHICH ARE NOT OWNED BY THE DEVELOPER, THEN THE DEVELOPER MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNER TO ALLOW THE DEVELOPER TO GRADE ON THE ADJACENT LANDS, OTHERWISE RETAINING WALLS MUST BE USED.
8. THE WRITTEN PERMISSION REQUIRED FROM THE ADJACENT LANDOWNER SHALL BE OBTAINED PRIOR TO ENTERING THE LANDS. SHOULD PERMISSION NOT BE OBTAINED OR IS WITHDRAWN PRIOR TO COMMENCING THE WORK, THEN THE DEVELOPER SHALL LIMIT HIS ACTIVITIES TO THE LIMITS OF THE DEVELOPMENT SITE.
9. DRIVEWAY AND DRIVEWAY APPROACHES SHALL BE LOCATED SUCH THAT HYDRO VAULTS AND OTHER STREET FURNITURE ARE A MIN. OF 1.2m FROM THE DRIVEWAY ENTRANCE CURB RADII.
10. ANY CHANGES IN GRADES AND CATCH BASINS REQUIRE THE APPROVAL OF THE CITY'S MANAGER OF DEVELOPMENT ENGINEERING.
11. ALL DRIVEWAYS FROM PROPERTY LINES FOR THE FIRST 7.5m SHALL BE WITHIN 5% MAXIMUM GRADE, THEREAFTER, ALL DRIVEWAYS SHALL BE WITHIN 10% MAXIMUM GRADES.

SILTATION AND EROSION CONTROL

1. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED.
2. ALL SILTATION CONTROL MEASURES SHALL BE CLEANED AND MAINTAINED AFTER EACH RAINFALL AS DIRECTED AND TO THE SATISFACTION OF THE CITY OF BURLINGTON AND/OR THE HALTON CONSERVATION AUTHORITY.
3. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER, THE CITY OF BURLINGTON AND/OR THE HALTON CONSERVATION AUTHORITY.

SANITARY SEWERS:

1. SANITARY SEWERS SHALL BE PVC. PVC PIPE IS TO BE BELL AND SPIGOT AND COMPLY TO ASTM D-3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SANITARY SEWER MAINS AND RELATED CONNECTIONS IN A SINGLE TRENCH SHALL BE CLASS B GRANULAR BEDDING AS PER OPSD 802.010 UNLESS OTHERWISE NOTED.
3. SANITARY SEWER MANHOLES FRAME AND COVER AS PER OPSD 401.010.
4. TAPPING AT EXISTING SANITARY SEWERS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
5. ALL SEWERS TO BE VIDEO INSPECTED.
6. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
7. ALL PVC SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. SANITARY SEWERS SHALL ALSO BE TESTED FOR LEAKAGE (LOW AIR PRESSURE). PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

STORM SEWERS:

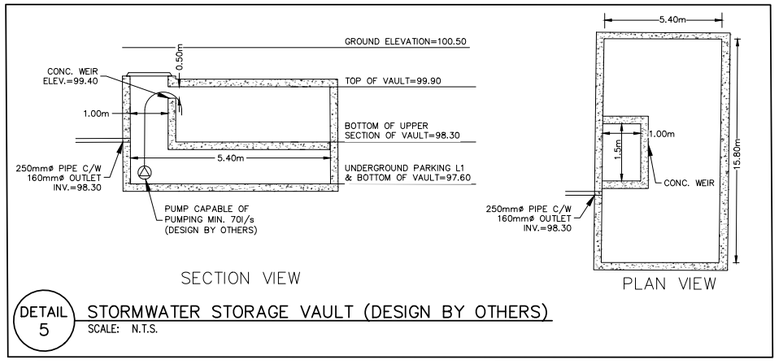
1. 300mm-450mm STORM SEWERS SHALL BE PVC, BELL AND SPIGOT AND SHALL COMPLY TO ASTM D-3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SINGLE STORM SEWER MAINS AND ALL RELATED CONNECTIONS SHALL BE HIGH PERFORMANCE CLEAR STONE (HL-8 GRADED) AS PER CITY OF BURLINGTON STANDARD DRAWINGS S-188.
3. STORM SEWER MANHOLES SHALL BE IN ACCORDANCE WITH OPSD 701.010. AND 703.010. FRAME AND COVER AS PER OPSD 401.01 TYPE A. FRAMES TO BE STAMPED "DANGER" AND "STORM".
4. CATCHBASINS SHALL BE IN ACCORDANCE WITH OPSD 705.010. CATCHBASIN MANHOLES SHALL BE IN ACCORDANCE WITH OPSD 701.010 AND 701.030 UNLESS OTHERWISE SPECIFIED. CATCHBASINS TO LOCATED WITHIN LANDSCAPED AREAS TO BE SUMPLESS. FRAME AND COVER FOR CATCHBASINS AND CATCHBASIN MANHOLES SHALL BE AS PER OPSD 400.100 (ROADS) AND PER CITY OF BURLINGTON STANDARD DRAWING S-176 (REAR YARDS).
5. DOUBLE CATCH BASINS SHALL BE IN ACCORDANCE WITH OPSD 705.020 WITH 250mm DIA. LEAD. FRAMES AND COVERS TO BE OPSD 400.11 (ROADS) AND CITY OF BURLINGTON STD. S-176 (REAR YARDS). LEADS TO BE PVC SDR 35.
6. CATCH BASIN AND MANHOLE TOPS SHALL BE INITIALLY SET TO BASE COURSE ASPHALT ELEVATION AND ADJUSTED TO GRADE PRIOR TO PLACEMENT OF TOP LIFT OF ASPHALT.
7. ALL TRENCH EXCAVATIONS ARE TO BE BACKFILLED WITH SELECT NATIVE MATERIAL PLACED IN MAXIMUM 200mm LIFT THICKNESSES WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT AND COMPACTED TO A MINIMUM OF 95% SPD, UNLESS OTHERWISE SPECIFIED.
8. INVERTS OF ALL SWALES TO BE SODDED TO A MINIMUM WIDTH OF 3.0m. ALL OTHER DISTURBED AREAS TO BE TOPSOILED AND SEEDED. SOD SHALL BE #1 NURSERY LAID ON A MINIMUM OF 150mm OF TOPSOIL.
9. ALL SEWERS TO BE VIDEO INSPECTED.
10. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
11. ALL PVC SEWERS (SANITARY AND STORM) ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

RESTORATIONS:

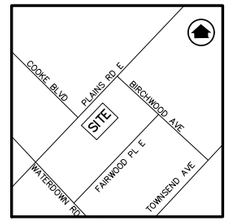
1. ALL TRENCH EXCAVATIONS WITHIN EXISTING ROAD ALLOWANCES SHALL BE AS BACKFILLED AS PER CITY OF BURLINGTON STANDARD DRAWING S-114 AND S-114A, OR S-115 AND S-115A WHERE CONCRETE ROAD BASE IS PRESENT.
2. EXISTING PRIVATE FENCING IS TO BE MAINTAINED THROUGHOUT CONSTRUCTION. WHERE REMOVAL OR RELOCATION OF FENCING IS NECESSARY IT SHALL BE RESTORED OR REPLACED TO ORIGINAL CONDITIONS OR BETTER UNDER THE DIRECTION OF THE ENGINEER.
3. DAMAGED CURB, GUTTER AND SIDEWALK TO BE REPLACED WITH 28 MPa CONCRETE TO EXISTING CONDITIONS OR BETTER.
4. PAVEMENT SURFACE ON EXISTING PLAINS ROAD EAST TO BE REPAIRED BY CONTRACTOR AT THEIR EXPENSE IF DAMAGED BY CONSTRUCTION TRAFFIC.

WATERMAINS:

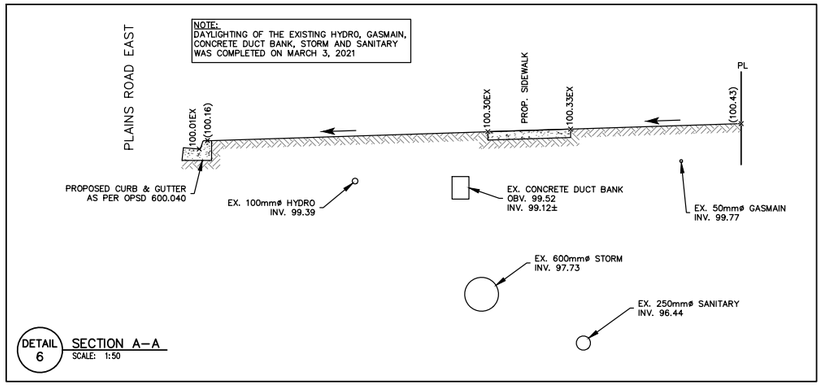
1. FLEXIBLE WATERMAIN PIPE UP TO 300mm DIAMETER TO BE P.V.C. DR-18 AND CONFORM TO A.W.W.A. C-900 WITH MECHANICAL JOINTS AS PER A.W.W.A. C-110, AND TO BE INSTALLED WITH A 10 GAUGE TRACER WIRE.
2. FLEXIBLE PIPE BEDDING TO BE OPSD 802.010 WITH COMPACTED GRANULAR B MATERIAL.
3. MINIMUM COVER TO BE 1.7m TO TOP OF PIPE.
4. DEFLECTION AT JOINTS NOT TO EXCEED 2.5 DEGREES AND SHALL BE EQUAL AT ALL JOINTS.
5. GATE VALVES AND BOXES FOR 150mm DIAMETER WATERMAINS AS PER A.W.W.A. STANDARD C-500 AND ARE TO OPEN TO THE LEFT (COUNTER CLOCKWISE).
6. HYDRANTS SHALL MEET THE REQUIREMENTS OF A.W.W.A. STANDARD C-502 AND SHALL BE SET IN ACCORDANCE WITH REGION OF HALTON, AND CITY OF BURLINGTON BUILDING DEPARTMENT STANDARDS, COMPLETE WITH STEAMER CONNECTIONS. THE 100mm STEAMER PORT SHALL FACE THE FIRE ROUTE AND SHALL BE UNOBSTRUCTED BY ANY PROPOSED LANDSCAPING.
7. ALL FITTINGS TO HAVE MECHANICAL RESTRAINTS THAT MEET UNI-B-13-92.
8. ALL TEMPORARY AND PERMANENT WATERMAIN PLUGS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH OPSD 1103.01.
9. TAPPING AT EXISTING WATERMAINS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
10. ALL WATER CUSTOMERS SUPPLIED BY A WATERMAIN TO BE SHUT DOWN SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 48 HOURS IN ADVANCE OF THE SHUT DOWN AS PER REGION OF HALTON SPECIFICATIONS. NOTIFICATION SHALL TAKE PLACE UNDER THE ENGINEER'S DIRECTION.
11. MINIMUM HORIZONTAL SEPERATION BETWEEN WATERMAINS (INCLUDING PRIVATE SERVICES) AND STORM AND SANITARY SEWERS SHALL BE 2.5m. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 500mm BETWEEN ALL OTHER UTILITIES WHEN CROSSING.



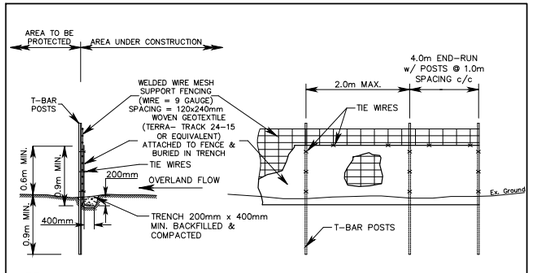
DETAIL 5 — STORMWATER STORAGE VAULT (DESIGN BY OTHERS)
SCALE: N.T.S.



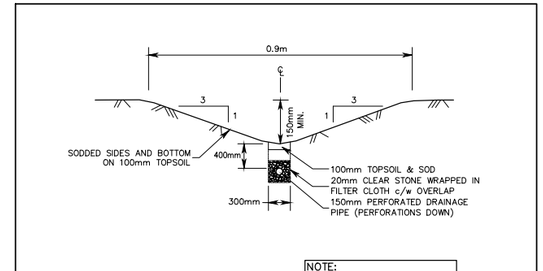
KEY MAP
N.T.S.



DETAIL 6 — SECTION A-A
SCALE: 1:50

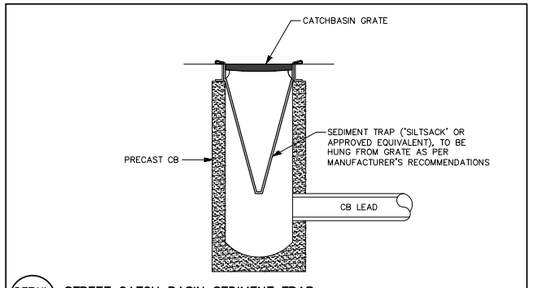


DETAIL 1 — HEAVY-DUTY SILT FENCE (PER OPSD 219.130)
SCALE: N.T.S.

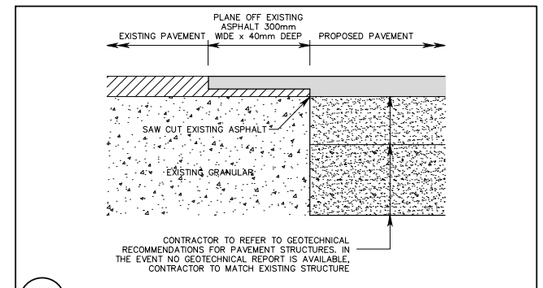


NOTE:
SUBDRAIN REQUIRED FOR SWALES WITH LESS THAN A 1.5% SLOPE

DETAIL 3 — TYPICAL SWALE DETAIL
SCALE: N.T.S.



DETAIL 2 — STREET CATCH BASIN SEDIMENT TRAP
SCALE: N.T.S.



DETAIL 4 — ASPHALT LAP JOINT
SCALE: N.T.S.

BENCH MARK NOTE:

CITY OF BURLINGTON BENCHMARK No. 298
ELEVATION = 97.915 METRES CGVD 1928:1978 ADJUSTMENT
BENCHMARK SET ON CITY PLATE ON SOUTH FACE AT SOUTHEAST CORNER OF GLENVIEW PUBLIC SCHOOL, No. 143 TOWNSEND AVENUE

NO.	DATE	BY	REVISIONS
01	APR.19/21	SN	REVISED PER CITY COMMENTS

NOTES TO CONTRACTOR:

1. CONTRACTORS AND SUBCONTRACTORS SHALL NOT SCALE FROM THIS DRAWING.
2. ANY INCONSISTENCIES AND OMISSIONS FOUND ON THE DRAWINGS MUST BE REPORTED TO THE ENGINEER FOR CLARIFICATION BEFORE COMMENCING THE WORK.
3. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ALL FINDINGS TO THE ENGINEER. ONCE CONSTRUCTION HAS COMMENCED, THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL DIMENSIONS, ELEVATIONS, AND SITE CONDITIONS.
4. THE POSITIONS OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVER-GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS. WHERE SHOWN ON THE DRAWING, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
5. ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED, REUSED, OR REVISED WITHOUT THE WRITTEN CONSENT OF S. LLEWELLYN AND ASSOCIATES LIMITED.

DESIGN	LVF	CHK'D	SF	DATE
DRAWN	LVF	CHK'D	SF	NOV 12, 2020
SCALE				

APPROVALS

STAMP: LICENSED PROFESSIONAL ENGINEER — Scott Nelson — S. J. NELSON — 100228748 — April 19/21 — PROVINCE OF ONTARIO

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS
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Fax (905) 631-8927
email: info@sla.on.ca
3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

CLIENT
INFINITY DEVELOPMENT GROUP
2275 UPPER MIDDLE RD E, OAKVILLE, ON

PROJECT NAME
40-70 PLAINS ROAD EAST
BURLINGTON, ON

TITLE
GENERAL NOTES & DETAILS

PROJECT No. 19121
DRAWING No. C103

S:\19121\WORKING\CURRENT\19121-Grading & Servicing Plan.dwg
Plotted: April 19, 2021 8:53:39 PM By: Scott Nelson