FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

875 APPLEBY LINE

CITY OF BURLINGTON
REGIONAL MUNICIPALITY OF HALTON

PREPARED FOR:

DYMON GROUP OF COMPANIES

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
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AUGUST 2024

CFCA FILE NO. 1644-6586

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CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	August 2024	Issued for ZBA Submission

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1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) was retained by Dymon Group of Companies (Owner) to prepare this Functional Servicing and Stormwater Management Report to support the Zoning By-Law Amendment Application (ZBA) for the property located at 875 Appleby Line in the City of Burlington. This report demonstrates how the proposed development's functional servicing and stormwater management will integrate with the area's existing water, sanitary, and stormwater infrastructure. This report has been prepared in accordance with the City of Burlington and the Halton Region standards and guidelines.

2.0 SITE DESCRIPTION

The Site covers an area of approximately 1.29 ha and currently consists of an undeveloped greenfield and an existing commercial development located in the City of Burlington. The subject lands are located within the Appleby Creek Watershed and are bounded by South Service Road to the north, commercial properties to the east, Appleby Line to the south, and commercial properties to the west.

The proposed development includes the construction of a 5-storey industrial building and includes retail and office area. Site access will be provided via South Service Road and Appleby Line. The building will be equipped with 166 at-grade parking spaces.

The expected population for the Site was calculated using the equivalent population density factors from the Halton Region Water and Wastewater Linear Design Manual October 2019, Version 5 (Table 3.2) and ground floor areas obtained from the site plan provided by Global Architect Inc, dated March 2024.

Table 1 summarizes the proposed population for the subject property.

Table 1: Estimated Proposed Population Density

Type	**Area** (ha)	**Equivalent Population Density**	**Population**
Storage	2.17	125 (persons/ha)	271
Retail	0.12	90 (persons/ha)	10
Office	0.52		46
		Site Total	**328**

The total estimated population for the proposed development is 328 persons.

3.0 WATER SERVICING

3.1 Existing Water Servicing

A review of the as-constructed drawings (MH-8_32, MH-8_33 dated December 2020, MA-3_10A dated May 2009, and H-35_01 dated August 1985) received from the City of Burlington indicate the following water infrastructure within proximity of the Site:

- A 400 mm diameter watermain located in Appleby Line to the south of the Site.
- A 300 mm diameter watermain located in South Service Road to the north of the Site.

Refer to **Drawing C102** for the locations of the existing water infrastructure.

3.2 Design Water Demand

The Site's existing and proposed water demands were calculated using the Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019). An average demand flow of 34.375 m^3/ha/day and 24.750 m^3/ha/day was used for light industrial and light commercial used, respectively, with the occupancy densities described in **Table 1**. A peak day and peak hour factor of 2.25 was applied to estimate the current and proposed water demands on a daily and hourly basis.

Table 2 summarizes the existing and proposed water demands for the Site and **Appendix A** contains detailed calculations.

Table 2: Estimated Domestic Design Water Demand

	Average Daily Demand (L/s)	Max Day Demand (L/s)	Max Hourly Demand (L/s)
Existing Flow	0.00	0.00	0.00
Proposed Flow	1.04	2.35	2.35
Increase	1.04	2.35	2.35

As shown in **Table 2**, the maximum hourly water demand for the Site under the proposed conditions was estimated to be 2.35 L/s.

3.3 Fire Flow Demand

The Fire Underwriters Survey (FUS) method was used to estimate the fire flow requirements for the proposed development. Flow requirements were calculated based on Type II Non-combustible Construction that considered the area of the largest floor plus 25% of the two immediately adjoining floors. Based on the site plan provided by Global Architect, dated March 13, 2024, the flow requirements for the residential building it was calculated to be 11,114 m^2, as calculated based on Levels 2 to 4.

The proposed building will be non-combustible construction containing combustible contents with a complete automatic sprinkler system as per NFPA sprinkler standards. Exposure charges were included in the calculations to account for various existing residential and commercial properties in proximity to the Site. Refer to **Appendix A** for a letter from the architect confirming the building construction coefficients.

The proposed building requires a fire flow of approximately 183.3 L/s per the FUS calculations, making the required maximum day + fire flow equal to 185.7 L/s.

A hydrant flow test was carried out by HTO on October 18th, 2023, on the existing 300 mm diameter watermain on South Service Road, a minimum of 227 L/s projected flow is available within the regional water system. As such, the proposed water services are sufficient in meeting fire flow demands and maximum daily domestic water demands. Results of the test are provided in **Appendix A**.

The hydrant flow test recorded a static pressure of 73 psi within the tested watermain. Per section 2.5.4 of Halton Region's Water and Wastewater Linear Design Manual (July 2017), static pressure in excess of 80 psi is to be reduced to 80 psi, in compliance with the Ontario Building Code. As the subject

property is within Halton Region's acceptable pressure range of 45 psi to 80 psi, no pressure reducing measures are proposed.

Please note that the Fire Underwriters Survey value is a conservative estimate for comparison purposes only. The mechanical/sprinkler engineer for this development will complete the required analyses for fire protection and the architect will design fire separation methods per the determined fire flow rate, in order to meet municipally available flows and pressures.

As such, the existing municipal water supply system has sufficient capacity to support the proposed development without the need for external improvements.

3.4 Proposed Water Servicing

The development is proposed to be serviced by as per Region Standard RH 409.010, with a combined fire and domestic water connection consisting of a 100 mm diameter PVC domestic connection branching from a 250 mm diameter PVC fire connection. The connection will be made to the existing 300 mm diameter municipal watermain in South Service Road.

A check detector assembly, water meter and backflow preventor will be installed internal to the proposed building per mechanical details and specifications. Refer to **Drawing C102** for details of the proposed water servicing and Siamese connection.

4.0 SANITARY SERVICING

4.1 Existing Sanitary Servicing

A review of the as-constructed drawings (MH-8_32, MH-8_33 dated December 2020, and H-35 dated August 1985) received from the City of Burlington indicate the following sanitary infrastructure within proximity of the Site:

- A 300 mm diameter sanitary sewer located in South Service Road to the north of the Site.

Refer to **Drawing C102** for the locations of the existing sanitary services.

4.2 Design Sanitary Flow

The Halton Region Water and Wastewater Linear Design Manual, Version 5 (October 2019) was referenced to calculate sanitary design flows for the proposed development. A unit sewage flow of 34.375 m^3/ha/day and 24.750 m^3/ha/day was used for light industrial and light commercial, respectively, with the occupancy densities described in **Table 1**. A peaking factor was applied to the unit sewage flow to obtain the total estimated design sewage flow.

Table 3 summarizes the estimated design sanitary flow results and **Appendix B** contains detailed calculations.

Table 3: Estimated Design Sanitary Flow

	Average Daily Flow (L/s)	**Peak Flow** (L/s)	**Infiltration Flow** (L/s)	**Total Peak Flow** (L/s)
Existing Flow	0.00	0.00	0.37	0.37
Proposed Flow	1.04	4.24	0.37	4.61
Increase	1.04	4.24	-	4.24

As shown in **Table 3**, the total peak sanitary flow for the proposed development is estimated to be 4.61 L/s.

4.3 Proposed Sanitary Servicing

The Site is proposed to be serviced with a 150 mm diameter PVC sanitary service connection to the existing 300 mm diameter sanitary sewer in South Service Road. The proposed sanitary sewer connection includes a property line manhole. The proposed building sanitary connection, and internal plumbing shall be installed per mechanical details and specifications.

Refer to **Drawing C102** for details of the proposed sanitary servicing. Existing inverts shown on **Drawing C102** were determined through as-built drawings. The internal sanitary system of the building will be designed per the mechanical engineer's details and specifications.

5.0 DRAINAGE CONDITIONS

5.1 Existing Drainage Conditions

Based on a review of the existing topographic survey completed by Speight, Van Nostrand & Gibson Ltd., received March 2024, majority of the existing drainage flows uncontrolled to the ditch inlet, except a small portion towards the southwest of the Site that contributes flows to the neighboring property. There is no evidence of external flows entering the Site. The Site currently does not currently have stormwater management controls. There is no evidence of external flows entering the Site.

Table 4 provides a breakdown of pre-development site area and associated runoff coefficient with the existing drainage conditions.

Table 4: Pre-Development Land Areas and Runoff Coefficients

Catchment No.	Outlet Location	Pervious Area (m^2) (RC 0.25)	Impervious Area (m^2) (RC 0.90)	Weighted Runoff Coefficient (RC)
101	**Ditch Inlet**	12437	0	0.25
202	**Neighboring Property**	117	369	0.78
	Total Site	**12923**		**0.27**

Refer to **Appendix C** and **Figure 1** for the Pre-Development Drainage Plan in existing conditions.

5.2 Existing Storm Servicing

A review of the as-constructed drawings, received from the City of, show the following proposed sanitary sewers within proximity to the subject property:

- An 825 mm diameter storm sewer flowing southeast located in South Service Road, to the northeast of the Site.
- An 825 mm diameter storm sewer located in Appleby Line, to the southwest of the Site.

Storm drainage from the existing site is currently collected via a ditch inlet at the southeast corner of the site with a connection to the existing municipal 825 mm diameter storm sewer in South Service Road. The locations of the existing storm sewers are shown on **Drawing C102**.

5.3 Proposed Drainage Conditions

The Site will be graded to promote positive drainage away from the building and to convey at-grade stormwater to the catchbasins proposed within the parking lot. The catchbasins will be connected to the proposed underground stormwater management tank. Stormwater from the storm tank will be controlled and then conveyed to the existing 825 mm storm sewer in South Service Road through a proposed 375 mm diameter storm sewer at 0.5%.

The Site Servicing and Site Grading Plans (**Drawing C102** and **Drawing C103**, respectively) illustrate the proposed drainage of the site, the location and design of the storm sewer and all connections. Please refer to **Figures 1** and **2** which highlight the pre-development and post-development pervious and impervious areas for the site. **Table 5** summarizes the results.

Table 5: Post-Development Land Areas and Runoff Coefficients

Catchment No.	Outlet Location	Landscape (m^2)	Hardscape – Roof (m^2)	Hardscape (m^2)	Weighted Runoff Coefficient (RC)
200	**825 mm Storm in South Service Road**	2853	7294	2760	0.80
UNC1	**Uncontrolled to South Service Road**	16	-	0	0.25
	Total Site	**12923**			**0.79**

Catchment 200 (which is comprised of catchments 201, 202, 203, 204, 205, and 206) is controlled to the proposed stormwater management tank which then outlets to the 825 mm diameter storm sewer in Nordin Ave. Catchment UNC1 is uncontrolled and overland flows to the catchbasins in South Service Road until the ultimate discharge to the 825 mm storm sewer in South Service Road. Refer to **Appendix C** for proposed drainage conditions.

5.4 Groundwater

Fisher Engineering Ltd has completed a Geotechnical Investigation, dated September 29, 2023, which identifies the groundwater elevation and geotechnical conditions of the Site. The major conclusions of their investigation are summarized below:

- Groundwater Elevation @ MW8 = 108.59 m asl (3.26 m below existing grade)

Refer to the Geotechnical Investigation by Fisher Engineering Ltd for more details in **Appendix D.**

Short-Term Discharge (Construction Dewatering)

As determined by Fisher, a Hydrogeological Investigation is required to determine if short-term dewatering is required for the subject site.

6.0 STORMWATER MANAGEMENT

Stormwater Management (SWM) design criteria were established in accordance with the Conservation Halton guidelines for Stormwater management Engineering Submissions (November 2021).

the SWM criteria applicable to the proposed development are follows:

- Water Quantity Control: Post-development peak flow rates must not not exceed corresponding pre-development rates for the 1:2-year, 1:5-year, 1:10-year, 1:25-year, 1:50-year and 1:100-year storms.

- Water Quality Control: Stormwater discharging from the proposed development must be treated to a minimum of 80% Total Suspended Solids (TSS) removal) in accordance with Enhanced (formerly Level 1) standard of treatment as defined by the Ministry of the Environment Stormwater Management Planning and Design Manual (SWMPDM) (MOE, 2003) prior to discharging to the receiving system.

- Erosion Control: Demonstrate that the use of parking lot/pipe storage, infiltration, evapotranspiration, and on-site re-use of runoff has been applied to the extent feasible to reduce erosion potential.

- Water Balance: Replicate as closely as possible existing hydrologic conditions by maintaining a balance between infiltration, runoff and evapotranspiration; To maintain as closely as possible groundwater and base flow regimes; and To ensure long-term sustainability of hydrological/ecological form and function of natural features.

6.1 Stormwater Quantity Control

The Modified Rational Method (MRM) was used to determine the pre-development and post-development stormwater flow rates for the site using the City of Burlington's Stormwater Management Design Guidelines (2020) to obtain the intensity, duration and frequency (IDF) rainfall data. These peak stormwater flow rates were then used to determine the required stormwater quantity control for the proposed development.

In accordance with the City of Burlington standards state that the 100-year post-development runoff rate must be controlled to the 5-year pre-development flow rate for the Site (Catchment 101 at 1.24 ha) with a runoff coefficient of 0.25, which equates to an allowable flow of 87.57 L/s.

Under post development conditions, Catchment 201 will ultimately outlet to the 825 mm storm sewer in South Service Road. The stormwater from Catchment 201 will be collected by the proposed catchbasins and roof drains within the Site, which are connected to the proposed underground stormwater management tank. The proposed Catchment UNC1 will drain uncontrolled to the South Service Road, at a flow of 0.18 L/s in the 100-year storm. Therefore, the new allowable release rate is 87.40 L/s (Allowable 87.57 – Uncontrolled 0.18 L/s).

A summary of site flows and required storage volumes have been provided in **Table 6.**

Table 6: Summary of 100-year Peak Stormwater Flow Rates and Storage

Storm Event (year)	Peak Flow Rate – Post Development				Storage Volume	
	Allowable Release Rate (101) (L/s)	Controlled (201) (L/s)	Uncontrolled (UNC1) (L/s)	Total Release Rate (201+UNC1) (L/s)	Required (m^3)	Provided (m^3)
100	87.57	86.79	0.18	86.97	283.6	237.6

Due to area constraints on Site, it is proposed that the proposed pipe system (see **Drawing C102**) be used as additional storage. A summary of the proposed pipe storage, manhole/catchbasin storage, and surface ponding storage has been provided in **Table 7**.

Table 7: Summary of Total Storage Provided

Type of Storage	Item ID	Provided Storage Volume (m^3)	Total Additional Storage (m^3)
Pipe Storage	P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	17.74	47.88
Manhole/Catchbasin Storage	STM MH 2, STM MH 3, STM MH 4, STM MH 5, STM MH 6; CB1, CB2, CB3, CB4, CB5	13.36	
Surface Ponding	STM CB 5	16.79	
Underground Storage	Stormwater Management Tank	237.6	237.6
Total Storage Provided		**Required** (m^3)	**Provided** (m^3)
		283.6	285.5

Storage will be provided on site by the proposed underground storage tank, which provides a total active storage of 237.6 m^3, and additional storage of 47.88 m^3 by pipe storage, manhole/catchbasin storage, and surface ponding storage.

This is acceptable per the City of Burlington's Stormwater Management Design Criteria which states that parking lot storage shall not be used for storm events with a 5-year return period or less to prevent nuisance flooding, and the depth of ponding shall be limited to a maximum of 300 mm during the 100-year storm event (Section 6.1.1.3)

Flows discharging from the underground storage will be controlled by a 145 mm diameter orifice plate, located at downstream of STM MH 2 with a release rate of 86.79 L/s.

Refer to **Appendix C** for the detailed calculations for the system. Refer to **Drawing C102** for the proposed size and location of the underground storage tank.

6.2 Water Balance

The Geotechnical investigation by Fisher Engineer dated November 11, 2022, determined the underground water elevation near the proposed storage tank. The bottom of proposed storage tank is in proximity of the ground water elevation. The remaining water balance objective after the reduction of retention volume through initial abstraction of the various surface types is a retention volume requirement of 41.2 m^3. Volume retention will be achieved by an underground concrete

water re-use chamber. Retained rainwater is proposed to be re-used for irrigation purposes. The supporting water balance design calculations can be found in **Appendix C**.

6.3 Stormwater Quality Control

To obtain the required removal of 80% Total Suspended Solids from the discharge from the site, a Up-Flo treatment has been used accounting for the infiltration chamber, Oil and Grit Separator (OGS), and landscaped areas. The OGS is proposed to treat stormwater prior to discharging into the stormwater storage chamber.

7.0 EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION

Erosion and sediment controls will be installed prior to the beginning of any construction activities. They will be maintained until the site is stabilized or as directed by the Site Engineer and/or City of Burlington. The Removals and Erosion & Sediment Control Plan (**Drawing C101**) identifies the location of the recommended controls. Controls will be inspected after each significant rainfall event and maintained in proper working condition. The following erosion and sediment controls will be included during construction on the site:

The following erosion and sediment controls will be provided during construction:

Silt Fencing

Silt fencing will be installed on the perimeter of the site to intercept sheet flow. Additional silt fence may be added based on field decisions by the site engineer and Owner prior to, during and following construction.

Rock Mud Mat

A rock mud mat will be installed at the entrance of the construction zone to prevent mud tracking from the site onto the surrounding lands and perimeter roadway network. All construction traffic will be restricted to this access only.

Sediment Control Devices

The existing catchbasins fronting the property shall be equipped with silt sacks in accordance with City standards.

8.0 CONCLUSIONS & RECOMMENDATIONS

Based on the information contained in this report, we offer the following conclusions:

1. Water servicing is proposed to be provided by the existing 300 mm diameter watermain in South Service Road through a 100 mm diameter water service and 250 mm fire connection.
2. Sanitary servicing is proposed through a 150 mm diameter sanitary service with a connection to the existing 300 mm diameter sanitary sewer in South Service Road.
3. Stormwater quantity control and erosion control is proposed to be provided via an underground stormwater management tank. A 145mm diameter orifice tube is proposed to control the runoff from the post-development site to below the total allowable release rate. Total storage of 237.6 m^3 is provided through the underground tank, and additional storage through pipes, manholes, catchbasins, and surface ponding of 47.88 m^3 for a site total of 282.5 m^3 which is sufficient to meet the maximum storage requirement of 283.6 m^3.
4. Stormwater and groundwater quality control for the proposed development will be met by a Up-Flo filter model or approved equivalent, providing an enhanced level of protection as stated by the MECP.

Based on these conclusions, we recommend the approval of the Zoning By-Law Amendment Application for the proposed commercial development from the perspective of functional servicing and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Alexa Minichillo, E.I.T.
Engineering Intern

C.F. CROZIER & ASSOCIATES INC.



James Boyd, P.Eng.
Project Engineer

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APPENDIX A

Water Demand Calculations

Project: 875 Appleby Line	**Design:** AM	**Date:** 2023-10-04
Project No.: 1644-6586	**Check:** JB	**Updated:** 2024-08-23

EXISTING WATER DEMAND

			Notes & References
Site Area:	1.29 ha		Areas based on the Site Plan provided by Global Architect Inc., dated July 7, 2023.
Greenspace:			
Population Density:	0	persons/ha	
Greenspace GFA:	1.29	ha	
Greenspace Population:	**0**	**persons**	
Total:			
Total Area:	**1.29**	**ha**	
Total Population:	**0**	**persons**	

Design Parameters:

Average Day Service Demand (m^3/ha/day)	Notes & References
34.375	Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019)

Water Demand:

Average Daily Demand =	0	L/day
Average Daily Demand =	**0.00**	**L/s**
Peaking Factors - Industrial		
Max Day =	2.25	
Max Hour =	2.25	
Max Day =	**0.00**	**L/s**
Max Hour =	**0.00**	**L/s**

Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019)

Municipality	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Max Hourly Demand (L/s)
City of Burlington	0.00	0.00	0.00

CROZIER CONSULTING ENGINEERS

Project: 875 Appleby Line | **Design:** AM | **Date:** 2023-10-04

Project No.: 1644-6586 | **Check:** JB | **Updated:** 2024-08-23

PROPOSED WATER DEMAND

Site Area: 1.29 ha

Storage (Light Industrial):

Population Density:	125	persons/ha
Light Industrial Area:	2.17	ha
Industrial Population:	**271**	**persons**

Retail (Light Commercial):

Population Density:	90	persons/ha
Retail Area:	0.12	ha
Retail Population:	**10**	**persons**

Office (Light Commercial):

Population Density:	90	persons/ha
Office Area:	0.52	ha
Office Population:	**46**	**persons**

Total Population:	**328**	**persons**

Design Parameters:

Average Day Service Demand (m^3/ha/day)		
Light Industrial	34.375	m^3/ha/day
Light Commercial	24.750	m^3/ha/day

Water Demand:

Average Daily Demand = 90267 L/day

Average Daily Demand = 1.04 L/s

Peaking Factors - Industrial/Commercial

Max Day = 2.25

Max Hour = 2.25

Max Day = 2.35 L/s

Max Hour = 2.35 L/s

Municipality	Average Daily Demand (L/s)	Max Day Demand (L/s)	Max Hourly Demand (L/s)
City of Burlington	1.04	2.35	2.35

Notes & References

Areas based on the Site Plan provided by Global Architect Inc., dated July 7, 2023.

Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019)

Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019)

Regional Municipality of Halton Water and Wastewater Linear Design Manual, Version 5 (October 2019)

CROZIER CONSULTING ENGINEERS

875 Appleby Line
Fire Protection Volume Calculation
CFCA File: 1644-6586

Date: 2024-08-23
Design: AM
Check: JB

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

RFF = 220 * C * sqrt A

where

RFF = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for Type V Wood Frame Construction (structure essentially all combustible)
=	0.8	for Type IV-A Mass Timber Construction (encapsulated mass timber)
=	0.9	for Type IV-B Mass Timber Construction (rated mass timber)
=	1.0	for Type IV-C Mass Timber Construction (ordinary mass timber)
=	1.5	for Type IV-D Mass Timber Construction (un-rated mass timber)
=	1.0	for Type III Ordinary Construction (brick or other masonry walls, combustible floor and interior)
=	0.8	for Type II Non-combustible Construction (unprotected metal structural components)
=	0.6	for Type I Fire-resistive Construction (fully protected frame, floors, roof)

Proposed Buildings

Floor 1	7,097.1	sq.m	0%
Floor 2	7,471.2	sq.m	25%
Floor 3	7,471.2	sq.m	100%
Floor 4	7,098.7	sq.m	25%
Floor 5	1,824.1	sq.m	0%

Area = 11,114 sq.m Single largest floor area plus 25% of each immediatley adjoining floors.

C = 0.8 Assumes Type I Fire-resistive Construction (fully protected frame, floors, roof)

Therefore RFF = 18,555 L/min

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Combustible	0% Adjustment Factor

0 L/min reduction
18,555 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, the building will have sprinkler protection: 50%

9,278 L/min reduction

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	> 30 m	0%
10.1 to 20 m	15%		

Exposed buildings

Name	Distance (m)	Charge (%)	Surcharge (L/min)
E	20.1	10%	1,856
W	>30	0%	-
N	>30	0%	-
S	>30	0%	-
			1,856 L/min Surcharge

Determine Required Fire Flow

No.1	18,555	
No. 2	0	reduction
No. 3	-9,278	reduction
No. 4	1,856	surcharge
Required Flow:	**11,133 L/min**	
Rounded to nearest 1000 L/min:	**11,000 L/min**	or **183.3 L/s** 2,906 USGPM

Hydrant Testing Ontario
Tel: 289-354-1942
Info@HTOntario.ca

REPORT
N°. 2370

October 18, 2023

To: James Byck B.Arch / CET
Vice President, Development
Dymon Group
5915 Airport Rd E. Suite 510
Mississauga ON L4V 1T1

RE: Hydrant Flow Test - 5051 Harvester Road, Burlington

Please find the Report for the following works

Scope: Conducted Watermain Capacity Tests as per NFPA291 / AWWA M17 recommendations and guidelines.

Hydrant Test Plan



HYDRANT FLOW TEST

Zone ID HALTON REGION

DATE: October 18, 2023 TIME: 11:00 AM

R -TEST HYDRANT	5002 SOUTH SERVICE ROAD	HYDRANT No.	HYD-R1
HYDRANT MODEL:	CENTURY	COLOUR:	BLUE
STATIC PRESSURE psi (hr-20^0.54):	**73**	VARIANCE:	12.33%
Q - FLOW HYDRANT	5044 SOUTH SERVICE ROAD	HYDRANT No.	HYD-F1
HYDRANT MODEL:	McAVITY	COLOUR:	BLUE

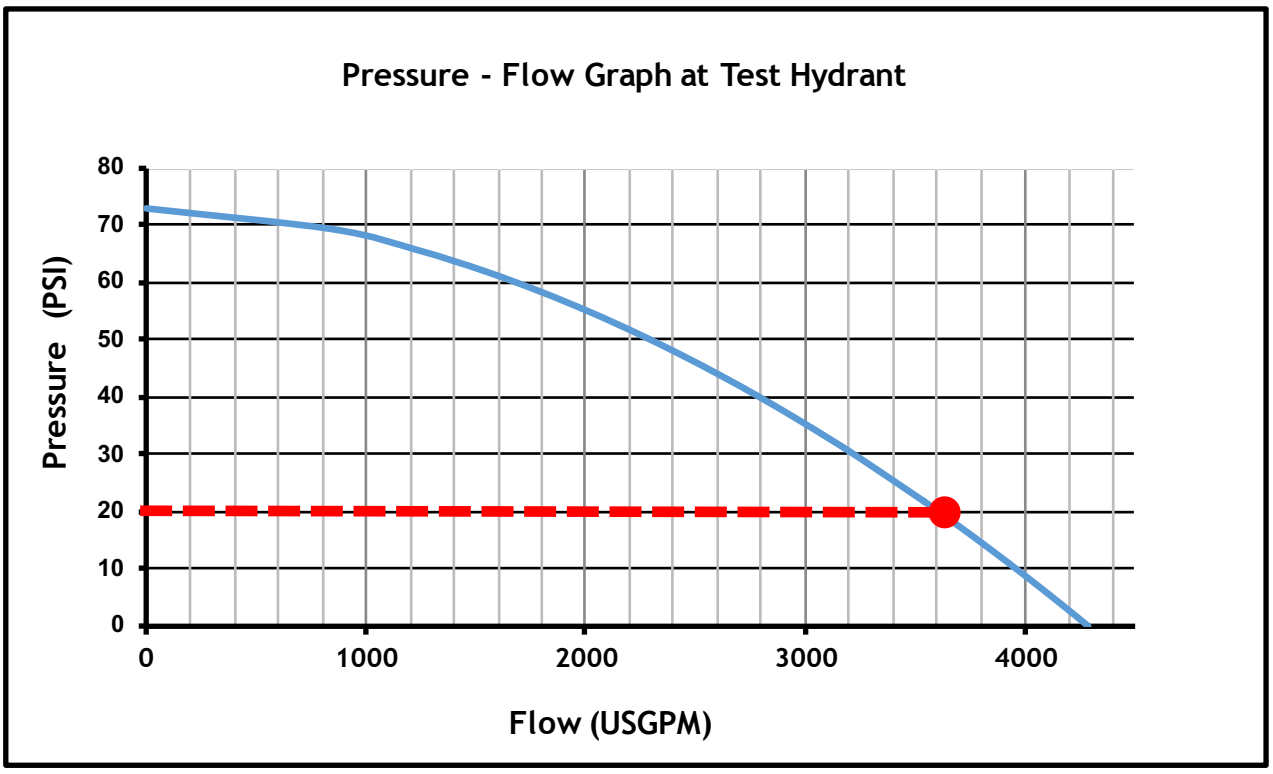
No. Outlets	Residual Pressure (hf-R^0.54)	Orifice Dia Dia. (in.) (d^2)	Coefficient 0.9	Nozzle PSI $(\sqrt{psi})$	Q = Flow (USGPM) $Q = 29.84\,(c)\,(d2)\,(\sqrt{psi})$
1	67	2.5	0.9	22	787
2	64	2.5	0.9	17	692
			Q_F = Total Flow (USGPM)		1384

Q_R = flow predicted @ 20 psi

$Q_R = Q_F * (H_r - 20^{\wedge 0.54}) / (H_f - R^{\wedge 0.54})$

3606	
227	L/s

NFPA Rating: **CLASS AA - BLUE**



Test Conclusion

The system at the time of testing produced a projected flow rate of:

	L/s	USGPM	
S SERVICE ROAD	227	3606	at 20 psi

Hydrants are classified in accordance with their rated capacities as per NFPA291.

COLOUR	CLASS	Available Flow @ 20psi
BLUE	**AA**	**1500 GPM or more**
GREEN	A	1000 – 1499 GPM
ORANGE	B	500 – 999 GPM
RED	C	Below 500 GPM

We strongly feel that all attempts have been made to ensure that the required data as stipulated was captured, stored and presented in an accurate, efficient and timely manner for the required period.

We look forward to working with you in the future.

Please feel free to contact the undersigned should you require any further information.

Best Regards



Rob Gamache E.P
Manager of Operations
Hydrant Testing Ontario
Info@HTOntario.ca

APPENDIX B

Sanitary Demand Calculations

CROZIER CONSULTING ENGINEERS

Project: 875 Appleby Line
Project No.: 1644-6586
Created By: AM
Checked By: JB
Date: 2023-10-04
Updated: 2024-08-23

Existing Sanitary Design Flow

				Notes & References
	Site Area:	1.29	ha	
Greenspace:				
	Population Density:	0	persons/ha	
	Greenspace GFA:	1.29	ha	
	Greenspace Population:	**0**	**persons**	
Total:				
	Total GFA:	**1.29**	**ha**	
	Total Population:	**0**	**persons**	

Design Parameters

Unit Sewage Flow (m3/ha/d)	Notes & References
34.375	Halton Region Water and Wastewater Linear Design Manual October 2019, Version 5 (Table 3.2)

Sanitary Design Flow:

				Notes & References
	Average Daily Flow =	0.00	m3/d	Average Daily Flow = Average Daily Flow (m3/ha/d) * area
	Average Daily Flow =	**0.00**	L/s	
Harmon Peak Factor:	M =	**4.50**		$M = K_{av} \times (1 + \frac{14}{4 + \sqrt{P + P_c}})$
	Peak Flow =	**0.00**	L/s	Peak Flow = Average Daily Flow * M
Infiltration Flow:	Infiltration =	0.286	L/ha/s	Total Infiltration = Infiltration * Site Area
	Total Infiltration =	**0.37**	L/s	
	Total Peak Flow =	**0.37**	L/s	Total Peak Flow = Peak Flow + Total Infiltration

Summary Table

Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
0.00	4.50	0.00	0.37	0.37

CROZIER CONSULTING ENGINEERS

Project: 875 Appleby Line
Project No.: 1644-6586
Created By: AM
Checked By: JB
Date: 2023-10-04
Updated: 2024-08-23

Proposed Sanitary Design Flow

				Notes & References
	Site Area:	1.29	ha	
Storage (Light Industrial):				
	Population Density:	125	persons/ha	Halton Region Water and Wastewater Linear Design Manual October 2019, Version 5 (Table 3.2)
	Light Industrial Area:	2.17	ha	
	Industrial Population:	**271**	**persons**	
Retail (Light Commercial):				
	Population Density:	90	persons/ha	
	Retail Area:	0.12	ha	
	Retail Population:	**10**	**persons**	
Office (Light Commercial):				
	Population Density:	90	persons/ha	
	Office Area:	0.52	ha	
	Office Population:	**46**	**persons**	
	Total Population:	**328**	**persons**	

Design Parameters

Unit Sewage Flow		
Light Industrial	34.375	m^3/ha/day
Light Commercial	24.750	m^3/ha/day

Halton Region Water and Wastewater Linear Design Manual October 2019, Version 5 (Table 3.2)

Sanitary Design Flow:

	Average Daily Flow =	90	m^3/d	Average Daily Flow = (Light Industrail Flow * Industrial Area) + (Light Commercial Flow * Light Commercial Area (Office + Retail))
	Average Daily Flow =	**1.04**	L/s	
Harmon Peak Factor:	M =	**4.06**		$M = K_{av} \times (1 + \frac{14}{4 + \sqrt{P + P_e}})$
	Peak Flow =	**4.24**	L/s	Peak Flow = Average Daily Flow * M
Infiltration Flow:	Infiltration =	0.286	L/ha/s	
	Total Infiltration =	**0.37**	L/s	Total Infiltration = Infiltration * Site Area
	Total Peak Flow =	**4.61**	L/s	Total Peak Flow = Peak Flow + Total Infiltration

Summary Table

Average Daily Flow (L/s)	**Peaking Factor**	**Peak Flow** (L/s)	**Infiltration Flow** (L/s)	**Total Peak Flow** (L/s)
1.04	4.06	4.24	0.37	4.61

APPENDIX C

Stormwater Management Calculation

CROZIER
CONSULTING ENGINEERS

Project: 875 Appleby Line
Project No.: 1644-6586
Prepared By: AM
Checked By: JB
Date: 2023-09-26
Updated: 2024-08-29

Modified Rational Calculations - Input Parameters

Storm Data: City of Burlington

Time of Concentration: T_c = **10.00** **mins**

Return Period	A	B	C	I (mm/hr)
2 yr	681.52	6	0.780	78.39
5 yr	802.04	5	0.764	101.31
10 yr	918.28	5	0.763	116.31
25 yr	1065.95	5	0.762	135.38
50 yr	1172.34	5	0.761	149.30
100 yr	1281.34	5	0.761	163.18

Pre-Development Conditions				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Catchment 101 to Ditch Inlet				
Pervious	1.24	12437	0.25	**0.25**
Impervious	0.000	0	0.95	**0.00**
Total Subcatchment	**1.24**	**12437**	-	**0.25**
Catchment 102 to Neighboring Property				
Pervious	0.01	117	0.25	**0.06**
Impervious	0.04	369	0.95	**0.72**
Total Subcatchment	**0.05**	**486**	**-**	**0.78**
Total Site (101 + 102)	**1.29**	**12923**	**-**	**0.27**

Post-Development Conditions				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Catchment 200 to Underground Storm Chamber				
Landscape	0.29	2853	**0.25**	**0.06**
Hardscape - Roof	0.73	7294	**0.95**	**0.54**
Hardscape	0.28	2760	**0.95**	**0.20**
Total Subcatchment	**1.29**	**12907**	**-**	**0.80**
UNC1 to South Service Road				
Pervious	0.00	16	0.25	**0.25**
Impervious	0.00	0	0.95	**0.00**
Total Subcatchment	**0.00**	**16**	**-**	**0.25**
Total Site	**1.29**	**12923**	**-**	**0.79**

References

Per Stormwater Management Design Guidelines, City of Burlington. (2020)

Rainfall Intensity
$I = A / (T_c + B)^C$

Project: 875 Appleby Line
Project No.: 1644-6586
Created By: AM
Checked By: JB
Date: 2023-09-26
Updated: 2024-08-29

Modified Rational Calculations - Peak Flow Summary

Pre-Development

Catchment 101 to Ditch Inlet						
Storm Event	**C**	**i (mm/hr)**	**A (ha)**	**Q (m^3/s)**	**Q (L/s)**	
2 yr	0.25	78.39	1.24	0.068	67.76	
5 yr		101.31		0.088	**87.57**	**Post-Dev Target**
10 yr		116.31		0.101	100.53	
25 yr		135.38		0.117	117.02	
50 yr		149.30		0.129	129.05	
100 yr		163.18		0.141	141.04	

Allowable Release Rate = **87.57** **L/s**

Catchment C102 to Neighboring Property					
Storm Event	**C**	**i (mm/hr)**	**A (ha)**	**Q (m^3/s)**	**Q (L/s)**
2 yr	0.78	78.39	0.05	0.008	8.28
5 yr		101.31		0.011	10.70
10 yr		116.31		0.012	12.28
25 yr		135.38		0.014	14.29
50 yr		149.30		0.016	15.76
100 yr		163.18		0.017	17.23

Post-Development (Uncontrolled)

Catchment 200 to Underground Storm Chamber					
Storm Event	**C**	**i (mm/hr)**	**A (ha)**	**Q (m^3/s)**	**Q (L/s)**
2 yr	0.80	78.39	1.2907	0.224	223.69
5 yr		101.31		0.289	289.10
10 yr		116.31		0.332	331.90
25 yr		135.38		0.386	386.31
50 yr		149.30		0.426	426.02
100 yr		163.18		0.466	465.63

Catchment UNC1 to South Service Road					
Storm Event	**C**	**i (mm/hr)**	**A (ha)**	**Q (m^3/s)**	**Q (L/s)**
2 yr	0.25	78.39	0.0016	0.000	0.08
5 yr		101.31		0.000	0.11
10 yr		116.31		0.000	0.13
25 yr		135.38		0.000	0.15
50 yr		149.30		0.000	0.16
100 yr		163.18		0.000	0.18

Rainfall Intensity
$I = A / (T_c + B)^C$

Peak Flow
$Q = 0.00278 \cdot C \cdot i \cdot A$

Project: 875 Appleby Line
Project No.: 1644-6586

Date: 2023-09-26
Revised: 2024-08-29
Designed By: AM
Checked By: JB

MODIFIED RATIONAL METHOD CALCULATIONS - 100 YEAR STORM EVENT

Rainfall Intensity Equation:

Intensity
i(Td) = A / (Td + B)^C

City of Burlington IDF (100-Year)	
a=	1281.34
b=	5
c=	0.761

CONTROLLED AREA

Drainage Area ID = 201
Drainage Area = 1.29 ha
Runoff Coefficient = 0.80

Controlled Release Rate at MH1 = 86.8 L/s

Max. Storage Volume Required = 283.6 m3
Storage Volume Provided = 285.5 m3

UNCONTROLLED AREA

Drainage Area ID = UNC1
Drainage Area = 0.00 ha
Runoff Coefficient = 0.25

Target Site Release Rate = 87.57 L/s

Controlled Release Rate at MH1 = 86.8 L/s
Uncontrolled Release Rate = 0.2 L/s
Total Site Release Rate = 86.97 L/s

Time (minutes)	Rainfall Intensity (mm/hr)	Q_{Runoff} (L/s)	$Q_{Release}$ (L/s)	Storage Volume Required (m^3)	Q_{Runoff} (L/s)
10	163.2	465.6	86.8	227.3	0.2
15	131.1	374.1	86.8	258.6	0.1
20	110.6	315.7	86.8	274.6	0.1
25	96.3	274.8	86.8	282.0	0.1
30	85.6	244.4	86.8	283.6	0.1
35	77.4	220.7	86.8	281.3	0.1
40	70.7	201.8	86.8	276.1	0.1
45	65.3	186.3	86.8	268.6	0.1
50	60.7	173.2	86.8	259.3	0.1
55	56.8	162.1	86.8	248.6	0.1
60	53.5	152.6	86.8	236.7	0.1
65	50.5	144.2	86.8	223.8	0.1
70	47.9	136.8	86.8	210.1	0.1
75	45.6	130.3	86.8	195.6	0.0
80	43.6	124.4	86.8	180.4	0.0
85	41.7	119.1	86.8	164.7	0.0
90	40.1	114.3	86.8	148.5	0.0
95	38.5	109.9	86.8	131.8	0.0
100	37.1	105.9	86.8	114.7	0.0
105	35.8	102.2	86.8	97.2	0.0
110	34.6	98.8	86.8	79.4	0.0
115	33.5	95.7	86.8	61.3	0.0
120	32.5	92.7	86.8	42.9	0.0
125	31.5	90.0	86.8	24.2	0.0
130	30.7	87.5	86.8	5.3	0.0
135	29.8	85.1	85.1	0.0	0.0
140	29.0	82.8	82.8	0.0	0.0
145	28.3	80.7	80.7	0.0	0.0
150	27.6	78.7	78.7	0.0	0.0
155	26.9	76.9	76.9	0.0	0.0
160	26.3	75.1	75.1	0.0	0.0

CROZIER
CONSULTING ENGINEERS

Project: 875 Appleby Line
Project No: 1644-6586
Created By: AM
Checked By: JB
Date: 2023-09-26
Updated: 2024-08-29

TANK SIZING & STORAGE

Orifice Sizing

HWL =	111.50	m	
Orifice Invert =	109.30	m	
Height =	2.20	m	
C =	0.8	(orifice tube)	
d_{orfice} =	145	mm	**Orifice: $Q=CA(2gH)^{\wedge 0.5}$**
Area of Orifice (m^2) =	0.017	m^2	
$Q_{Orifice}$ =	86.79	L/s	
$Q_{Target/Allowable}$ =	87.40	L/s	

Tank Sizing

Required Active Storage	**283.6**	m^3
Required Dead Storage	**41.2**	m^3

Ground Level Above Tank	111.90	masl
MAX Groundwater Level @ BH8	108.59	masl
Top of Tank	111.20	masl
Outlet Invert	110.21	masl
Bottom of Tank	110.00	masl

Height	0.99	m
Free Board	0.00	m
Maximum Active Height	0.99	m

Tank Dimensions

Area	240.0	m^2

Tank Storage

Provided Active Storage	**237.6**	m^3

Pipe Storage

Proposed Pipe ID	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P12	
Pipe Diameter	250	250	250	250	375	450	250	300	300	300	250	mm
Pipe Radius	125	125	125	125	187.5	225	125	150	150	150	125	mm
Pipe Length	26.4	1.9	2.8	7.4	14	16.6	10.2	80.9	61.2	9.0	9.8	m
Provided Pipe Volume	**1.30**	**0.09**	**0.14**	**0.36**	**1.55**	**2.64**	**0.50**	**5.72**	**4.33**	**0.64**	**0.48**	m^3
TOTAL (m^3)	**17.74**											

Manhole/Catchbasin Structure

Proposed ID	STM MH 6	STM MH 5	STM MH 4	STM MH 3	STM MH2	CB1	CB2	CB3	CB4	CB5	
Diameter (MH)/ Length(CB)	1200	1200	1200	1200	1200	600	600	600	600	600	mm
Pipe Invert	109.89	109.53	109.78	109.41	109.3	110.21	110.26	109.9	110.36	109.8	m
HWL	111.50	111.50	111.50	111.50	111.50	111.50	111.50	111.50	111.50	111.50	m
Height	1.61	1.97	1.72	2.09	2.20	1.29	1.24	1.60	1.14	1.70	m
Volume	**1.82**	**2.23**	**1.95**	**2.36**	**2.49**	**0.46**	**0.45**	**0.58**	**0.41**	**0.61**	m^3
TOTAL (m^3)	**13.36**										

Surface Ponding

Proposed CB ID	STM CB 5
Ponding Area	167.9
Catchbasin T/G	111.20
HWL	111.50
Height	0.30
Volume	**16.79**

Pipe Volume
V = π r^2 h

MH Volume
V = π r^2 h

CB Volume
V = A h

Surface Ponding Volume
V = A h / 3

Total Storage

Provided Active Storage (Tank + Pipes + MH + Ponding)	**285.5**	m^3
Provided Dead Storage	**50.4**	m^3
Total Storage	**335.9**	m^3

CROZIER CONSULTING ENGINEERS

Project: 875 Appleby Line
Project No.: 1644-6586

Created By: AM
Checked By: JB

Date: 2023-09-26
Updated: 2024-08-29

WATER BALANCE CALCULATIONS

Site Area = 12,922.90 m^2

Rainfall Depth = 5 mm

Required Retention Voume = 64.61 m^3

Initial Abstraction Calculations:

Cover Type	Area (m^2)	Initial Abstraction (mm)	Volume (m^3)
Hardscape Area	10294.50	1	10.3
Landscape Area	2628.40	5	13.1
Total	**12922.90**	**-**	**23.4**

Remaining Volume Required (Water Balance Volume - IA) =	41.2	m^3

Infiltration Area

Drawdown Time (hr) =	48
Runoff Volume (m^3) =	41.2
Infiltration Rate (mm/hr) =	8.4
Void Ratio =	1
Minimum Infiltration Area (m^2) =	102.13

$$DrawdownTime(hr) = \frac{1000 \times RunoffVolume(m^3)}{InfiltrationRate(\frac{mm}{hr}) \times VoidRatio \times InfiltrationArea(m^2)}$$

CROZIER CONSULTING ENGINEERS

875 Appleby Line
STORM SEWER DESIGN SHEET

Municipality: Burlington

5 YEAR DESIGN STORM

A	802.04	B	5	C	0.764

100 YEAR DESIGN STORM

A	1281.34	B	5	C	0.761

PROJECT: 875 Appleby Line
PROJECT No.: 1644-6586
FILE: Storm Sewer Design
DATE: March 28, 2024
Revised: August 23, 2024
Design: AM
Check: JB

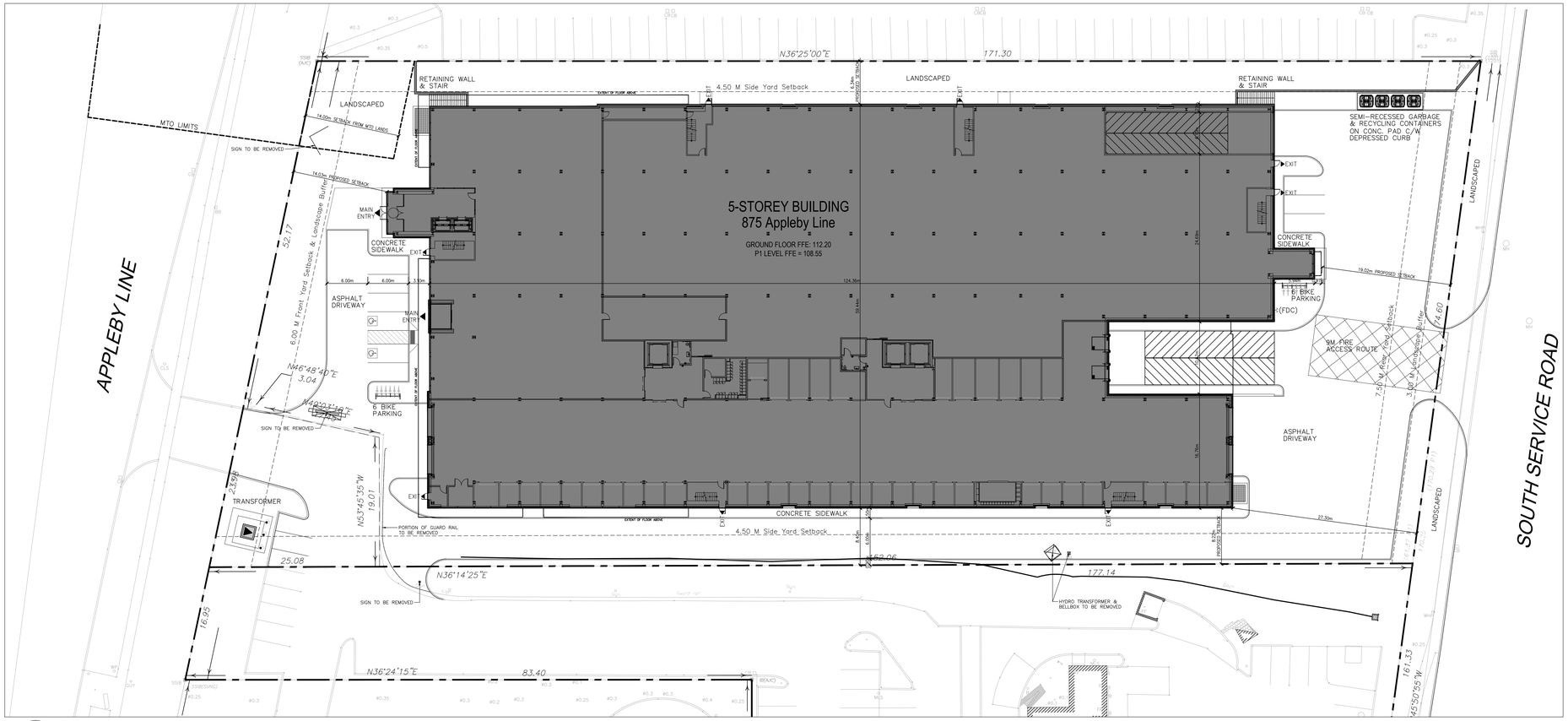
INITIAL TIME OF CONCENTRATION (min) 10.00 MANNINGS "n" 0.013

Drainage Area ID	FR MH NO	TO MH NO	TOTAL AREA (A) Ha	Hardscape Area Ha	Landscape Area Ha	RUN-OFF COEFF	A x C	Cummul. A x C	TIME OF CONC. min	I mm/hr	Q l/sec	SLOPE %	PIPE DIA. mm	Area m2	VEL. m/sec	Q/A m/s	LENGTH m	TIME OF FLOW min	CAPACITY l/sec	% Capacity
C201	CB1	U/G Storage	0.07	0.01	0.06	0.36	0.03	0.03	10.00	101.3123	**7.41**	0.50	250	0.05	0.86	0.15	10.2	0.20	**42.05**	18
C202	CB2	U/G Storage	0.12	0.11	0.01	0.87	0.10	0.10	10.00	101.3123	**29.24**	0.50	250	0.05	0.86	0.60	1.9	0.04	**42.05**	70
	U/G Storage	MH4	0.00	0.00	0.00		0.00	0.13	10.04	101.122	**36.58**	0.50	300	0.07	0.97	0.52	80.9	1.39	**68.38**	53
C203	MH4	MH3	0.08	0.08	0.00	0.95	0.07	0.20	11.43	94.50016	**53.33**	0.50	300	0.07	0.97	0.75	61.2	1.05	**68.38**	78
	MH3	MH2	0.00	0.00	0.00		0.00	0.20	12.49	90.11454	**50.85**	0.50	300	0.07	0.97	0.72	9.0	0.16	**68.38**	74
C205	CB4	MH6	0.10	0.00	0.10	0.25	0.02	0.02	10.00	101.3123	**6.77**	1.00	250	0.05	1.21	0.14	26.4	0.36	**59.47**	11
C206	MH6	MH5	0.74	0.74	0.00	0.95	0.70	0.72	10.36	99.47732	**199.80**	2.00	375	0.11	2.25	1.81	14.0	0.10	**247.95**	81
C204	MH5	MH2	0.19	0.17	0.02	0.86	0.17	0.89	10.47	98.96622	**244.20**	1.00	450	0.16	1.79	1.54	16.6	0.15	**285.11**	86
	MH2	Up-Flo Filter	Proposed 149 mm diameter orifice tube, flow is controlled to 5-year pre-development flow rate of 91.02 L/s, refer to modified rational calculations																	
	Up-Flo Filter[1]	MH1	0.00	0.00	0.00						**91.02**	0.50	375	0.11	1.12	0.82	35.0	0.52	**123.98**	73
	MH1[1]	Municipal Tie-in	0.00	0.00	0.00						**91.02**	0.50	375	0.11	1.12	0.82	15.8	0.23	**123.98**	73

1. Flow rates downstream of orifice tube have been set to maximum release rate for site, refer to modified rational calculations

APPENDIX D

Background Information



1 A101 SITE PLAN 1:300

LEGEND

- PROPOSED BUILDING LOCATION
- EXISTING NEIGHBORING BUILDINGS
- LANDSCAPED AREA
- CONCRETE/ SIDEWALK
- BARRIER FREE PARKING CLEARANCE
- CURB
- DEPRESSED CURB
- TACTILE WALKING SURFACE INDICATOR
- NEW TREE/ VEGETATION (REFER TO LANDSCAPE PLAN FOR TYPE, SIZE AND LOCATION)
- EXISTING TREE (FOR REFERENCE ONLY, REFER TO LANDSCAPE PLAN)
- BARRIER FREE PARKING
- INTERIOR PARKING
- MAN HOLE, CATCH BASIN
- SIAMESE CONNECTION
- ENTRANCE/ EXIT LOCATION
- PRINCIPAL ENTRANCE
- TRANSFORMER
- FENCE & GATE
- UTILITY POLE
- FIRE HYDRANT
- NLS (NEW LIGHT STANDARD, REFER TO ELECTRICAL)
- BOLLARD
- HYDRO POLE
- PEDESTRIAN CROSSING DEMARCATION PAINTED
- DENOTES PAINTED LINES
- DENOTES FIRE ROUTE ACCESS
- ONE-WAY SIGN
- NO ENTRY SIGN
- FIRE ROUTE ACCESS / NO PARKING SIGN
- TRAFFIC DIRECTION

BOUNDARY INFORMATION FROM SURVEY BY: SPEIGHT, VAN NOSTRAND & GIBSON LIMITED ONTARIO LAND SURVEYORS COMPLETED ON APRIL 22, 2018

SCALE 1 : 300

5 0 10m

SITE STATISTIC

LEGAL DESCRIPTION OF PROPERTY
PART OF LOT 5 CONCESSION 3, SOUTH OF DUNDAS STREET (GEOGRAPHIC TOWNSHIP OF NELSON)
CITY OF BURLINGTON, REGIONAL MUNICIPALITY OF HALTON
SURVEYED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED
ONTARIO LAND SURVEYORS 2022

ZONING REGULATION (By-law BC1-62)	PROPOSED			REQUIRED	COMPLIANCE
Lot Area	12,922.9sm	[139,101sf]			
Building Area (footprint)	7,096.2sm	[76,383sf]	54.91%		
Paved Area	3,191.0sm	[34,348sf]	24.69%		
Landscaped Area	2,635.7sm	[28,371sf]	20.40%		
Building Setbacks					
Setback from Appleby Line - Front yard	14.03m (min.)			6.0m	YES
Setback from the northeast property line - Rear yard	27.30m (min.)			7.5m	YES
Setback from the northwest property line - Side yard	6.34 (min.)			4.5m	YES
Setback from the southeast property line - Side yard	8.23m (min.)			4.5m	YES
Building Height	30.78mm - 6 storeys (from ground floor to top of parapet) 34.55m (from ground floor to top of lantern canopy)			No maximum	YES
Permited uses	Retails, Offices & Self-Storage Warehouse				NO-storage/retail not permitted
Parking spaces	166 parking spaces			306	NO
Office (Other) - 3 spaces/100 m^2 GFA				156	
Retail Store - 3.5 spaces/100 m^2 GFA				41	
Storage Locker Facility - 0.5 spaces/100 m^2 GFA				109	
Accessible Parking Spaces - 3% of required parking	Total provided: 5 spaces (2 at grade, 3 at P1)			10	NO
Bicycle Parking Spaces - 2 spaces plus 1 spaces/1000 m^2 GFA	24 spaces (12 at grade, 12 at P1)			14	YES
Landscape Buffers					
Abutting South Service Rd.	3.0m			3.0m	YES
Abutting Appleby Line	6.0m			6.0m	YES
Loading	1 interior Loading and Parking			N/A	
Drive Aisle Width	6.0m (two-way)			6.0m	YES

GFA BREAKDOWN

	P1		GF		2F		3F		4F		5F		RF		Total GFA / Use		% over GFA
Dymon Reception (Retail)			1,159.0sm	[12,475sf]											**1,159.0sm**	**[12,475sf]**	3.7%
Dymon Work Refined (Office)					1,508.0sm	[16,232sf]	1,508.0sm	[16,232sf]	1,371.4sm	[14,762sf]	807.8sm	[8,695sf]			**5,195.2sm**	**[55,921sf]**	16.8%
Storage			3,832.7sm	[41,255sf]	5,741.2sm	[61,798sf]	5,741.2sm	[61,798sf]	5,478.9sm	[58,974sf]	916.4sm	[9,864sf]			**21,710.4sm**	**[233,689sf]**	70.1%
Storage 1			3,305.3sm	[35,578sf]													
Storage 2			353.7sm	[3,807sf]													
Storage Lobby 1			96.0sm	[1,033sf]													
Storage Lobby 2			77.8sm	[837sf]													
Conditioned Storage			117.5sm	[1,265sf]											**117.5sm**	**[1,265sf]**	0.4%
Interior Loading			1,596.7sm	[17,187sf]											**1,596.7sm**	**[17,187sf]**	5.2%
Parking	7,003.7sm	[75,387sf]													**7,003.7sm**	**[75,387sf]**	22.6%
Ramp			183.8sm	[1,978sf]											**183.8sm**	**[1,978sf]**	0.6%
Stairs			147.7sm	[1,590sf]	162.2sm	[1,746sf]	162.2sm	[1,746sf]	187.0sm	[2,013sf]	66.9sm	[720sf]			**726.0sm**	**[7,815sf]**	2.3%
Stair A			25.0sm	[269sf]	29.1sm	[313sf]	29.1sm	[313sf]	78.2sm	[842sf]	37.8sm	[407sf]					
Stair B			22.9sm	[246sf]	22.9sm	[246sf]	22.9sm	[246sf]	22.9sm	[246sf]							
Stair C			27.2sm	[293sf]	26.7sm	[287sf]	26.7sm	[287sf]	26.7sm	[287sf]							
Stair D			24.2sm	[260sf]	26.2sm	[282sf]	26.2sm	[282sf]	26.2sm	[282sf]							
Stair E			24.2sm	[260sf]	33.1sm	[356sf]	33.1sm	[356sf]	33.1sm	[356sf]	29.1sm	[313sf]					
Stair F			24.3sm	[262sf]	24.3sm	[262sf]	24.3sm	[262sf]									
Elevator			59.7sm	[643sf]	59.7sm	[643sf]	59.7sm	[643sf]	61.4sm	[661sf]	33.0sm	[355sf]			**273.6sm**	**[2,945sf]**	0.9%
Elevator A			15.9sm	[171sf]	15.9sm	[171sf]	15.9sm	[171sf]	17.6sm	[189sf]	17.6sm	[189sf]					
Elevator B			15.4sm	[166sf]	15.4sm	[166sf]	15.4sm	[166sf]	15.4sm	[166sf]	15.4sm	[166sf]					
Elevator C			28.4sm	[306sf]	28.4sm	[306sf]	28.4sm	[306sf]	28.4sm	[306sf]							
Lantern*													76.2sm	[820sf]		[820sf]	
Marquee*											120.5sm	[1,297sf]	235.7sm	[2,537sf]	356.2sm	[3,834sf]	
Roof*											4,621.2sm	[49,742sf]	1,716.3sm	[18,474sf]	6,337.5sm	[68,216sf]	
Terrace*									359.3sm	[3,868sf]	546.7sm	[5,885sf]			906.1sm	[9,753sf]	
Total GFA / Floor(*)	**7,003.7sm**	**[75,387.0sf]**	**7,097.1sm**	**[76,393.0sf]**	**7,471.2sm**	**[80,419.0sf]**	**7,471.2sm**	**[80,419.0sf]**	**7,098.7sm**	**[76,410.0sf]**	**1,824.1sm**	**[19,634sf]**			**30,962.2sm**	**[333,275sf]**	

Note:
The area is calculated from midpoint to midpoint of demising walls and to the outside edge of exterior walls. The area of elevator shafts, stairs & building services are determined using the exterior perimeter of a walls.
Total Building GFA excludes P1

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PROJECT NORTH / TRUE NORTH

DYMON STORAGE

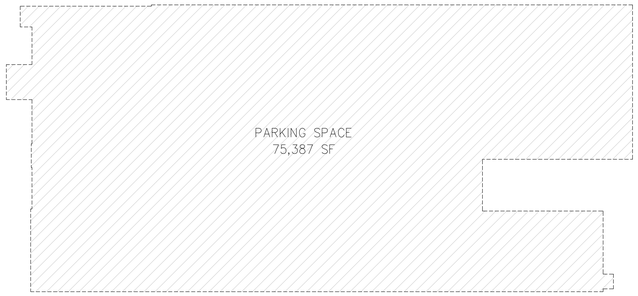
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OTTAWA ON. K1H 8K3

PROJECT NAME
5 STOREY SELF STORAGE, OFFICE & RETAIL
875 APPLEBY LINE
BURLINGTON, ONTARIO

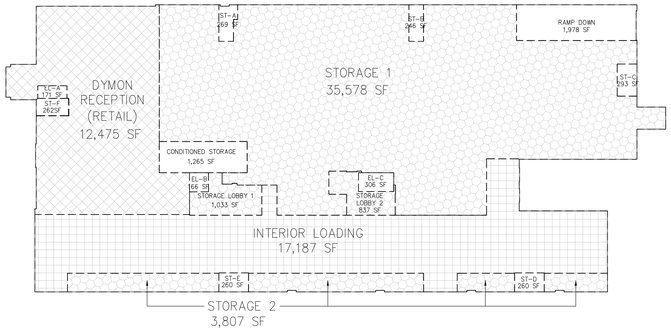
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DATE November 22, 2023
SCALE AS NOTED

DRAWING TITLE
SITE PLAN

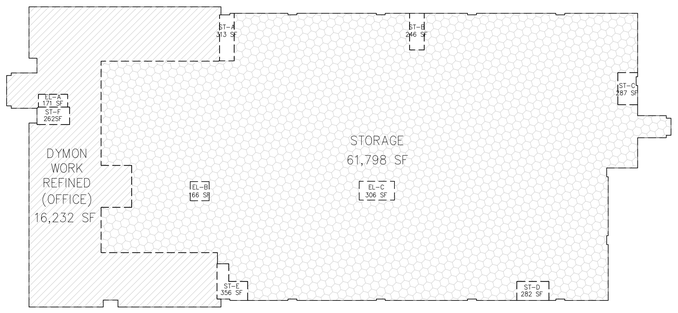
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DRAWING NO. A101



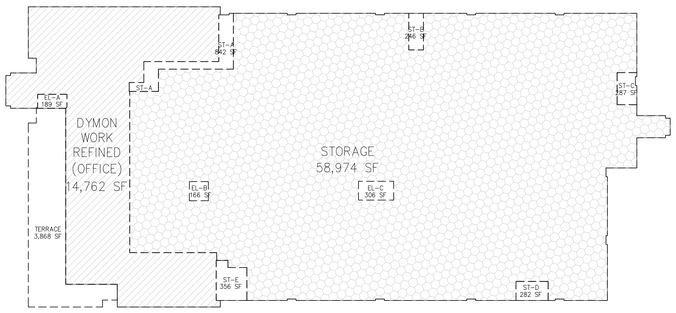
PARKING LEVEL PLAN
75,387 SF



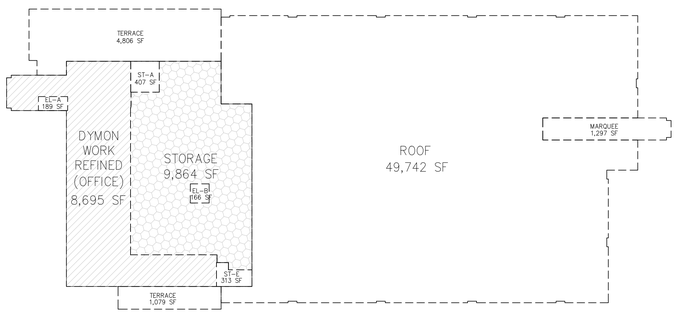
GROUND FLOOR PLAN
76,383 SF



2ND & 3RD FLOOR PLAN
80,420 SF



4TH FLOOR PLAN
76,558 SF



5TH FLOOR PLAN
19,634 SF

1/A102 FLOOR PLATE COMPARISON
1:500

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PROJECT NORTH
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DYMON STORAGE

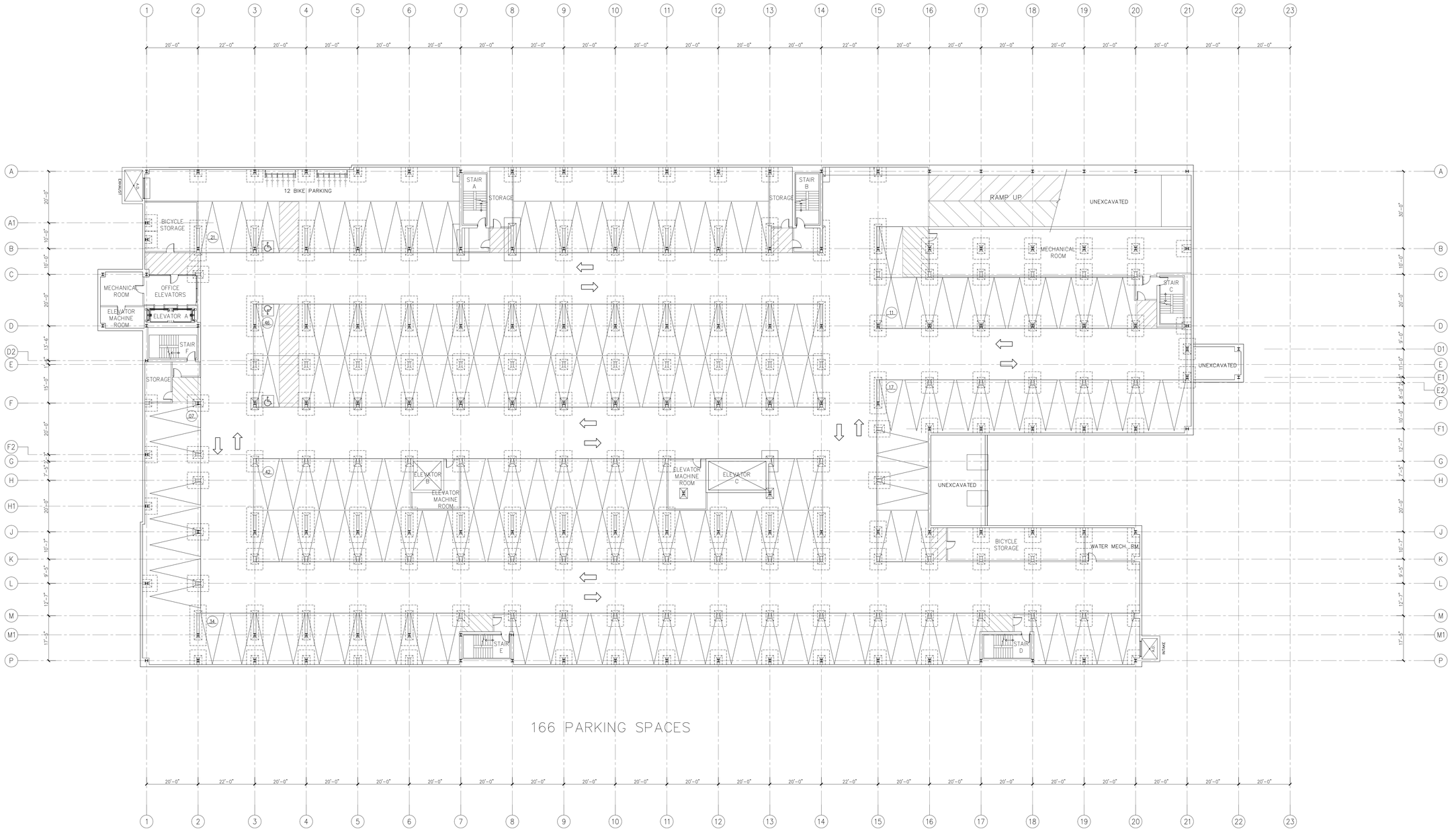
DYMON CAPITAL CORP.
2-1830 WALKLEY ROAD
OTTAWA ON. K1H 8K3

PROJECT NAME
5 STOREY SELF STORAGE, OFFICE & RETAIL
875 APPLEBY LINE
BURLINGTON, ONTARIO

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DRAWING TITLE
FLOOR PLATE COMPARISON

PROJECT NO.	DRAWING NO.
22-09	A102



1 PARKING LEVEL 1 PLAN

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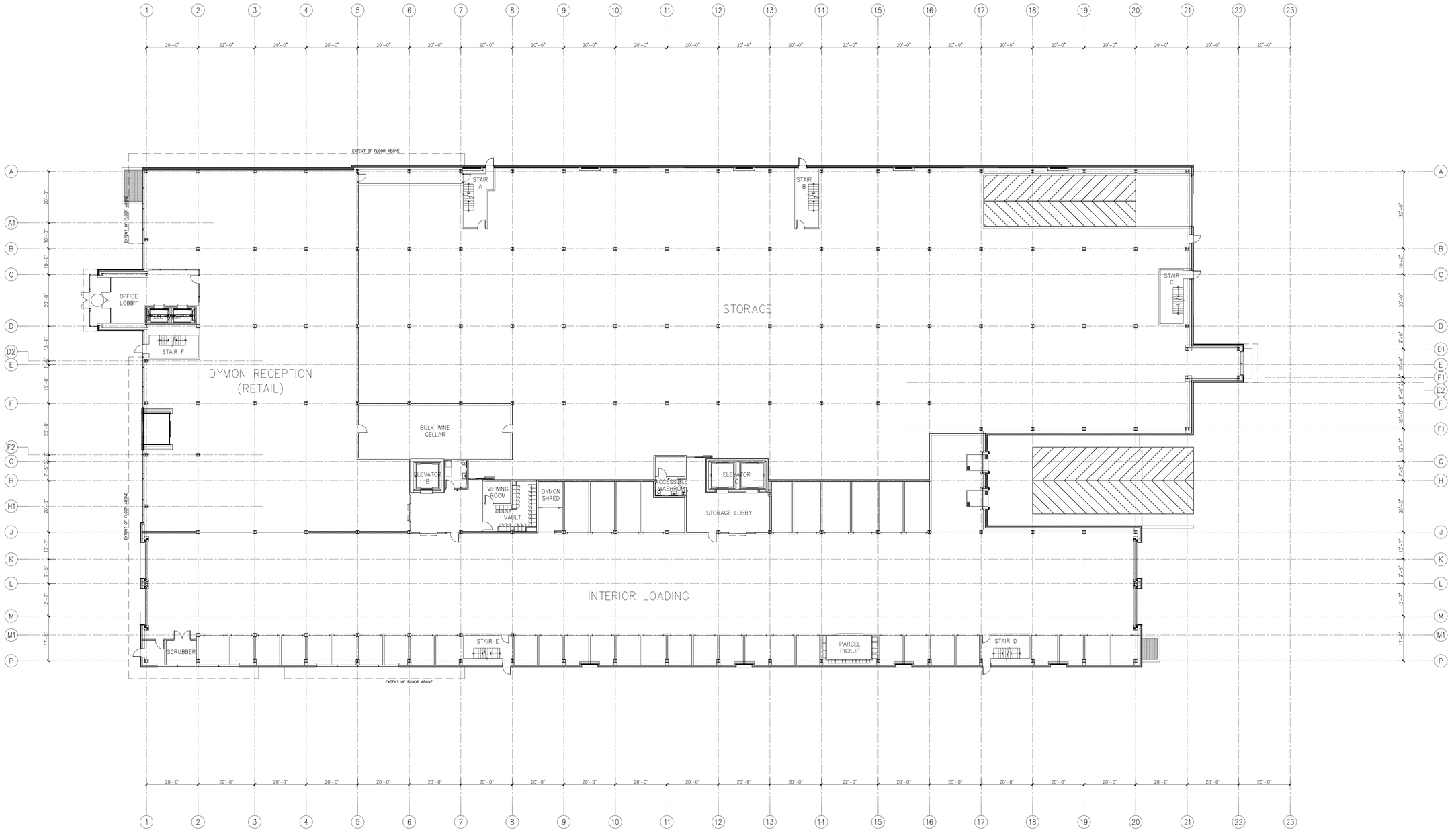
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DRAWING TITLE
PARKING LEVEL P1

PROJECT NO.	DRAWING NO.
22-09	A200



1 GROUND FLOOR PLAN
1/16" = 1'-0"

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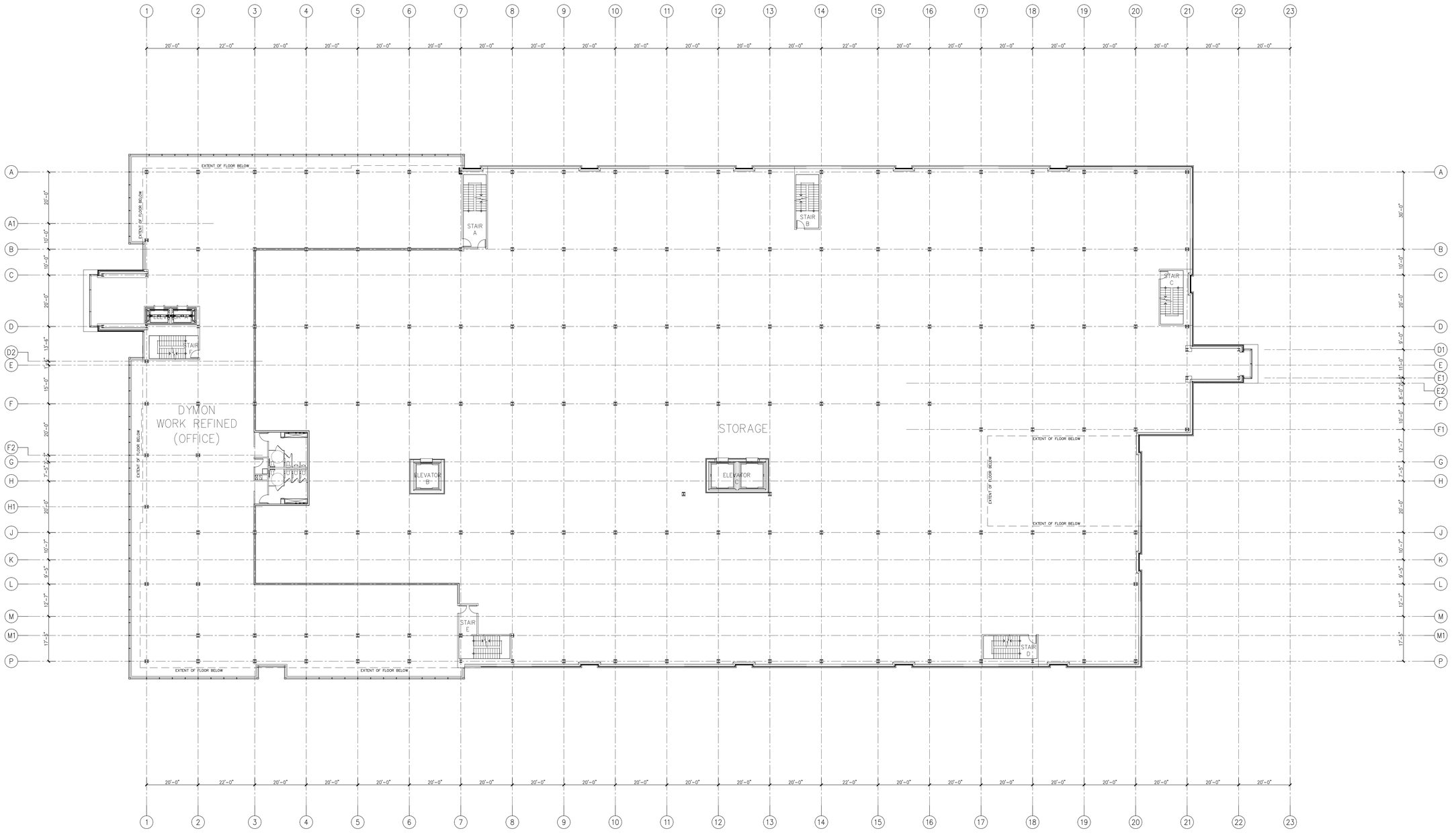
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BURLINGTON, ONTARIO

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DRAWING TITLE
GROUND FLOOR

PROJECT NO. 22-09
DRAWING NO. A201



1 2ND FLOOR PLAN
1/16" = 1'-0"

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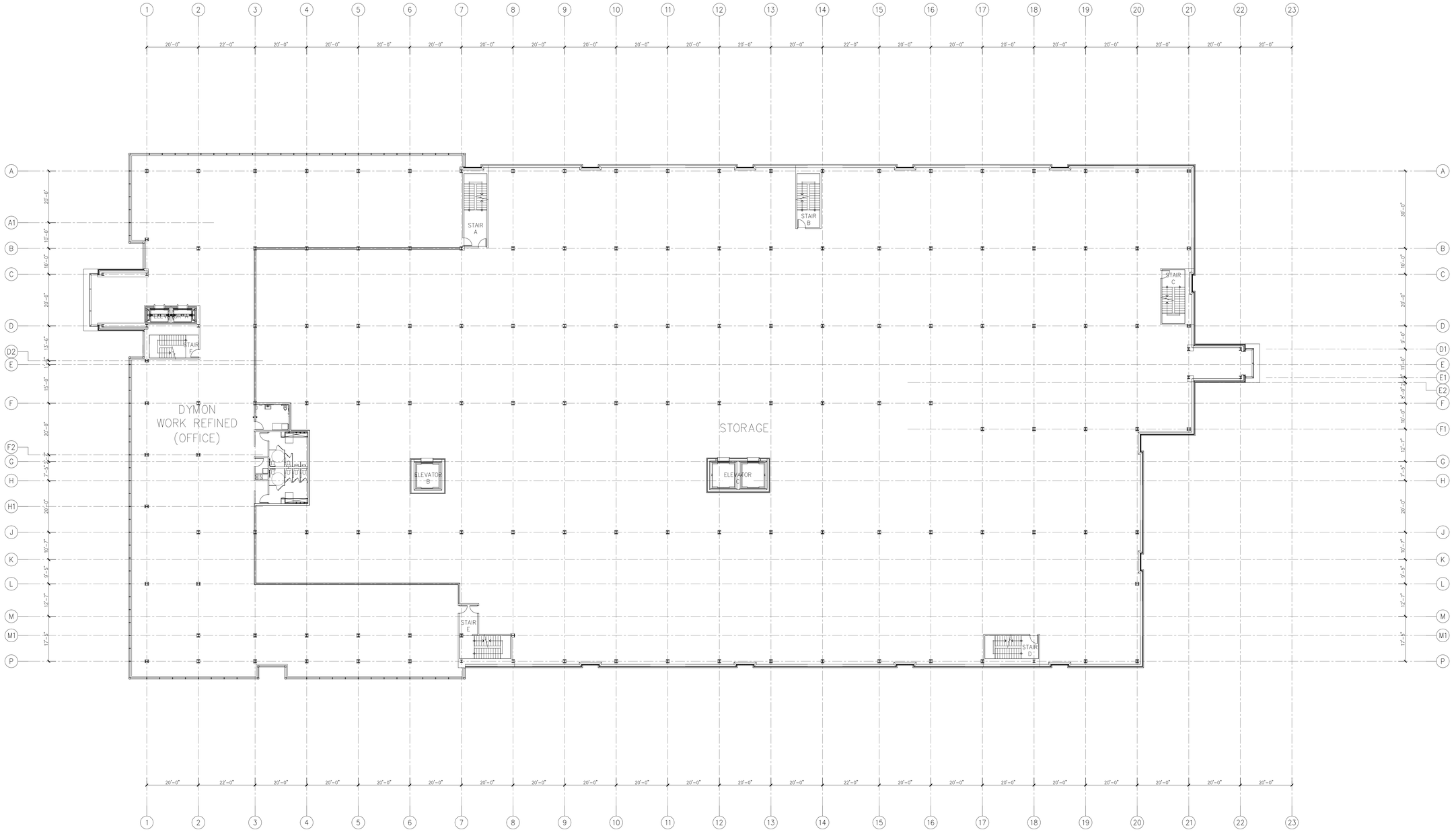
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PROJECT NAME
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875 APPLEBY LINE
BURLINGTON, ONTARIO

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DRAWING TITLE
2ND FLOOR

PROJECT NO.	DRAWING NO.
22-09	A202



1 3RD FLOOR PLAN
1/16" = 1'-0"

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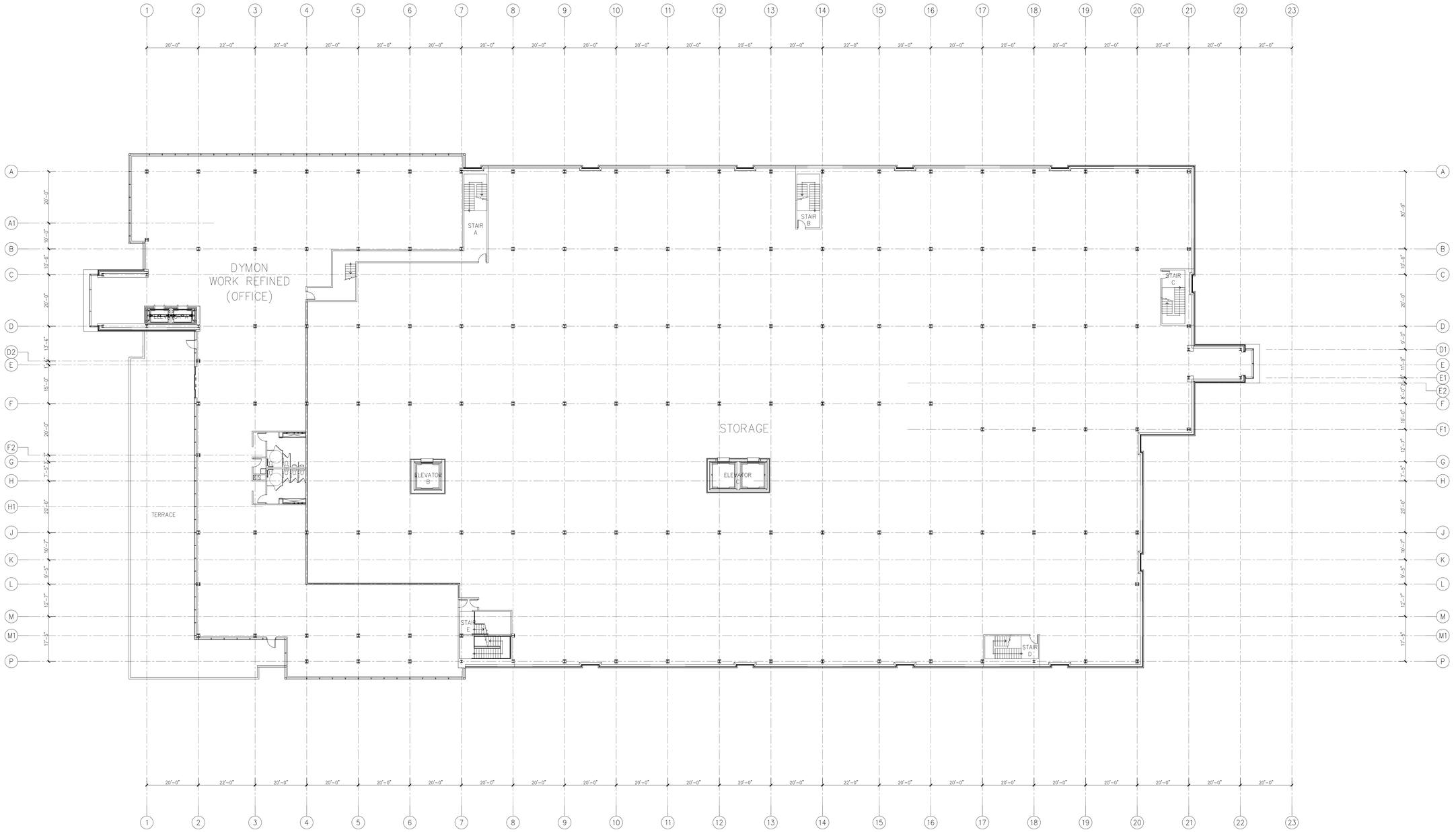
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PROJECT NAME
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875 APPLEBY LINE
BURLINGTON, ONTARIO

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DATE	February 7, 2023
SCALE	AS NOTED

DRAWING TITLE
3RD FLOOR

PROJECT NO.	DRAWING NO.
22-09	A203



1 4TH FLOOR PLAN
1/16" = 1'-0"

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PROJECT NORTH

DYMON STORAGE

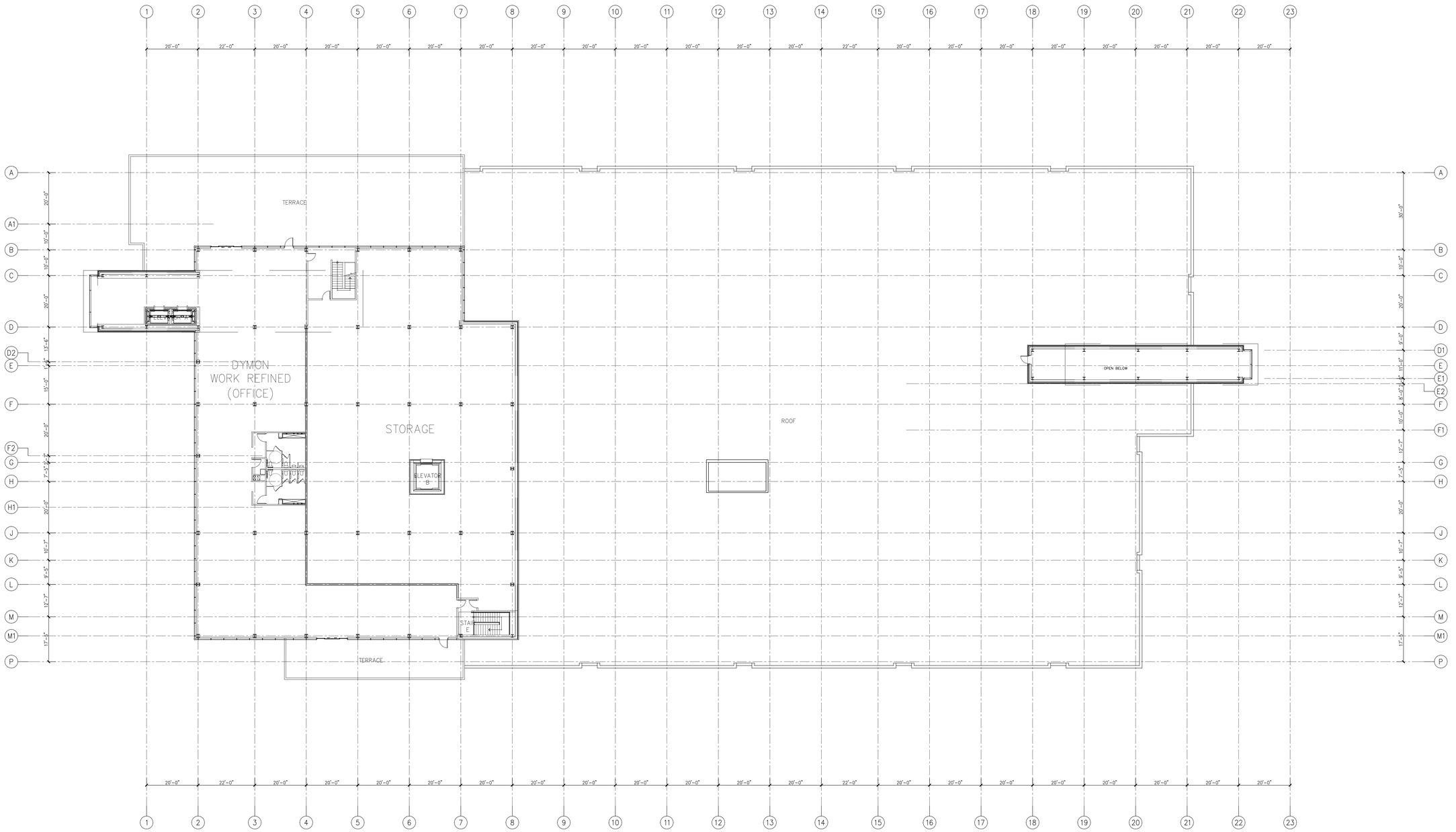
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PROJECT NAME
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875 APPLEBY LINE
BURLINGTON, ONTARIO

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DRAWING TITLE
4TH FLOOR

PROJECT NO. 22-09
DRAWING NO. A204



1 5TH FLOOR PLAN
1/16" = 1'-0"

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PROJECT NORTH

DYMON STORAGE

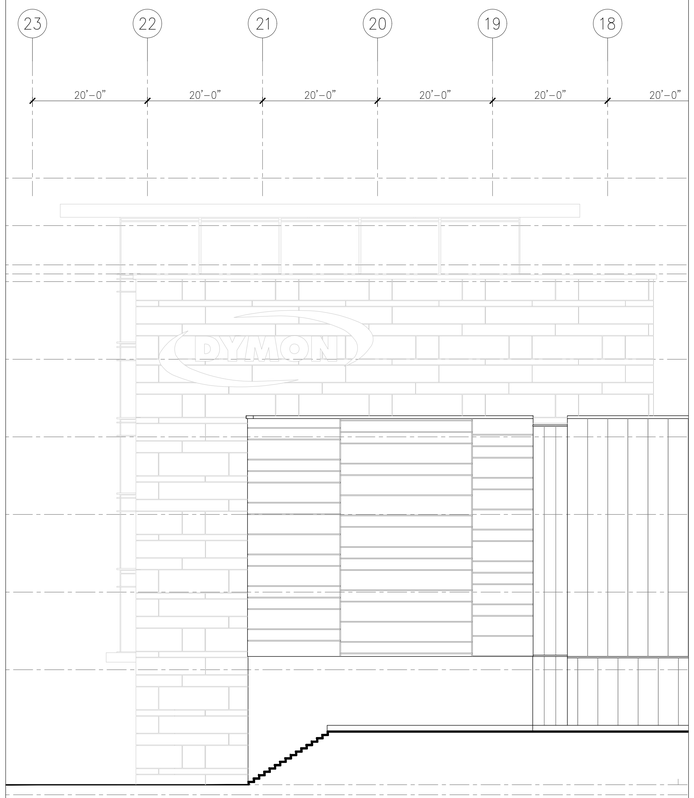
DYMON CAPITAL CORP.
2-1830 WALKLEY ROAD
OTTAWA ON. K1H 8K3

PROJECT NAME
5 STOREY SELF STORAGE,
OFFICE & RETAIL
875 APPLEBY LINE
BURLINGTON, ONTARIO

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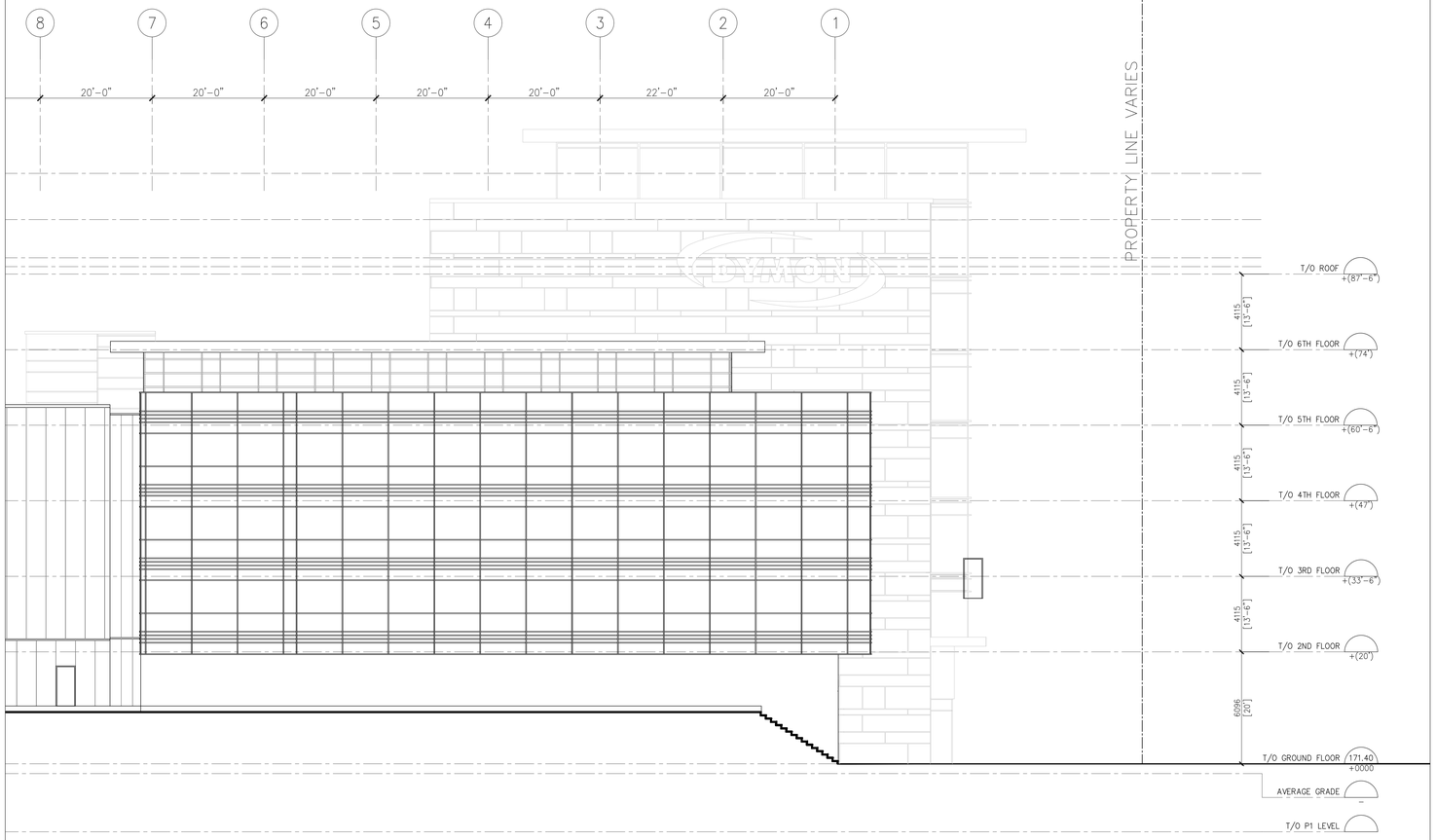
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5TH FLOOR

PROJECT NO.	DRAWING NO.
22-09	A205



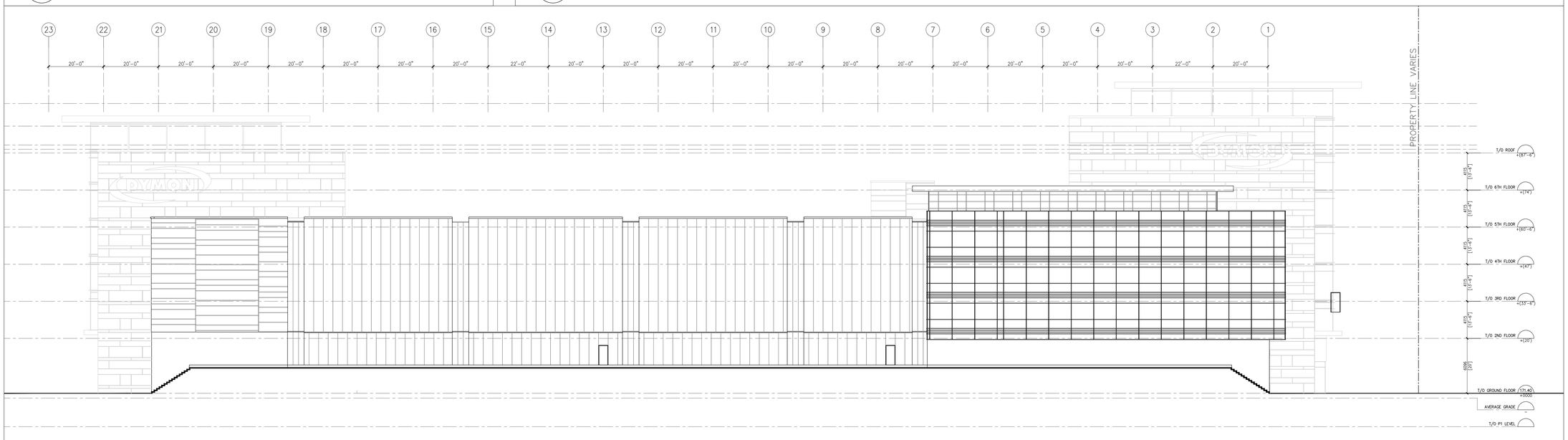
2 A301 PARTIAL NORTH ELEVATION - East End

3/32" = 1'-0"



3 A301 PARTIAL NORTH ELEVATION - West End

3/32" = 1'-0"



1 A301 NORTH ELEVATION

1/16" = 1'-0"

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PROJECT NORTH

DYMON STORAGE

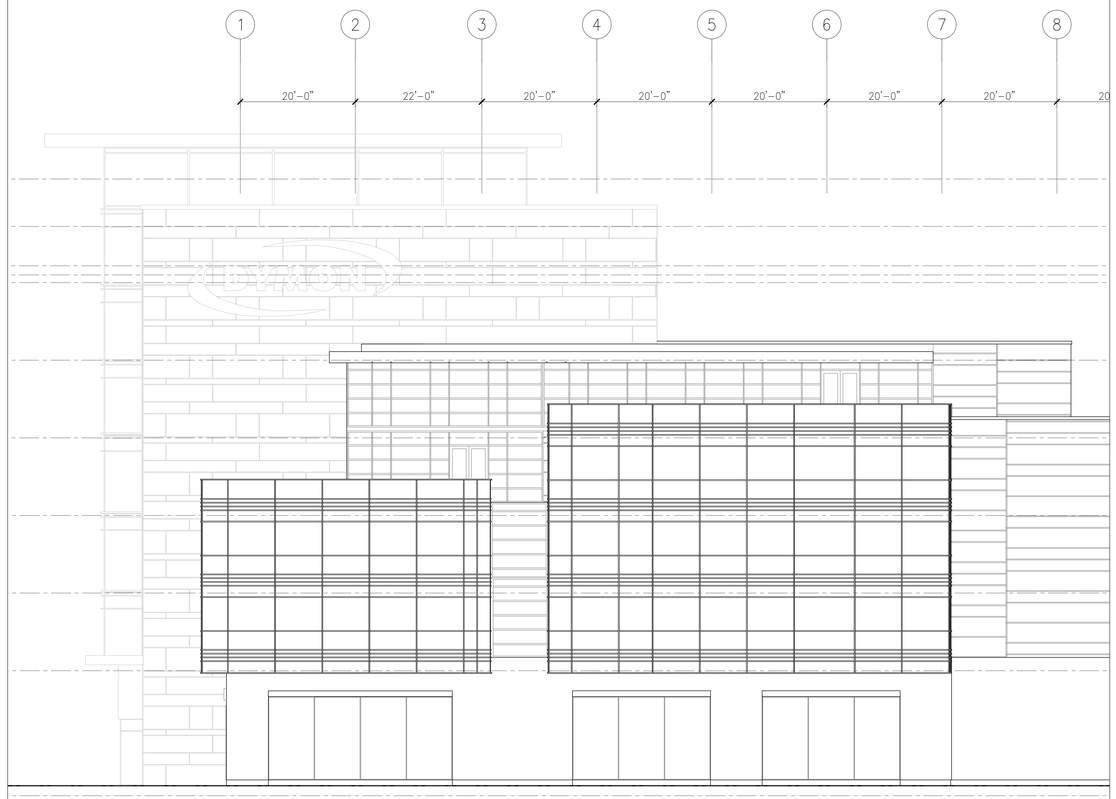
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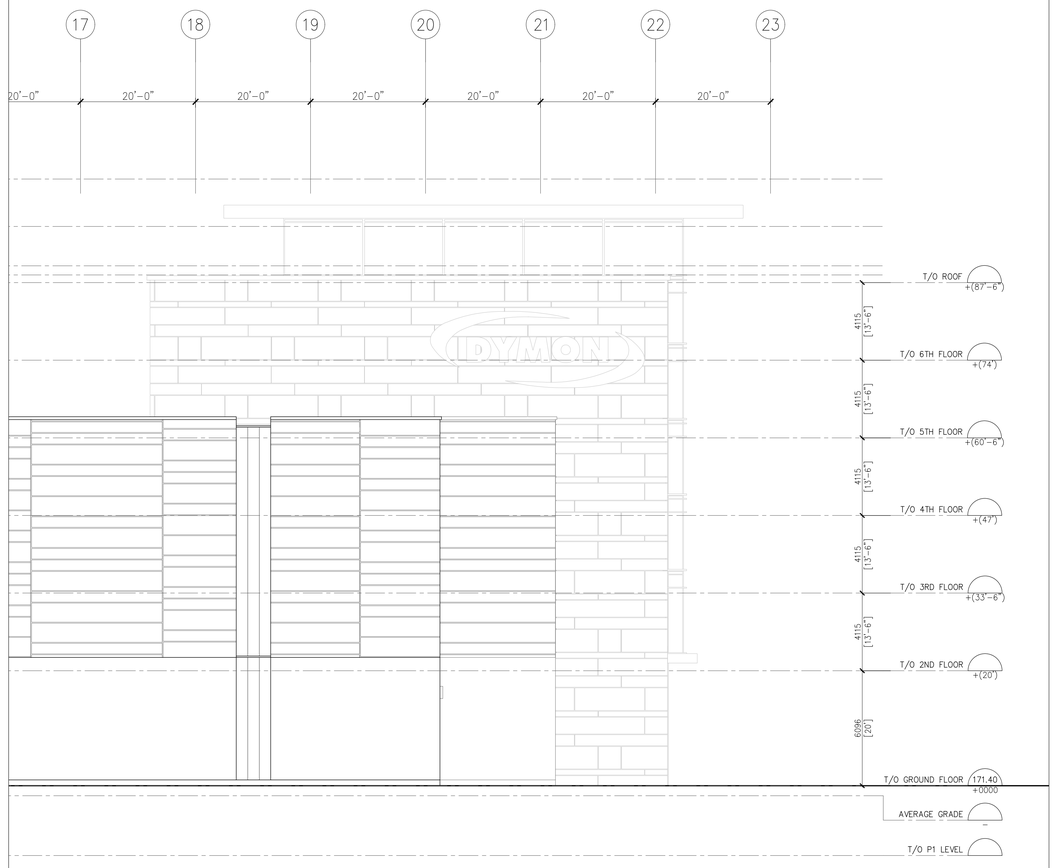
DRAWING TITLE
NORTH ELEVATION

PROJECT NO.	DRAWING NO.
22-09	A301



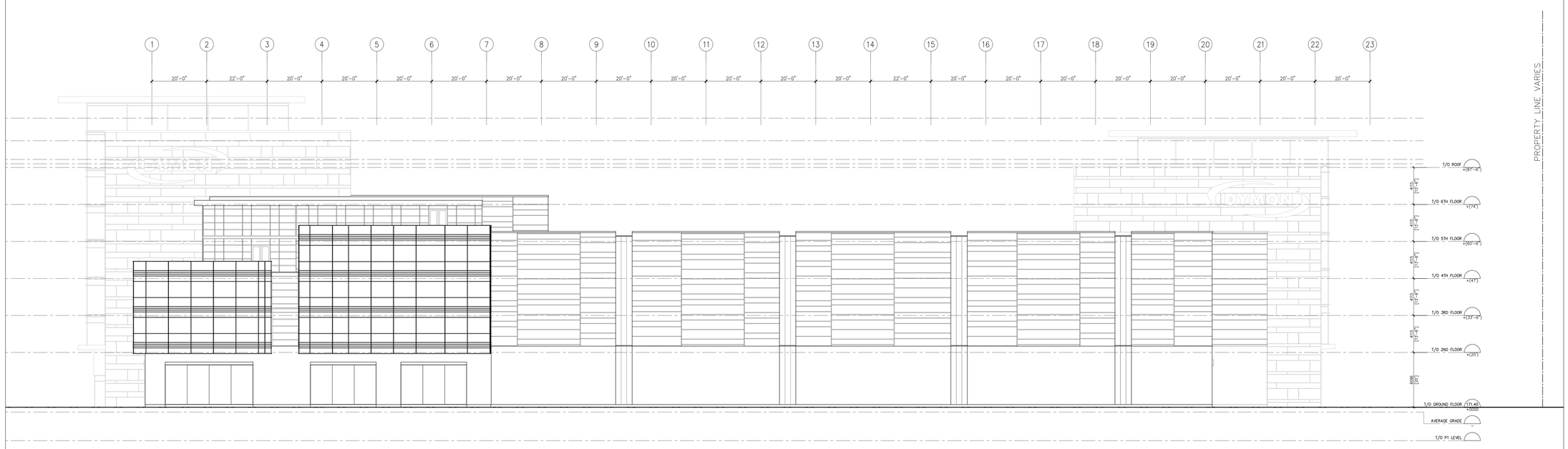
2 A302 PARTIAL SOUTH ELEVATION - East End

3/32" = 1'-0"



3 A302 PARTIAL SOUTH ELEVATION - West End

3/32" = 1'-0"



1 A302 SOUTH ELEVATION

1/16" = 1'-0"

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PROJECT NORTH

DYMON STORAGE

DYMON CAPITAL CORP.
2-1830 WALKLEY ROAD
OTTAWA ON. K1H 8K3

PROJECT NAME
5 STOREY SELF STORAGE, OFFICE & RETAIL
875 APPLEBY LINE
BURLINGTON, ONTARIO

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DRAWING TITLE

SOUTH ELEVATION

PROJECT NO.	DRAWING NO.
22-09	A302

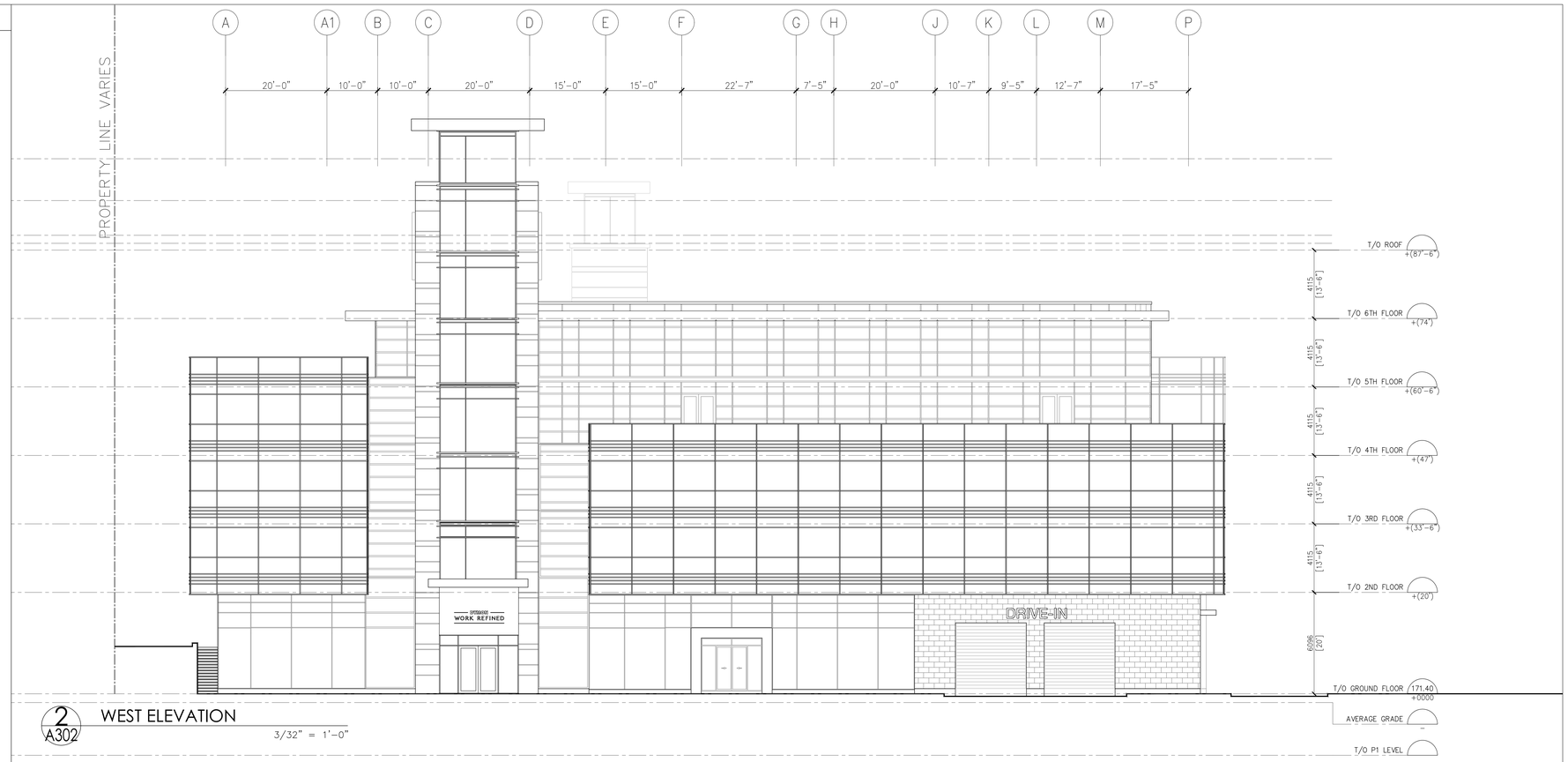
COLOUR/MATERIAL LEGEND

1. INSULATED METAL PANEL (IMP) SYSTEM
   – HORIZONTAL ORIENTATION – 'MINI MICRO-RIB' PROFILE
   – COLOUR: 'PEWTER'
3. INSULATED METAL PANEL (IMP) SYSTEM
   – VERTICAL ORIENTATION (RECESSES & REVEALS)
   – 'EMBOSSED SHADOWLINE' PROFILE – COLOUR: 'DARK BRONZE'
4. KINGSPAN KARRIER FIN
   – STANDAR RECTANGLE FIN – COLOUR: 'PEWTER'
5. LIMESTONE
   – COLOUR: DARK BROWN
6. 3 ½" ARCHITECTURAL MASONRY UNIT
   – ARRISCRAFT ADAIR LIMESTONE
   – FINISH: FINE DRESSED "SEPIA-VEINED" – RUNNING BOND
7. ALUCOIL LARSON
   – ALUMINUM COMPOSITE MATERIAL
   – FINISH: 'LIGHT WENGE' 4mm FR CORE
8. GLAZING
   – VISION GLASS
9. SPANDREL PANEL
   – COLOUR: TO MATCH IMP 'PEWTER'
10. PARAPET
11. METAL CANOPY W/ UNDERSIDE OF ALUMINUM COMPOSITE PANEL
    – FINISH: 'LIGHT WENGE'
12. PRECAST CONCRETE SILL
    – COLOUR: TO MATCH 'SEPIA-VEINED' ADAIR LIMESTONE
13. INTERNALLY LIT SIGNAGE
    – COLOUR: TBD.
13A. GLASS & METAL SIGNAGE BAND
14. FIRESTONE PREFINISHED METAL CAP.
    – FINISH: 'SLATE GREY' (ALL BENT METAL CAP PARAPETS)
15. PREFINISHED METAL IMP STACK JOINT COVER TRIM
    – COLOUR: TO MATCH IMP 'PEWTER'
16. INSULATED HOLLOW METAL DOOR
    – COLOUR: TO MATCH IMP 'PEWTER'
17. HIGH SPEED ROLL-UP O/H DOOR
18. INSULATED O/H DOOR
    – COLOUR: TO MATCH IMP 'PEWTER'
19. POURED COMCRETE
20. BACK-LIT GLASS W/ FRIT PATTERN
    – COLOUR: TO MATCH 'BOLD BLUE' W/ WHITE FRITTING
21. VENTILATION GRILLE
22. METAL PANEL
    – ALUMINUM COMPOSITE MATERIAL – COLOUR: MATCH TO 'PEWTER'
23. CONTINUOUS BENT FLASHING SILL
24. ARCHITECTURE OF RECORD PLAQUE
    – DETAILS: TBD.
25. BIRD FRIENDLY GLAZING (REFER TO GLAZING LEGEND FOR DETAILS)
26. INSULATED METAL PANEL (IMP) SYSTEM
    – VERTICAL ORIENTATION – 'MINI MICRO-RIB' PROFILE
    – COLOUR: 'PEWTER'
27. 3'-6"(H.) METAL RAILING

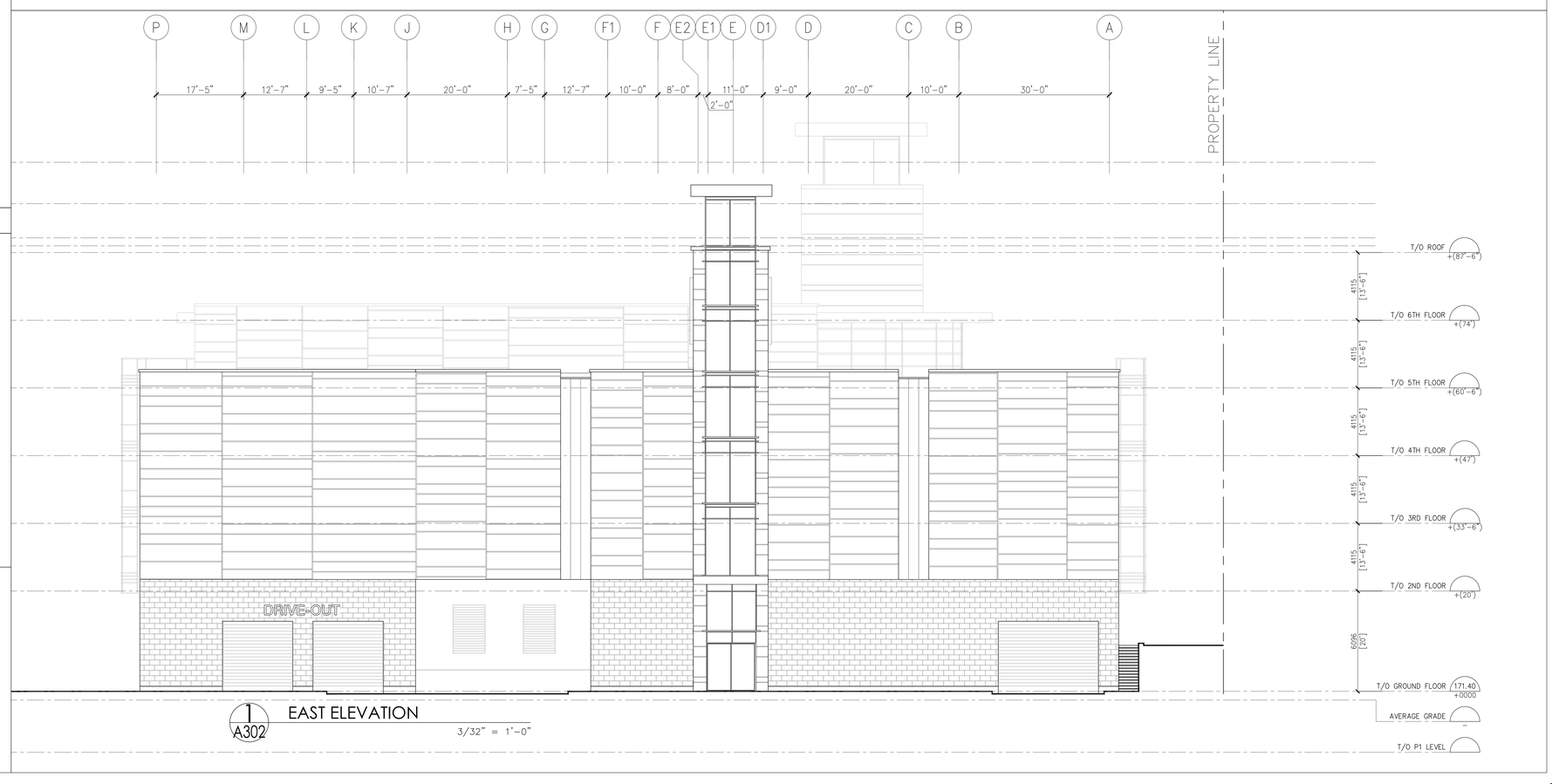
GLAZING LEGEND

ALL GLAZING TO BE TINTED (SOLARBAN 70 XL)
DOUBLE GLAZED SEALED WINDOW UNITS IN THERMALLY BROKEN
PREFINISHED ALUMINUM FRAMES (DURANAR XL FINISH)
LOW E AND ARGON FILLED COLOURS AS SELECTED BY DESIGN ARCHITECT

- 25A BIRD FRIENDLY FRITTED GLASS (MARQUEE)
- 25B BIRD FRIENDLY GLAZING: VISUAL MARKERS CONSISTING OF 5mm OPAQUE POINTS ON THE EXTERIOR SURFACE OF THE GLASS W/ A MAX. SPACING OF 50mm X 50mm
- 25C BIRD FRIENDLY LOW REFLECTANCE OPAQUE GLASS SPANDRAL PANEL
- 9 PREFINISHED METAL SPANDRAL PANEL
- 8 CLEAR GLASS



2 A302 WEST ELEVATION
3/32" = 1'-0"



1 A302 EAST ELEVATION
3/32" = 1'-0"

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BUILDING ELEVATIONS

PROJECT NO.	DRAWING NO.
22-09	A303

FISHER ENGINEERING

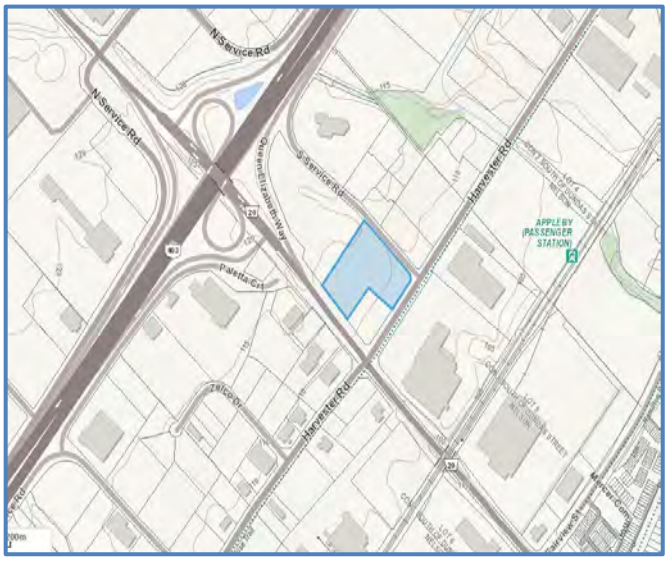
ENGINEERING

Professional Engineers Ontario

LABORATORY

CALA Canadian Association for Laboratory Accreditation Inc.

GEOTECHNICAL INVESTIGATION



PROPOSED DEVELOPMENT,
5051 HARVESTER ROAD, BURLINGTON,
L7L 6S1, ONTARIO

Prepared for:

Dymon Group of Companies

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Project No. FG 23-13264

September 29, 2023

Issued to:	Dymon Group of Companies 5915 Airport Rd E., Suite 510 Mississauga, ON L4V 1T1
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Project Name:	Geotechnical Investigation for Proposed Development
Project Address:	5051 Harvester Road, Burlington, ON
Project Number:	FG 23-13264
Issued on:	September 29, 2023
Report Prepared By:	Kevin Wai, M. Eng., Geotechnical Technician kevin@fishereng.com
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1. INTRODUCTION

Fisher Engineering Limited (Fisher) was commissioned by Dymon Group of Companies to carry out a Geotechnical Investigation for the proposed development at the property located at 5051 Harvester Road, Burlington, ON, hereinafter referred to as the 'Site'.

The purpose of this investigation was to determine general subsurface conditions in the area of the proposed construction and provide recommendations for the design of the structures, by advancing fourteen (14) boreholes.

Discussion of the findings and results of the Geotechnical Investigation is in accordance with the general terms of reference. This report was prepared specifically and solely for the purpose of assessing geotechnical conditions as they relate to the development of the site with respect to the proposed structures as detailed to Fisher at the time of the investigation.

2. SITE and PROJECT DESCRIPTIONS

Site Settings

For the purpose of this report, Appleby Line was taken as running in a north-south direction. The site is located on the northeast corner of the intersection of Appleby Line and Harvester Road, approximately 300m south of the onramp of Appleby and HWY403, in an active commercial/ industrial area of Burlington. The site is bounded by commercial/office property/building to the north, South Service Road to the east, beyond which are commercial properties, Harvester Road to the south and a gas station and Appleby Line to the west. The site has an approximate area of 22,886m^2.

The property may be divided into two sections:

1. A northern portion, which is rectangular in shape, abutting Appleby Line and South Service Road, and which was covered with small trees, grass and shrubs during the investigation.
2. A southeastern section, adjacent to the gas station, Harvester Road and South Service Road, and which was occupied by a Tim Hortons and covered with asphalt during the investigation. Site and Location Plans are presented in Appendix A.

Topography

The site slopes generally from north to south with elevations changing from approximately 115.20m asl at BH3(MW) located in the northeast corner to 110.96m asl at BH11(MW) in the southwest and 109.24m at BH14(MW) in the southeast. A drainage ditch is located between the vacant lot in the north and the Tim Hortons lot in the south.

Proposed Development

It was understood that the proposed development will consist of a 5-storey commercial/self-storage building with one underground level. Design details such as Finished Floor Elevations were not available during the investigation. Ground floor elevation was assumed to be slightly higher than average grade in the area of the building.

3. SCOPE OF GEOTECHNICAL WORK

The geotechnical scope of work includes the following:

- Investigation of subsurface conditions on the site by advancing boreholes, soil sampling and visual evaluation.
- Preparation of a report with comments and recommendations regarding:
    - geotechnical aspects of design and construction of the proposed development.
    - foundation type, ultimate and serviceability bearing capacity.
    - slab-on-grade construction.
    - pavement construction and
    - excavation recommendations etc.

4. FIELD AND LABORATORY WORK

Public and private utilities clearances were carried out by Ontario One-Call and Utility Marx, on behalf of Fisher Engineering, prior to drilling.

Subsurface Investigation (Vacant lot)

Subsurface soil exploration for the Geotechnical Investigation was conducted concurrent with drilling for a Hydrogeological Investigation and Phase II ESA on August 31 and September 1, 2023 during which ten (10) boreholes (BH1 to BH10), generally covering the building footprint, were extended to approximate

depths of 4.60m to 6.20m below prevailing grades. Boreholes BH1, BH3, BH5, BH6, BH8 and BH10 were instrumented as monitoring wells on completion of drilling to be used for groundwater testing and sampling. The wells were constructed using 50mm diameter PVC pipes with 3.05m (10') long screens.

A Diedrich D-50 track mounted drill rig equipped with solid stem augers, supplied by Terra Firma Services, was used for all drilling work under direct supervision of Fisher Engineering personnel. Soil samples were taken at regular intervals using a split–spoon sampler advanced by means of the Standard Penetration Test (SPT) which was conducted in general accordance with ASTM Specification D1586. All recovered soil samples were placed in clear, sealable plastic bags in the field and transported to Fisher Engineering laboratory for further examination, characterization and laboratory analyses.

Subsurface Investigation (Tim Hortons lot)

Four (4) boreholes (BH11 to BH14) were drilled to depths of 4.60m on the Tim Hortons lot on September 6, 2023. Boreholes BH11, BH13 and BH14 were instrumented as monitoring wells on completion of drilling to be used for groundwater testing and sampling. The wells were constructed using 50mm diameter PVC pipes with 3.05m (10') long screens.

A truck mounted drill rig (CME-75) equipped with solid stem augers, supplied by Terra Firma Services, was used for all drilling work under direct supervision of Fisher Engineering personnel. Soil samples were taken at regular intervals using a split–spoon sampler advanced by means of the Standard Penetration Test (SPT) which was conducted in general accordance with ASTM Specification D1586. All recovered soil samples were placed in clear, sealable plastic bags in the field and transported to Fisher Engineering laboratory for further examination, characterization and laboratory analyses.

A description of subsurface conditions encountered at each borehole location is presented in Appendix B - Log of Boreholes.

Laboratory Analyses

Fifteen (15) representatives soil sample from BH1, BH5 and BH10 were submitted to the laboratory for moisture content tests; twelve (12) samples for grain size analyses and six (6) samples for hydrometer tests. Six (6) soil samples were submitted for pH, chloride and sulphate tests. The samples were tested and classified in general accordance with Unified Soil Classification System, ASTM D 2487 and Standard Practice for Classification of Soil for Engineering Purposed. The laboratory results, which are presented in Appendix C, are consistent with the field description for subsurface soils discussed in Section 5.0.

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

Site Survey

Elevations at borehole/monitoring well locations were interpolated from an undated topographic survey plan, prepared by Speight, Van Nostrand and Gibson Ltd., 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 in the following sections. The logs include stratification at borehole locations along with detailed soil descriptions. Variations in soil stratification may occur and should be expected between borehole locations and elsewhere on the site.

Fill/Asphalt/Granular Material: Layers of fill, consisting of reddish-brown clayey silt, with some topsoil mixed soils, trace rootlets and trace gravel were encountered below the topsoil in boreholes BH1, BH2, BH4, BH5 and BH9. Topsoil of BH3, BH6 to BH8, BH10 and BH11 were underlain generally by fill consisting of dark brown clayey silt, with trace gravel, some sand and trace of organic material. The asphalt layers in BH12 to BH14 were underlain by granular material and fill to depths below prevailing grade as shown in Table 1.

Clayey Silt: Deposits of reddish grey, dry to moist, stiff to hard clayey silt were encountered below the fill/topsoil layers in BH1 to BH6, BH8 to BH11 and BH13 & BH14 and generally contained shale fragments.

Sandy Silt: The granular material in BH12 was underlain by reddish brown, moist, compact sandy silt, with trace gravel, some clay and pieces of shale. The sandy silt layer appeared to be disturbed.

Shale: Boreholes BH1 to 14 were terminated at refusal to auger in shale rock at depths of 1.46m to 3.44m below prevailing grade. Bedrock in the area is generally reddish-brown shale with some grey seams at the upper sections. The upper portion of the shale, beneath the overburden soils, is generally highly weathered as indicated by auguring readily to depths of over 6m. Inferred elevations at the top of bedrock are presented in Table 2.

Table 1: Summary of Depth and Elevation of Fill

Borehole No.	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Surface Elevation (m asl)	114.74	114.76	115.20	112.70	113.08	113.42	113.39	111.85	111.64	111.95	110.96	110.12	109.44	109.24
Depth of Borehole (m)	4.60	4.60	6.20	4.57	4.60	6.12	4.70	6.12	6.12	6.15	4.60	4.62	4.62	4.62
Elevation at Bottom of Borehole (m asl)	110.14	110.16	109.00	108.13	108.48	107.30	108.69	105.73	105.52	105.80	106.36	105.50	104.82	104.62
Depth of Fill (m)	1.07	0.67	0.30	0.58	0.82	0.79	0.91	0.30	0.61	0.91	1.62	0.91	0.79	0.79
Elevation at Bottom of Fill (m asl)	113.67	114.09	114.90	112.12	112.26	112.63	112.48	111.55	111.03	111.04	109.34	109.21	108.65	108.45

Table 2: Inferred Bedrock Depths and Elevations

Borehole No.	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Surface Elevation (m asl)	114.74	114.76	115.20	112.70	113.08	113.42	113.39	111.85	111.64	111.95	110.96	110.12	109.44	109.24
Depth to surface of Bedrock (m)	1.52	1.52	0.61	0.91	0.91	1.07	0.91	0.91	1.52	0.91	3.44	0.91	1.46	2.35
Elevation at surface of Bedrock (m asl)	113.22	112.24	114.59	111.79	112.17	112.35	112.48	110.94	110.12	111.04	107.52	109.21	107.98	106.89

6. GROUNDWATER LEVELS

Standing water was observed in the open boreholes BH3, BH6, BH8, BH10 and BH14 at depths of 3.96m to 5.18m below prevailing grade on completion of drilling (elevations vary from 105.28m to 110.32m asl). Boreholes BH1, BH2, BH4, BH5, BH7, BH9 and BH11 to BH13 were observed to be dry. Static groundwater levels were measured at 2.77m (MW14) to 5.39m (MW3) bgs (elevations from 106.05m to 110.49m asl). Monitoring well MW1 was dry during the investigation. Approximate locations of the monitoring wells are presented in Appendix A. Measured groundwater depths and elevations are summarized in Table 3.

Moisture content values, from laboratory tests on subsurface native soils, were in the range 2.7% to 11.9% for samples retrieved from depths of 1m or more below grade indicating moist to dry conditions. Based on the field investigation and laboratory results it is expected that some amount of groundwater will be encountered within the estimated footing depths, into weathered shale, during excavation on some areas of the site.

The accompanying hydrogeological investigation report, prepared by Fisher Engineering, should be read in conjunction with this geotechnical engineering report to determine requirements for construction dewatering and permanent drainage, if necessary.

Table 3: Groundwater Levels and Elevations

Monitoring Wells		MW1	BH2	MW3	BH4	MW5	MW6	BH7	MW8	BH9	MW10	MW11	MW12	MW13	MW14
Surface Elevation (m asl)		114.74	114.76	115.20	112.70	113.08	113.42	113.39	111.85	111.64	111.95	110.96	110.12	109.44	109.24
Depth of Well, m bgs		6.09	-	6.09	-	6.09	6.09	-	6.09	-	6.09	4.57	-	4.57	4.57
Elevation at well base, m asl		108.65	-	109.11	-	106.99	107.33	-	105.76	-	105.86	106.39	-	104.87	104.67
On Completion	GW level, m bgs	Dry	Dry	4.88	Dry	Dry	3.96	Dry	3.96	Dry	5.18	Dry	Dry	Dry	3.96
	GW Ele, m asl			110.32			109.46		107.89		106.77	Dry			105.28
8-Sep-23	GW level, m bgs	Dry	n/a	5.39	n/a	3.87	4.27	n/a	3.90	n/a	3.62	3.83	n/a	3.39	2.83
	GW Ele, m asl			109.81		109.21	109.15		107.95		108.33	107.13		106.05	106.41
13-Sep-23	GW level, m bgs	Dry	n/a	4.71	n/a	3.06	3.60	n/a	3.26	n/a	3.35	3.64	n/a	3.35	2.77
	GW Ele, m asl			110.49		110.02	109.82		108.59		108.60	107.32		106.09	106.47

7. GEOTECHNICAL DISCUSSIONS AND RECOMMENDATIONS

7.1 General Discussion

It was understood that the proposed development will consist of a 5-storey commercial/self-storage building with one underground level. Details of the finished floor elevations were not available and were therefore assumed to be approximately 0.20m above average grade.

The subsurface investigation showed that the soils in the area of the proposed building, covered by BH1 to BH10, generally consisted of fill/topsoil underlain by native silty clay extending to depths of 0.3m to 1.52m below prevailing grade. The overburden soils are underlain generally by highly weathered shale to weathered shale extending to the maximum investigation depth of 6.20m. Boreholes generally terminated at refusal to power auger at elevations varying from 106.89m to 112.72m asl. The following foundation options are recommended based on the observed soil conditions:

7.2 Spread/Strip Footings

The proposed building with one underground parking level may be supported by conventional strip/spread footings. For footings to be founded into shale, generally 2.0 to 3.5m below the top of the shale, bearing capacity values are as follows:

Serviceability Limit States (SLS)	=	650 kPa
Ultimate Limit States (ULS)	=	900 kPa

For footings to be founded into the hard clayey soils overlying shale/ bedrock or highly weathered shale, recommended bearing values are:

Serviceability Limit States (SLS)	=	350 kPa
Ultimate Limit States (ULS)	=	525 kPa

Recommended approximate founding depths / elevations and corresponding bearing resistance at limit states (SLS and ULS) in the rock are presented in the Table 4.

Table 4: Foundation Design for Conventional Footings

Building/Borehole			Elevation at BH surface (m asl)	Approx depth of footings at or below		Bearing Pressure	
				m bgs	m asl	at SLS (kPa)	at ULS (kPa)
Proposed Development	BH1	With one underground level	114.74	2.50	112.25	*650*	900
	BH2		114.76	2.50	112.25	*650*	900
	BH3		115.2	3..0	112.20	*650*	900
	BH4		112.7	2.20	110.50	*650*	900
	BH5		113.08	2.50	111.60	*650*	900
	BH6		113.42	2.20	111.20	*650*	900
	BH7		113.39	2.50	110.90	*650*	900
	BH8		111.85	2.50	109.35	*650*	900
	BH9		111.64	2.50	109.15	*650*	900
	BH10		111.95	2.50	109.45	*650*	900

7.3 General Comments about Footing Construction

- For footings founded at different levels in the vicinity of each other or located adjacent to excavated and backfilled areas, such as footing/sewer/utility trenches/previous excavations 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 10 horizontal to 7 vertical.
- Footings subjected to seasonal winter weather, such as exterior wall and column footings, should be founded at least 1.2m below the adjacent finished grades to prevent damage due to frost penetration.
- It is recommended that exposed weathered shale surfaces be covered with skim/mud coat to prevent softening or disturbance due to inclement weather if they are not poured immediately after excavation.
- Base conditions at the footing founding levels should be observed by geotechnical personnel from Fisher, prior to pouring concrete, to ensure that design bearing pressures are being attained.

8. SEISMIC DESIGN CONSIDERATIONS

The building must be designed to resist a minimum earthquake force. The Ontario Building Code (2016) specifies that the building be designed to withstand a minimum lateral seismic force ***V***, which is assumed to act non-currently in any direction on the building as per the following expression:

$$\boldsymbol{V = S(T_a)M_v I_E W/(R_d R_o)}$$

Where ***S*** ***(T_a)*** can be calculated by ***S_a (T_a)F_a*** or ***S_a (T_a)F_v***, depending on the fundamental lateral period ***T_a***. The term, which is relevant to the geotechnical conditions at the Site, are acceleration-based Site coefficient, ***F_a*** and velocity–based Site coefficient ***F_v***.

Site classification for seismic site response **Table 4.1.8.4.A**. is determined from the average Standard Penetration Resistance (N60) and/or estimated undrained shear strength (Su) of the soils within the upper 30m.

Based on the results of standard penetration tests and estimated undrained shear strength from the current geotechnical investigation, the site designation for seismic analysis for the proposed building is expected to be "**Class C**" in the weathered shale. Shear wave velocity tests are recommended to confirm a higher site classification.

9. BASEMENT WALLS

The basement walls should be designed to resist a pressure “p” at any given depth “h” below the surface, as given by the expression:

$$\boldsymbol{p = 0.4[\Upsilon h + q]}$$

Where: 0.35 is the earth pressure coefficient considered applicable

Υ= 21.0 KN/m3 is the unit weight of backfill

q = an allowance for surcharge in kPa.

The above equation assumes that a perimeter drainage system will be provided and that the backfill against subsurface walls, where applicable, would be a free draining granular material.

10. EXCAVATION AND BACKFILL

It is anticipated that no major problems will be encountered for the excavation depths for footings and underground utilities. The excavations must however be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA).

For excavations deeper than 1.2m, the sides should be sloped in accordance with the requirements of OHSA. Where this condition cannot be met, a temporary shoring system should be introduced.

Based on the subsurface exploration, the encountered sub soils are dominated generally by fill material underlain generally by a layer of hard clayey silt/ silt overlying bedrock. Standing water was observed in some boreholes on completion of drilling. For the subject site excavation, in accordance with O. Reg. 213/91, S.226 (1) the fill may be classified as Type 3 soils while the native, hard silty clay to silt can be classified as Type 2 soils. Highly weathered /weathered shale bedrock may be treated as Type 2 soils. As defined by the OHSA, excavation walls within the Type 3 soils will require battering back at slopes no steeper than 1H (horizontal):1V (vertical). For Type 2 soils, the bottom 1.2m of trench wall can be vertical.

For backfill against subsurface walls and footings it is recommended that backfill materials consist of Granular Class 'B' aggregates.

11. SHORING

Based on site conditions, if a shoring system is required for excavation/footings to protect adjacent structures, the fourth edition of the Foundation Manual should be referred to for the design of the shoring system. Geotechnical parameters, which are considered applicable for the design of shoring wall and basement are presented in Table 5.

Shoring subject to unbalanced earth pressures must be designed to resist a pressure distribution that can be calculated as follows:

$$p = K [\gamma (h-h_w) + \gamma' h_w + q] + \gamma_w h_w$$

where: p = Lateral earth pressure in kPa acting at depth h

K = parameters are provided below

h = the depth below the ground surface (m)

hw = the depth below the ground water level (m)

γ = the bulk unit weight of soil, (kN/m^3) use 20.0

γ' = the submerged unit weight of the exterior soil, (γ - 9.8 kN/m^3)

q = equivalent value of surcharge on the ground surface in kPa (min 12 kPa)

Table 5: Geotechnical Parameters

SUBSOIL	Unit Weight, γ	Depth bgs	Effective friction angle, φ°	Coefficient of Earth Pressure		
	(kN/m^3)			K_a	K_p	K_o
Fill	19	from 0.3m to 1.62m	30	0.33	3.00	0.5
Clayey silt/ Silt	20	From 0.91m to 4.64m	32	0.35	2.90	0.53
Highly weathered /weathered Shale	25	Below .91m to 4.64m	36	0.29	3.4	0.41

12. SLAB ON GRADE AND PERMANENT DRAINAGE

For the building with one underground parking level, the basement floor slab can be supported by native clayey soils and or shale deposits.

Exposed subgrade should be proof-rolled in the presence of Fisher soils personnel to detect any compressible, spongy or unstable areas. If isolated pockets of such materials are detected, they should be sub-excavated to competent subsoils and backfilled with approved inorganic materials (granular A or ¾" crusher lime stone is preferred) compacted to at least 98% of their Standard Proctor Maximum Dry Density (S.P.M.D.D.) in thin layers.

For backfill against subsurface walls and footings it is recommended that backfill materials consist of Granular Class 'B' aggregates.

Upon completion of foundation work, the floor slab should rest on a well compacted bed of size 19mm clear stone at least 200mm thick. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the floor slab.

The design of the concrete slabs on hard clayey soil/shale bedrock may be made on the basis of a value of modulus of subgrade reaction (k) of 40 MPa/m on the surface of the granular moisture barrier. The floor slab should be structurally independent from any load bearing structural elements.

Permanent perimeter and sub-floor drainage with shoring / foundation wall waterproofing should be provided and installed as shown in Appendix D. Geotextile (filter socks) should cover subsurface drain pipes to prevent migration of fine soils.

13. UNDERGROUND UTILITIES

Pipe bedding and backfill materials specifications and compaction criteria for water and sewer services should be in accordance with the pipe designer's recommendations and/or local municipal requirements.

Bedding for utilities - For the subject site, it is expected that the underground services would be founded on bedrock/native clayey soil. In order to provide uniform support Granular Class 'A'/ 20mm CRL aggregate (crusher run limestone) is generally considered well suited to be used as bedding material. Localized dewatering may be required.

If the excavation is deeper than 1.2m, the sides should be sloped in accordance with requirements of OHSA. If this condition cannot be met, a temporary shoring system or trench box should be introduced.

Trench backfill should be uniformly compacted to a density that minimizes the risk of long-term settlement. Selected on-site excavated native soils/fill (subject to further site review) may be considered suitable for re-use in trench backfilling, provided that organics/construction debris are sorted out and materials are not allowed to be wet. Moisture content should be within 2% of the optimal moisture content.

In normal sewer construction practice, the problem of road settlement largely occurs adjacent to manholes, catch basins and service crossings. In these areas, granular materials are generally required for backfill and compaction.

Backfill in the upper 1.0m from road subgrade or in settlement sensitive areas should be placed in maximum 200mm thick lifts and compacted to 98% SPMDD. Beyond these zones a 95% SPMDD compaction criterion is considered acceptable.

The Queenston Shale Formation is recognized for its swell characteristics during trench work, known as "Rock Squeeze". The designer should take this phenomenon into consideration if the trench is entirely positioned in the shale bedrock.

14. Pavement Consideration

It is expected that associated pavement for driveways and parking areas will be developed on the site. The functional life of a pavement depends directly on subgrade conditions and load carrying capacity of the pavement structure. Typical flexible pavement designs are presented in Table 6.

Table 6: Typical flexible pavement design

Pavement Layer	Compacted Thicknesses	
	Driveways & Heavy Duty Parking	Public Roadway
Asphalt top course, HL-3	40mm	40mm
Asphalt base course, HL-8	60mm	80mm
Granular 'A' or 20mm crusher run limestone base	150mm	150mm
50mm crusher run limestone sub-base	300mm	350mm

- Prior to the construction of asphalt pavement, topsoil, organic soils and construction debris must be removed. The exposed base should be proof-rolled and supervised/approved by geotechnical personnel. Any soft spongy spots detected during proof-rolling should be sub-excavated and replaced with suitable materials and compacted to 98% of their SPMDD. The placement of engineering fill, if any, should be supervised and inspected by Fisher Engineering staff.
- The finished subgrade must be contoured/graded and finally proof-rolled and approved by Fisher before placing the upper granular materials.
- The pavement structure should also meet the minimum municipal design requirements, if any, for the proposed development.
- The above thicknesses are applicable for dry and stable subgrade conditions during summer season construction only. If the construction is carried out during winter, and for unstable subgrade conditions, the thicknesses of granular materials may have to be increased.
- The granular base materials should conform to O.P.S.S. Form 1010 specifications and be compacted to at least 98% of their SPMDD's. Similarly, asphaltic concretes should meet O.P.S.S. Form 1150 requirements for specified grades and be compacted at least 92% of their Marshall Densities.
- The subgrade should be prepared as described in Section 12 prior to placement of granular base. The finished sub-grade should be contoured to eliminate depressions and sloped at a minimum of 2%

towards catch basins or perimeter ditches/drains to facilitate drainage of subgrade and base materials.

- Water should not be allowed to accumulate at/near the pavement edges. The importance of sub-grade drainage and regular maintenance and repairs cannot be over-emphasized.

15. INFILTRATION

The subsurface soils below the fill are dominated by clayey soils underlain by highly weather shale encountered generally from depths of 0.91m to 1.52m below grade (elevations from 109.21m to 112.72m asl).

Based on field observation, the soils at typical infiltration depths, below the frost line, may be described as ML (Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silt with slight plasticity). Coefficient of Permeability k values for ML soils, based on Table 3 of the 'Supplementary Guidelines to the Ontario Building Code 1997, SB-6 Percolation Time and Soil Description', are approximately 10^{-7} to 10^{-8} m/s with Percolation Times T of 20 - 50 mins/cm. Corresponding infiltration rates would be in the order of 30 to 12 mm/hr with an average factored rate of 8.4 mm/hr (FOS=2.5).

It should be noted that insitu tests at any proposed location and invert of infiltration-based facility would be required for design of infiltration-based LID facilities.

It should also be noted that groundwater levels vary across the site and are reflective of the varying soil conditions observed during the investigation. The location of any infiltration-based facilities should be carefully selected in order to maintain at least 1m separation between the invert of the infiltration facility and the highest observed groundwater level.

16. CHEMICAL ANALYSES

Five (5) soil samples were submitted to Fisher Environmental laboratories for chemical analyses related to potential sulphate attack on buried concrete. Results of the analyses are presented in Appendix C.

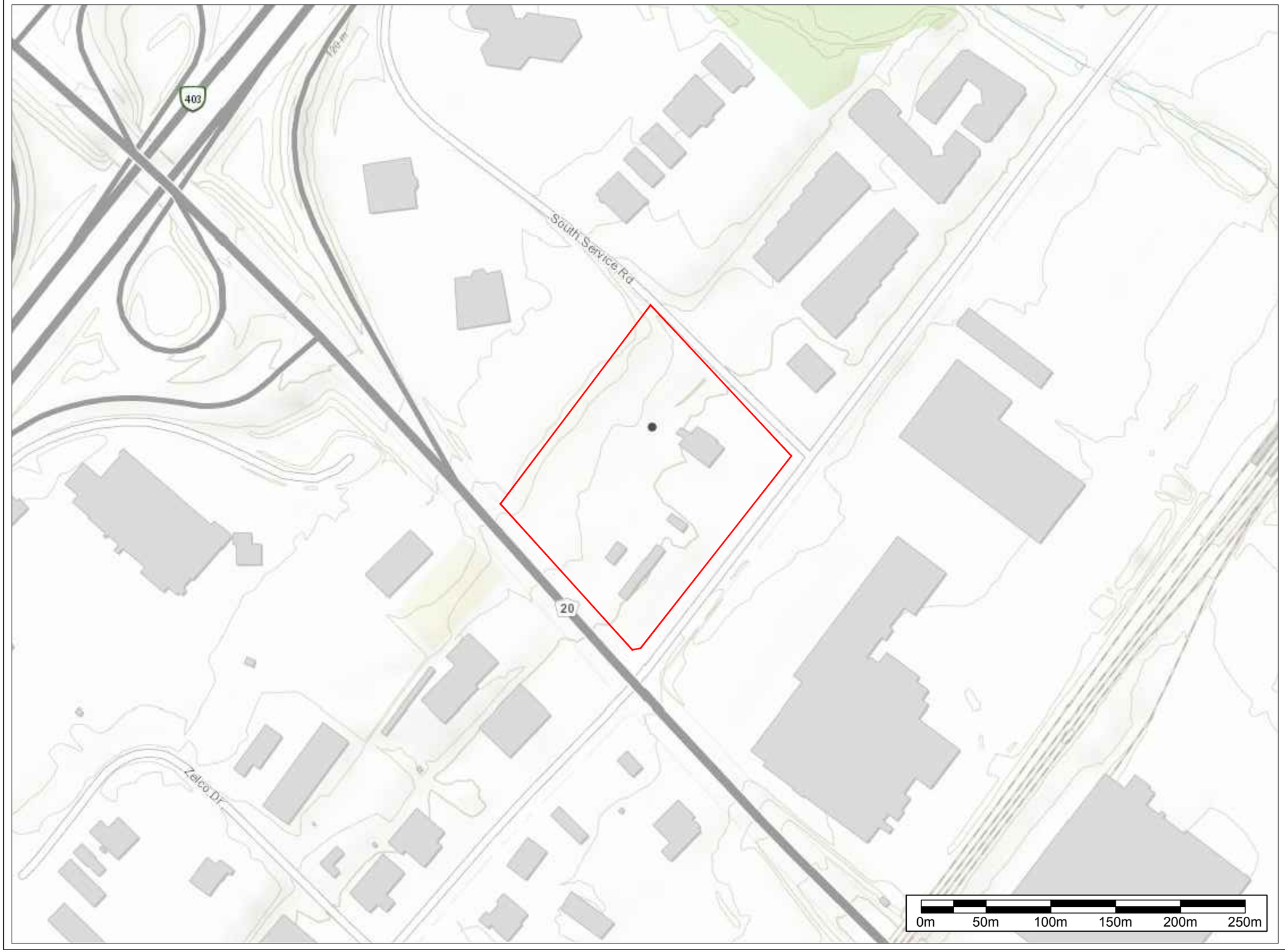
- The chemical analyses show that sulphate concentration levels in the soil samples are 16, 14, <1, 21 and 62 mg/kg or 0.0016%, 0.0014%, <0.0001% and 0.0062% respectively. According to CSA-A23.1 Table 3, the results indicate negligible degree of exposure to sulphate attack.

- Chloride contents in the samples were 20, 24, <10 and 37 ug/g or 0.002%, 0.0024, <0.001 and 0.0037% indicating negligible corrosion of exposed ferrous metals.
- pH levels of 8.39, 8.63, 8.42, 8.3 and 8.51 are within the expected range for subsurface soils (5-11).

17. 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, their design engineers and those directly involved in 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, and particularly the fill material, may be present between and beyond the boreholes on which the recommendations are made and will have to be verified during construction. As more specific subsurface information becomes available during excavations on the subject 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 subsurface soils and 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 recommended that Fisher be contacted to provide assistance in interpreting the borehole records by anyone undertaking work on/or below the ground surface at this site prior to work been carried out.
- The client expressly agrees that they entered into this agreement with Fisher, both on their own behalf and as agent on behalf of their 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 they 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.

APPENDIX A: SITE & LOCATION PLANS



FISHER ENGINEERING

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

Tel: 905 475-7755

NORTH

N

LEGEND

SITE BOUNDARY

PROJECT NAME AND ADDRESS

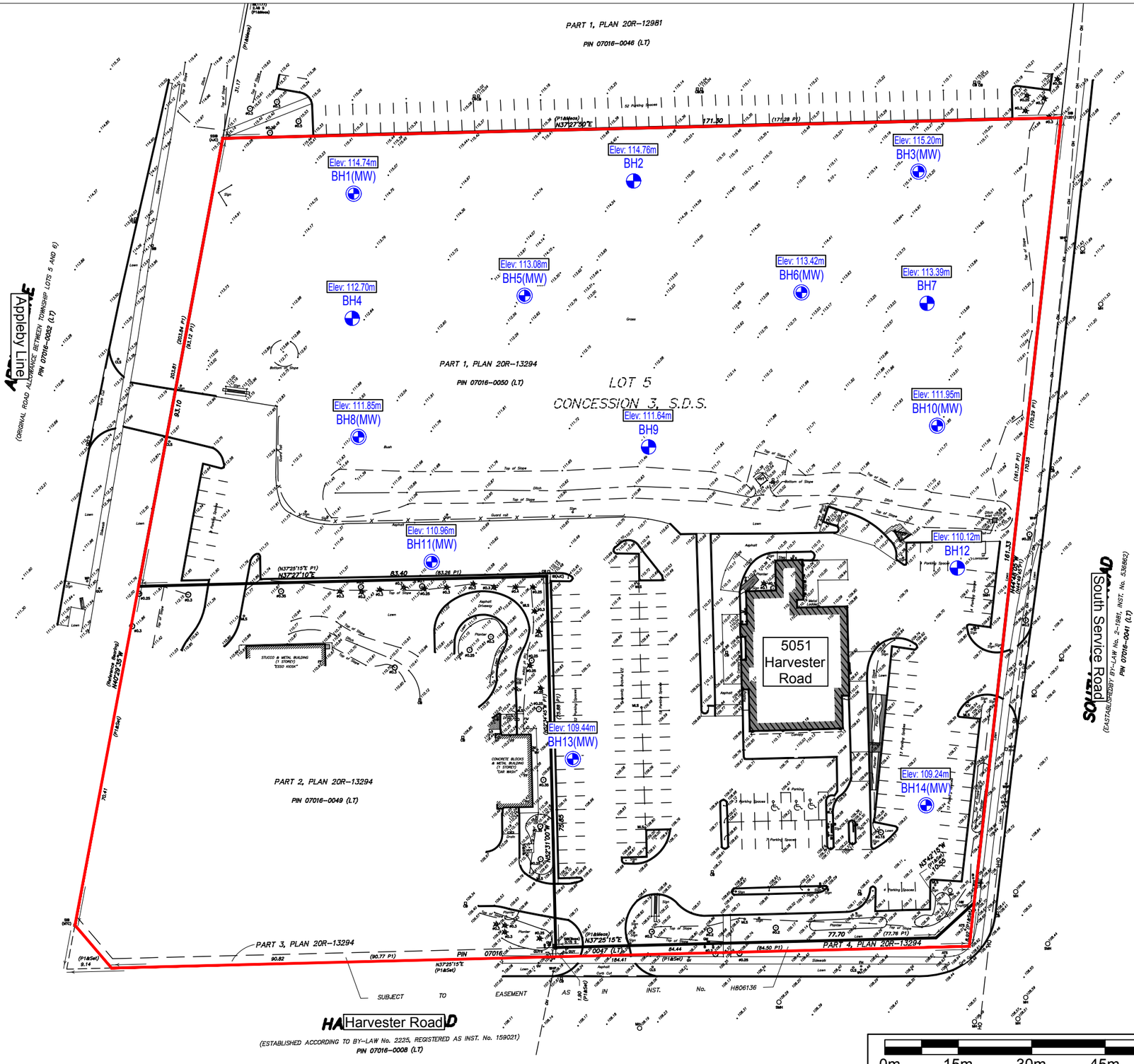
DYMON PROJECTS

5051 Harvester Road,
Burlington, Ontario

FIGURE A1:

SITE LOCATION MAP

PROJECT NO.	SHEET NO.
FE 23-13264/65	A1
DATE: 6 September, 2023	
SCALE: AS SHOWN	



FISHER ENGINEERING

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

Tel: 905 475-7755

NORTH

LEGEND

- SITE BOUNDARY
- BUILDING FOOTPRINT
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION

PROJECT NAME AND ADDRESS

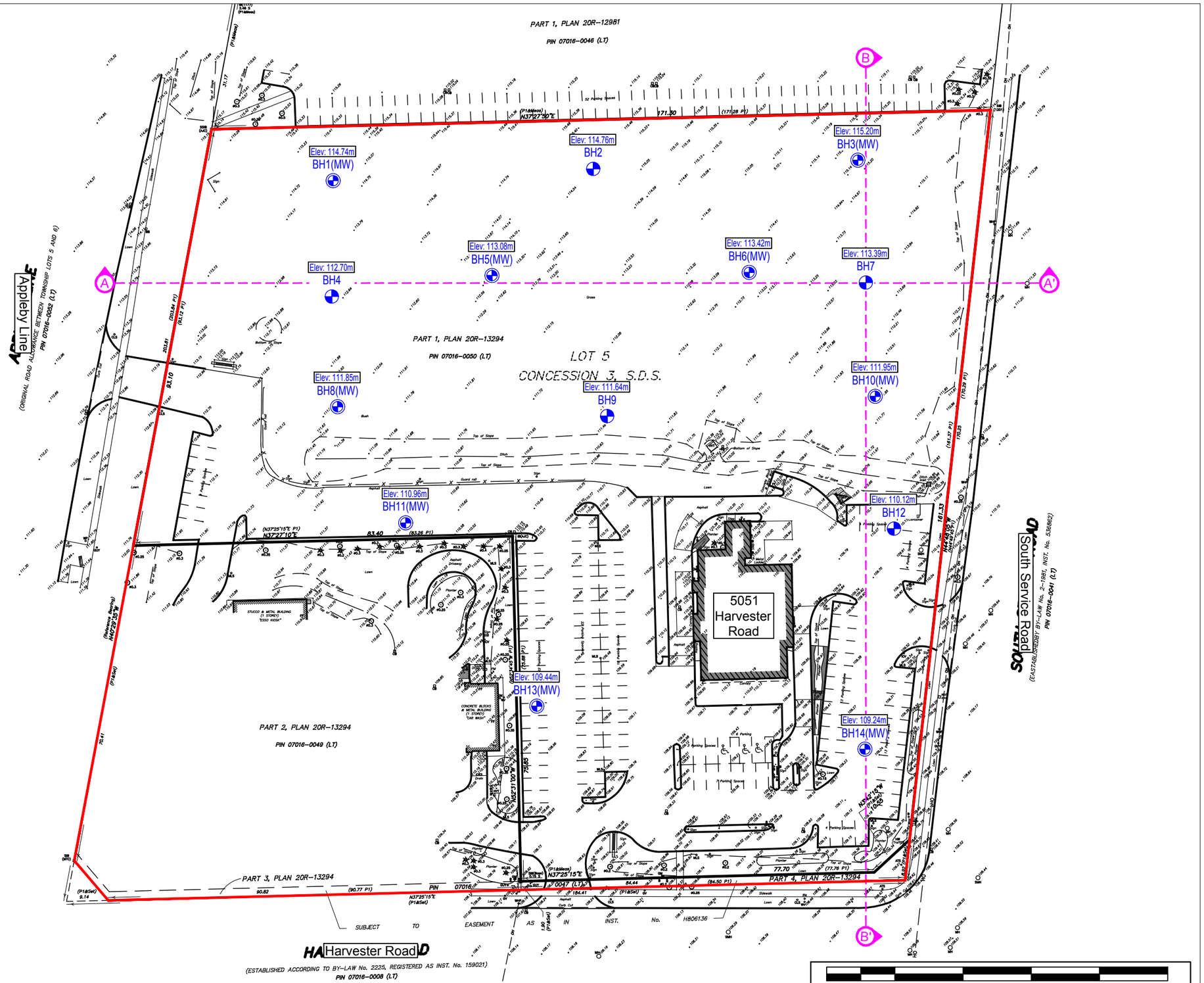
DYMON PROJECTS

5051 Harvester Road,
Burlington, Ontario

FIGURE A2:

SITE PLAN WITH BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE 23-13264/65	A2
DATE: 6 September, 2023	
SCALE: AS SHOWN	



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

NORTH

LEGEND

- SITE BOUNDARY
- EXISITING BUILDING FOOTPRINT
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- A-A' CROSS SECTION MARK

PROJECT NAME AND ADDRESS

DYMON PROJECTS

5051 Harvester Road,
Burlington, Ontario

FIGURE A3:

SITE PLAN WITH CROSS SECTIONS

PROJECT NO.	SHEET NO.
FE 23-13264/65	A3
DATE: 6 September, 2023	
SCALE: AS SHOWN	

APPENDIX B: LOG OF BOREHOLES

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH1(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 1 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				114.74			
0	0	TOPSOIL		0.30 / 114.44		SS-1	16
2		FILL: Reddish brown sandy silt, some topsoil, trace rootlets, trace gravel, moist					
4	1			1.07 / 113.67		SS-2	26
		CLAYEY SILT: Reddish brown to grey, trace to some shale, trace sand, moist to dry, hard		1.52 / 113.22			
6	2	SHALE: Reddish brown, dry, hard				SS-3	100+
8						SS-4	100+
10	3					SS-5	100+
12	4						
14							
		End of borehole at 4.60m		4.60 / 110.14		SS-6	100+
16	5						
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32							
34	10						

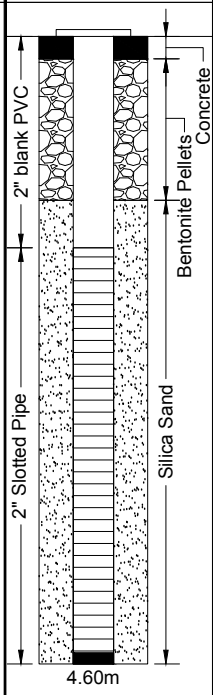
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: Dry; on 8 September 2023: Dry

DRAWN: T.L. | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH2 SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 1 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				114.76			
0	0	~152mm TOPSOIL		0.15 / 114.61		SS-1	8
2		FILL: Reddish brown clayey silt/disturbed fill, some sand, trace topsoil, trace gravel, trace rootlets, moist		0.67 / 114.09		SS-2	43
4	1	CLAYEY SILT: Reddish brown to grey, trace to some shale, trace sand, moist to dry, hard		1.52 / 113.24		SS-3	100+
6	2	SHALE: Reddish brown, dry, hard				SS-4	100+
8						SS-5	100+
10	3						
12	4					SS-6	100+
14							
16	5	End of borehole at 4.60m		4.60 / 110.16			
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32							
34	10						

SOIL PROFILE | SAMPLES

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 (m): on completion: Dry

DRAWN: T.L. | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH3(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 1 September, 2023

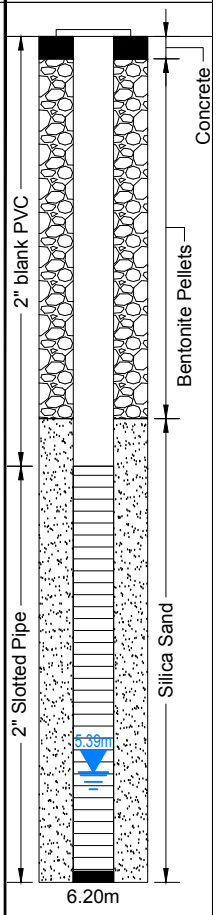
DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				115.20			
0	0	TOPSOIL		0.30 / 114.90		SS-1	16
2		CLAYEY SILT: Reddish brown, trace to some shale, trace to some sand, dry, hard		0.61 / 114.59			
4	1	SHALE: Reddish brown to grey, dry, hard				SS-2	100+
6	2					SS-3	100+
8						SS-4	100+
10	3					SS-5	100+
12	4						
14							
16	5	Water encountered @5.18m				SS-6	100+
18							
20	6	End of borehole at 6.20m		6.20 / 109.00		SS-7	100+
22	7						
24							
26	8						
28							
30	9						
32	10						
34							

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



Groundwater Depth (m): on completion: 4.88m; on 8 September 2023: 5.39m

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH4 SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 1 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				112.70			
0	0	TOPSOIL		0.30 / 112.40		SS-1	7
2	1	FILL: Reddish brown clayey silt/disturbed fill, trace gravel, some sand, trace topsoil, trace rootlets, moist		0.58 / 112.12		SS-2	47
4		CLAYEY SILT: Reddish brown, trace some shale, trace sand, dry, hard		0.91 / 111.79			
6	2	SHALE: Reddish brown to grey, dry, hard				SS-3	100+
8						SS-4	100+
10	3					SS-5	100+
12	4						
14							
		End of borehole at 4.57m		4.57 / 108.13		SS-6	100+
16	5						
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						
34							

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 (m): on completion: Dry

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH5(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 1 September, 2023

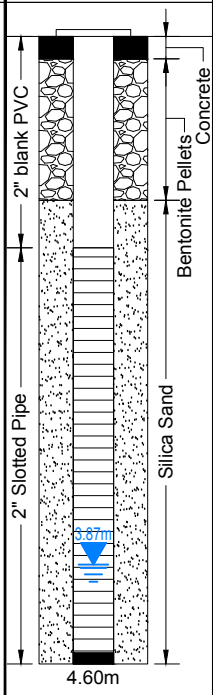
DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				113.08			
0	0	~152mm TOPSOIL		0.15 / 112.93		SS-1	8
2	1	FILL: Reddish brown sandy silt, trace shale, some clay, trace gravel, trace topsoil, trace rootlets, moist		0.91 / 112.17		SS-2	27
4		SHALE: Reddish brown to grey, dry, hard					
6	2					SS-3	100+
8						SS-4	100+
10	3					SS-5	100+
12	4						
14							
		End of borehole at 4.60m		4.60 / 108.48		SS-6	100+
16	5						
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						
34							

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



Groundwater Depth (m): on completion: Dry; on 8 September 2023: 3.87m

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH6(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 31 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				113.42			
		TOPSOIL		0.30 / 113.12		SS-1	8
		FILL: Reddish brown clayey silt, some sand, trace topsoil, trace rootlets, trace gravel, moist		0.79 / 112.63		SS-2	30
		CLAYEY SILT: Reddish brown to grey, some shale, trace to some sand, dry, hard		1.07 / 112.35		SS-3	100+
		SHALE: Grey to reddish brown, dry, hard				SS-4	100+
						SS-5	100+
		Wet below 5.18m				SS-6	100+
		End of borehole at 6.12m		6.12 / 107.30		SS-7	100+

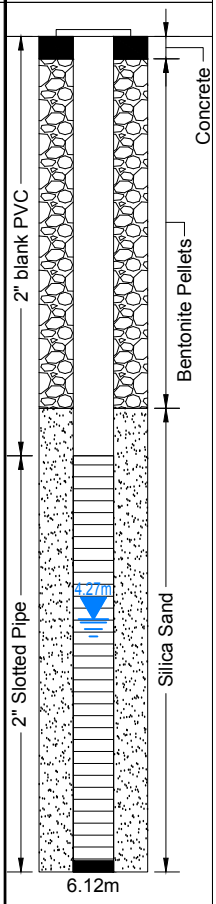
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: 3.96m; on 8 September 2023: 4.27m

DRAWN: T.L. | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH7 SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 31 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				113.39			
0	0	TOPSOIL		0.30 / 113.09		SS-1	8
2		FILL: Reddish brown clayey silt, trace sand, trace gravel, trace topsoil, trace rootlets, moist		0.91 / 112.48		SS-2	100+
4	1	SHALE: Grey to reddish brown, dry, hard					
6						SS-3	100+
8	2					SS-4	100+
10						SS-5	100+
12	3						
14	4						
16		End of borehole at 4.70m		4.70 / 108.69		SS-6	100+
18	5						
20							
22	6						
24	7						
26							
28	8						
30	9						
32							
34	10						

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 (m): on completion: Dry

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH8(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 31 August, 2023

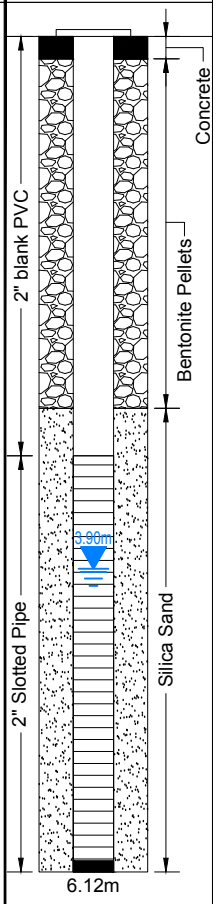
DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				111.85			
0	0	TOPSOIL		0.30 / 111.55		SS-1	9
2		CLAYEY SILT: Reddish brown, trace gravel, trace to some sand, trace grey shale, moist, very stiff to hard		0.91 / 110.94		SS-2	29
4	1	SHALE: Grey to reddish brown, wet, hard				SS-3	100+
6	2						
8						SS-4	52
10	3					SS-5	42
12	4						
14							
16	5					SS-6	100+
18							
20	6	End of borehole at 6.12m		6.12 / 105.73		SS-7	100+
22	7						
24							
26	8						
28							
30	9						
32	10						
34							

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



Groundwater Depth (m): on completion: 3.96m; on 8 September 2023: 3.90m

DRAWN: T.L. | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH9 SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 31 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				111.64			
		TOPSOIL		0.30 / 111.34		SS-1	11
2		FILL: Reddish brown sandy silt, trace topsoil, some clay, trace gravel, rootlets, moist		0.61 / 111.03			
4	1	CLAYEY SILT: Grey, trace shale, dry, very stiff				SS-2	28
				1.52 / 110.12			
6	2	SHALE: Reddish brown to grey, hard				SS-3	70
8						SS-4	100+
10	3					SS-5	100+
12	4						
14							
16	5					SS-6	100+
18							
20	6						
		End of borehole at 6.12m		6.12 / 105.52		SS-7	100+
22	7						
24							
26	8						
28							
30	9						
32							
34	10						

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 (m): on completion: Dry

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH10(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: D-50 Truck, Solid Stem

DRILLING DATE: 31 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				111.95			
		TOPSOIL		0.30 / 111.65		SS-1	9
2		FILL: Reddish brown clayey silt, trace sand, trace topsoil, trace rootlets, moist		0.91 / 111.04		SS-2	66
4	1	SHALE: Grey to reddish brown, dry, hard				SS-3	100+
6							
8	2					SS-4	100+
10							
12	3					SS-5	100+
14							
16	4					SS-6	100+
18		Water encountered @5.18m					
20	5	Spoon @6.10m wet, sample dry					
22		End of borehole at 6.15m		6.15 / 105.80		SS-7	100+
24	6						
26							
28	7						
30							
32	8						
34							
	9						
	10						

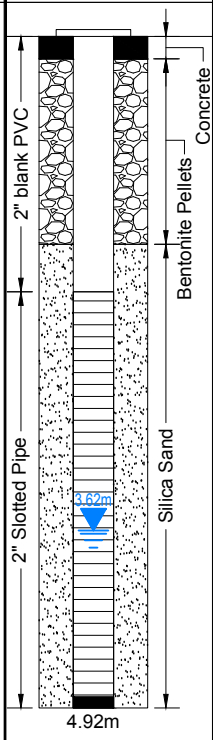
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: 5.18m; on 8 September 2023: 3.62m

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH11(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: CME-75 Truck, Solid Stem

DRILLING DATE: 6 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				110.96			
		TOPSOIL		0.30 / 110.66		SS-1	8
		GRANULAR MATERIAL		0.58 / 110.38			
4	1	FILL: Dark brown clayey silt, some sand, trace gravel, trace organics, moist		0.91 / 110.05		SS-2	23
		FILL: Reddish brown sandy silt, trace clay, trace gravel, trace topsoil, moist		1.62 / 109.34		SS-3	100+
6	2	CLAYEY SILT: Reddish brown, trace to some sand, some shale, dry, hard					
8						SS-4	100+
10	3					SS-5	100+
		SHALE: Reddish brown, dry, hard		3.44 / 107.52			
14	4						
		End of borehole at 4.60m		4.60 / 106.36		SS-6	100+
16	5						
20	6						
22	7						
26	8						
28							
30	9						
32	10						
34							

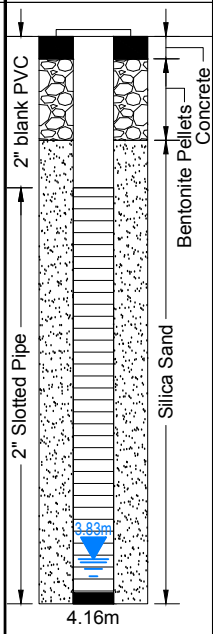
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: Dry; on 8 September 2023: 3.83m

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH12 SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: CME-75 Truck, Solid Stem

DRILLING DATE: 6 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				110.12			
0	0	~76mm ASPHALT				SS-1	18
		GRANULAR MATERIAL		0.55 / 109.57			
2		SANDY SILT: Reddish brown disturbed soil, trace gravel, some clay, trace shale, moist, compact		0.91 / 109.21		SS-2	21
4	1	SHALE: Reddish brown to grey, dry, hard				SS-3	100+
6	2						
8						SS-4	100+
10	3					SS-5	100+
12		Caved into 3.96m					
14	4						
		End of borehole at 4.62m		4.62 / 105.50		SS-6	100+
16	5						
18							
20	6						
22							
24	7						
26	8						
28							
30	9						
32							
34	10						

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 (m): on completion: Dry

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

LOG OF BOREHOLE

NO. BH13(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: CME-75 Truck, Solid Stem

DRILLING DATE: 6 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				109.44			
		~102mm ASPHALT		0.25 / 109.19		SS-1	7
		GRANULAR MATERIAL					
		FILL: Reddish brown clayey silt/disturbed fill, some sand, trace gravel, trace topsoil, trace rootlets, moist		0.79 / 108.65		SS-2	100+
		CLAYEY SILT: Reddish brown, some shale, some sand, dry, hard		1.46 / 107.98		SS-3	100+
		SHALE: Reddish brown, dry, hard				SS-4	100+
						SS-5	100+
		Caved into 4.27m					
		End of borehole at 4.62m		4.62 / 104.82		SS-6	100+

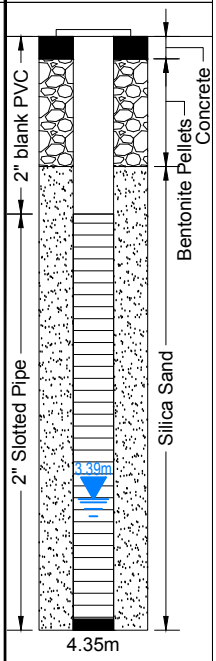
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: Dry; on 8 September 2023: 3.39m

DRAWN: T.L. LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH14(MW) SHEET. 1 of 1

PROJECT NO.: FE# 23-13264/65

PROJECT NAME: DYMON PROJECT

LOCATION: 5051 Harvester Road, Burlington, ON

DRILLING METHOD: CME-75 Truck, Solid Stem

DRILLING DATE: 6 September, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				109.24			
		~76mm ASPHALT		0.20 / 109.04		SS-1	5
		GRANULAR MATERIAL					
		FILL: Reddish brown clayey silt, trace topsoil, trace gravel, trace shale, trace rootlets, trace organics, moist		0.79 / 108.45		SS-2	34
		CLAYEY SILT: Reddish brown to grey, some shale, dry, hard				SS-3	100+
		SHALE: Reddish brown, dry, hard		2.35 / 106.89		SS-4	62
		Water encounter @3.81m				SS-5	100+
		End of borehole at 4.62m		4.62 / 104.62		SS-6	100+

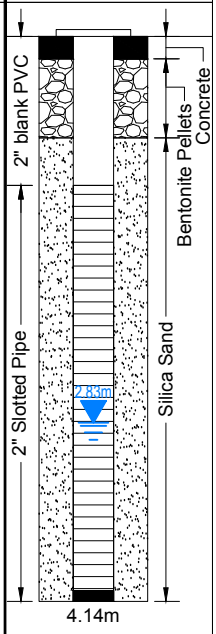
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 (m): on completion: 3.96m; on 8 September 2023: 2.83m

DRAWN: T.L. | LOGGED: D.G. | CHECKED: C.W.

APPENDIX C: GRAIN SIZE, MOISTURE CONTENT & CHEMICAL ANALYSES

FISHER ENGINEERING

CERTIFIED BY CCIL

Project Name: Environmental/Geotechnical Investigation ***F.E. Lab #:*** 23-781

Client: Dymon Group of Companies ***Date Sampled:*** 1-Sep-2023

Project ID: 23-13263/13264 ***Date Received:*** 1-Sep-2023

Location: 5051 Harvester Road, Burlington, Ontario ***Date Reported:*** 22-Sep-2023

Certificate of Analysis

Analyses	Matrix	Quantity	Testing Date	Method Reference
Moisture Content	Soil	15	06-Sep-23	ASTM D2216
Grain Size (Sieve Analysis)	Soil	8	19-Sep-23	LS-602
Grain Size (Hydrometer)	Soil	7	22-Sep-23	LS-702
Atterberg test	Soil	0	N.A.	LS-703/704

Authorized by: Behnam Sayad-Pour

Behnam Sayad Pour Zanjani
Geo-Lab Supervisor

400 Esna Park Drive, Unit 15, Markham, ON L3R 3K2
Tel:(905) 475-7755 www.fishereng.com

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Moisture Content	***Sample Description:***	15 Soil Sample(s)

Sample Info	BH1 SS2 A	BH1 SS2 B	BH1 SS3	BH1 SS4	BH5 SS2	BH5 SS3
Sample Depth (m)	0.76-1.07	1.07-1.23	1.53-1.98	2.29-2.75	0.76-1.22	1.53-1.98
Moisture Content (%)	18.2	11.9	8.7	5.7	10.9	6.6

Sample Info	BH5 SS5	BH10 SS2	BH10 SS2	BH10 SS3	BH10 SS4	BH10 SS5
Sample Depth (m)	3.05-3.51	0.76-0.92	0.92-1.22	1.53-1.98	2.29-2.75	3.05-3.51
Moisture Content (%)	3.2	14.5	4.1	5.9	4.0	2.7

Sample Info	BH10 SS6	BH13 SS1	BH14 SS1			
Sample Depth (m)	4.58-5.03	0-0.61	0-0.61			
Moisture Content (%)	4.8	18.8	16.3			

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Grain Size (Sieve Analysis)	***Sample Quantity:***	8	Soil Sample(s)

Sample Info	***23-782 BH1 SS2 A***	***23-783 BH1 SS2 B***	***23-786 BH5 SS2***	***23-788 BH5 SS5***	***23-789 BH10 SS2 A***	***23-790 BH10 SS2 B***
Sample Depth (m)	***0.76-1.07***	***1.07-1.23***	***0.76-1.22***	***3.05-3.51***	***0.76-0.92***	***0.92-1.22***
Grain Size (%)						
>19mm	0.0	9.9	0.0	0.0	0.0	20.0
9.5mm-19mm	0.0	4.3	0.0	43.0	0.0	10.8
4.75mm-9.5mm	0.9	2.2	0.0	5.4	1.1	11.8
1.18mm-4.75mm	8.4	3.5	0.9	13.6	2.6	10.3
300um-1.18mm	9.0	4.2	4.0	10.0	18.0	5.6
75um-300um	6.0	4.2	7.3	5.0	6.5	2.9
<75um	75.6	71.6	87.9	23.1	71.8	38.6
Clay and Silt	**75.6**	**71.6**	**87.9**	**23.1**	**71.8**	**38.6**
Sand	**23.5**	**12.0**	**12.1**	**28.5**	**27.1**	**18.8**
Gravel	**0.9**	**16.5**	**0.0**	**48.4**	**1.1**	**42.6**

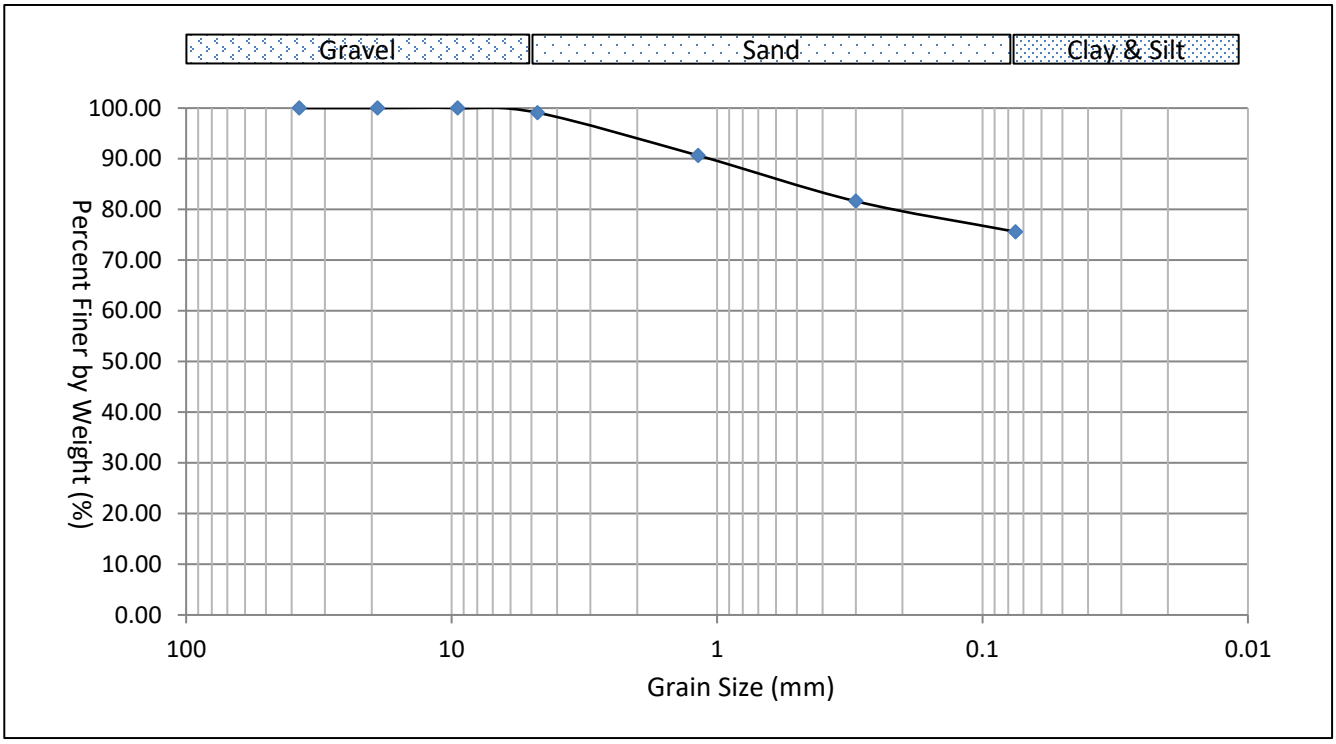
Sample Info	***23-793 BH10 SS5***	***23-794 BH10 SS6***				
Sample Depth (m)	***3.05-3.51***	***4.58-5.03***				
Grain Size (%)						
>19mm	0.0	0.0				
9.5mm-19mm	33.8	3.4				
4.75mm-9.5mm	2.0	4.2				
1.18mm-4.75mm	11.5	19.3				
300um-1.18mm	8.8	8.8				
75um-300um	4.4	3.1				
<75um	39.5	61.2				
Clay and Silt	**39.5**	**61.2**				
Sand	**24.7**	**31.3**				
Gravel	**35.8**	**7.6**				

Results related only to the items tested

Grain Size Distribution

Sample ID: 23-782 BH1 SS2 A (0.76-1.07m)

Gravel: 0.9% Sand: 23.5% Clay and Silt 75.6%

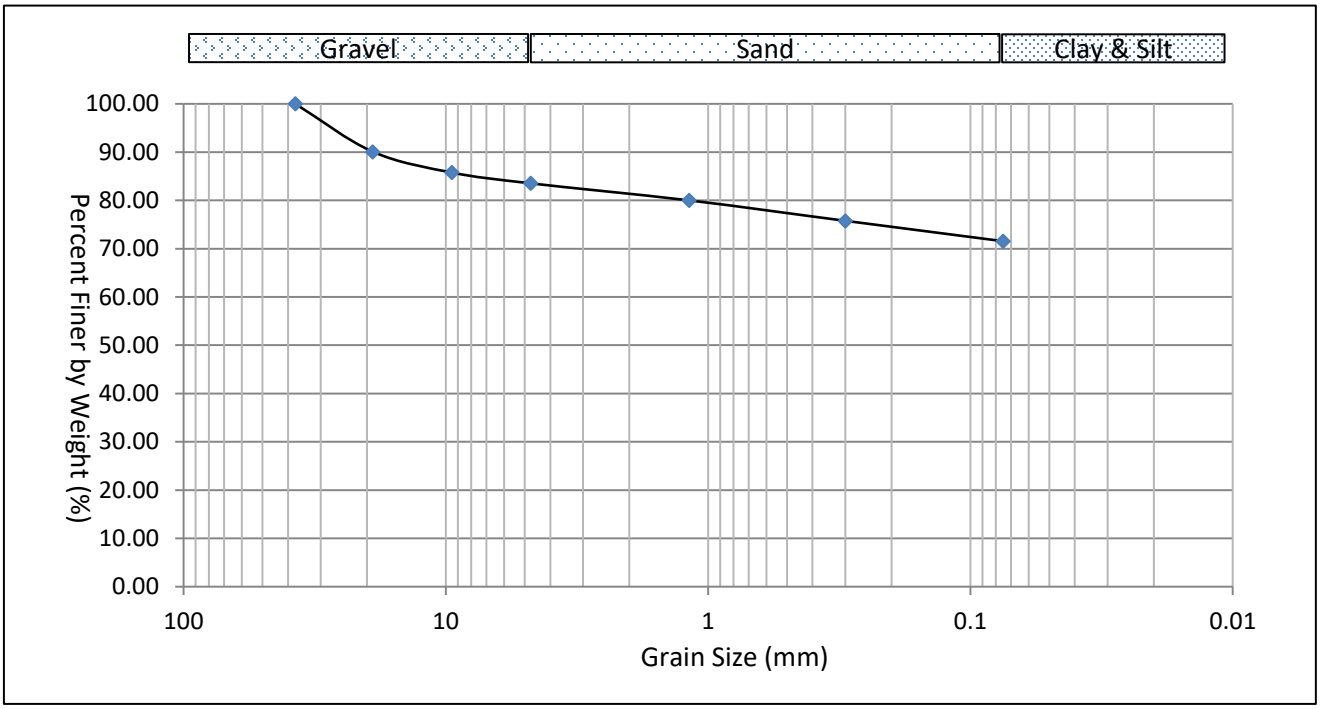


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-783 BH1 SS2 B (1.07-1.23m)

Gravel: 16.5% Sand: 12% Clay and Silt 71.6%

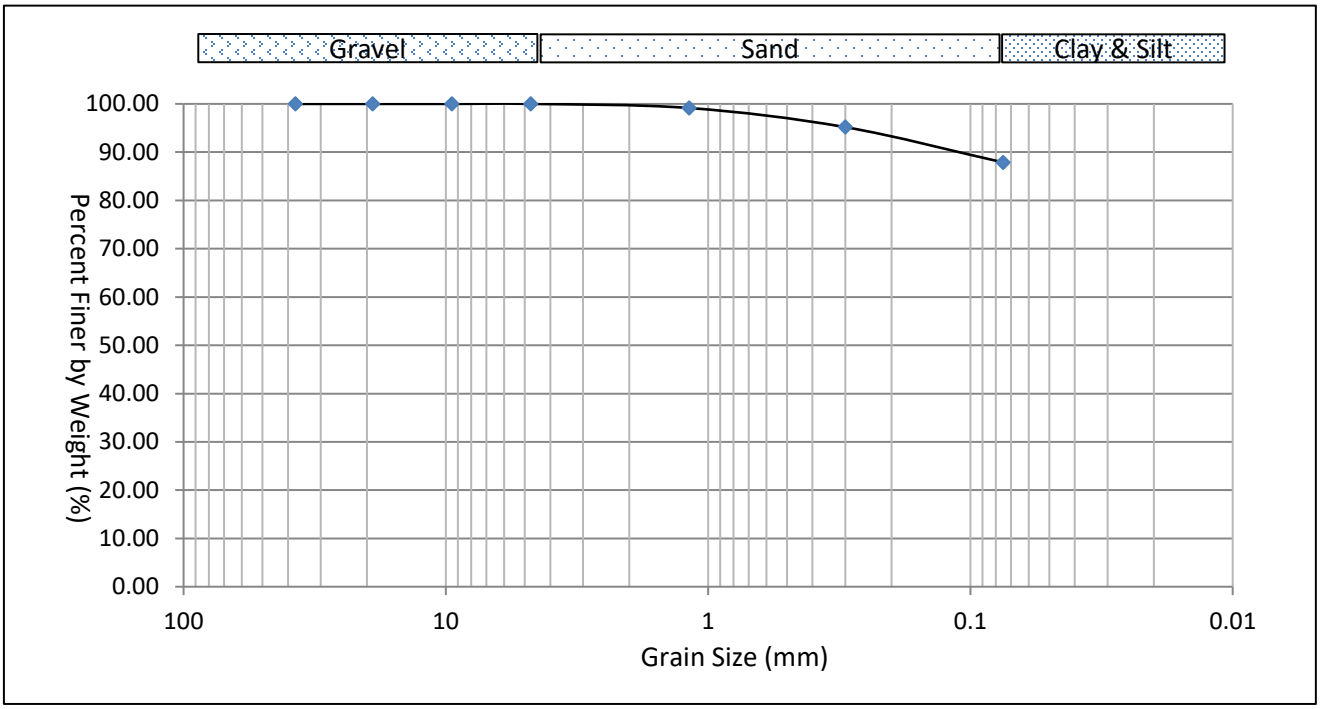


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-786 BH5 SS2 (0.76-1.22m)

Gravel: 0% Sand: 12.1% Clay and Silt 87.9%

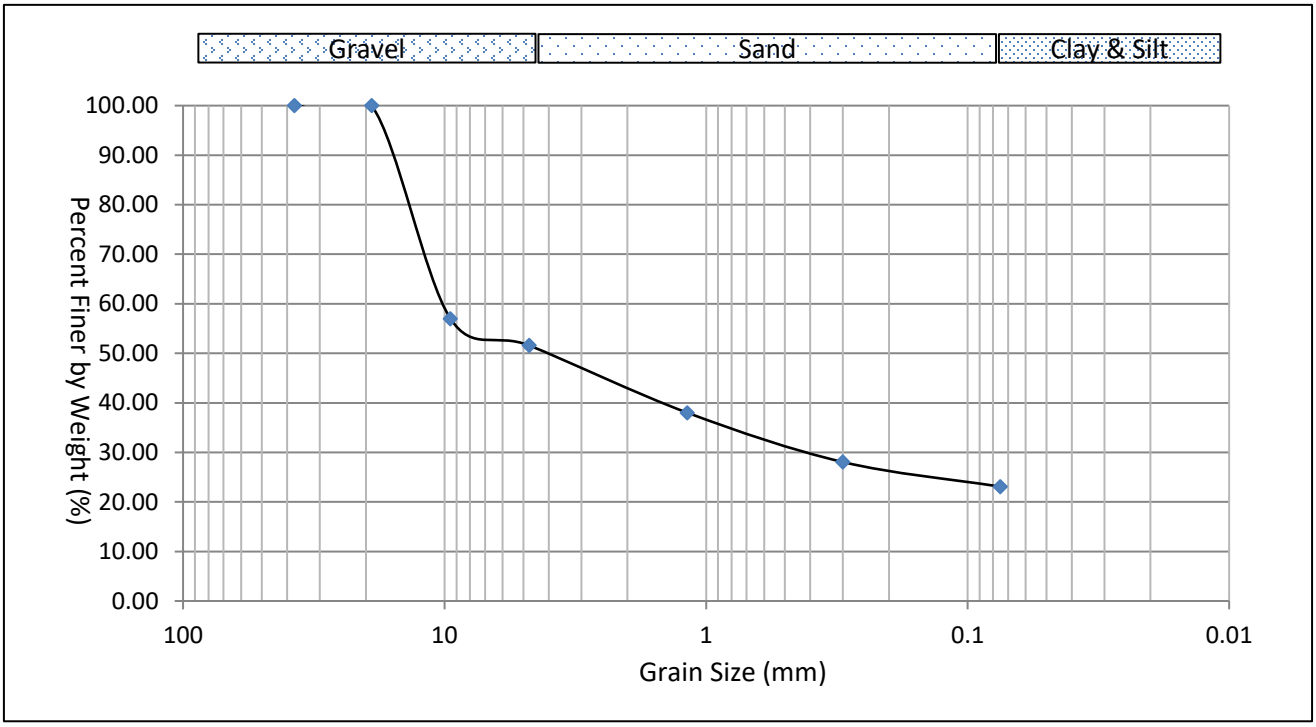


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-788 BH5 SS5 (3.05-3.51m)

Gravel: 48.4% Sand: 28.5% Clay and Silt 23.1%

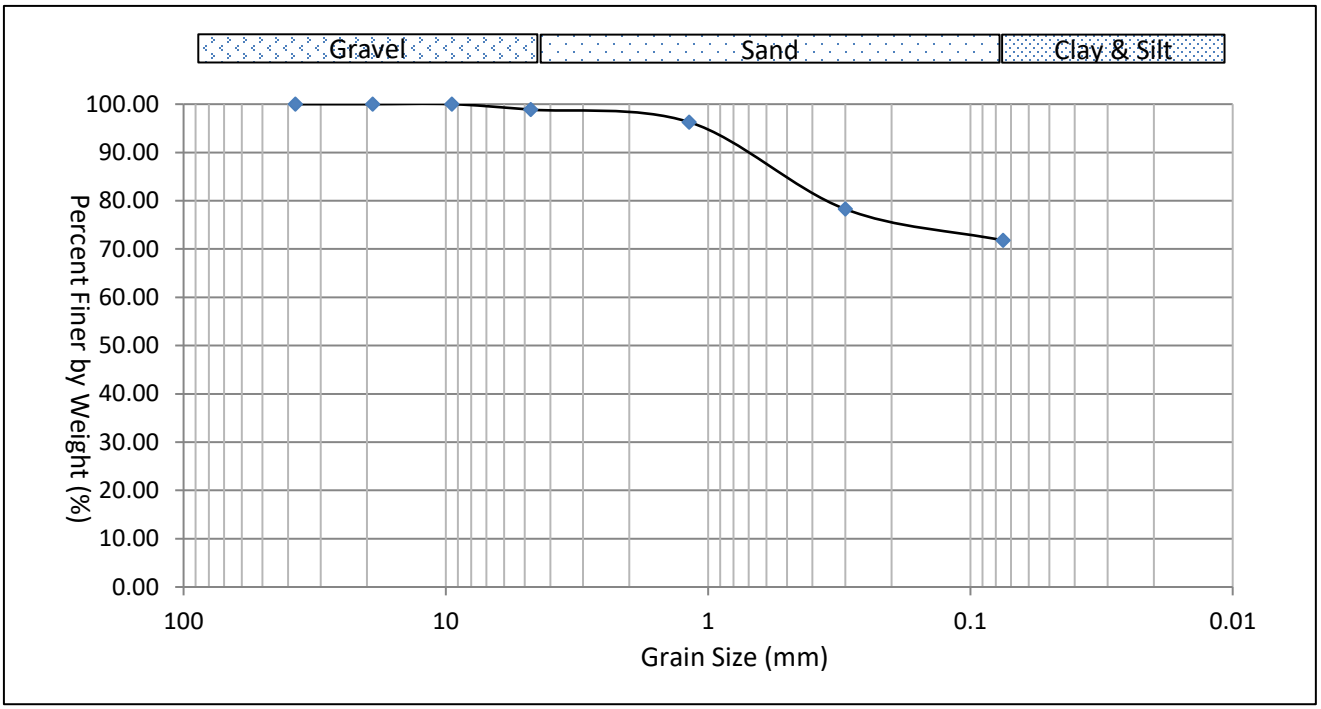


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-789 BH10 SS2 A (0.76-0.92m)

Gravel: 1.1% Sand: 27.1% Clay and Silt 71.8%

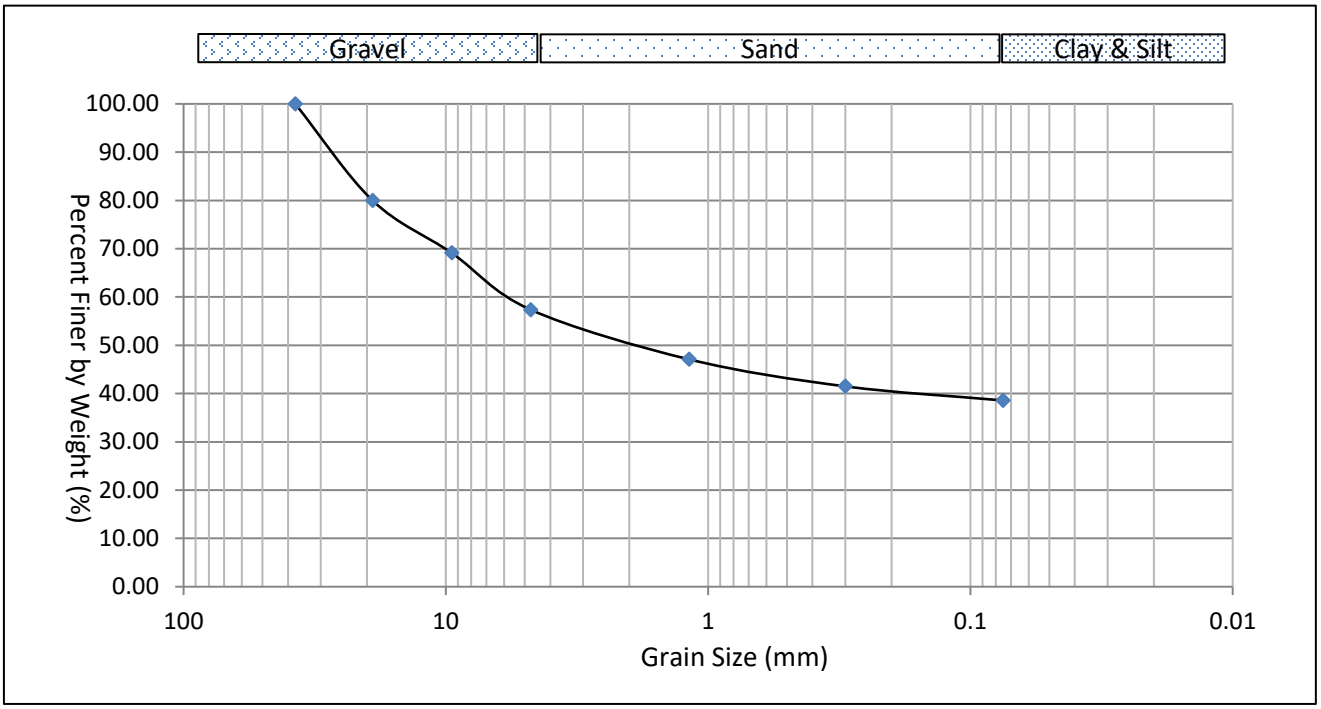


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-790 BH10 SS2 B (0.92-1.22m)

Gravel: 42.6% Sand: 18.8% Clay and Silt 38.6%

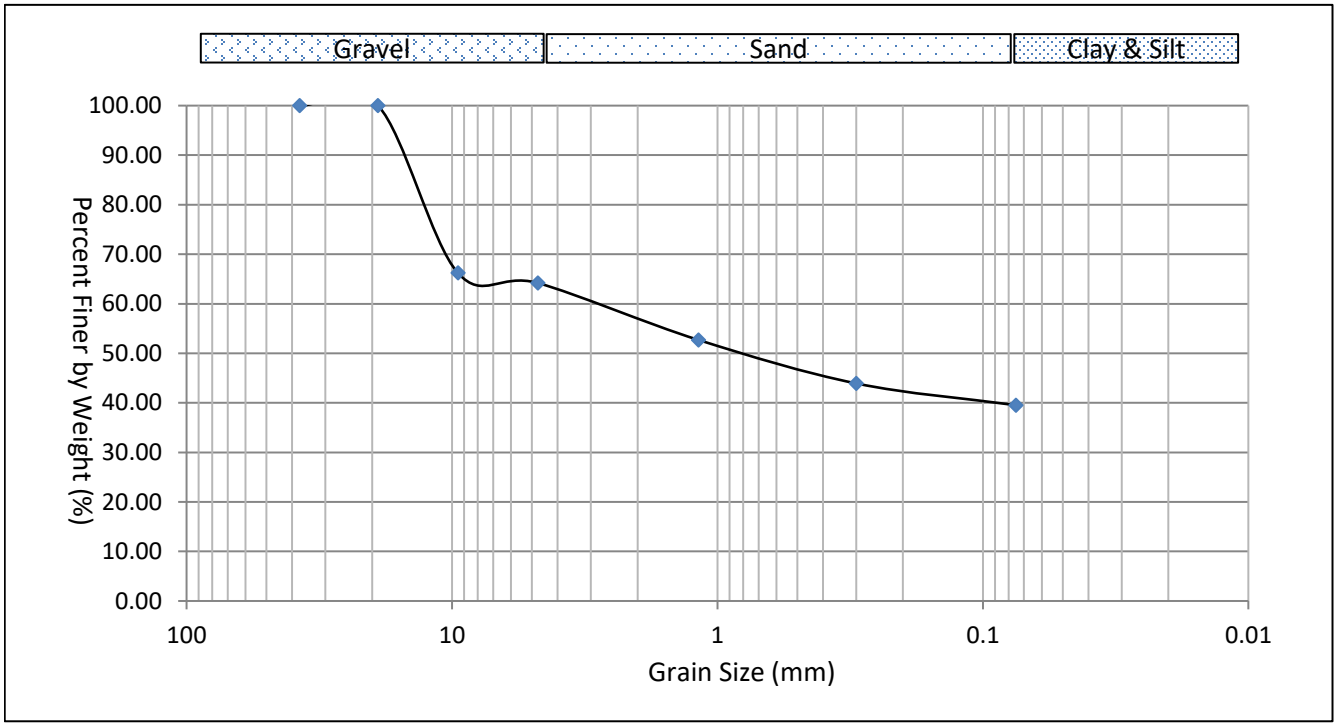


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-793 BH10 SS5 (3.05-3.51m)

Gravel: 35.8% Sand: 24.7% Clay and Silt 39.5%

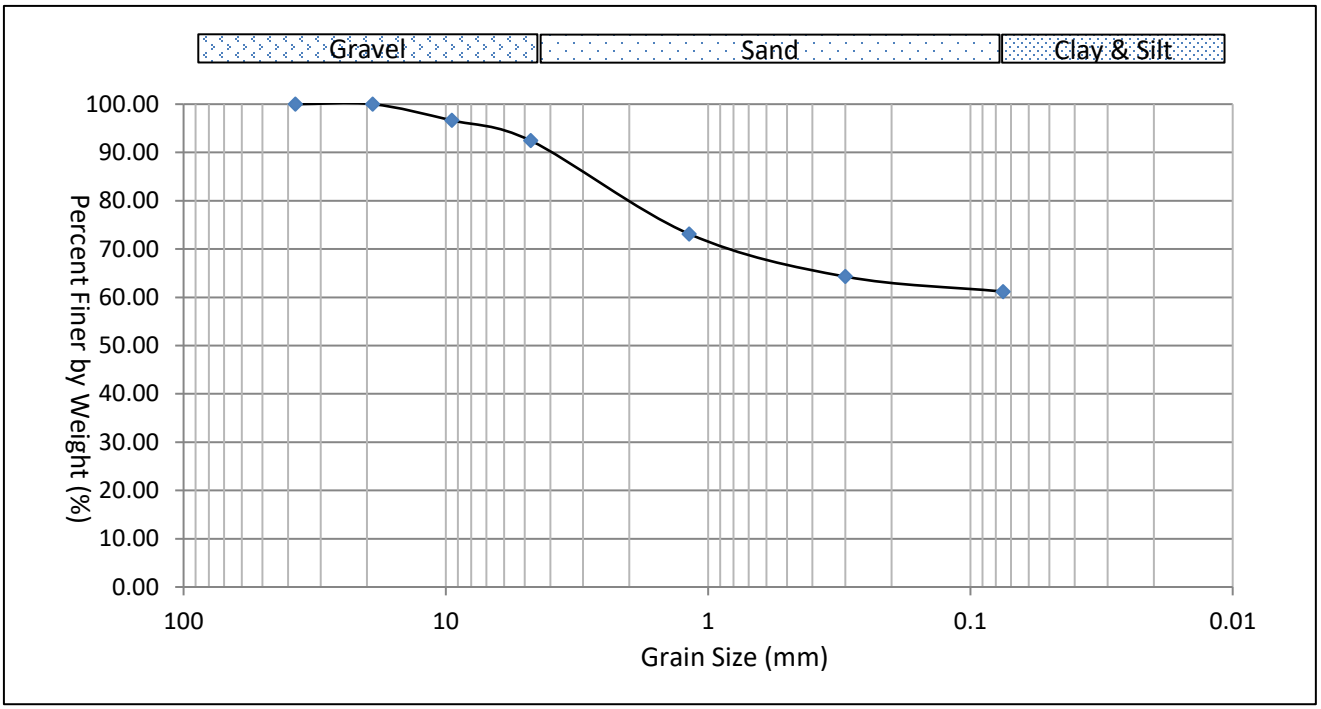


Results related only to the items tested

Grain Size Distribution

Sample ID: 23-794 BH10 SS6 (4.58-5.03m)

Gravel: 7.6% Sand: 31.3% Clay and Silt 61.2%



Results related only to the items tested

F.E. Job #: 23-781

Certificate of Analysis

Analysis Requested:	Grain Size (Hydrometer)
Sample Description:	7 Soil Sample(s)

Sample Info	***23-784 BH1 SS3***	***23-785 BH1 SS4***	***23-787 BH5 SS3***	***23-791 BH10 SS3***	***23-792 BH10 SS4***	***23-799 BH13 SS1***
Sample Depth (m)	***1.53-1.98***	***2.29-2.75***	***1.53-1.98***	***1.53-1.98***	***2.29-2.75***	***0-0.61***
Grain Size (%)						
>19mm	0.0	8.7	0.0	0.0	0.0	0.0
9.5mm-19mm	0.8	1.7	10.0	0.0	13.5	0.0
4.75mm-9.5mm	0.2	1.9	5.5	2.5	15.9	0.0
1.18mm-4.75mm	4.3	10.7	13.8	12.0	26.0	1.2
300um-1.18mm	2.4	9.5	5.1	10.0	10.7	2.9
75um-300um	2.4	5.4	3.4	4.6	3.9	2.8
5um-75um	50.5	38.9	34.7	42.6	20.0	46.4
2um-5um	14.3	8.2	9.0	8.3	2.7	7.1
<2um	25.0	15.1	18.5	20.0	7.2	39.6
Clay	**25.0**	**15.1**	**18.5**	**20.0**	**7.2**	**39.6**
Silt	**64.8**	**47.1**	**43.6**	**50.9**	**22.7**	**53.5**
Sand	**9.2**	**25.6**	**22.3**	**26.7**	**40.6**	**6.9**
Gravel	**1.0**	**12.2**	**15.5**	**2.5**	**29.4**	**0.0**

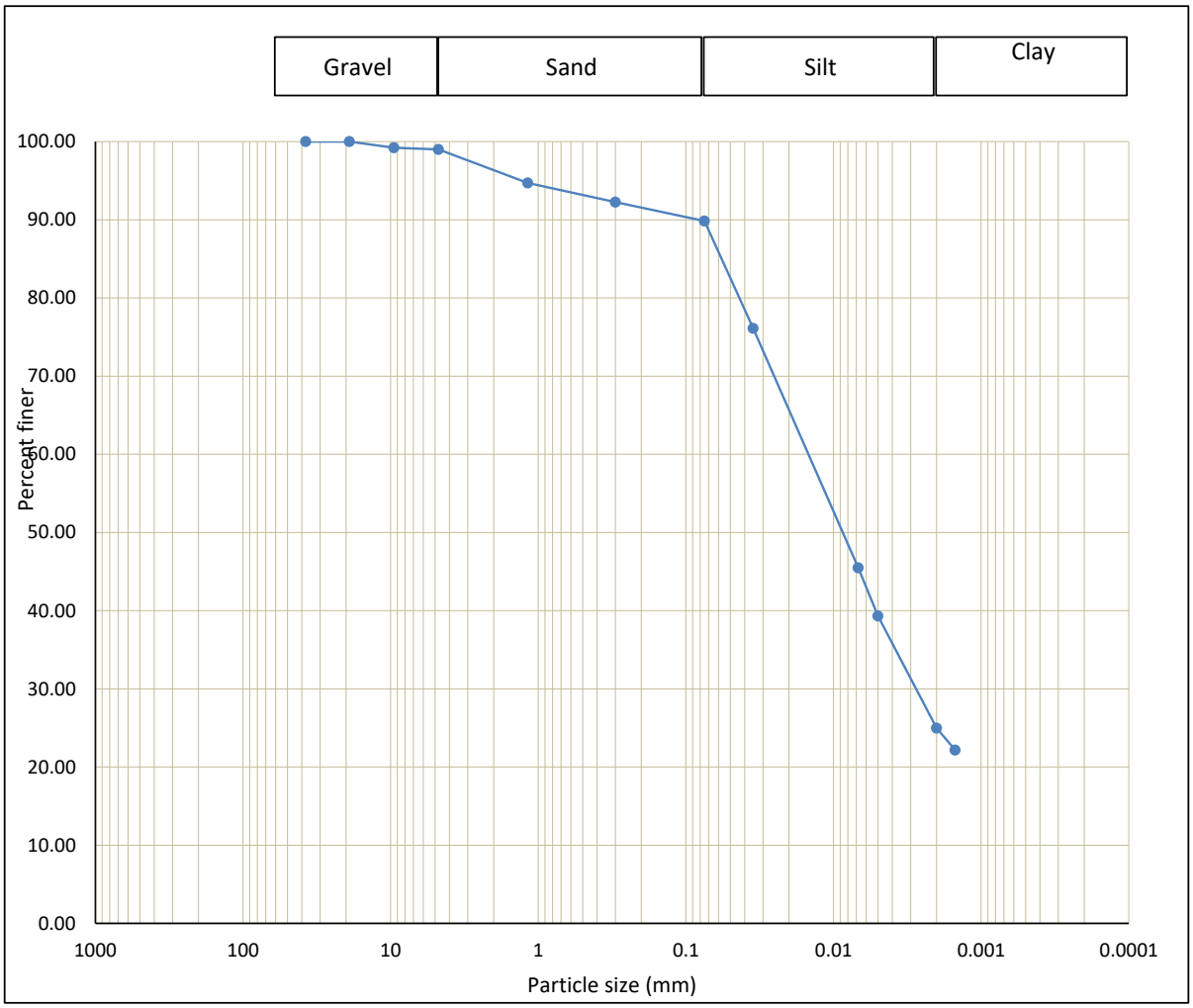
Sample Info	***23-800 BH14 SS1***					
Sample Depth (m)	***0-0.61***					
Grain Size (%)						
>19mm	0.0					
9.5mm-19mm	0.0					
4.75mm-9.5mm	0.0					
1.18mm-4.75mm	2.8					
300um-1.18mm	0.3					
75um-300um	2.4					
5um-75um	47.8					
2um-5um	9.0					
<2um	37.6					
Clay	**37.6**					
Silt	**56.9**					
Sand	**5.5**					
Gravel	**0.0**					

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-784 BH1 SS3 (1.53-1.98m)

Gravel: 1% Sand: 9.2% Silt: 64.8% Clay: 25%

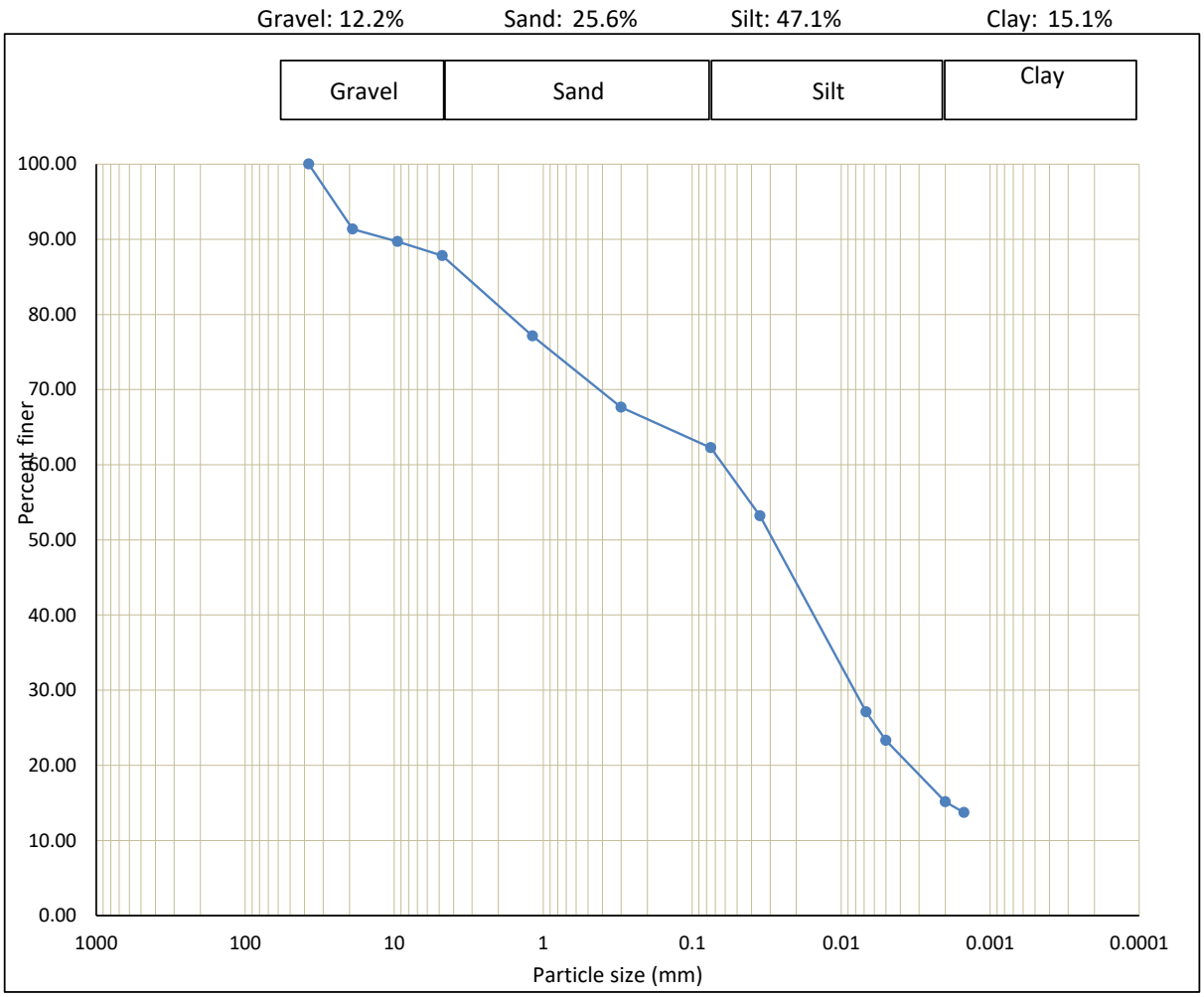


Sample ID: 23-784 BH1 SS3 (1.53-1.98m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	1.0	Gravel
1.18mm-4.75mm	4.3	Coarse Sand
300um-1.18mm	2.4	Medium Sand
75um-300um	2.4	Fine Sand
5um-75um	50.5	Silt
2um-5um	14.3	
<2um	25.0	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-785 BH1 SS4 (2.29-2.75m)



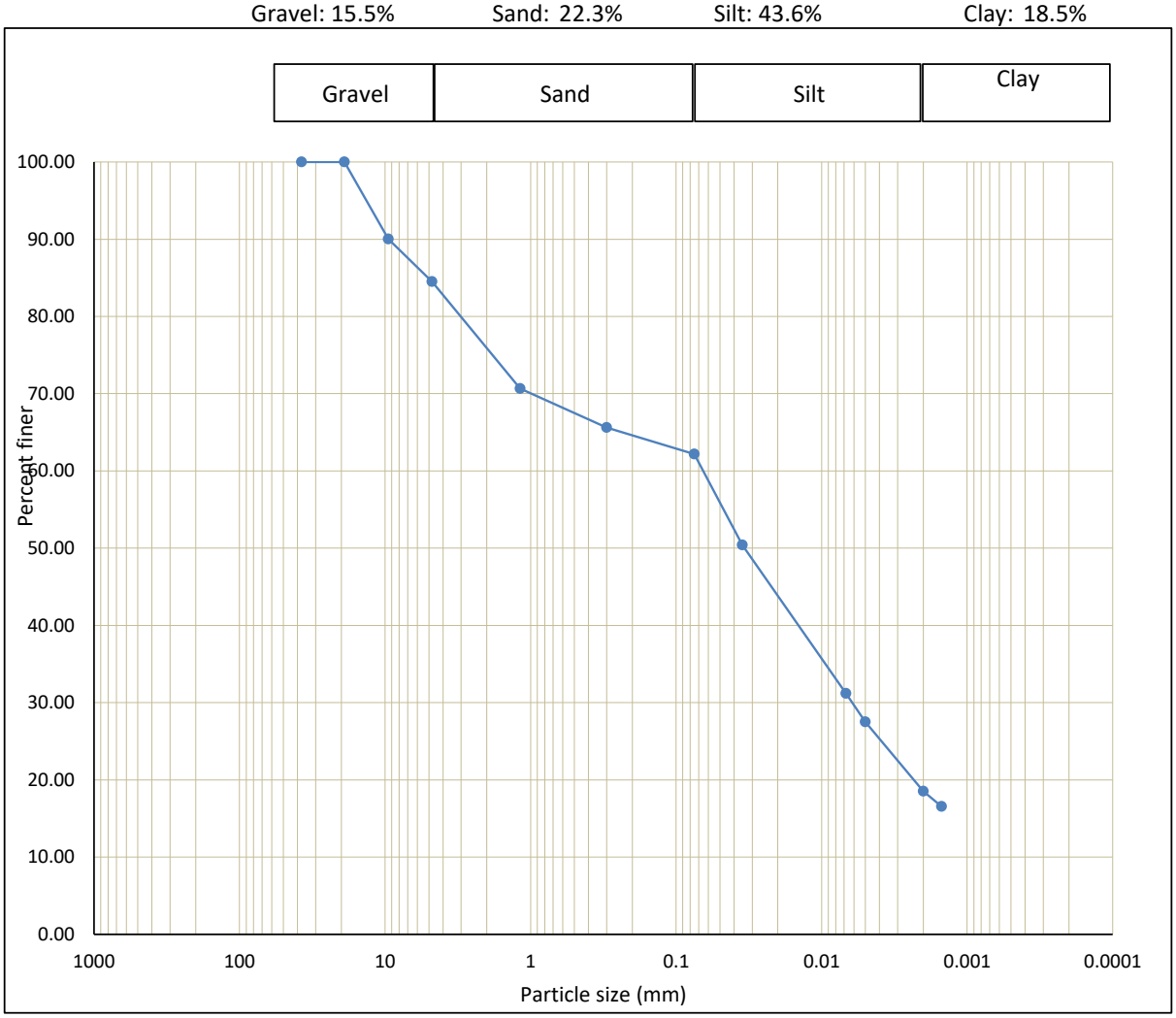
Sample ID: 23-785 BH1 SS4 (2.29-2.75m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	12.2	Gravel
1.18mm-4.75mm	10.7	Coarse Sand
300um-1.18mm	9.5	Medium Sand
75um-300um	5.4	Fine Sand
5um-75um	38.9	Silt
2um-5um	8.2	
<2um	15.1	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-787 BH5 SS3 (1.53-1.98m)

Gravel: 15.5% Sand: 22.3% Silt: 43.6% Clay: 18.5%



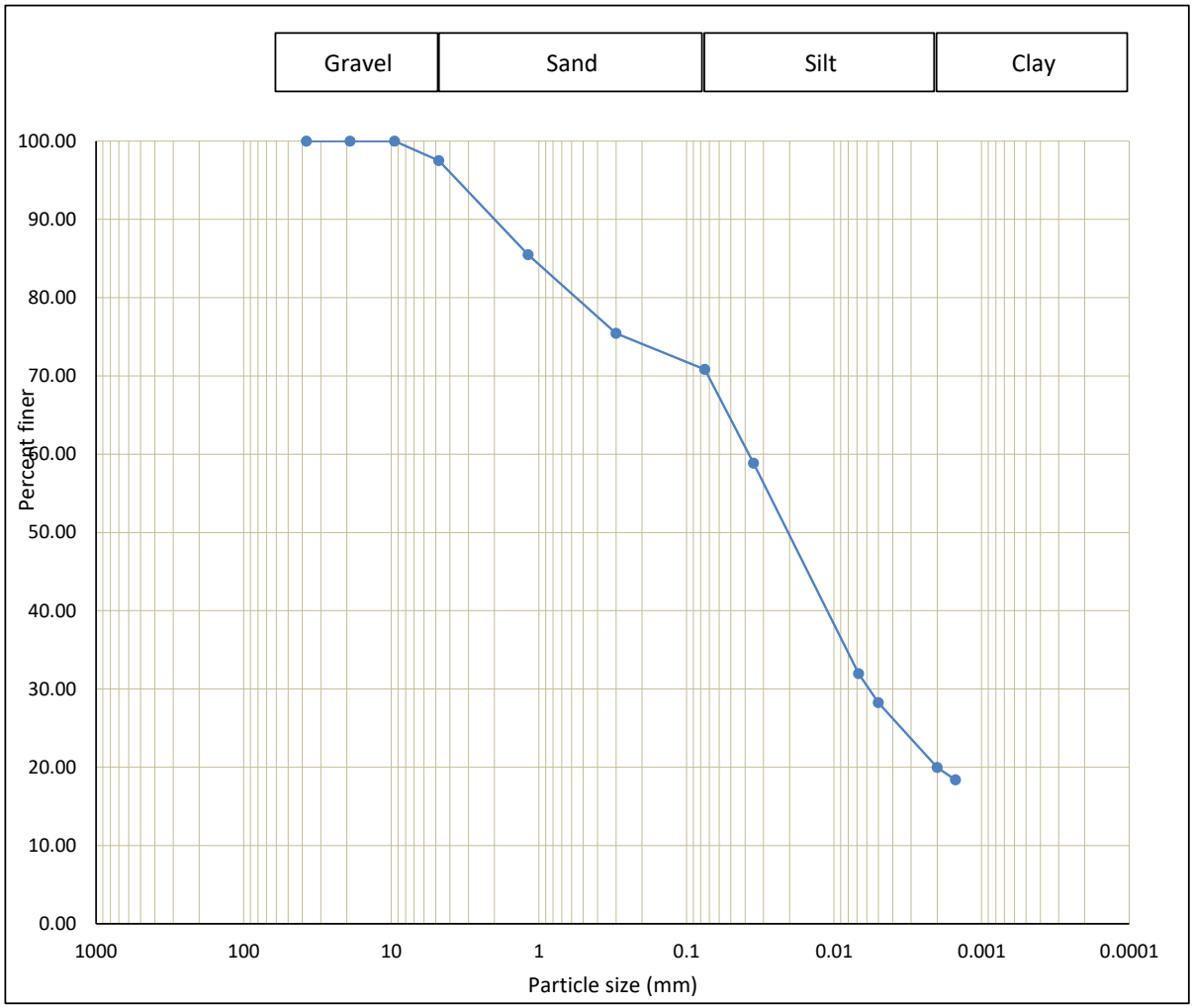
Sample ID: 23-787 BH5 SS3 (1.53-1.98m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	15.5	Gravel
1.18mm-4.75mm	13.8	Coarse Sand
300um-1.18mm	5.1	Medium Sand
75um-300um	3.4	Fine Sand
5um-75um	34.7	Silt
2um-5um	9.0	
<2um	18.5	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-791 BH10 SS3 (1.53-1.98m)

Gravel: 2.5% Sand: 26.7% Silt: 50.9% Clay: 20%



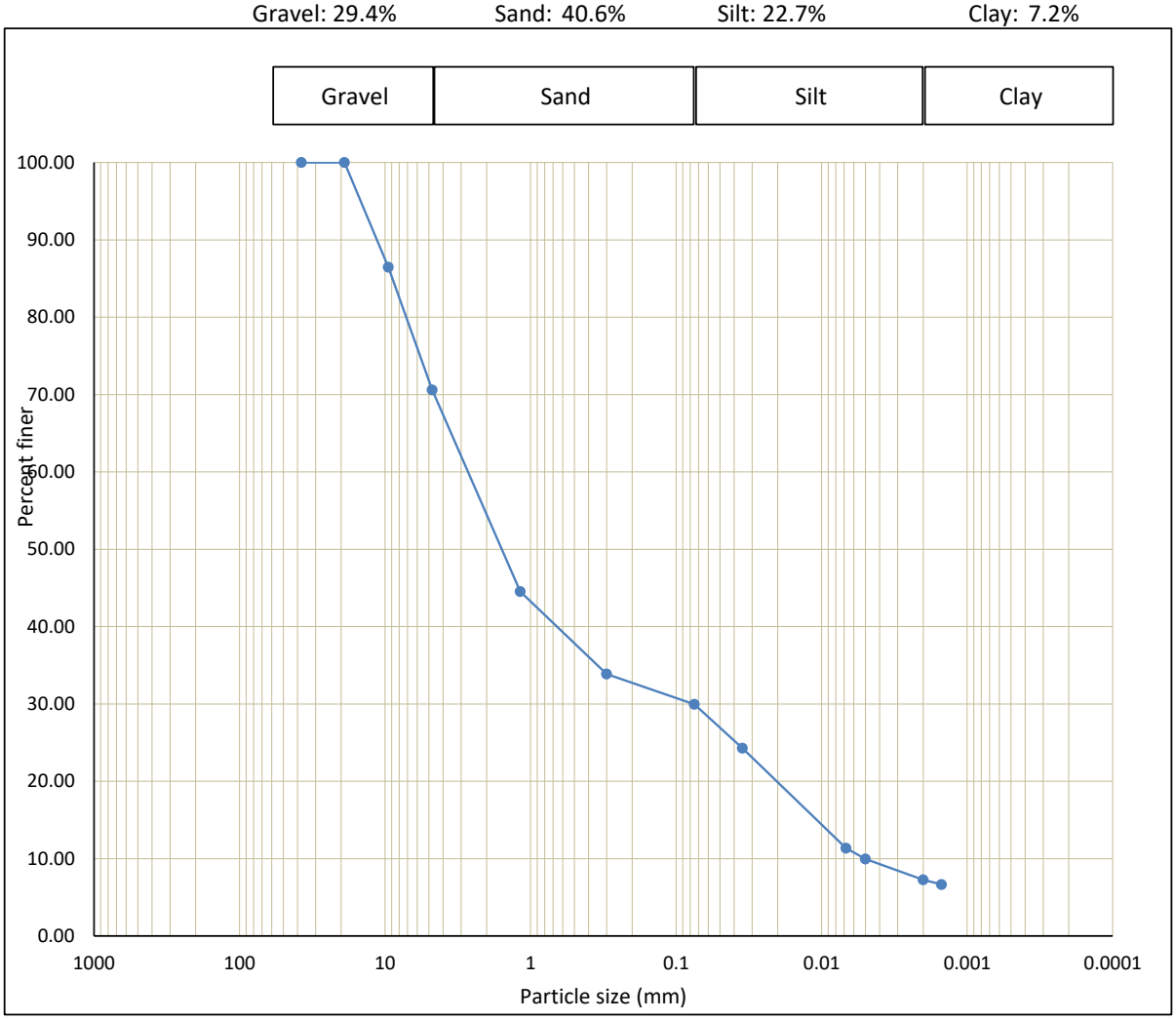
Sample ID: 23-791 BH10 SS3 (1.53-1.98m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	2.5	Gravel
1.18mm-4.75mm	12.0	Coarse Sand
300um-1.18mm	10.0	Medium Sand
75um-300um	4.6	Fine Sand
5um-75um	42.6	Silt
2um-5um	8.3	
<2um	20.0	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-792 BH10 SS4 (2.29-2.75m)

Gravel: 29.4% Sand: 40.6% Silt: 22.7% Clay: 7.2%

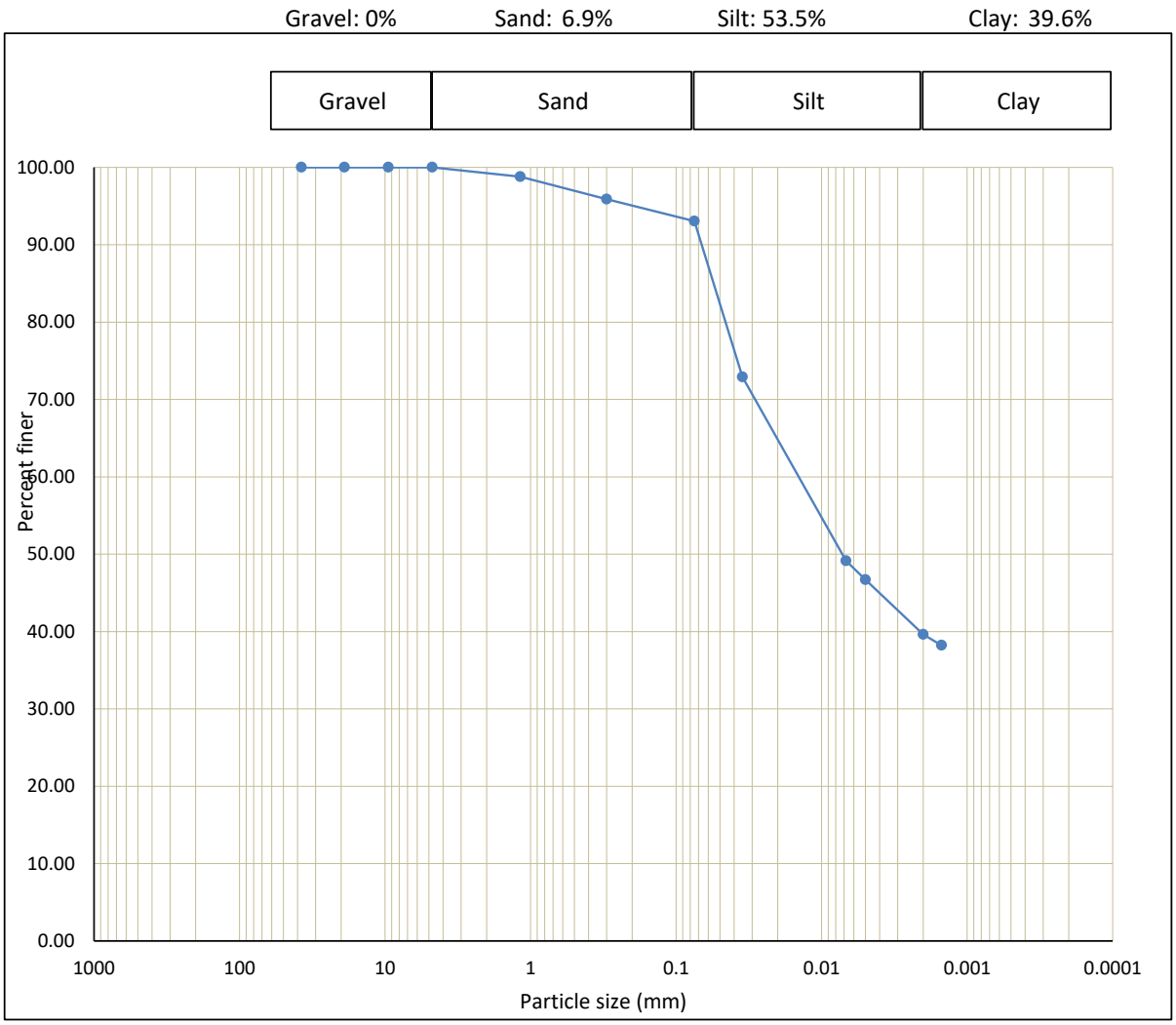


Sample ID: 23-792 BH10 SS4 (2.29-2.75m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	29.4	Gravel
1.18mm-4.75mm	26.0	Coarse Sand
300um-1.18mm	10.7	Medium Sand
75um-300um	3.9	Fine Sand
5um-75um	20.0	Silt
2um-5um	2.7	
<2um	7.2	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-799 BH13 SS1 (0-0.61m)

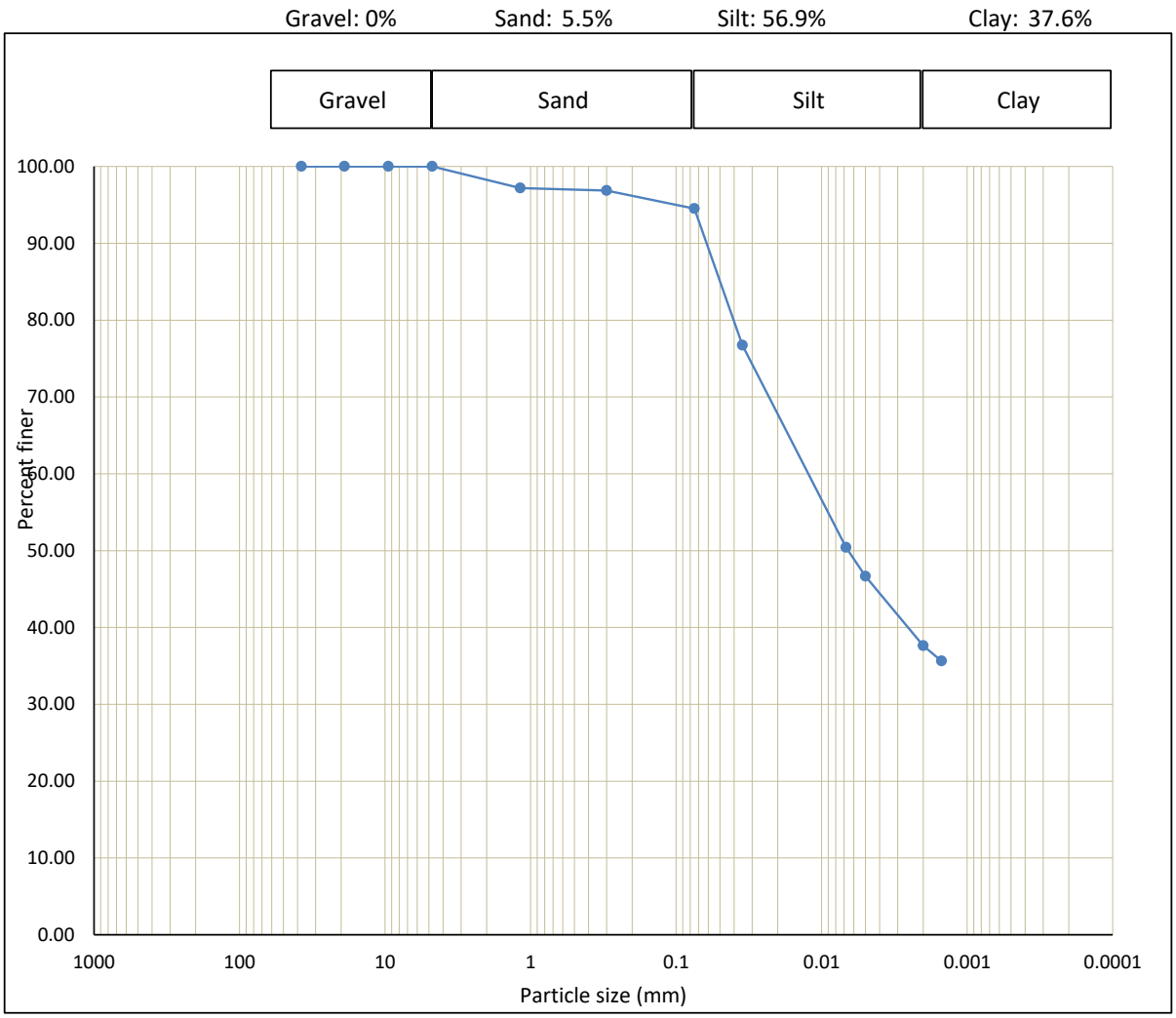


Sample ID: 23-799 BH13 SS1 (0-0.61m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	1.2	Coarse Sand
300um-1.18mm	2.9	Medium Sand
75um-300um	2.8	Fine Sand
5um-75um	46.4	Silt
2um-5um	7.1	
<2um	39.6	Clay

F.E. Job #: 23-781

Grain Size Distribution

Sample ID: 23-800 BH14 SS1 (0-0.61m)



Sample ID: 23-800 BH14 SS1 (0-0.61m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	2.8	Coarse Sand
300um-1.18mm	0.3	Medium Sand
75um-300um	2.4	Fine Sand
5um-75um	47.8	Silt
2um-5um	9.0	
<2um	37.6	Clay

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Call for Emergency Response

LAB JOB No: 23-781

Standard Laboratory Request Form: Chain of Custody

CLIENT INFORMATION
Name:
Contact:
Address: 5051 Harvester Rd. Burlington
Email:
Fax: Fax results ☐
Phone: Email results ☑

PROJECT INFORMATION
Project Name: Environmental / Geotechnical Investigation
Project ID: 23-1326314
Sampled By: David

BILLING INFORMATION
Purchase Order No:
Verbal Authorization:
Credit Card Type (e.g. MC/Visa/AMEX...):
Credit Card #:
Expiry Date:

TURNAROUND TIME (TAT): Check ONE if all samples are the same/or see below.

STD - Standard (5-7 bus. days)	✓	Standard Charge	Reg. Business Hrs. 9am to 5pm Samples received after 2pm are considered next day orders.
3D - Three-Day (72 hrs.)		+25% SURCHARGES MAY APPLY Custom quotations (if applicable) will be reflected on final billing. CALL for: Emergencies, Bulk Quotes, or other Questions.	

LAB SAMPLE ID	CLIENT'S SAMPLE ID AND DESCRIPTION	SAMPLING DATE/TIME	SAMPLE MATRIX	CONTAINER NO. and TYPE	TAT (Above)	ANALYSIS REQUESTED (Check or Specify) Moisture Content	Sieve Analysis	Hydrometer	Atterberg Limits	Proctor						NOTES
	BH1 (2.5-3.5')	Sept 1	Soil	Bag	STD	✓	✓									
	(3.5-4')						✓									
	(5-6.5')							✓								
	(7.5-9')							✓								
	BH5 (2.5-4')						✓									
	(5-6.5')							✓								
	(10-11.5')						✓									
	BH10 (2.5-3')						✓									
	(3-4.0')						✓									
	(5-6.5')							✓								
	(7.5-9')							✓								
	(10-11.5')						✓									
	(15-16.5')															
	BH13 (0-2')							✓								
	BH14 (0-2')							✓								

Relinquished by:
Name: (print)
Signature: Clive & Lena
Date & Time: Sept 1, 2023
Method of Shipment:

Client's Comments:

Regulatory Requirements:
OPSS Reg.

Purpose for sampling:
Road Base
Road Subbase
Subgrade
Backfill
Engineering Fill
Soil Classification
Other

Received by (Internal):
Name:
Date & Time:

Arrival Temperature °C:
Laboratory Remarks:

FISHER ENVIRONMENTAL LABORATORIES

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FAX: 905 475-7718
www.fisherenvironmental.com

Client: Dymon Group of Companies
Address: 1450 The Queensway
Etobicoke, ON
M8Z 1S4
Tel.:
Email:
Attn.:

F.E. Job #: 23-1787
Project Name: Geotechnical Investigation
Project ID: FG-P 23-13263
Date Sampled: 31-Aug-2023
Date Received: 6-Sep-2023
Date Reported: 12-Sep-2023
Location: 5051 Harvester Road
Burlington, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
pH	Soil	5	6-Sep-23	6-Sep-23	pH-EC-SAR F-16	SW-846, 9045D
Chloride	Soil	5	N/A	8-Sep-23	Chloride F-20	SM 4500-Cl-E
Sulphate	Soil	5	6-Sep-23	8-Sep-23	Sulphate F-21	SM 4500-SO_4

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:	pH, Chloride, Sulphate
Sample Description:	5 Soil Sample(s)

Parameter	***23-1787-1*** BH1 SS3 1.52-1.98m	***23-1787-2*** BH1 SS5 3.05-3.51m	***23-1787-3*** BH3 SS3 1.52-1.98m	***23-1787-4*** BH9 SS3 1.52-1.98m	***23-1787-5*** BH9 SS5 3.05-3.51m	**Soil Standards** *
pH *(pH unit)*	8.39	8.63	8.42	8.30	8.51	(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)*	7.03	6.90-7.20	0.01	<0.3		

LEGEND:
LCS - Laboratory Control Sample
AR - Acceptable Range

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	pH, Chloride, Sulphate
Sample Description:	5 Soil Sample(s)

Parameter	***23-1787-1*** BH1 SS3 1.52-1.98m	***23-1787-2*** BH1 SS5 3.05-3.51m	***23-1787-3*** BH3 SS3 1.52-1.98m	***23-1787-4*** BH9 SS3 1.52-1.98m	***23-1787-5*** BH9 SS5 3.05-3.51m	
	Concentration (µg/g)					
Chloride in Soil	20	24	<10	<10	37	

< 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	97	70-130	100	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chloride in Soil	3.3	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:	pH, Chloride, Sulphate
Sample Description:	5 Soil Sample(s)

Parameter	***23-1787-1*** BH1 SS3 1.52-1.98m	***23-1787-2*** BH1 SS5 3.05-3.51m	***23-1787-3*** BH3 SS3 1.52-1.98m	***23-1787-4*** BH9 SS3 1.52-1.98m	***23-1787-5*** BH9 SS5 3.05-3.51m	
Sulphate *(mg/kg)*	16	14	<1	21	62	

< result obtained was below RL (Reporting Limit).

QA/QC Report

Parameter	**Blank**	**RL**	**LCS/Spike**	**AR**	**Duplicate**	**AR**
	(mg/kg)		**Recovery (%)**		**RPD (%)**	
Sulphate	<1	1	90	70-130	9	0-30

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

Results related only to the items tested

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Hours: 9AM - 5PM M-F
Call for Emergency Response

LAB JOB No: 23-1787

STANDARD LABORATORY REQUEST FORM: CHAIN OF CUSTODY

CLIENT INFORMATION

Name:
Contact:
Address: 5051 Harvester Rd.
Email:
Fax: Fax results?
Phone: Email results? ✓

PROJECT INFORMATION

Project Name: Geotechnical Investigation
Project ID: 23-13263
Sampled By: David

TURNAROUND TIME (TAT): Check ONE if all samples are the same/or see below.

STD - Standard (5-7 bus. days)	✓	Standard Charge	Reg. Business Hrs. 9am to 5pm. Samples received after 2pm are considered next day orders.
3D - Three-Day (72 hrs.)		+25%	SURCHARGES MAY APPLY. Custom quotations (if applicable) will be reflected on final billing. CALL for: Emergencies, Bulk Quotes, or other Questions.
SR - Semi Rush (48 hrs.)		+50%	
R - Rush (24 hrs.)		+75%	
SD - Same Day - 100%		+100%	

BILLING INFORMATION

Purchase Order No:
Verbal Authorization:
Credit Card Type (e.g. MC/Visa/AMEX...):
Credit Card #:
Expiry Date: CVV -- -- --

LAB SAMPLE ID	CLIENT'S SAMPLE ID AND DESCRIPTION	SAMPLING DATE/TIME	SAMPLE MATRIX	CONTAINER NO. and TYPE	TAT (Above)	ANALYSIS REQUESTED (Check or Specify) Metals	PHCs	VOCs	PAHs	PCBs	PH	CL	SO4	NOTES
	BH8 SS3 (5-6.5')	Aug 31,	Soil	Bag	STD						✓	✓	✓	
	SS5 (10-11.5')	"	"	"	"						✓	✓	✓	
	BH3 SS3 (5-6.5')	"	"	"	"						✓	✓	✓	
	~~SS5 (10-11.5')~~	"	"	"	"						✓	✓	✓	
	BH9 SS3 (5-6.5')	"	"	"	"						✓	✓	✓	
	SS5 (10-11.5')	"	"	"	"						✓	✓	✓	

Relinquished by:
Name: (print)
Signature: Clive, Behnam
Date & Time:
Method of Shipment: Sep 5, 23

Client's Comments:

Regulatory Requirements:

Reg. 153
Table _____
☐ Residential / Parkland
☐ Industrial / Commercial
☐ Agricultural

Soil Texture
☐ Coarse ☐ Med/Fine

Sewer Use
☐ Sanitary
☐ Storm
Region _____

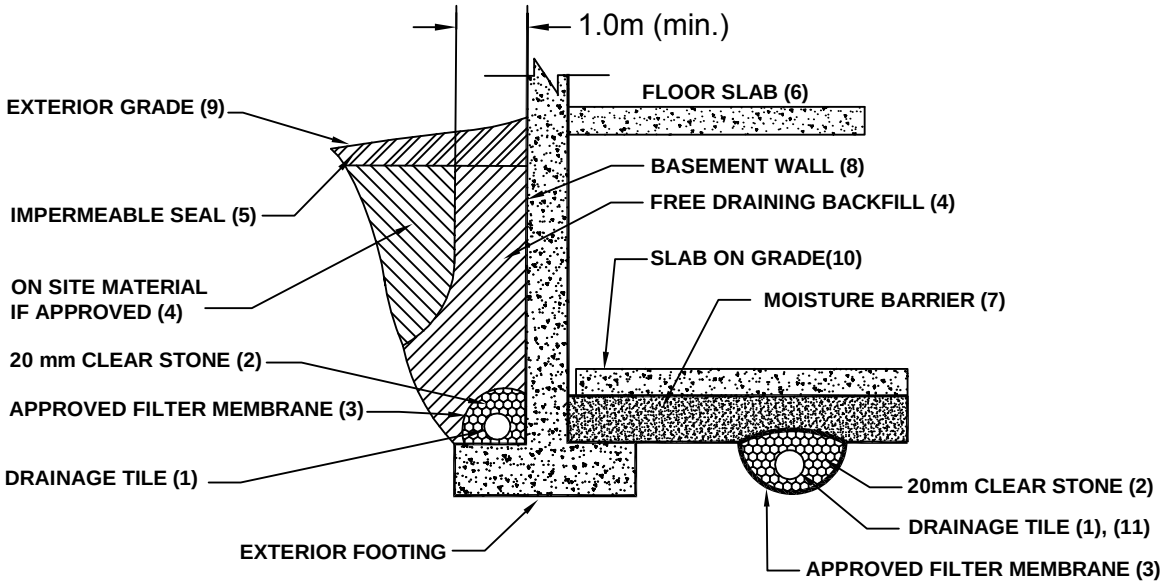
Reg. 558
☐ TCLP

Received by (Internal):
Name:
Date & Time: Sept 6, 23.

Laboratory Remarks:

APPENDIX D - 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.

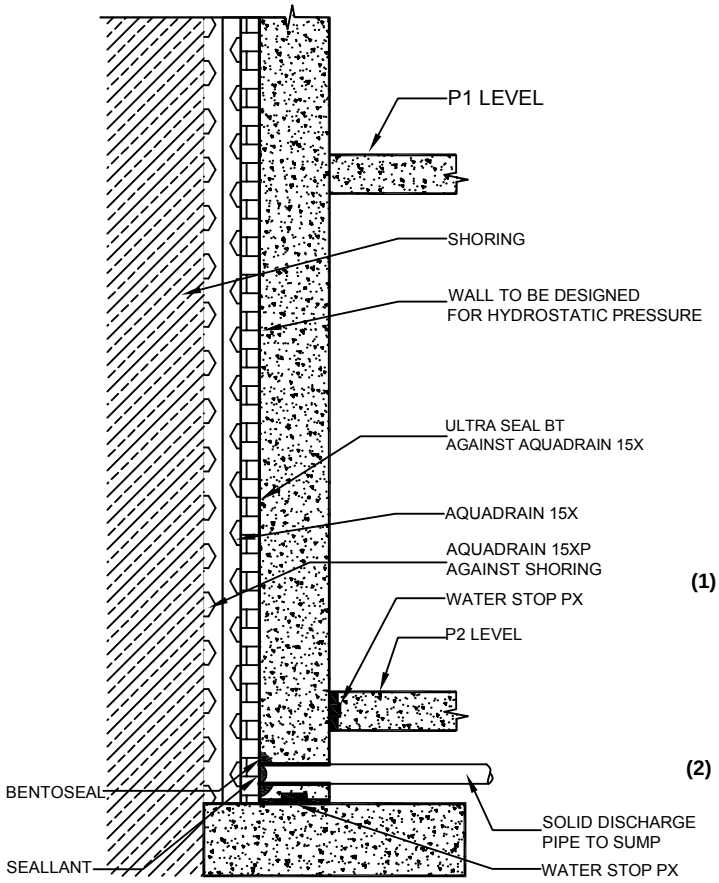
(13) DO NOT CONNECT THE UNDERFLOOR DRAINS TO PERIMETER DRAINS.

(14) REVIEW THE GEOTECHNICAL REPORT FOR SPECIFIC DETAILS.

DRAINAGE AND BACKFILL RECOMMENDATIONS

BASEMENT WITH UNDERFLOOR DRAINAGE

(NOT TO SCALE)



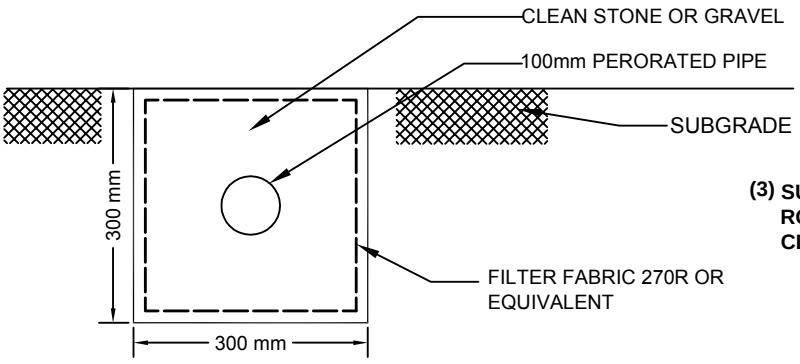
NOTES:

(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)

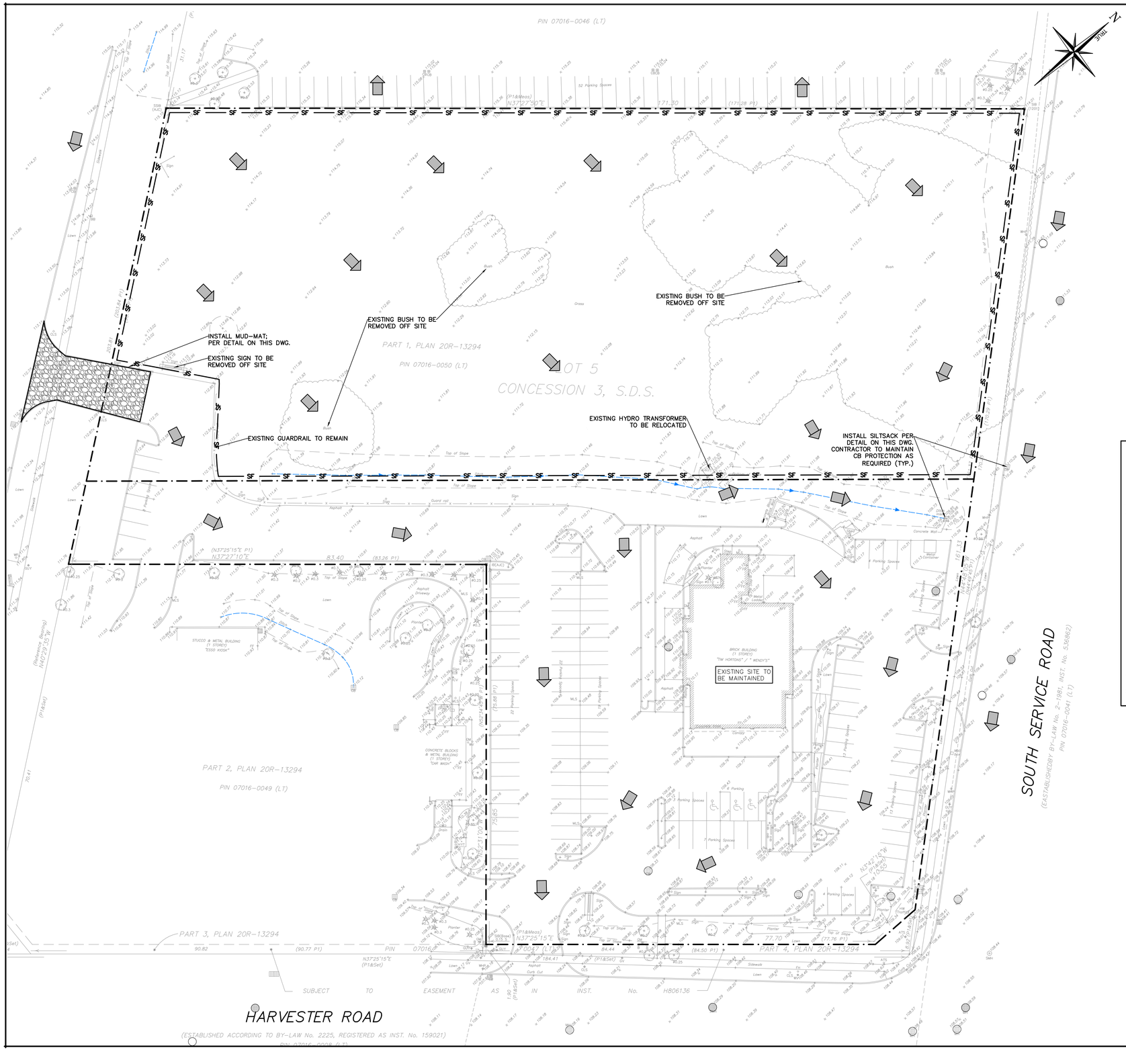


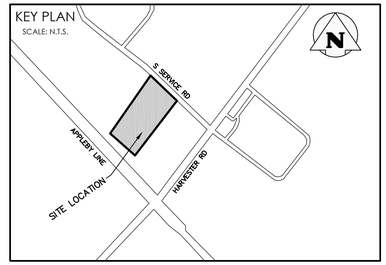
(3) SUBGRADE DRAIN TO BE PLACED IN PARALLEL ROWS 6-8 m (20'-25'), FROM CENTERLINE TO CENTERLINE.

DETAIL OF SUBGRADE DRAIN

(NOT TO SCALE)

DRAWINGS



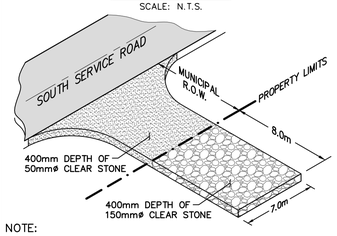


LEGEND

- PROPERTY LINE
- EXISTING DITCH
- UP — EXISTING HYDRO POLE
- EXISTING FENCE
- x 112.00 — EXISTING GRADE
- MUD-MAT; SEE DETAIL
- SF — SILT FENCE; SEE DETAIL
- EXISTING STORM SEWER & MANHOLE
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING OVERLAND FLOW DIRECTION

MUD-MAT DETAIL

SCALE: N.T.S.

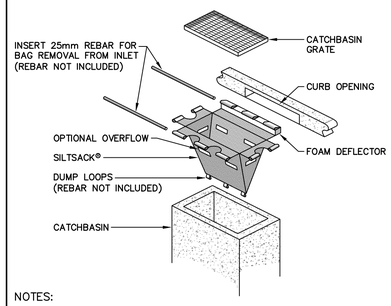


NOTE:

GEOTEXTILE (TERRAFIX 270R OR APPROVED EQUAL) TO BE PLACED AS SEPARATION BARRIER BETWEEN EXISTING GROUND AND CLEAR STONE.

'SILTSACK' DETAIL

SCALE: N.T.S.

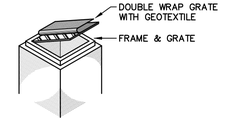


NOTES:

1. INSTALL TERRAFIX 'SILTSACK' IN ALL CATCHBASINS & CATCHBASIN MANHOLES AFFECTED BY CONSTRUCTION.
2. INSTALL TERRAFIX 'SILTSACK' IN ALL NEW CATCHBASINS & CATCHBASIN MANHOLES.

CATCHBASIN SEDIMENT CONTROL DETAIL

SCALE: N.T.S.



NOTES:

1. TO BE INSTALLED IN ALL AFFECTED EXISTING & PROPOSED CATCHBASIN & CATCHBASIN MANHOLES UNDER APPROPRIATE DRAINAGE CIRCUMSTANCES, BETWEEN APRIL AND DECEMBER.
2. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING SIZE OF 0.15mm AND A MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm. OR A NON-WOVEN GEOTEXTILE TO BE CONSIDERED BASED ON SOIL PARAMETERS AND SITE CONDITIONS.
3. GEOTEXTILE TO BE REPLACED PERIODICALLY WHEN ACCUMULATED SEDIMENTS INTERFERE WITH DRAINAGE, OR AS DIRECTED BY THE MUNICIPALITY.

10 0m 10 20 30

SCALE: 1:400

No.	ISSUE / REVISION	YYYY/MMM/DD
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BENCHMARK NOTE:

BENCHMARK PLATE SET ON THE WESTERLY END OF THE HEAD WALL OF A BOX CULVERT FOR APPLEBY CREEK (WEST BRANCH) UNDER HARVESTER, APPROXIMATELY 550M EAST OF APPLEBY LINE.

SURVEY NOTES:

SURVEY COMPLETED BY COMPANY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED ONTARIO LAND SURVEYORS LTD. DATED AUG. 20, 2010
JOB No: 010-0017

BEARINGS ARE ASTRONOMIC AND ARE REFFERED TO THE NORTHERLY LIMIT OF HARVESTER ROAD AS SHOWN ON PLAN 20R-13294, HAVING A BEARING OF N37°25'15E"

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN PREPARED BY GLOBAL ARCHITECT INC. DATED OCT 17, 2023

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Project

875 APPLEBY LINE
CITY OF BURLINGTON

Drawing

REMOVALS PLAN
EROSION & SEDIMENT CONTROL PLAN

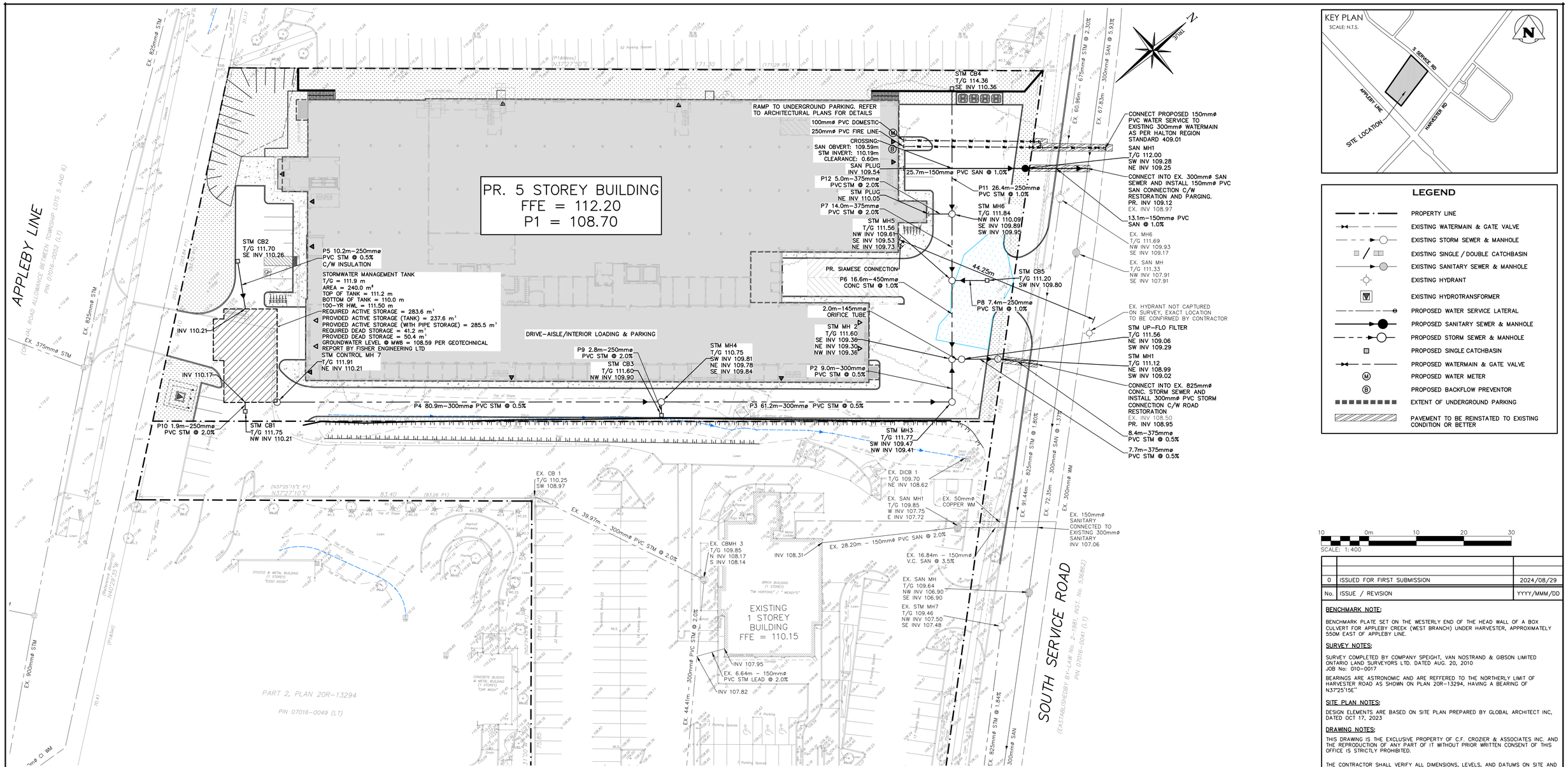
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Drawn	Design	Project No.	
I.M.	A.M.	1644-6586	
Check	Check	Scale	Dwg.
J.B.	J.B./A.M.	1: 400	C101



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING HYDRANT
- EXISTING HYDROTRANSFORMER
- PROPOSED WATER SERVICE LATERAL
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE CATCHBASIN
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED WATER METER
- PROPOSED BACKFLOW PREVENTOR
- EXTENT OF UNDERGROUND PARKING
- PAVEMENT TO BE REINSTATED TO EXISTING CONDITION OR BETTER

10 0m 10 20 30
SCALE: 1: 400

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Project
875 APPLEBY LINE
CITY OF BURLINGTON

Drawing
SITE SERVICING PLAN

GENERAL NOTES FOR STORM AND SANITARY SEWER

1. SANITARY 375mm DIAMETER AND SMALLER SHALL BE POLYVINYL CHLORIDE (PVC) SDR 28 OR 35 (AS REQUIRED) TO CSA B182.2, B182.4 OR LATEST VERSION.
2. MINIMUM DEPTH OF COVER 1.3m STORM AND 1.8m FOR SANITARY.
3. PIPE BEDDING AS PER S-200.010 DURHAM REGION STANDARD FOR PVC AND AS-135 TOWN OF AJAX STANDARD.
4. THE CONTRACTOR/OWNER IS RESPONSIBLE FOR ALL UTILITY LOCATES AND ANY DAMAGE OR DISTURBANCE DURING CONSTRUCTION.
5. STORM SEWER PIPES 450mm DIAMETER AND LARGER SHALL BE STEEL REINFORCED CONCRETE PIPE CERTIFIED AS CONFORMING TO SPECIFICATION CSA A257.1, A257.3 OR LATEST VERSION AND CLASS AS NOTED.
6. ALL BENCHING AS PER AS-113 TOWNS OF AJAX STANDARD OR AS NOTED.
7. MAINTENANCE HOLES SHALL CONFORM TO OPSD 701.010 (1200mm), OPSD 701.011 (1500mm) AND 701.011.COVERS AND FRAMES SHALL CONFORM TO OPSD 401-010.
8. CATCHBASINS SHALL CONFORM TO OPSD 705.010 (SINGLE) AND 705.020 (DOUBLE). FRAME AND GRATES TO CONFORM TO OPSD 400.010.
9. SUBDRAINS TO BE INSTALLED AT EACH CATCHBASIN AND MAINTENANCE HOLE, SEE DETAIL.
10. ALL STORM CONNECTIONS SHALL CONFORM TO AS-165.
11. ALL SANITARY CONNECTIONS SHALL CONFORM TO REGION OF DURHAM STANDARDS S-100.010 AND S-100.020.

GENERAL NOTES

1. BOULEVARDS TO BE GRADED, TOP SOILED 150mm DEPTH AND SODDED BY OWNER/CONTRACTOR TO THE TOWN'S AND REGION'S SATISFACTION.
2. ALL EXISTING PAVEMENT, CURBS, SIDEWALKS, DRIVEWAYS AND BOULEVARD AREAS DISTURBED BY THE CONSTRUCTION MUST BE REINSTATED TO THE SATISFACTION OF THE TOWN OF AJAX.
3. A MINIMUM SETBACK OF 1m FROM STREET FURNITURE TO PROPOSED DRIVEWAYS AND SIDEWALKS SHALL BE MAINTAINED. ALL EXISTING STREET FURNITURE TO BE RELOCATED BY CONTRACTOR/OWNER TO A SETBACK OF 1m. THE COST OF RELOCATION OF ANY UTILITY IS THE RESPONSIBILITY OF THE DEVELOPER/OWNER.
4. THE CONTRACTOR/OWNER IS RESPONSIBLE FOR ALL UTILITY LOCATES AND ANY DAMAGE OR DISTURBANCE DURING CONSTRUCTION.
5. ALL BARRIER FREE ENTRANCES AND BARRIER FREE PATHS OF TRAVEL MUST COMPLY WITH AODA.
6. THE OWNER/CONTRACTOR SHALL SUPPLY ALL FIRE ROUTE AND HANDICAP SIGNS AS SET OUT IN THE TOWN OF AJAX BY-LAWS AND DESIGN CRITERIA.
7. ALL EXTERIOR ILLUMINATION TO BE DIRECTED DOWNWARD AS WELL AS INWARD AND DESIGNED TO MAINTAIN ZERO CUTOFF LIGHT DISTRIBUTION AT THE PROPERTY LINE.
8. SIDEWALK AND DRIVEWAYS SHALL BE CONSTRUCTED AS PER TOWN OF AJAX DETAIL AS 231 AND AS 342 RESPECTIVELY.
9. ALL MUNICIPAL CURBS TO BE CUT BY THE TOWN ON KERRISON DRIVE EAST. CONTACT 905-619-2529 TO OBTAIN A CURB CUT PERMIT.CURB CUTS ON SALEM ROAD (REG.RD.41) TO BE DONE BY THE REGION OF DURHAM, CONTACT 905-683-1471.
10. ALL DOWNSPOUTS TO BE CONNECTED TO THE STORM DRAINAGE SYSTEM.

GENERAL NOTES FOR WATERMAINS AND FIREMAINS:

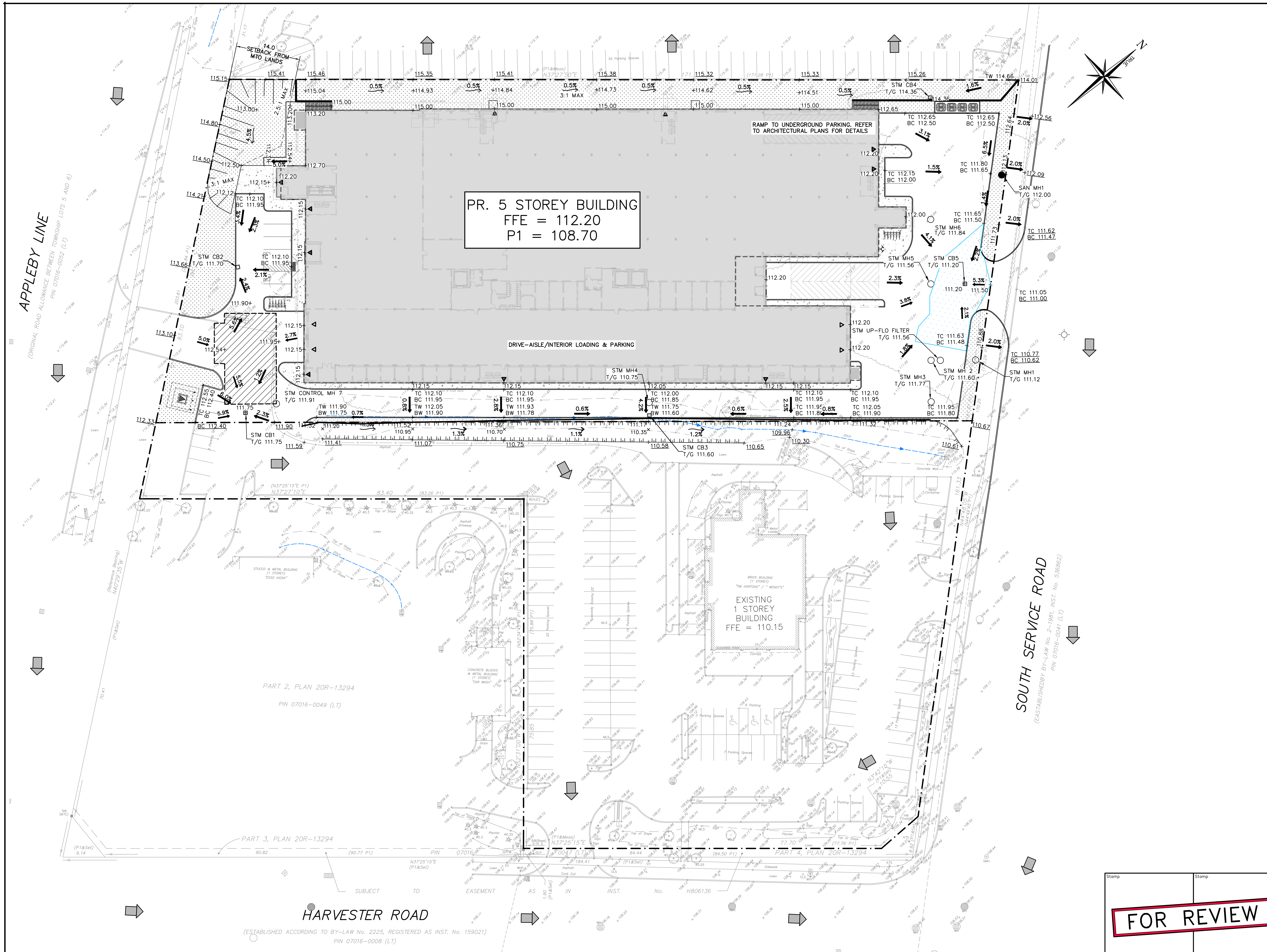
1. WATER SERVICE CONNECTION SHALL BE CONSTRUCTED IN ACCORDANCE WITH DURHAM REGION STANDARDS.
2. HYDRANT AND VALVE SHALL CONFORM TO S-210.010 DURHAM REGION STANDARD AND PROVIDED WITH STORZ PUMPER CONNECTION.
3. WATERMAIN SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 150 DR-18 PIPE MANUFACTURED TO AWWA C900-89 AND CSA CAN3 B137.3-M1986 WITH GASKETED BELL END C/W #14 AEG SOLID COPPER TRACER WIRE. TRACER WIRE SHALL BE ATTACHED TO EVERY NON-METALIC WATERMAIN, FIREMAIN AND SERVICE CONNECTION AS PER S-435 REGION OF DURHAM STANDARD.
4. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH LOCAL MUNICIPAL AND PROVINCIAL GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC., MUST BE PROVIDED. ALL NEW MAINS AND SERVICES TO BE PRESSURE TESTED TO 200 PSI (1379kPA) FOR AT LEAST 1 (ONE) HOUR. THE CONTRACTOR (INSPECTED BY THE ENGINEER) SHALL SUCCESSFULLY SWAB AND CHLORINATE MAINS AND SERVICES PRIOR TO CONNECTING TO EXTERNAL WATERMAINS. THE SYSTEM TO BE CONSTRUCTED AND TESTED AS PER OPSS 701. NO CONNECTION TO MUNICIPAL WATERMAIN UNTIL A POSITIVE LABORATORY TEST RESULT IS DELIVERED TO THE TOWN OF AJAX AND DURHAM REGION AND A WRITTEN CLEARANCE IS GIVEN BY THE TOWN OF AJAX.
5. THE CONTRACTOR/OWNER IS RESPONSIBLE FOR ALL UTILITY LOCATES AND ANY DAMAGE OR DISTURBANCE DURING CONSTRUCTION.
6. PIPES 300mm DIAMETER AND SMALLER SHALL BE POLYVINYL CHLORIDE PIPE (PVC) CONFORMING TO CAN/CSA B-137.
7. BEDDING AS PER S-200.010 DURHAM REGION STANDARD FOR PVC.

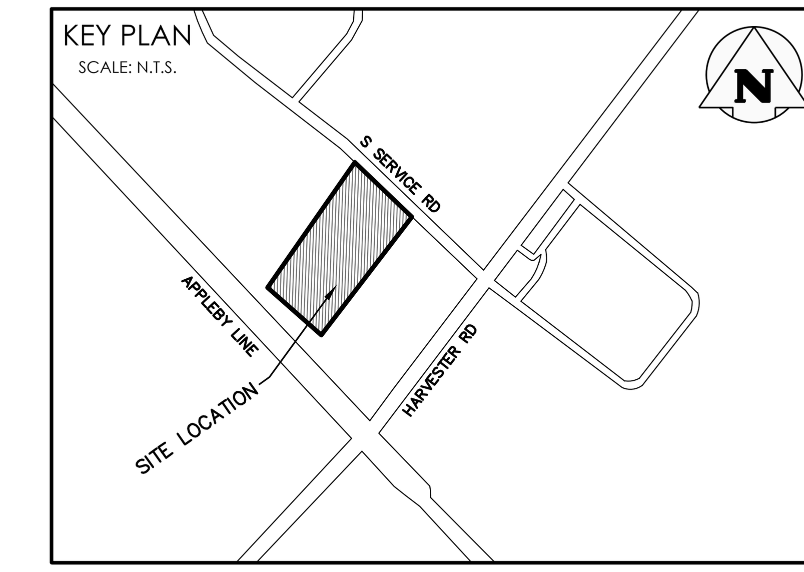
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Drawn	Design	Project No.	
I.M.	A.M.	1644-6586	
Check	Check	Scale	Dwg.
J.B.	J.B. /A.M.	1: 400	C102





LEGEND

- PROPERTY LINE
- EXISTING GRADE
- PROPOSED GRADE
- PROPOSED GRADE (TO MATCH EXISTING)
- PROPOSED MINOR FLOW DIRECTION
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED SINGLE CATCHBASIN
- BUILDING ENTRANCE (PERSONNEL DOOR)
- BUILDING ENTRANCE (OVERHEAD DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- EXTENT OF UNDERGROUND PARKING
- PROPOSED RETAINING WALL
- PROPOSED SURFACE PONDING AREA

10 0m 10 20 30
SCALE: 1:400

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0	ISSUED FOR FIRST SUBMISSION	2024/08/29

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JOB No: 010-0017

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Project
875 APPLEBY LINE
CITY OF BURLINGTON

Drawing
SITE GRADING PLAN

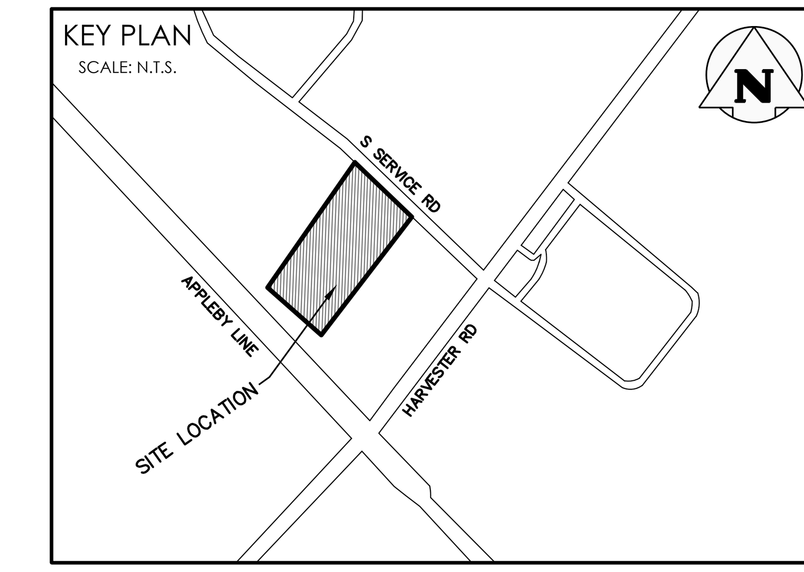
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Drawn I.M.	Design A.M.	Project No. 1644-6586	
Check J.B.	Check J.B./A.M.	Scale 1:400	Dwg. C103

FIGURES





LEGEND

— — · —	PROPERTY LINE
× 112.00	EXISTING GRADE
⇨	EXISTING OVERLAND FLOW DIRECTION
■ ■ ■ ■	STORM DRAINAGE CATCHMENT
ID / A | RC	CATCHMENT I.D.
	AREA (ha) | RUNOFF COEFFICIENT

10 0m 10 20 30

SCALE: 1:400

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Project

875 APPLEBY LINE
CITY OF BURLINGTON

Drawing

PRE-DEVELOPMENT
DRAINAGE AREA PLAN

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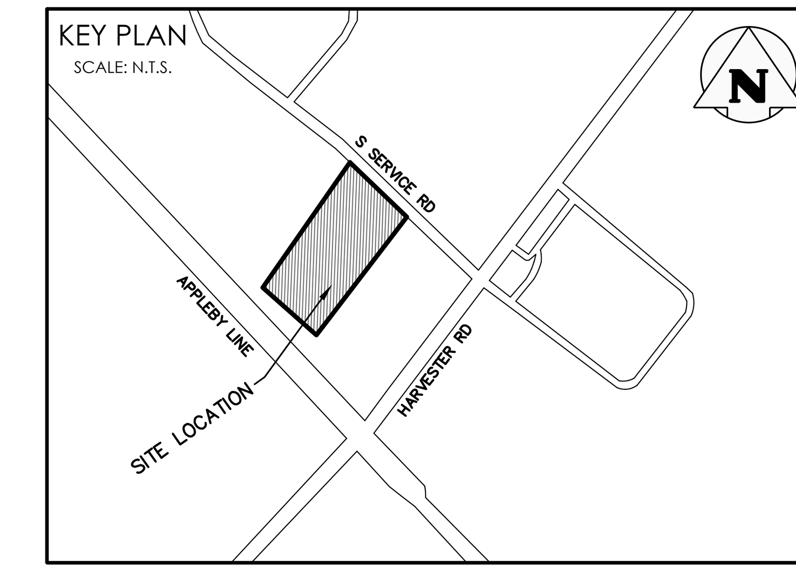
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Drawn I.M.	Design A.M.	Project No. 1644-6586	
Check J.B.	Check J.B./A.M.	Scale 1:400	Dwg. FIG.1



KEY PLAN

SCALE: N.T.S.



LEGEND

— — · —	PROPERTY LINE
× 215.00	EXISTING GRADE
	EXISTING OVERLAND FLOW DIRECTION
	PROPOSED MAJOR OVERLAND FLOW DIRECTION
	PROPOSED STORM DRAINAGE CATCHMENT
ID	CATCHMENT I.D.
A | RC	AREA (ha) | RUNOFF COEFFICIENT

10 0m 10 20 30

SCALE: 1:400

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Project

875 APPLEBY LINE
CITY OF BURLINGTON

Drawing

POST–DEVELOPMENT
DRAINAGE AREA PLAN

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Drawn	Design	Project No.	
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Check	Check	Scale	Dwg.
J.B.	J.B./A.M.	1:400	FIG.2