

Marco Polo 100 Design Challenge

Site Servicing Design Brief

**Fourth Street
GANANOQUE, ONTARIO**

Prepared for: **Horizon Legacy**

Project No. **GW-21050**

Date: **07 December 2021**

Revised: **20 January 2022**

GEOTECHNICAL • CIVIL • STORMWATER • ONSITE WASTEWATER

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1.0 Introduction

This report is written in support of the proposed residential development on Fourth Street, Gananoque, Ontario. There are six (6) residential buildings proposed with building size ranging from 84 m² to 125 m². The property is approximately 0.83 ha and is currently undeveloped. Horizon Legacy (Client) has retained the services of Groundwork Engineering Limited to complete the civil design of the facility. This includes completion of a site servicing plan, lot grading plan, stormwater management plan, and sediment and erosion control plan.

The proposed development consists of six (6) two-story residential buildings. Each building will contain three (3) units; one (1) bachelor style unit, one (1) single bedroom unit, and one (1) two-bedroom unit.

2. Site Overview / Existing Conditions

The property can be legally described as Lot 161 W Gananoque River, 162 W Gananoque River, 163 W Gananoque River, 165 W Gananoque River, 167 W Gananoque River, 169 W Gananoque River, 171 W Gananoque River, 173 W Gananoque River, 175 W Gananoque River, 177 W Gananoque River, 179 W Gananoque River, 180 W Gananoque River PL 86; Town of Gananoque. The site is bordered by Fourth Street to the north, residential buildings to the east, and unopened road allowances to the west and south.

The site topography generally slopes from south to north. The site is currently not serviced and does not have service stubs at the property line. The site currently has no approved stormwater management.

3. Site Servicing

Servicing providers for this project will include water, sanitary, electricity, and communications. The proposed development will require the extension of water and sanitary along Fourth Street to service the buildings.

3.1. Water Servicing

Water servicing in a municipal road right away is governed by the Ministry of Environment Conservation and Parks (MECP) and their design guidelines for drinking water systems (MOE PIBS 6881e). Once the service enters private property, it is either a single service and falls under the Ontario Building Code (OBC) or becomes a private water supply under 7.1.5.5 of the OBC and remains under the MECP and their design guidelines.

The MECP guidelines outline that the typical water flows per person in a residential setting range between 270 L to 450 L per person. An estimated daily flow of 350 L was used to calculate the required water flow. The guidelines state that water distribution systems are to be assessed under the worst-case demand scenario. The outlined demand scenarios are Maximum Daily Flow plus Fire Flow and Peak Hour Flow. A peak hour factor of 4.25 and maximum day factor of 2.75 was selected from Table 3-1 (Peaking Factors for Domestic Water Demands). Water demand calculations can be seen in Appendix A. The calculations confirmed

that the Maximum Daily Flow would be 5.35 L/min and the Peak Hour Demand would be 8.26 L/min.

Fire Flow is calculated using the Water Supply for Public Fire Protection published by the Fire Underwriter's Survey. This calculation considers building size, number of stories and building construction type to provide an accurate base flow for firefighting. The calculation also implies reductions or increases based on risk factors such as fire suppression systems, distance to other buildings and content type. The detailed fire flow calculation can be found in Appendix A. Since the proposed building is for residential use, it was assumed that the contents would be combustible and there would be no fire suppression systems. Therefore, there would be no reduction to the base fire flow of 3478 L/min. There will be a 20% increase in fire flows due to the buildings being within 10 m of each other. Therefore, the calculated fire flow requirement for this development will be 4174.21 L/min.

As mentioned previously, MECP guidelines state that the water distribution system is to be assessed under the worst-case demand scenario. It was confirmed that the worst-case demand scenario would be Maximum Daily Flow plus Fire Flow or 4179.56 L/min.

The closest fire hydrant to the proposed development is located at the intersection of Fourth Street and Victoria Avenue. Confirmation of available flow at 20 psi will be required to ensure adequate fire flow will be available on-site.

The existing 250 mm main is currently stubbed at the junction of Fourth Street and the Gananoque Waterfront Trail. The existing watermain will be extended 95 m to the proposed site. A 200 mm diameter water service will be installed off the extended main to service the site and proposed fire hydrants. Once the new 200 mm service extends past the northern most proposed hydrant it will be down sized to a 150 mm diameter service to provide water to the southern three (3) buildings. A flushing hydrant will be installed at the end of the 150 mm service for maintenance purposes. With the building requiring a service capable of providing the Peak Hour Demand of 8.26 L/min, a 38 mm diameter service has been selected to service each building. Since this is a direct service to the buildings it is governed by OBC.

3.2. Sanitary Servicing

Sanitary and storm servicing in a municipal road right away are governed by the MECP and their Design Guidelines for Sewage Works (MOE PIBS 6879). Once the service enters private property, it is either a single service and falls under the OBC or becomes a private sewer under 7.1.5.5 of the OBC and remains under the MECP and their design guidelines.

There is an existing 200 mm diameter municipal sanitary servicing stub at the junction of Fourth Street and the Gananoque Waterfront Trail. The existing stub will be extended 90 m to a new manhole. A 150 mm diameter sanitary service will be installed from the new manhole in the road to a new manhole near the northern property line. The 150 mm diameter service will be extended south through the property to service the buildings individually. A manhole will be installed at the mid-point of the site to ensure that the service length is not more than 90m. Each building will be serviced with a 125mm diameter service.

The development consists of six (6) units with the potential of 48 tenants. The MECP Guidelines

recommend an average daily domestic sewage flow for residential use of 225 to 450 L per person, closely matching domestic water intake. It was decided that daily sanitary flow will match the flow selected in the water section of this report. The design sewage flow will be 350 L per person per day for the 48 tenants for a combined peak flow of 0.16 L/s. Detailed calculations were completed to confirm that the 150 mm proposed service would have the required capacity. The predicted flows would operate at 0.46% of the pipe's total capacity.

3.3. Stormwater Management

A new stormwater management system has been designed to restrict the runoff rate to pre-development flows. The site will use a combination of sheet flow and grassed swales to convey stormwater to a new dry pond designed to store the 100-year post-development storm volume of 96.58 m³. An orifice will restrict the release rate to 14.40 L/s to ensure no downstream effects. The pond will be designed with a 0.3m overflow freeboard in accordance with MECP guidelines.

3.4. Utilities Servicing

All proposed utilities are to be supplied by underground servicing to aid in protecting them from damage.

3.4.1. Electrical Servicing

Main service to the development will be taken from the overhead main distribution lines on the south side of Fourth Street and continue underground in a combined trench on the east side of the driveway. Transformer locations to be confirmed with Hydro supplier Eastern Ontario Power. Electrical needs and meter locations will be designed by the mechanical engineer.

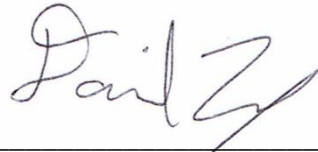
3.4.2. Communication Servicing

Communication servicing will be designed and installed by the service provider. It is assumed that the provider will service the buildings along the east side of the driveway, as seen in the attached servicing drawings in Appendix B.

4. Summary

The proposed development of a six (6) building residential development at Fourth Street will include the extension of the municipal water and sanitary mains and the installation of underground hydro and communications services. The new development will implement a dry pond with an outlet restriction to control flow of stormwater leaving the site.

The proposed buildings will be provided with water, sanitary and utilities servicing to meet current demands.



Report prepared by:

Daniel Fox, Engineering Technologist



Report Reviewed by:

Martin Burger, M.Eng., P.Eng.

Statement of Qualifications and Limitations

The attached Report has been prepared by Groundwork Engineering Limited (the Consultant) for the benefit of the Client in accordance with their Agreement.

The information, data, recommendations and conclusions contained in the Report:

1. is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report;
2. represents the Consultant's judgement in light of the limitations and industry standards for the preparation of similar reports;
3. may be based on information provided to Consultant which has not been independently verified;
4. has not been updated since the date of issuance of the Report and its accuracy is limited to the time and circumstances in which it was prepared; and
5. Must be read as a whole and sections should not be read out of context.

The Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared.

Any estimates or opinions regarding expected construction costs or construction schedule provided by Consultant represent Consultant's judgement in light of its experience and the knowledge and information available to it at the time of preparation. The Consultant does not make any representations, with respect to such estimates or opinions, and accepts no responsibility for any loss or damage arising from them. Persons relying on such estimates or opinions do so at their own risk.

Except as agreed to in writing by the Consultant and the Client; as required by-law; or to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by the Client.

The Consultant accepts no responsibility, to parties other than the Client who may obtain access to the Report or the information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report, except to the extent those parties have obtained the prior written consent of the Consultant to use and rely upon the Report and the information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.



Appendix A

Servicing and Sewer Calculation Sheets



Required Fire Flow Design Calculation

Project Name : Marco Polo

Project Number: GW-21050

Project Address : Fourth Street, Gananoque

Clients Name : Horizon Legacy

Prepared By: Daniel Fox

Reviewed By: Martin Burger

Fire Underwriters Survey - Water Supply for Public Fire Protection (1999)

Building Foot Print:	125 m ²	Construction Type (C):	Ordinary Construction	1
Number of Storeys:	2	Fire Suppression System:	None	0
Gross Floor Area (A):	250 m ²	Distance From Other Building:	3 to 10m	0.2
		Content Type:	Combustible	0

$$F = 220C\sqrt{A}$$

Base Fire Flow = 3478.51 L/min

Reduction or Increase 20.00%

Required Fire Flow = 4174.21 L/min = 1102.71^{US} Gpm



Water Demand Design Caculation

Project Name : Marco Polo

Project Number: GW-21050

Project Address : Fourth Street, Ontario

Clients Name : Horizon Legacy

Prepared By: Daniel Fox

Reviewed By: Martin Burger

Design Criteria

Average Flow

Residential Tri-Plex

8

350 L/day

Peak Day Factor:

2.75

Peak Hour Flow:

4.25

Average Flow:

2800 L/day

1.94

L/min

Peak Hour Demand

8.26

L/min

Max Daily Flow

5.35

L/min

Ministry of the Environment, Conservation and Parks requires a water distribution system to be assessed under the worst-case demand scenario

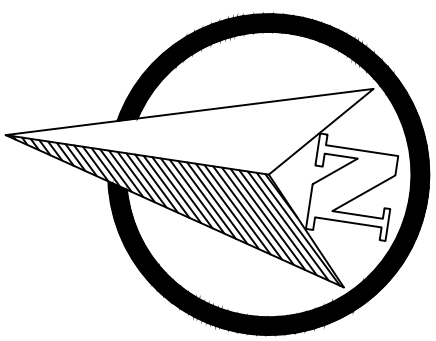
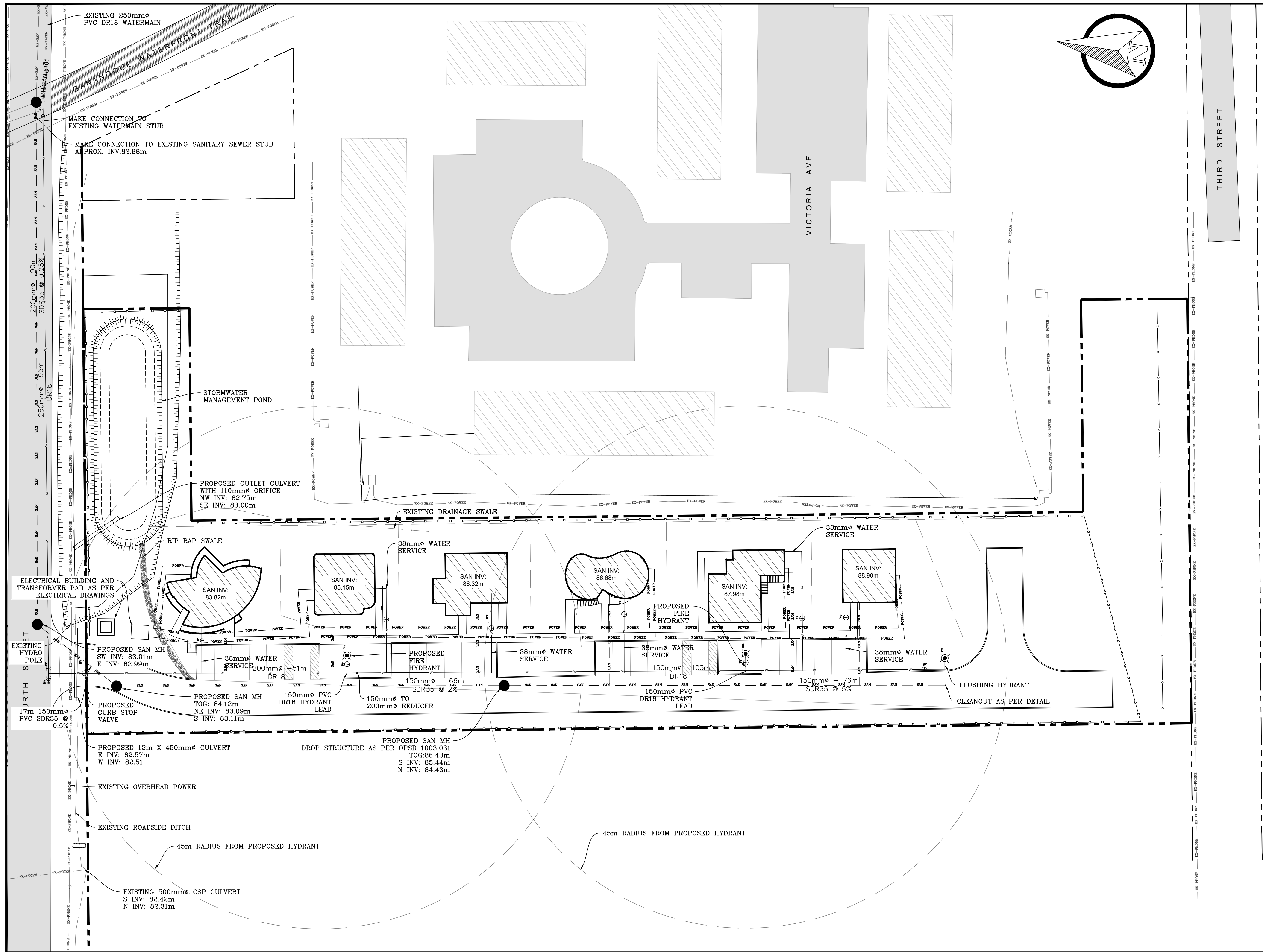
Max Daily Flow + Fire Flow

Peak Hour Flow



Appendix B

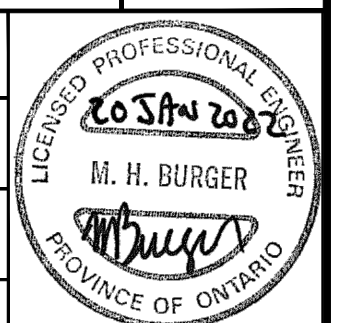
Design Drawing Set



- BUILDING SANITARY SERVICES TO BE 125mmØ PVC SDR28 @ MINIMUM 2% SLOPE
- ELECTRICAL AND COMMUNICATIONS CONDUIT SIZING AS PER MECHANICAL DRAWINGS

REVISIONS		
No.	Description	Date
1.	ISSUED FOR SUBMISSION	2021/12/07
2.	REVISED AS PER TOWN COMMENTS	2022/01/20

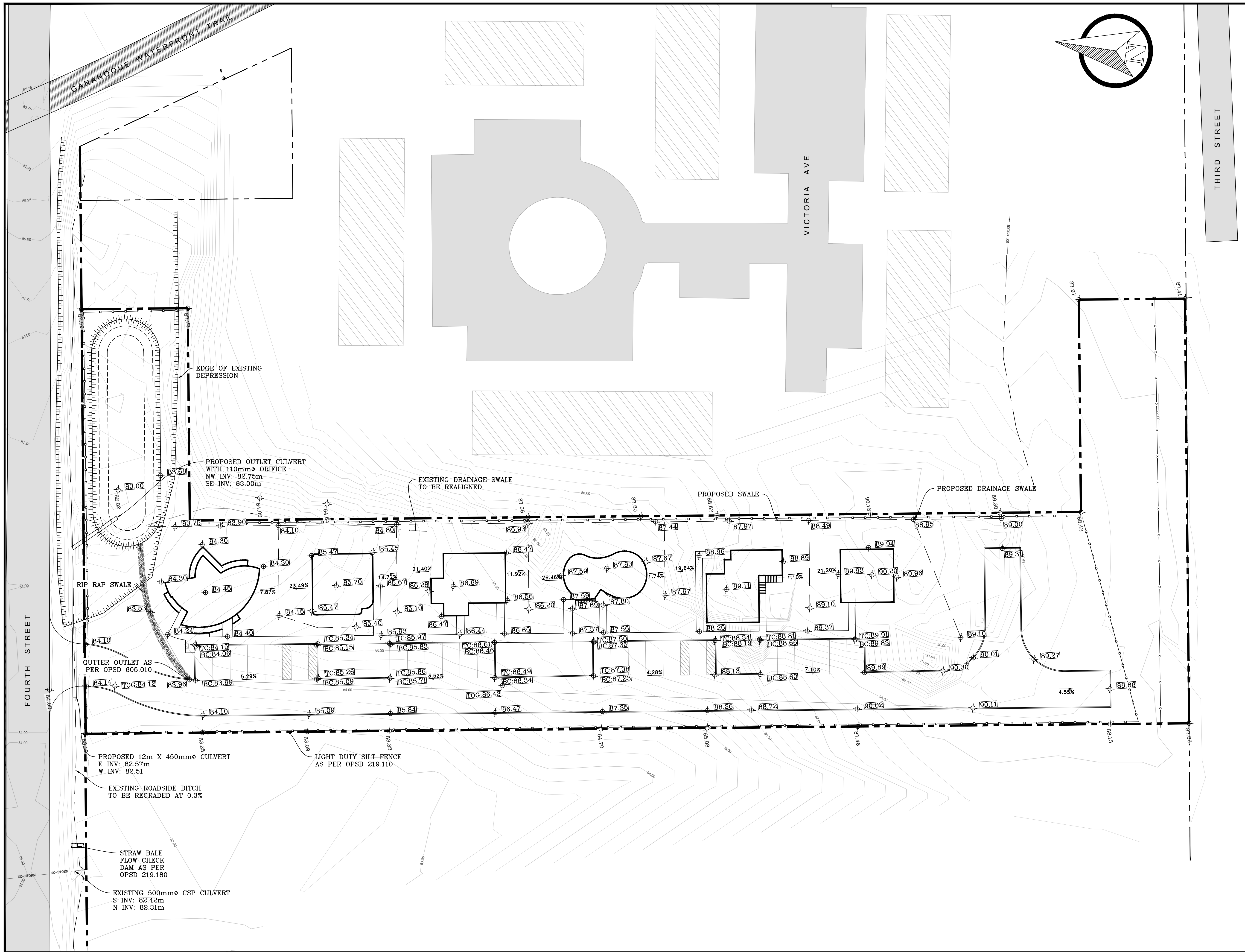
BENCHMARK:		
No.	DESCRIPTION	ELEVATION
##.	XXX	XXX.XX



Client / Land Owner:
MARCO POLO 100 DESIGN CHALLENGE
 425 FOURTH ST. GANANOQUE ONTARIO

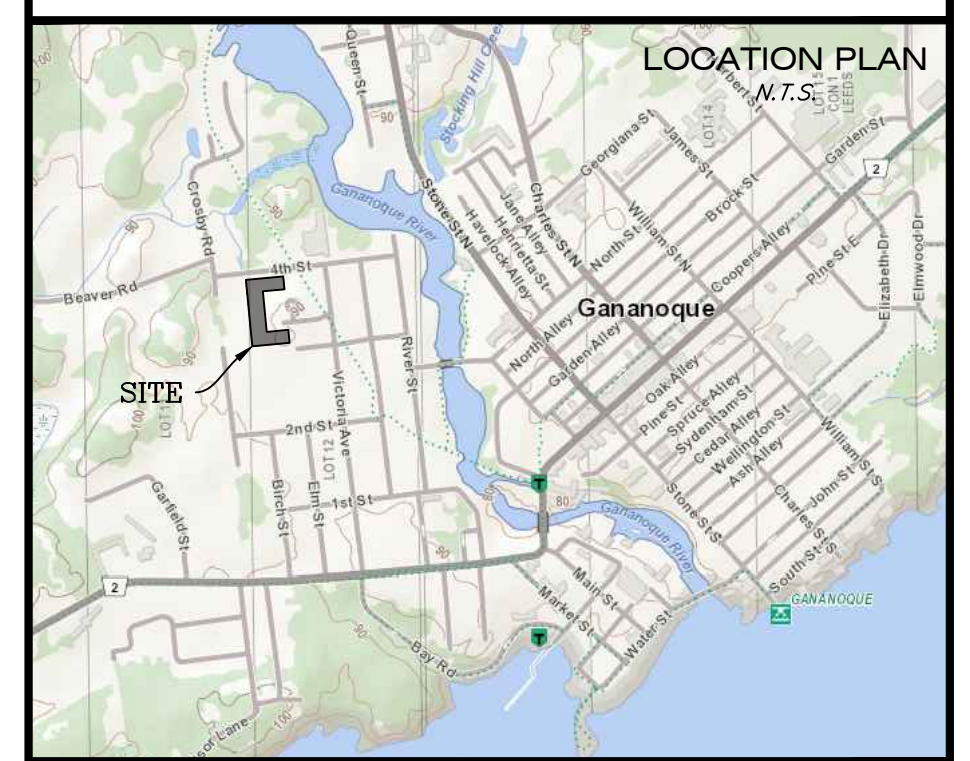
Drawing Title:
SITE SERVICING PLAN

Drawn by: DF	Project Number: GW-21050
Checked By: MB	Drawing Number: C-101
Scale: 24"x36" 1:300	Date: OCT 25, 2021
Date: OCT 25, 2021	SHEET 1 of 3

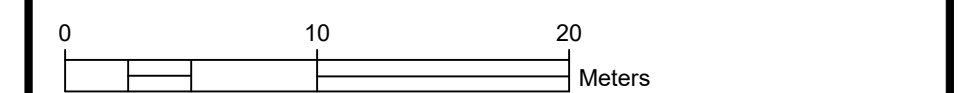


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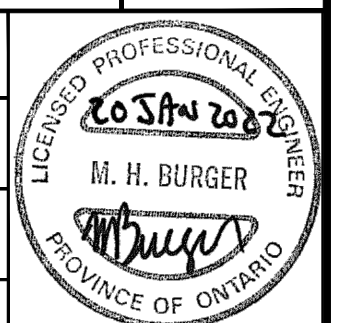


- ⊕ **XX.XX** PROPOSED ELEVATION
- ⊕ **xx.xx** EXISTING ELEVATION
- ⊕ **TOG:XX.XX** TOP OF GRATE ELEVATION
- ⊕ **TC:XX.XX** TOP OF CONCRETE / CURB
- ⊕ **BC:XX.XX** BOTTOM OF CONCRETE / CURB
- **xxx** EXISTING MAJOR CONTOUR (1m)
- **xxxx** EXISTING MINOR CONTOUR (0.25m)



REVISIONS		
No.	Description	Date
1.	ISSUED FOR SUBMISSION	2021/12/07
2.	REVISED AS PER TOWN COMMENTS	2022/01/20

BENCHMARK:		
No.	DESCRIPTION	ELEVATION
##.	XXX	XXX.XX



Client / Land Owner:

Project: **MARCO POLO 100 DESIGN CHALLENGE**
 425 FOURTH ST. GANANOQUE ONTARIO
 Drawing Title: **LOT GRADING PLAN**

Drawn by: DF	Project Number: GW-21050
Checked By: MB	Drawing Number: C-102
Scale: 24"x36" 1:300	Date: OCT 25, 2021
Date: OCT 25, 2021	SHEET 2 of 3

GENERAL NOTES:

- THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVICING AND SURVEY DATA SHOWN ON THIS PLAN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THESE PLANS. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
- ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THE DRAWINGS. IF THERE ARE ANY DISCREPANCIES THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY. GAS, HYDRO, CABLE, TELEPHONE, OR ANY OTHER UTILITY THAT MAY EXIST ON SITE MUST BE LOCATED BY ITS OWN UTILITIES AND VERIFIED.
- ALL UNDERGROUND SERVICES, MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE STATED (OPSS).
- ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED. ANY GRASSED AREAS DISTURBED ARE TO BE REINSTATED WITH MINIMUM 100MM TOPSOIL AND SEED.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
- TREES DESIGNATED BY THE ENGINEER MUST BE PROTECTED AND MAINTAINED DURING CONSTRUCTION.
- CONTRACTOR TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS FROM THE COUNTY, MUNICIPALITY AND/OR CONSERVATION AUTHORITY PRIOR TO COMMENCING CONSTRUCTION.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL.
- ALL CURBS TO BE AS PER OPSD 600.110 UNLESS OTHERWISE SPECIFIED.
- ALL SIDEWALKS SHALL BE A MIN OF 1.5M WIDE CONSTRUCTED AS PER OPSD 310.010. UNLESS OTHERWISE SPECIFIED.
- ALL SIDEWALKS ADJACENT TO ASPHALT PAVING TO HAVE MINIMUM 150MM BURNED FINE.
- HOT MIX, HOT LAID ASPHALT AS PER OPSS 1150. MIX DESIGNS SHALL CONTAIN A MINIMUM OF 5.4% ASPHALT CEMENT WITH A PERFORMANCE GRADE OF PG58-28 AND 3.5% AIR VOIDS.
- PAINT LINES FOR STANDARD PARKING SPACES TO BE CANICGSB-174-2001, ALKYD TRAFFIC PAINT, PAVEMENT SURFACE TO BE DRY, FREE FROM PONDED WATER, FROST, ICE, DUST, OIL, GREASE AND OTHER FOREIGN MATERIALS PRIOR TO PAINTING. PAINT LINES TO BE UNIFORM COLOUR AND DENSITY WITH SHARP EDGES. PROTECT PAVEMENT MARKINGS UNTIL DRY.
- GRADES TO MATCH ADJACENT PROPERTIES AT PROPERTY LINE.
- AT PIPE CROSSING WHERE SEPARATION CANNOT BE MET, CONTRACTOR SHALL PROVIDE A MINIMUM OF 250MM NON SHRINK CONCRETE PIPE SURROUND.
- SLOPES IN LANDSCAPED AREAS SHALL NOT EXCEED 3:1 (3 HORIZONTAL TO 1 VERTICAL).
- ALL SIGNS ARE TO COMPLY WITH TOWN OF GANANOQUE, THE ONTARIO TRAFFIC ACT, AND THE MINISTRY OF TRANSPORTATION BOOK 5 REGULATORY SIGNS.

ENVIRONMENTAL

- EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND MONITORED AND MAINTAINED BY THE CONTRACTOR UNTIL COMPLETION. THE TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE REMOVED ONCE THE SITE HAS BEEN STABILIZED AND SITE WORKS COMPLETED.
- ALL TREE PROTECTION SHALL BE IN PLACE PRIOR TO ANY SITE ALTERATION AND REMAIN UNDISTURBED FOR THE REMAINDER OF THE PROJECT.
- REGARDLESS OF SITE SPECIFIC ITEMS DETAILED ON THE PLANS, THE CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES TO SUIT THE PROPOSED WORK METHODS TO CONTROL SEDIMENT FROM RUNNING OFF THE SITE OR INTO WATER BEARING FEATURES PRIOR TO ANY DISTURBANCE. FOLLOWING CONSTRUCTION, DISTURBED AREAS, AS WELL AS PROPOSED GRASSED AND VEGETATED SURFACES SHALL BE REINSTATED.
- IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING CONSTRUCTION, THE MINISTRY OF CITIZENSHIP, CULTURE AND RECREATION SHALL BE NOTIFIED IMMEDIATELY AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS (416) 362-8392, SHALL BE NOTIFIED IMMEDIATELY.
- IN THE EVENT THAT BURIED ARCHAEOLOGICAL REMAINS ARE FOUND DURING CONSTRUCTION ACTIVITIES, THE MINISTRY OF CITIZENSHIP, CULTURE AND RECREATION SHALL BE NOTIFIED IMMEDIATELY.
- WHILE UNDERTAKING CLEARING, DEMOLITION, EXCAVATION OR CONSTRUCTION THE OWNER AND THEIR CONTRACTORS SHALL BE VIGILANT FOR THE POTENTIAL PRESENCE OF UNDERGROUND FUEL TANKS, CONTAMINATED SOIL OR GROUNDWATER, BURIED WASTE OR ABANDONED WATER WELLS. IF ANY OF THE ABOVE ARE ENCOUNTERED OR SUSPECTED, THE OWNER SHALL ENSURE THAT:
 - THE TOWN OF GANANOQUE'S ENVIRONMENT DEPARTMENT IS ADVISED THAT CONTAMINANTS OR WASTES HAVE BEEN DISCOVERED OR ARE SUSPECTED.
 - ANY SOIL OR GROUNDWATER CONTAMINATION ENCOUNTERED IS REMEDIATED TO APPLICABLE STANDARDS AS DEFINED WITHIN O. REG OR AS REVISED.
 - ANY WASTES GENERATED BY SITE CLEAN-UPS ARE MANAGED IN ACCORDANCE WITH APPLICABLE LAWS AND STANDARDS;
 - ANY ABANDONED FUEL TANKS ENCOUNTERED ARE DECOMMISSIONED IN ACCORDANCE WITH APPLICABLE LAWS AND STANDARDS;
 - ANY UNUSED WATER WELLS (DRILLED OR DUG) ARE PROPERLY ABANDONED IN ACCORDANCE WITH ONTARIO REGULATIONS 903 - WELLS OR AS ADVISED.
 - IF IT APPEARS LIKELY THAT CONTAMINATION EXTENDS BEYOND THE BOUNDARIES OF THE SUBJECT PROPERTY, THE OWNER NOTIFIES THE LOCAL OFFICE OF THE MINISTRY OF ENVIRONMENT AND THE TOWN OF GANANOQUE'S ENVIRONMENT DEPARTMENT.
 - CONSTRUCTION WASTES ARE NOT TO BE BURIED WITHIN THE PROPERTY THAT IS THE SUBJECT OF THIS AGREEMENT, AND
 - THE OWNER AND THEIR CONTRACTORS REPORT ALL SPILLS TO THE MINISTRY OF THE ENVIRONMENT'S SPILLS ACTION CENTRE (1-800-268-6060) AND TO THE MUNICIPALITY FORTHWITH.

STORM

- ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION. CONTRACTOR TO MAINTAIN SILT FENCE AND STRAW BALE FLOW CHECK DAMS.
- RIP RAP TO BE AS PER OPSD 810.010. RIP RAP TO BE PLACED ON GEOTEXTILE. GEOTEXTILE TO BE TERRAFIX 270R OR EQUIVALENT.

SANITARY

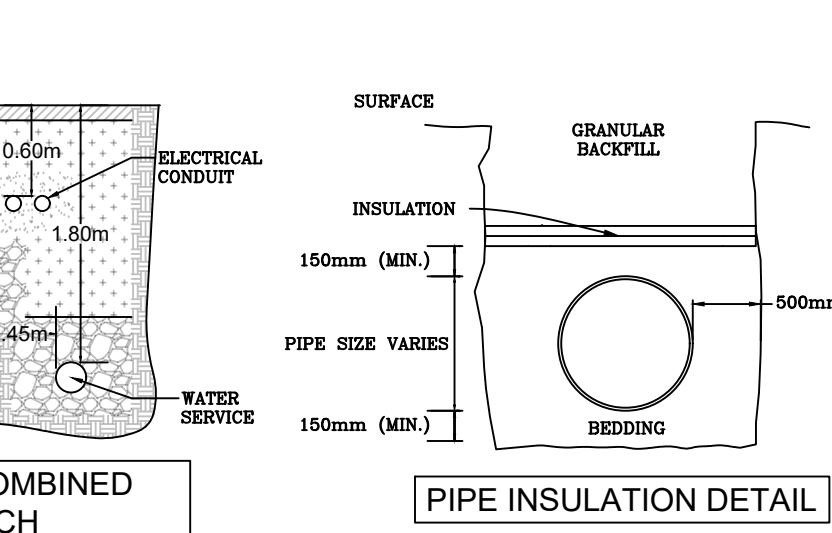
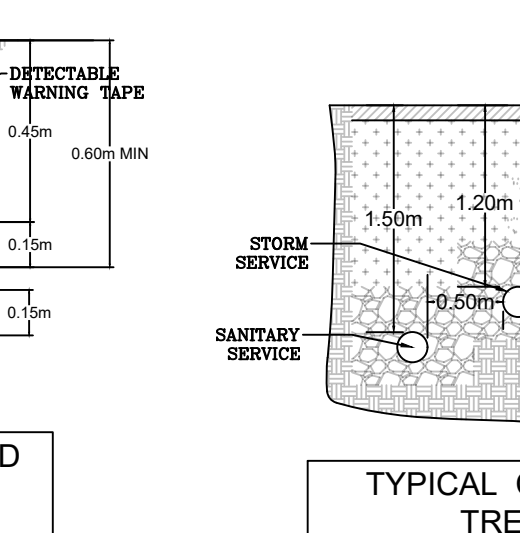
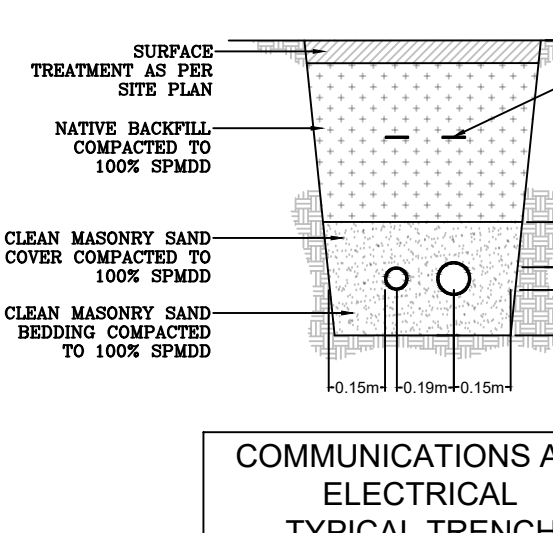
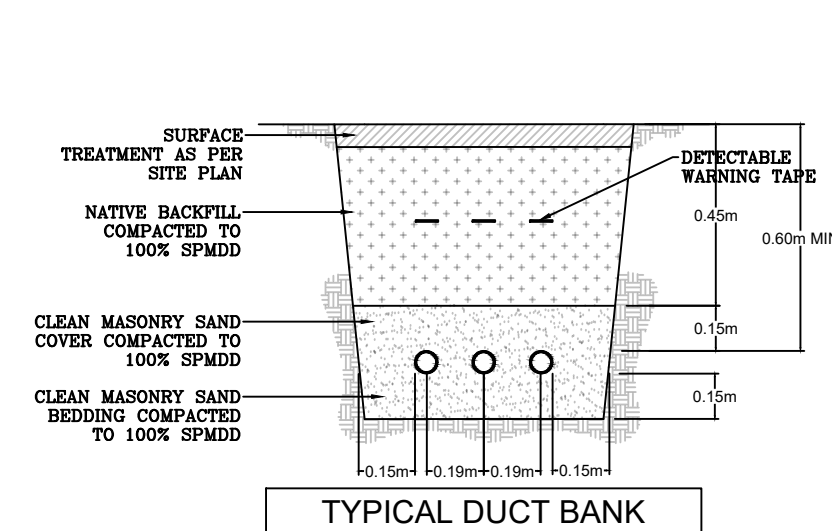
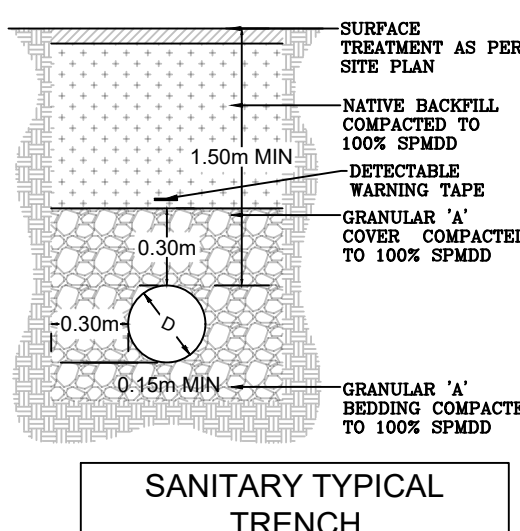
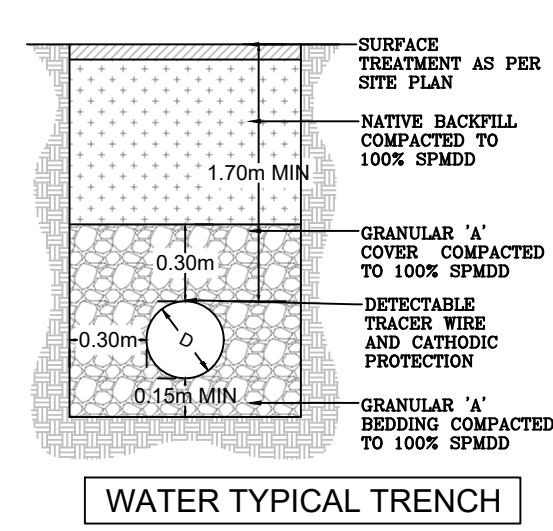
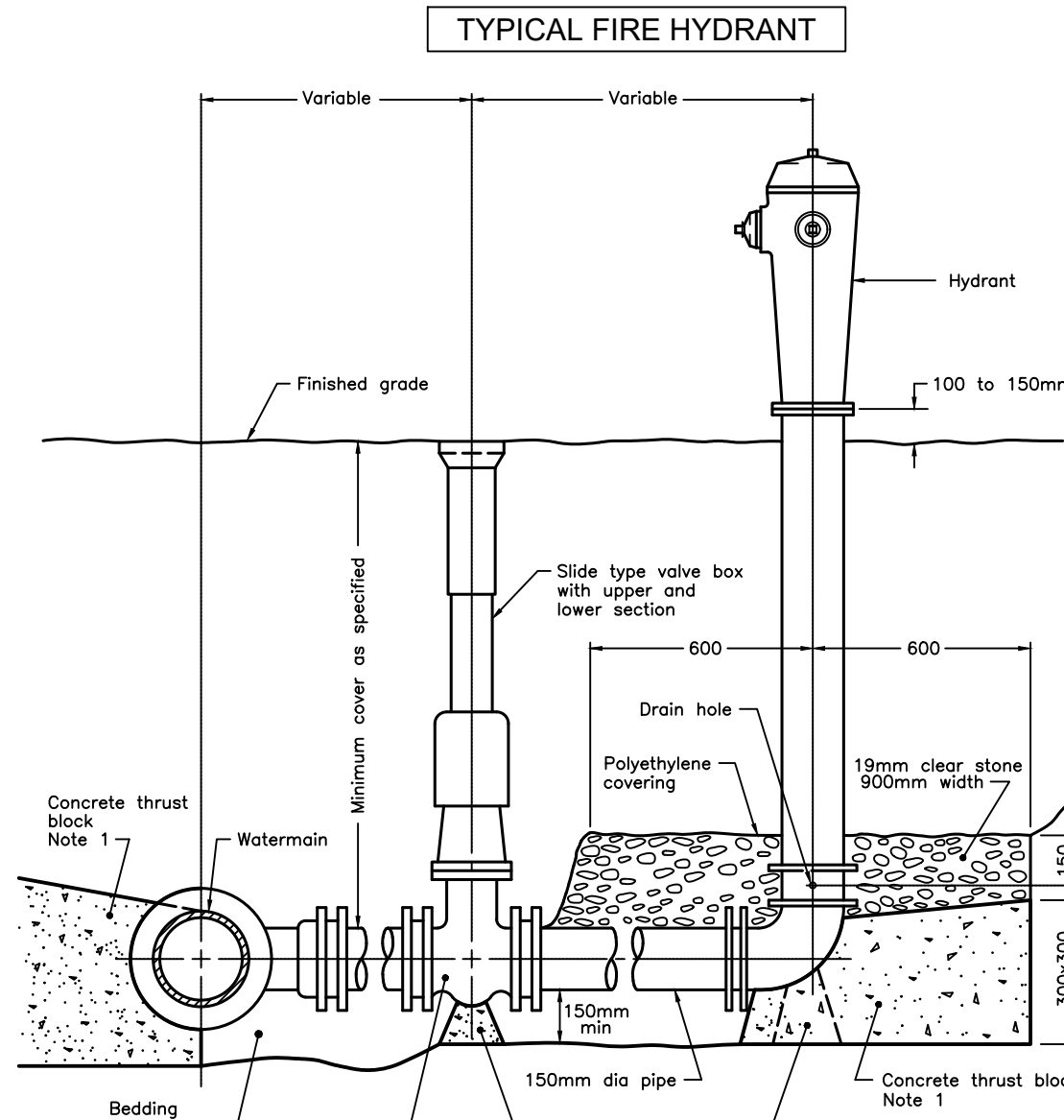
- CONSTRUCT ALL SEWER AND APPURTENANCES TO ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND DRAWINGS, AS WELL AS THE TOWN OF GANANOQUE STANDARDS AS INDICATED.
- SEWER TRENCHING AND BEDDING SHALL CONFORM TO OPSD 802.010 AND 802.013 UNLESS NOTED OTHERWISE.
- SEWERS AND CONNECTIONS 150MM DIAMETER AND SMALLER TO BE PVC SDR 28 OR APPROVED EQUIVALENT.
- INSULATE ALL SEWERS/SERVICES THAT HAVE LESS THAN 1.5M OF COVER WITH THERMAL INSULATION.
- ALL SANITARY MAN HOLES SHALL HAVE FRAME AND GRATE AS PER OPSD 401.010 TYPE A.
- SANITARY SEWERS TO BE PRESSURE TESTED AS PER OPSS AND TOWN OF GANANOQUE STANDARDS.
- ALL MAN HOLES TO BE LEAK TESTED AS PER OPSS AND TOWN OF GANANOQUE STANDARDS.
- MANHOLES TO BE CONSTRUCTED AS PER OPSD 701.010, 701.011, 701.012, AS INDICATED.
- CONTRACTOR TO VERIFY INVERT ELEVATION OF SANITARY STUB.

TRENCHING

- BEDDING SHALL BE A MINIMUM 150MM OF GRANULAR "A", COMPACTED TO MINIMUM 98% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.
- SUB-BEDDING, IF REQUIRED SHALL BE AS PER THE DIRECTION GEOTECHNICAL ENGINEER
- BACKFILL TO AT LEAST 300MM ABOVE TOP OF PIPE WITH GRANULAR "A".
- TO MINIMIZE DIFFERENTIAL FROST HEAVING, TRENCH BACKFILL (FROM PAVEMENT SUBGRADE TO 2 METRES BELOW FINISHED GRADE) SHALL MATCH EXISTING SOIL CONDITIONS.
- ALL ELECTRICAL AND COMMUNICATIONS DUCTS TO HAVE A MINIMUM OF 150MM SAND BEDDING AND COVER AS PER DETAIL.
- MINIMUM OF 600MM COVER MUST BE PROVIDED ON ALL ELECTRICAL AND COMMS SERVICES.

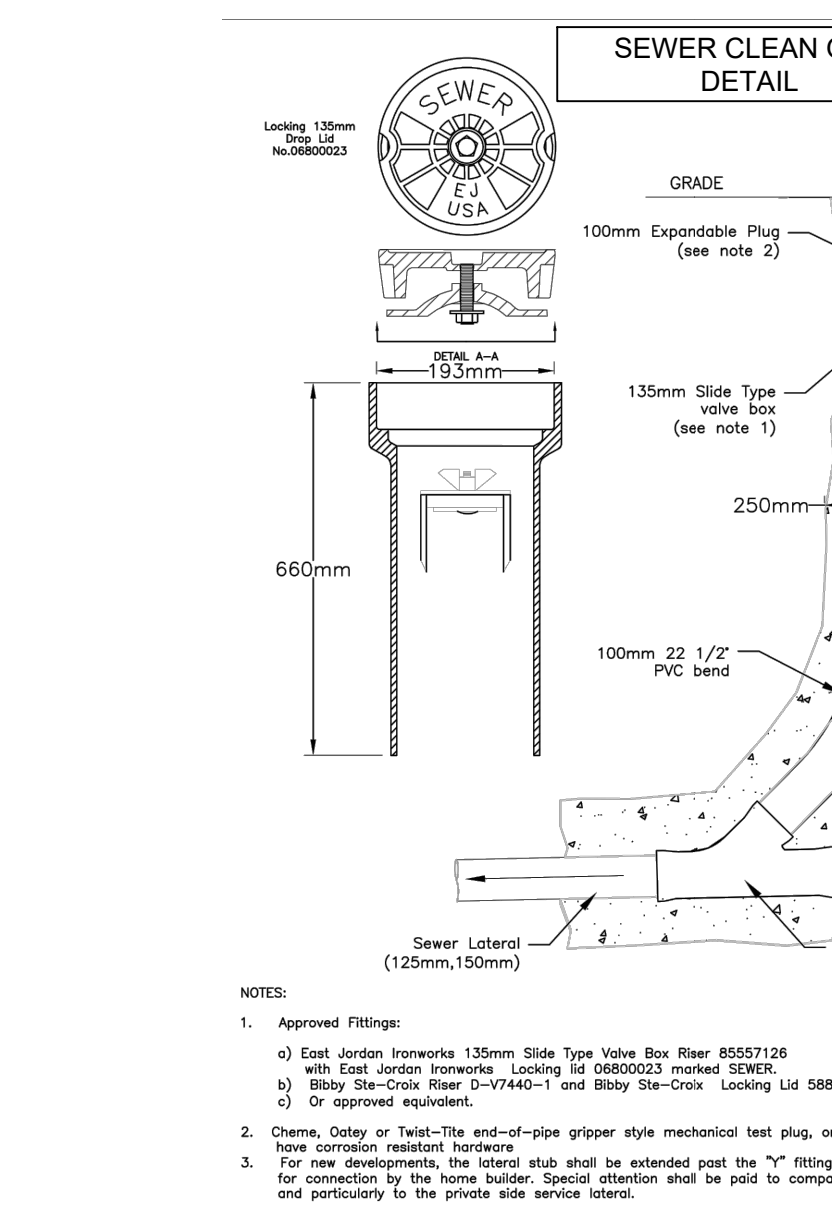
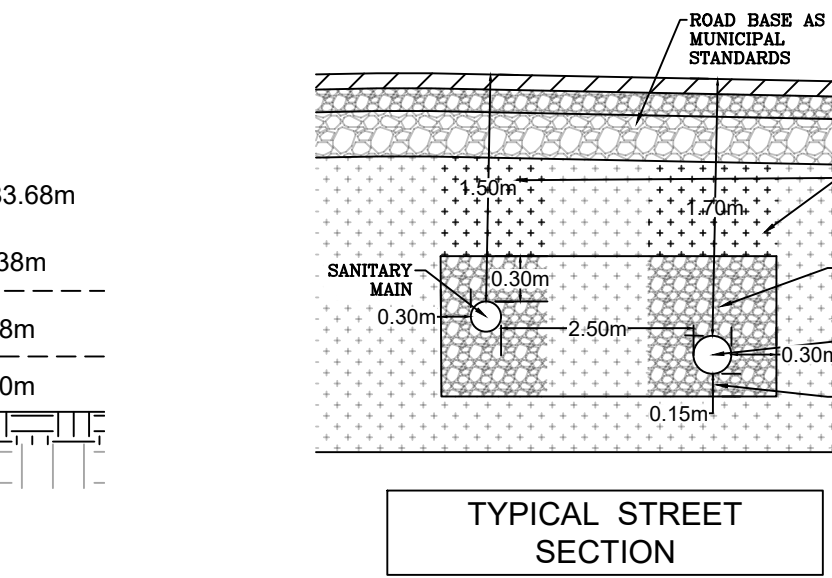
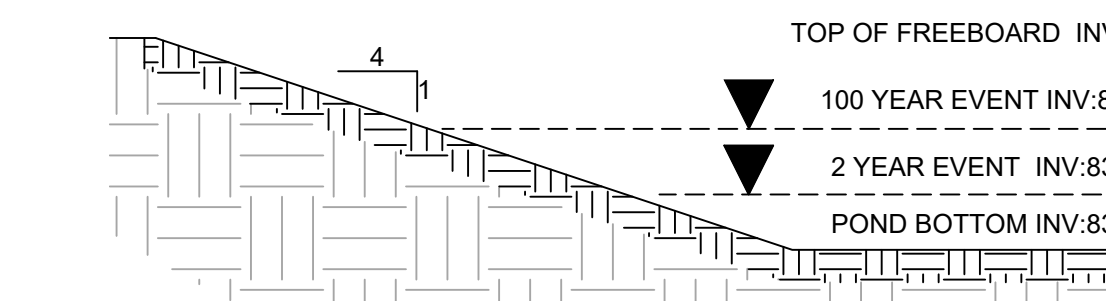
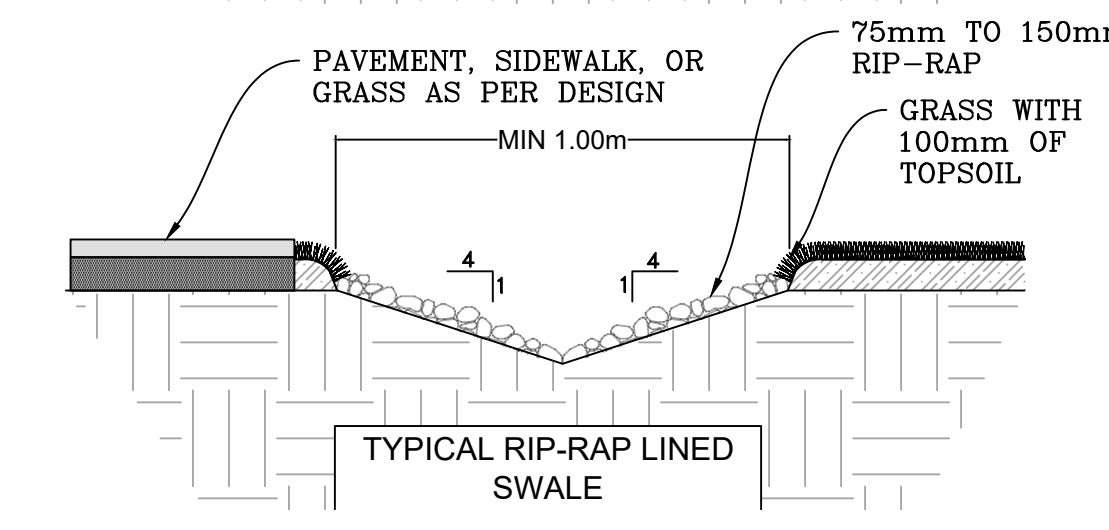
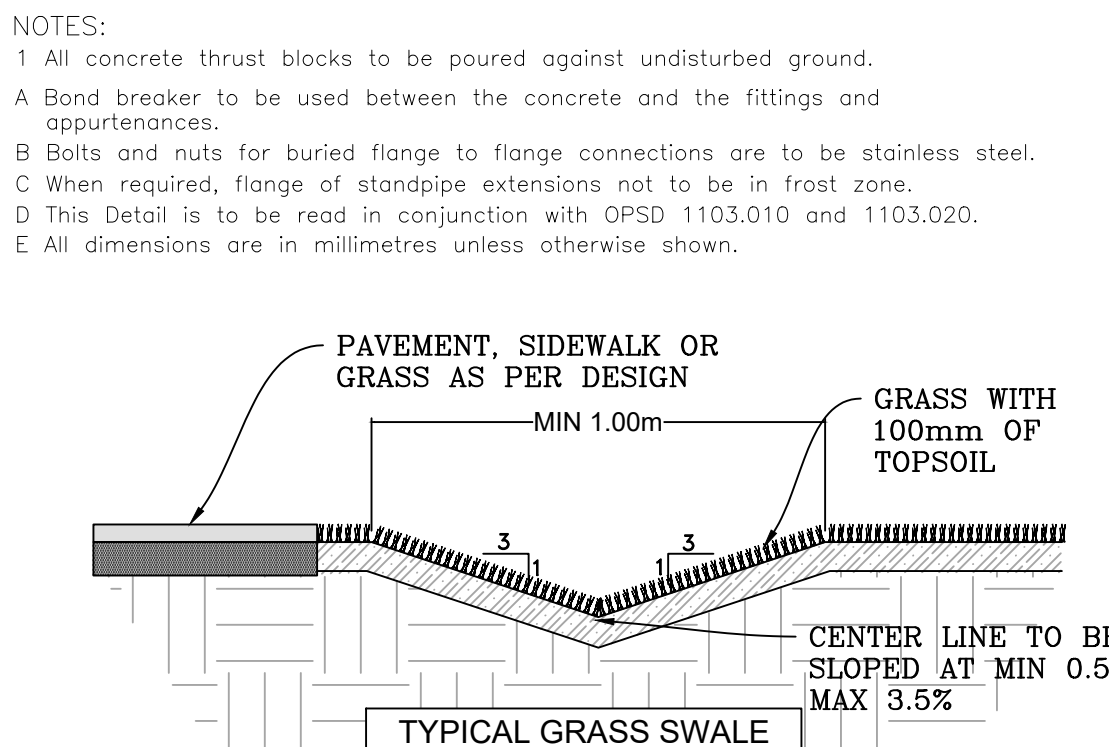
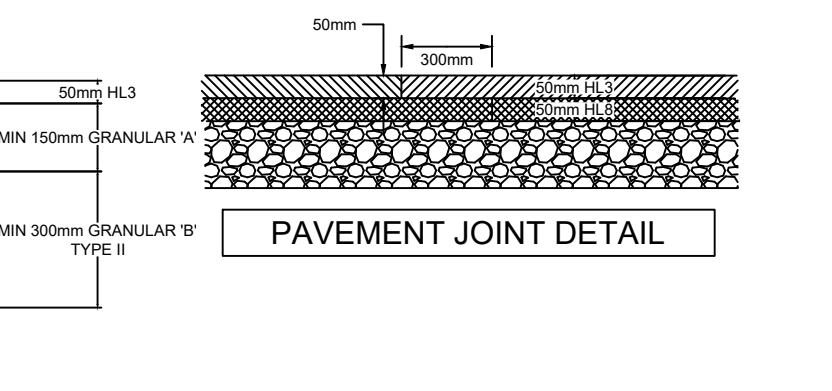
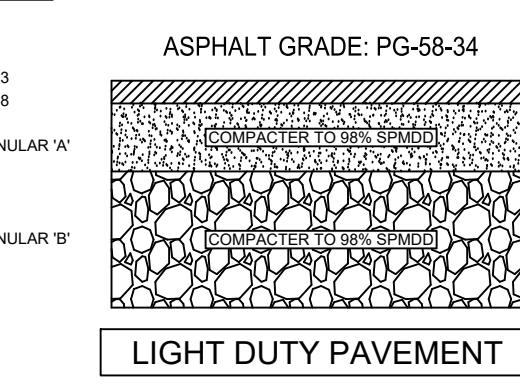
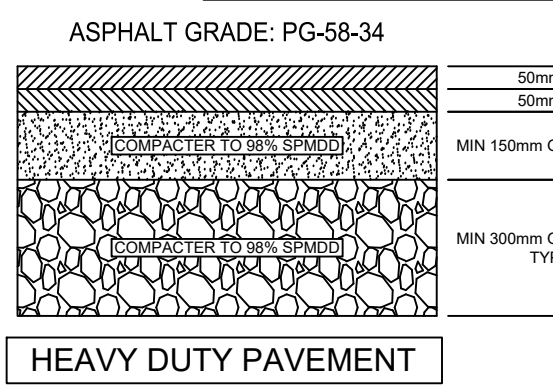
WATERMAIN

- WATERMAIN TO BE BLUE BRUTE CLASS 150 PVC DR18 OR APPROVED EQUIVALENT.
- CONSTRUCT ALL WATERMANS AND APPURTENANCES IN ACCORDANCE WITH OPSD STANDARDS AND SPECIFICATIONS AS WELL AS TOWN OF GANANOQUE STANDARDS.
- WATERMAIN AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.8M. OTHERWISE INSULATION IS REQUIRED AS PER DETAIL.
- IF THE WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS EQUAL TO OR LESS THAN THAT WHICH IS RECOMMENDED BY THE MANUFACTURER.
- COORDINATE WATERMAIN CONNECTION WITH TOWN OF GANANOQUE. CONNECTION TO BE DONE BY COMPETENT CONTRACTOR. EXCAVATION, BACKFILLING AND REINSTATEMENT ALSO TO BE DONE BY CONTRACTOR.
- WATER QUALITY TESTING AND DISINFECTION FOLLOWING CONSTRUCTION TO MEET TOWN OF GANANOQUE, AWWA, MECP, AND BUILDING CODE STANDARDS. THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING ALL REQUIRED TESTING.
- WATERMANS TO BE PRESSURE TESTED AS PER OPSS AND TOWN OF GANANOQUE STANDARDS.
- WATERMAIN THRUST BLOCKS TO BE CONSTRUCTED AS PER OPSD 1103.010.
- CORROSION PROTECTION AS PER OPSS MUNI 442.
- CONTRACTOR TO SUPPLY AND INSTALL WATERMAIN PIPE RESTRAINTS AT ALL ELBOWS AND TEES, BEFORE AND AFTER FITTINGS.
- WATER SERVICE TO BE BLUE BRUTE 904 SDR9 OR APPROVED EQUIVALENT.
- CURB STOP VALVES TO BE MUELLER ROTO-SEAL OR APPROVED EQUIVALENT. INVERTED KEY TYPE NOT ACCEPTABLE.
- VALVES TO BE NO DEEPER THAN 1.7m BELOW FINISHED GRADE.
- TRACER WIRE TO BE INSTALLED ON ALL WATERMANS AND WATER SERVICES AS PER OPSS AND TOWN OF GANANOQUE STANDARDS.
- FLUSHING HYDRANT TO BE MUELLER® 2-1/8" FLUSH TYPE FIRE HYDRANT OR APPROVED EQUIVALENT.



PIPE INSULATION TABLE

GROUND COVER	INSULATION THICKNESS (mm)
500 OR LESS	150
500 to 1500mm	100
1500mm and over	50



GROUNDWORK ENGINEERING LIMITED
 GEOTECHNICAL • CIVIL • STORMWATER • ONSITE WASTEWATER

**UNIT 640 - 654 NORRIS COURT
 KINGSTON ONTARIO
 OFFICE (613) 634-1789
 www.groundengineer.ca**



REVISIONS

No.	Description	Date
1.	ISSUED FOR SUBMISSION	2021/12/07
2.	REVISED AS PER TOWN COMMENTS	2022/01/20

BENCHMARK:

No.	DESCRIPTION	ELEVATION
##.	XXX	XXX.XX

REGISTERED PROFESSIONAL ENGINEER
 M. H. BURGER
 PROVINCE OF ONTARIO

Client / Land Owner:

HORIZON LEGACY

Project: **MARCO POLO 100 DESIGN CHALLENGE**

425 FOURTH ST. GANANOQUE ONTARIO

Drawing Title: **NOTES & DETAILS**

Drawn by: DF Project Number: GW-21050

Checked by: MB Drawing Number: C-103

Date: OCT 25, 2021 SHEET 3 of 3