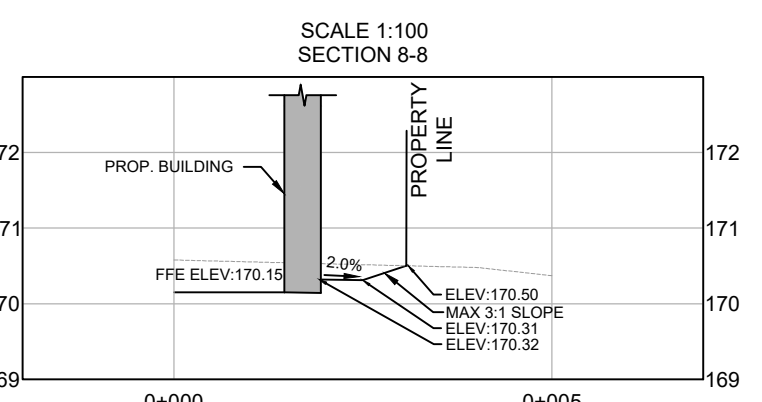
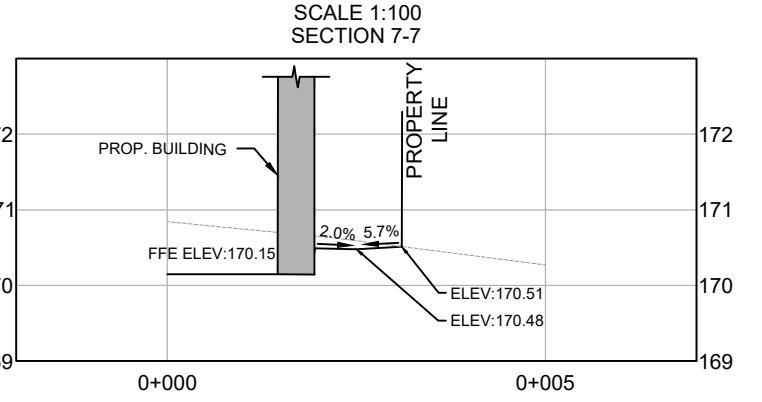
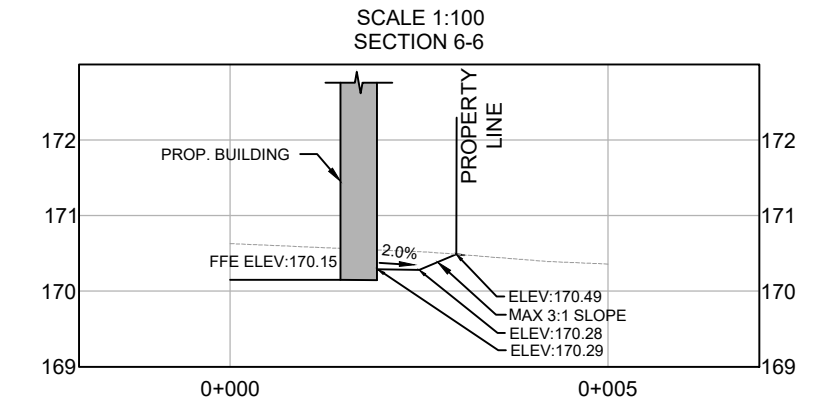
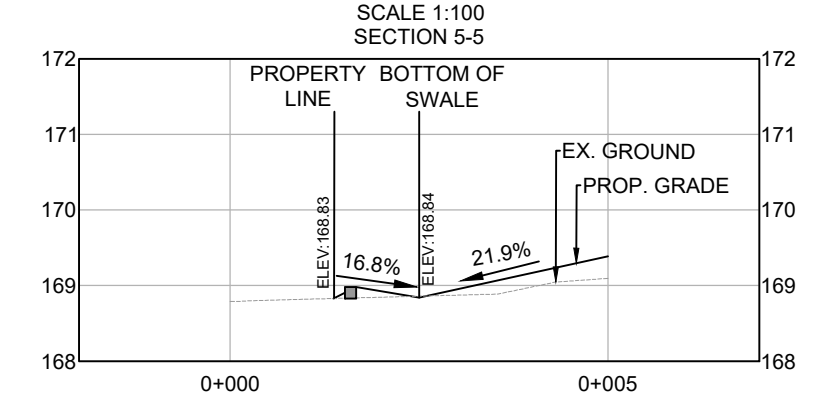
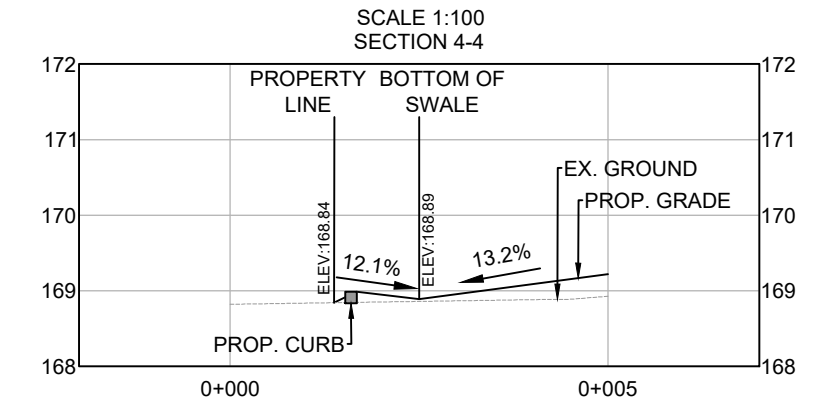
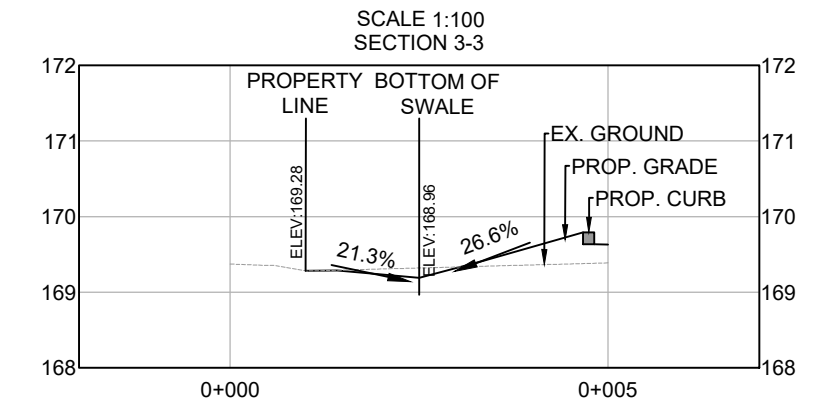
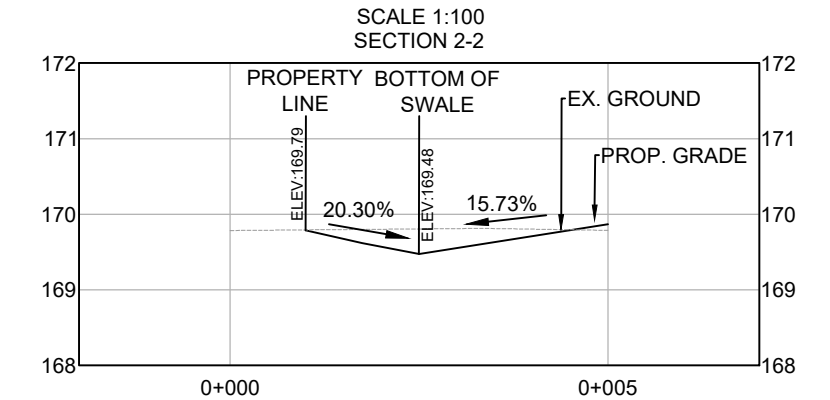
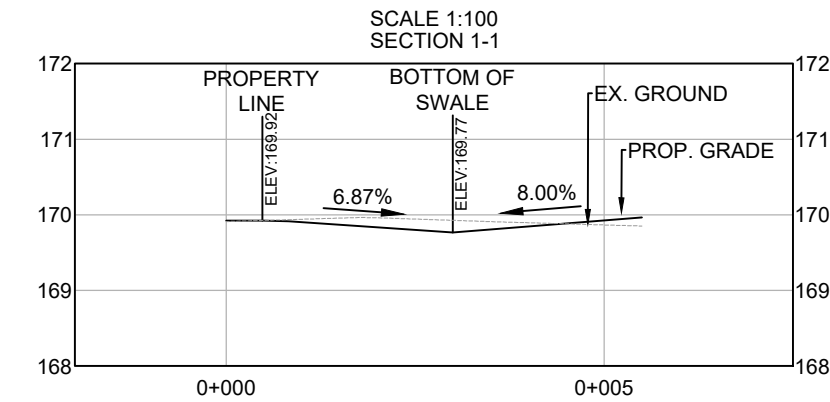
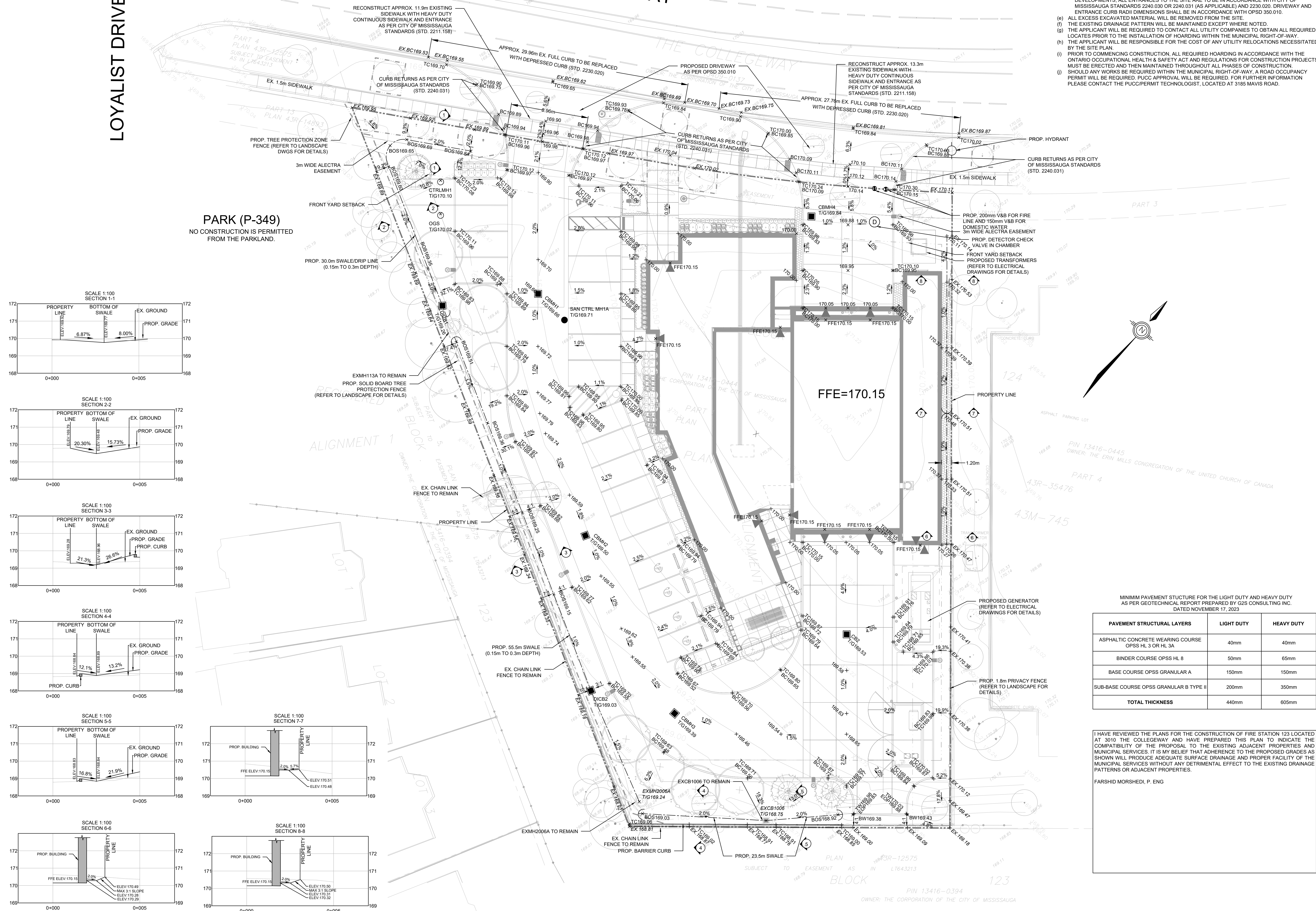
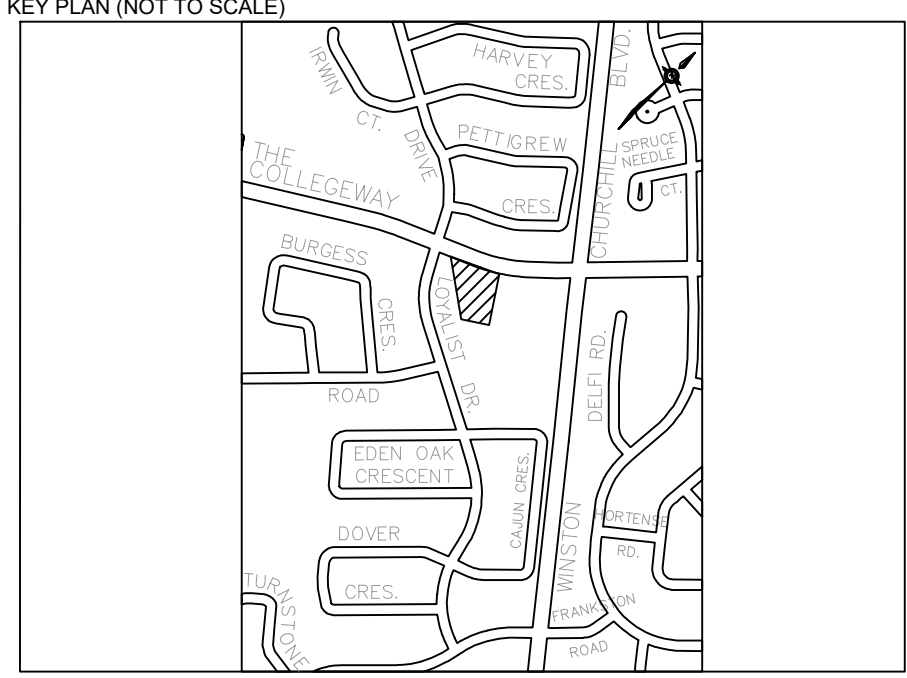


LOYALIST DRIVE



- GRADING NOTES:**
- (a) ALL SURFACE DRAINAGE WILL BE SELF-CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
 - (b) THE PORTIONS OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD WILL BE PAVED BY THE APPLICANT.
 - (c) AT THE ENTRANCES TO THE SITE, THE MUNICIPAL CURB AND SIDEWALK WILL BE CONTINUOUS THROUGH THE DRIVEWAY AND A CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE. ALL PROPOSED CURBING WITHIN THE MUNICIPAL BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS:
 - i) FOR ALL SINGLE FAMILY RESIDENTIAL PROPERTIES INCLUDING ON STREET TOWNHOUSES, ALL CURBING IS TO STOP AT THE PROPERTY LIMIT OR THE BACK OF THE MUNICIPAL SIDEWALK, WHICHEVER IS APPLICABLE, OR
 - ii) FOR ALL OTHER PROPOSALS INCLUDING INDUSTRIAL, COMMERCIAL AND MULTI-UNIT RESIDENTIAL DEVELOPMENTS, ALL ENTRANCES TO THE SITE ARE TO BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARDS 2240.030 OR 2240.031 (AS APPLICABLE) AND 2230.020. DRIVEWAY AND ENTRANCE CURB RADI DIMENSIONS SHALL BE IN ACCORDANCE WITH OPSD 350.010.
 - (d) ALL EXCESS EXCAVATED MATERIAL WILL BE REMOVED FROM THE SITE.
 - (e) THE EXISTING DRAINAGE PATTERN WILL BE MAINTAINED EXCEPT WHERE NOTED.
 - (f) THE APPLICANT WILL BE REQUIRED TO CONTACT ALL UTILITY COMPANIES TO OBTAIN ALL REQUIRED LOCATES PRIOR TO THE INSTALLATION OF HOARDING WITHIN THE MUNICIPAL RIGHT-OF-WAY.
 - (g) THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF ANY UTILITY RELOCATIONS NECESSITATED BY THE SITE PLAN.
 - (h) PRIOR TO COMMENCING CONSTRUCTION, ALL REQUIRED HOARDING IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS, MUST BE ERECTED AND THEN MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.
 - (i) SHOULD ANY WORKS BE REQUIRED WITHIN THE MUNICIPAL RIGHT-OF-WAY, A ROAD OCCUPANCY PERMIT WILL BE REQUIRED. PUCC APPROVAL WILL BE REQUIRED. FOR FURTHER INFORMATION PLEASE CONTACT THE PUCC/PERMIT TECHNOLOGIST, LOCATED AT 3185 MAVIS ROAD.



- LEGEND:**
- MH1 PROPOSED STORM MANHOLE
 - MH1A PROPOSED SANITARY MANHOLE
 - PROPOSED VALVE BOX & WATER SERVICE
 - PROPERTY LINE
 - OUTLINE OF UNDERGROUND PARKING GARAGE
 - EXISTING CATCHBASIN
 - EXISTING AREA DRAIN
 - EXISTING MANHOLE
 - EXISTING TREE
 - EXISTING FIRE HYDRANT
 - EXISTING HYDRO POLE
 - EXISTING LIGHT POLE
 - PROPOSED BOTTOM OF SWALE
 - PROPOSED GRADE
 - PROPOSED TOP OF CURB
 - PROPOSED BOTTOM OF CURB
 - EXISTING GRADE TO REMAIN
 - PROPOSED TOP OF RETAINING WALL
 - EXISTING ELEVATION TO REMAIN
 - TOP ELEVATION OF PROPOSED MANHOLE/AREA DRAIN/CATCH BASIN
 - PROPOSED BOTTOM OF TOP OF RETAINING WALL ELEVATION
 - PROPOSED AREA DRAIN
 - PROPOSED CATCH BASIN/DITCH INLET CATCHBASIN
 - FLOW DIRECTION & SLOPE
 - BUILDING DOOR
 - PROPOSED SOLID BOARD TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)
 - EXISTING CHAIN LINK FENCE TO REMAIN (REFER TO LANDSCAPE FOR DETAILS)
 - PROPOSED 1.8m PRIVACY FENCE (REFER TO LANDSCAPE FOR DETAILS)
 - PROPOSED TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)

- BENCHMARK:**
- ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM-1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 824, HAVING A PUBLISHED ELEVATION OF 170.52.
- GENERAL NOTES:**
- ALECTRA TO BE NOTIFIED AND BE ON SITE TO ENCASE THE HYDRO CABLES THAT RUN BELOW THE CONCRETE APRON. THIS WORK MAY OCCUR AT THE SAME TIME AS CONSTRUCTION.

10	ISSUED FOR ADDENDUM #1	2024-06-17	GB	FM
9	ISSUED FOR TENDER	2024-05-01	GB	FM
8	ISSUED FOR SITE SERVICES PERMIT	2024-05-01	GB	FM
7	ISSUED FOR BUILDING PERMIT	2024-05-01	GB	FM
6	RE-ISSUED FOR SPA	2024-05-01	GB	FM
5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
No.	Revision	Date	By	App



625 Cochrane Drive, Suite 900
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Fax: (905)470-0030



Owner/Client:

CITY OF MISSISSAUGA FIRE STATION 123

APPLICANT INFO: DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220

OWNER INFO: CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395

Location:

3010 THE COLLEGEWAY

Title:

SITE GRADING PLAN

Designed By: G.B. Drawn By: G.B. Checked By: F.M.

Scale: 1:200 Date: MAY, 2023 Drawing No.: C-01

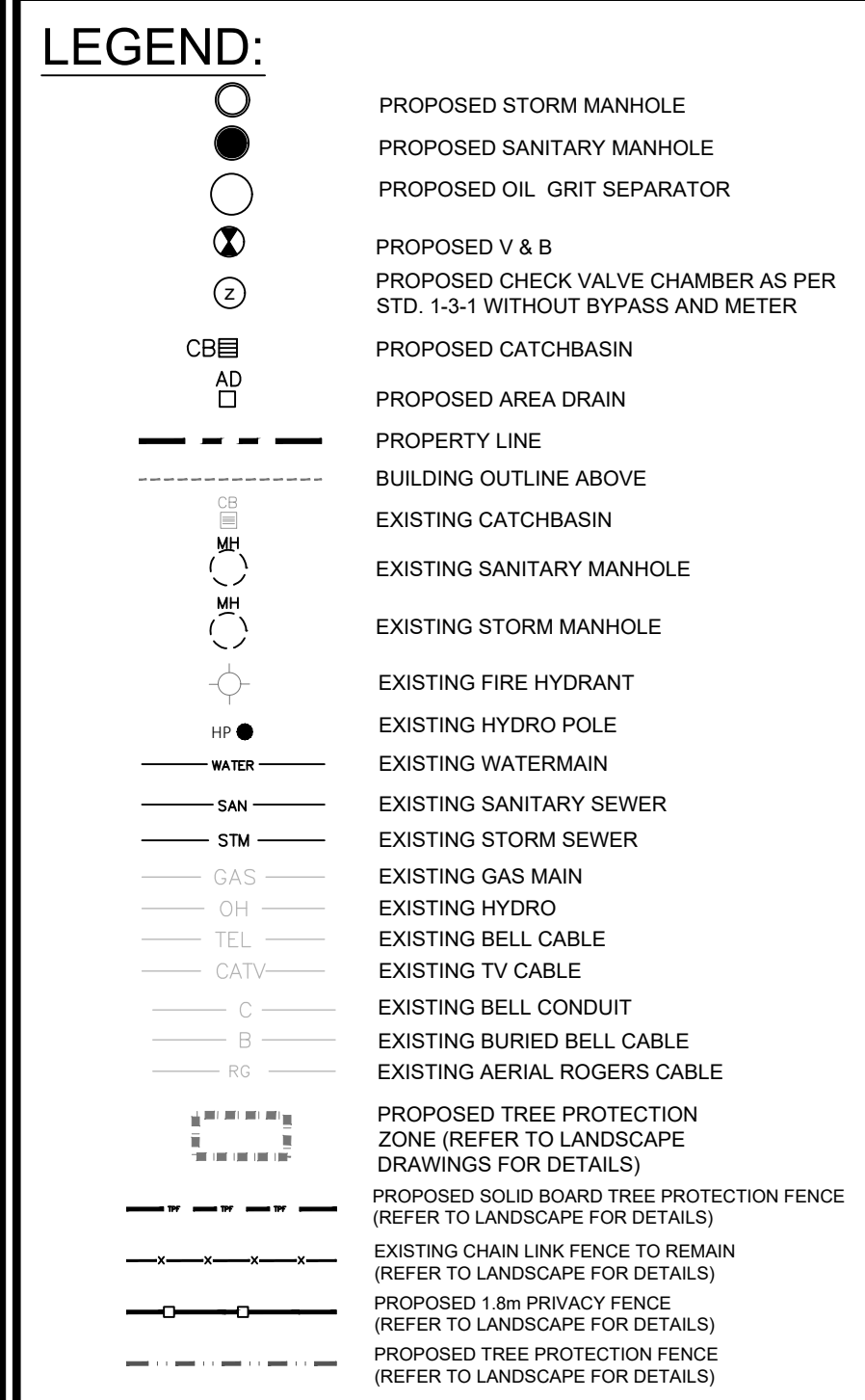
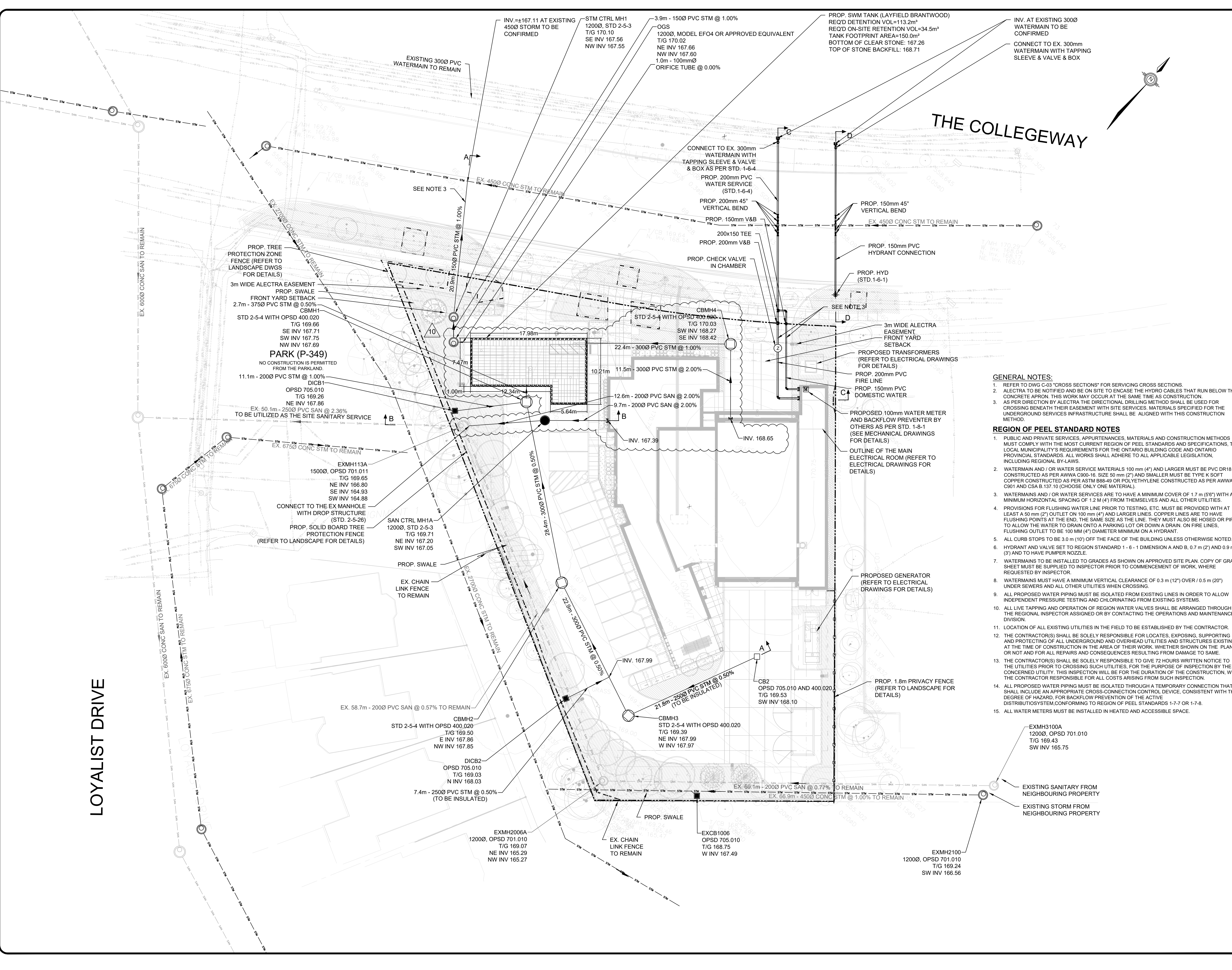
Project No.: 23394.01 Site Plan Application No.: SP 24-3

MINIMUM PAVEMENT STRUCTURE FOR THE LIGHT DUTY AND HEAVY DUTY AS PER GEOTECHNICAL REPORT PREPARED BY G2S CONSULTING INC. DATED NOVEMBER 17, 2023

PAVEMENT STRUCTURAL LAYERS	LIGHT DUTY	HEAVY DUTY
ASPHALTIC CONCRETE WEARING COURSE OPSS HL 3 OR HL 3A	40mm	40mm
BINDER COURSE OPSS HL 8	50mm	65mm
BASE COURSE OPSS GRANULAR A	150mm	150mm
SUB-BASE COURSE OPSS GRANULAR B TYPE II	200mm	350mm
TOTAL THICKNESS	440mm	605mm

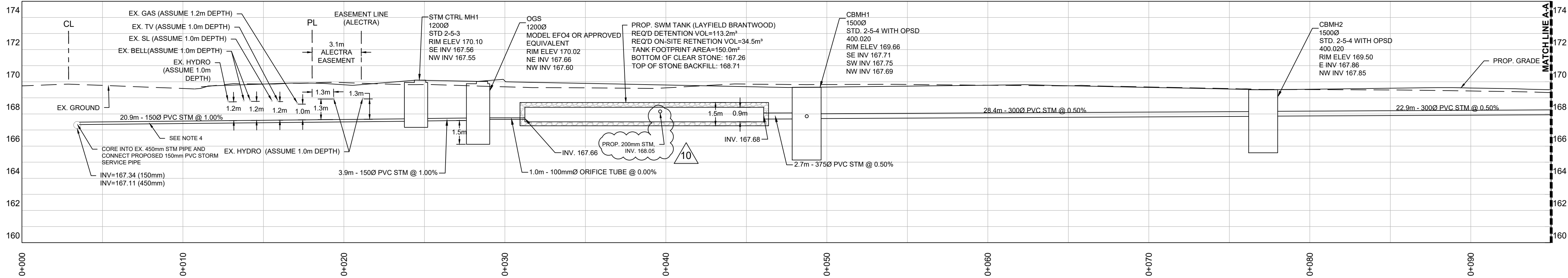
I HAVE REVIEWED THE PLANS FOR THE CONSTRUCTION OF FIRE STATION 123 LOCATED AT 3010 THE COLLEGEWAY AND HAVE PREPARED THIS PLAN TO INDICATE THE COMPATIBILITY OF THE PROPOSAL TO THE EXISTING ADJACENT PROPERTIES AND MUNICIPAL SERVICES. IT IS MY BELIEF THAT ADHERENCE TO THE PROPOSED GRADES AS SHOWN WILL PRODUCE ADEQUATE SURFACE DRAINAGE AND PROPER FACILITY OF THE MUNICIPAL SERVICES WITHOUT ANY DETRIMENTAL EFFECT TO THE EXISTING DRAINAGE PATTERNS OR ADJACENT PROPERTIES.

FARSHID MORSHEDI, P. ENG



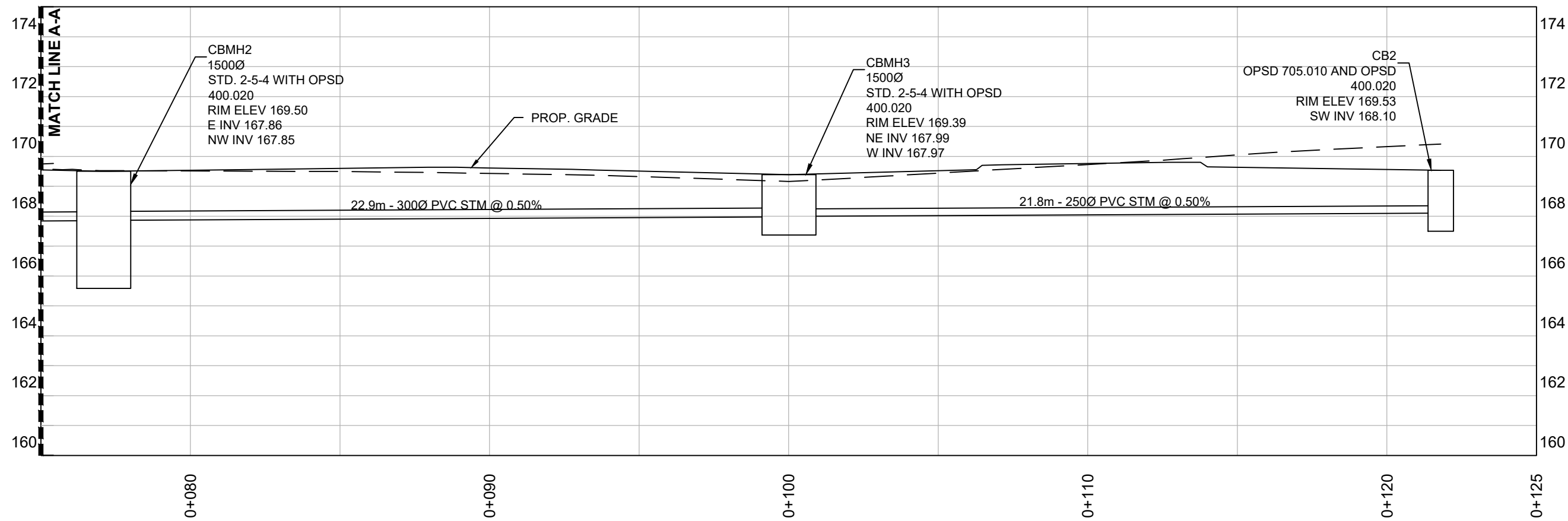
Owner/Client:	
CITY OF MISSISSAUGA FIRE STATION 12	
APPLICANT INFO DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220	OWNER INFO CITY OF MISSISSAUGA, ADRIANA TANT 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395

3010 THE COLLEGEWAY			
Title:			
PRELIMINARY SITE SERVICING PLAN			
Designed By:	G.B.	Drawn By:	G.B.
Scale:	1:250	Date:	MAY, 2023
Project No.:	23394.01	Site Plan Application No.:	SP 24-3
			Checked By: F.M.
			Drawing No.:
			C-0-



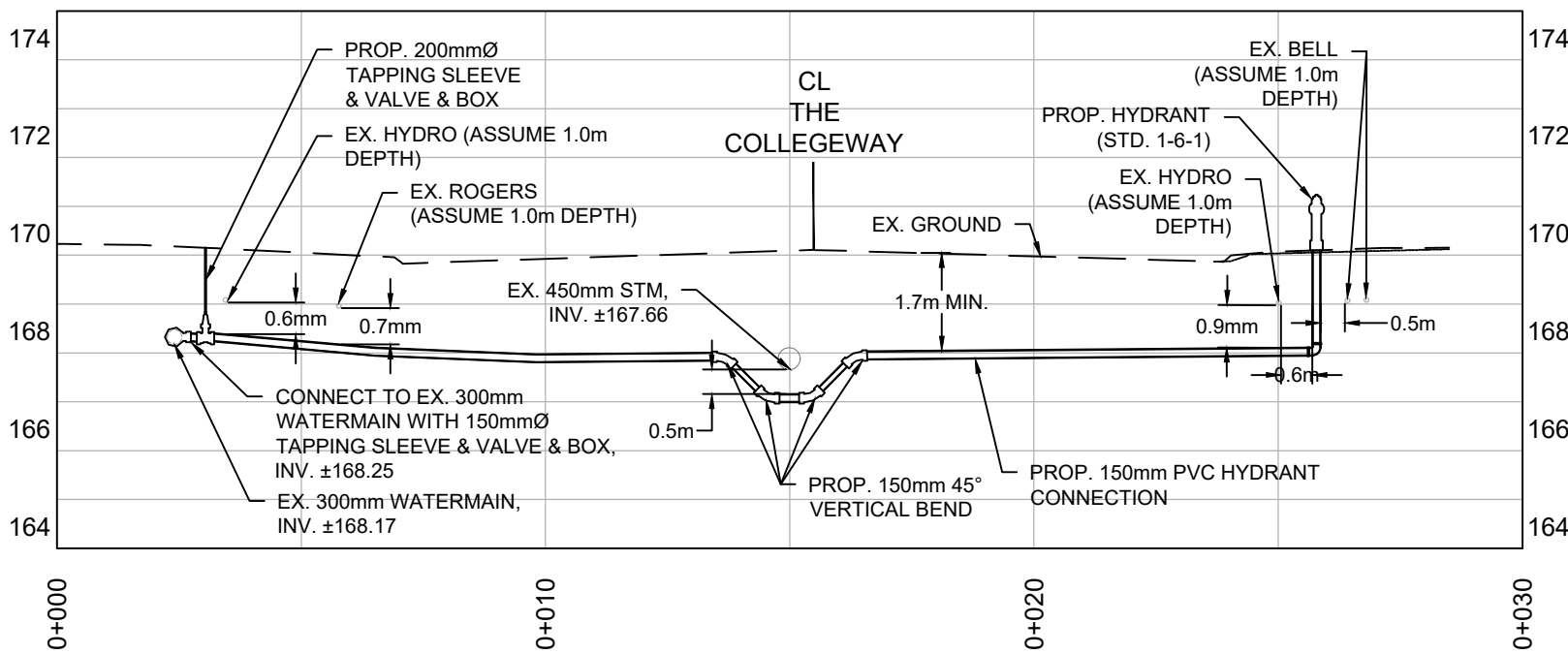
PROPOSED STORM PROFILE (A-A) (STA. 000 TO STA. 095)

SC 1:150



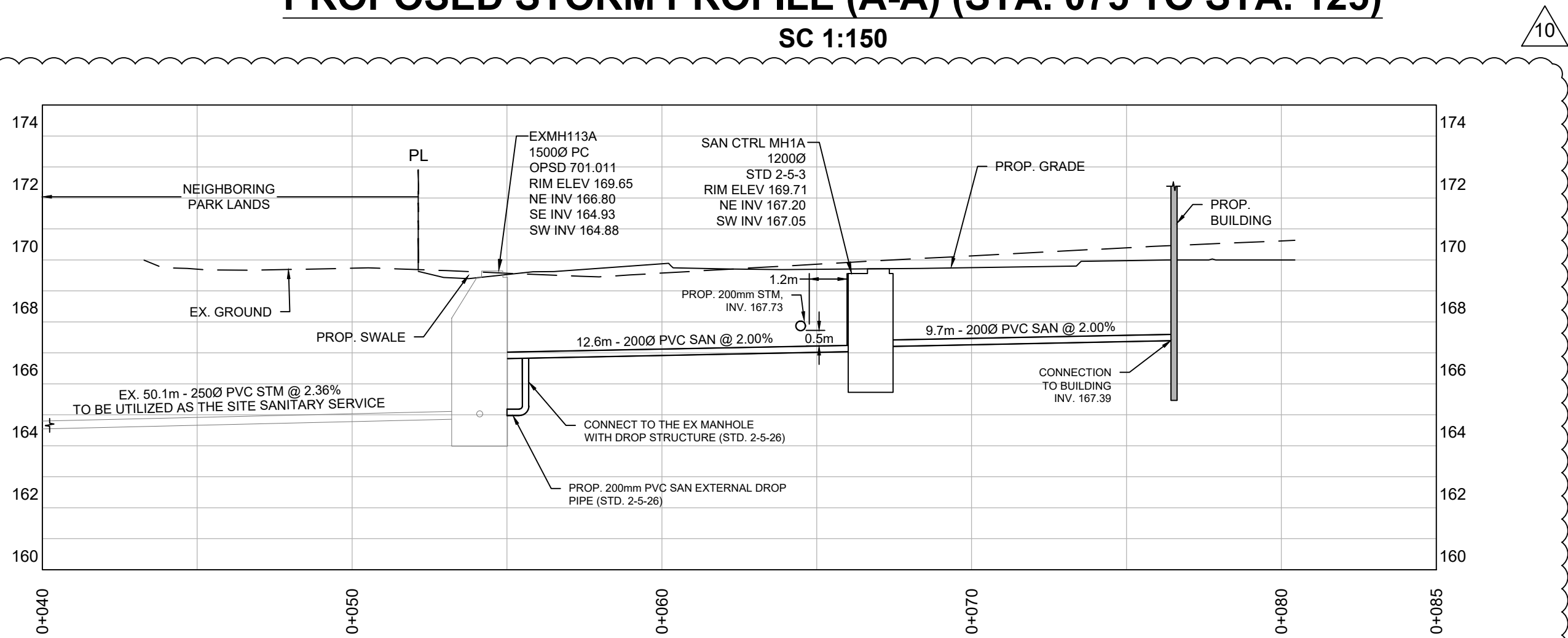
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SC 1:150



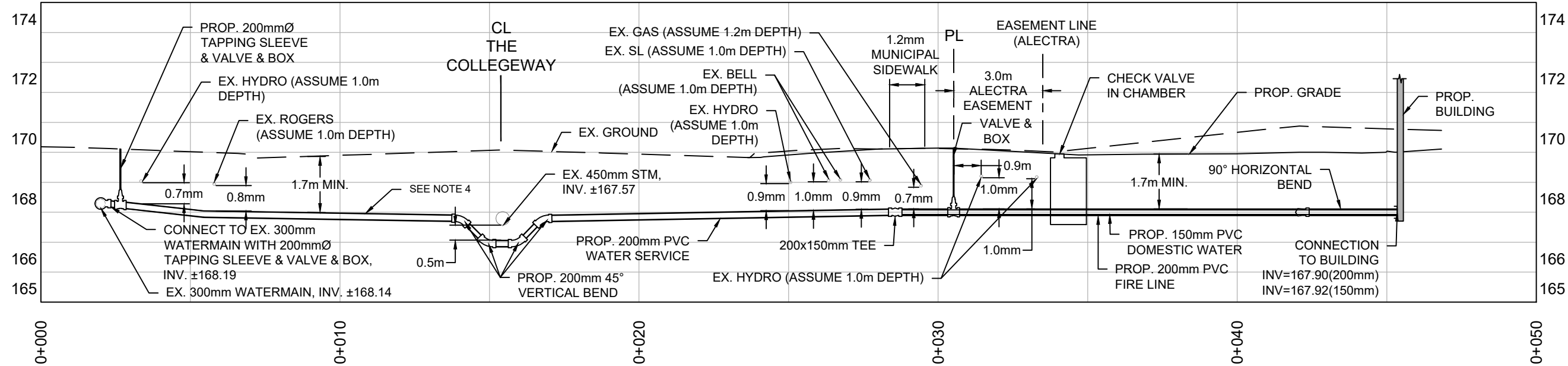
PROPOSED WATERMAIN PROFILE (D-D) (STA. 000 TO STA. 030)

SC 1:150



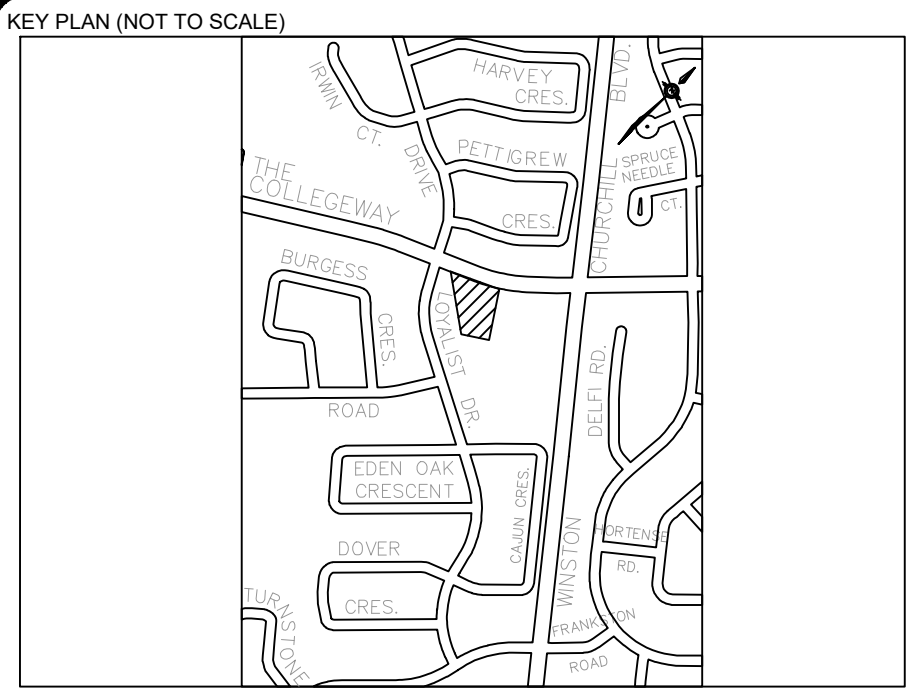
PROPOSED SANITARY PROFILE (B-B) (STA. 040 TO STA. 085)

SC 1:150



PROPOSED WATERMAIN PROFILE (C-C) (STA. 000 TO STA. 050)

SC 1:150



GENERAL NOTES:

- ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM-1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 624, HAVING A PUBLISHED ELEVATION OF 170.552.
- REFER TO DWG C-02 FOR SITE SERVING PLAN.
- ALECTRA TO BE NOTIFIED AND BE ON SITE TO ENCASE THE HYDRO CABLES THAT RUN BELOW THE CONCRETE APRON. THIS WORK MAY OCCUR AT THE SAME TIME AS CONSTRUCTION.
- AS PER DIRECTION BY ALECTRA THE DIRECTIONAL DRILLING METHOD SHALL BE USED FOR CROSSING BENEATH THEIR EASEMENT WITH SITE SERVICES. MATERIALS SPECIFIED FOR THE UNDERGROUND SERVICES INFRASTRUCTURE SHALL BE ALIGNED WITH THIS CONSTRUCTION METHOD.

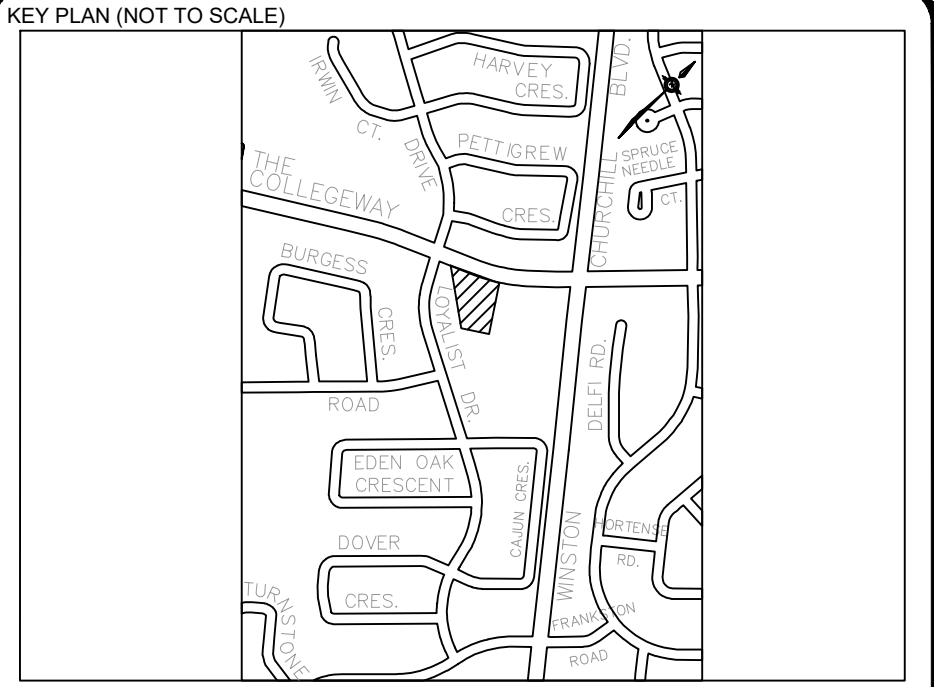
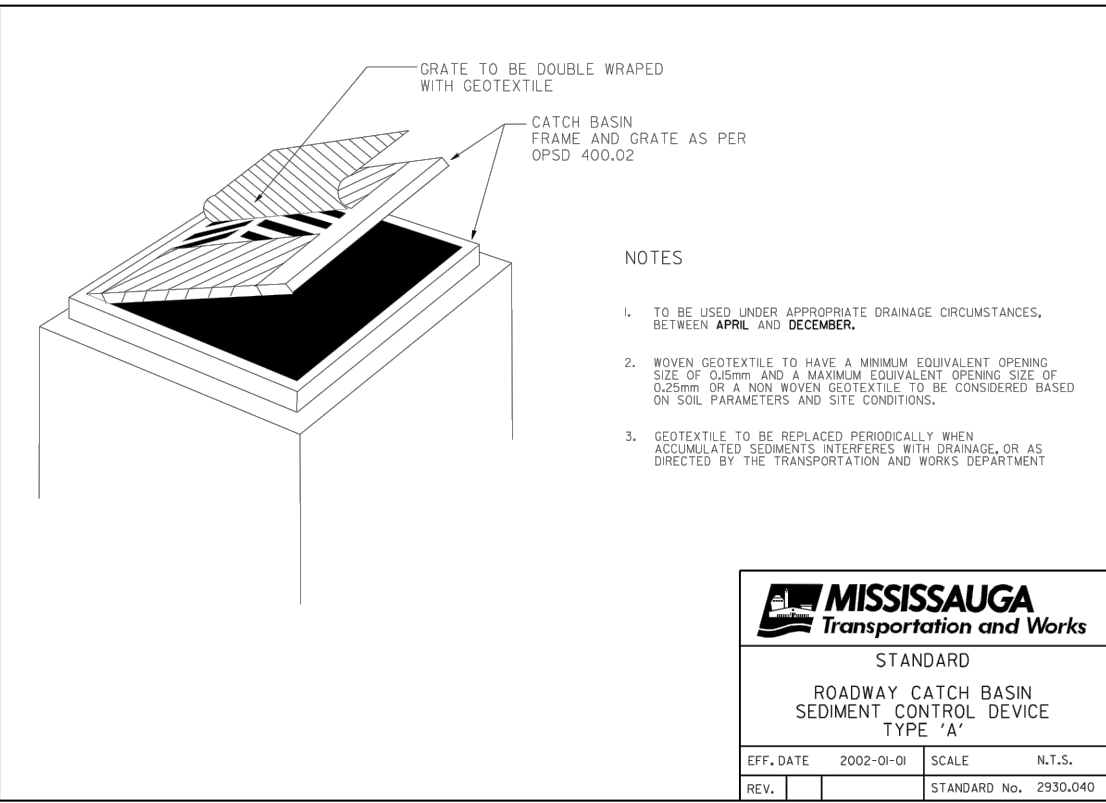
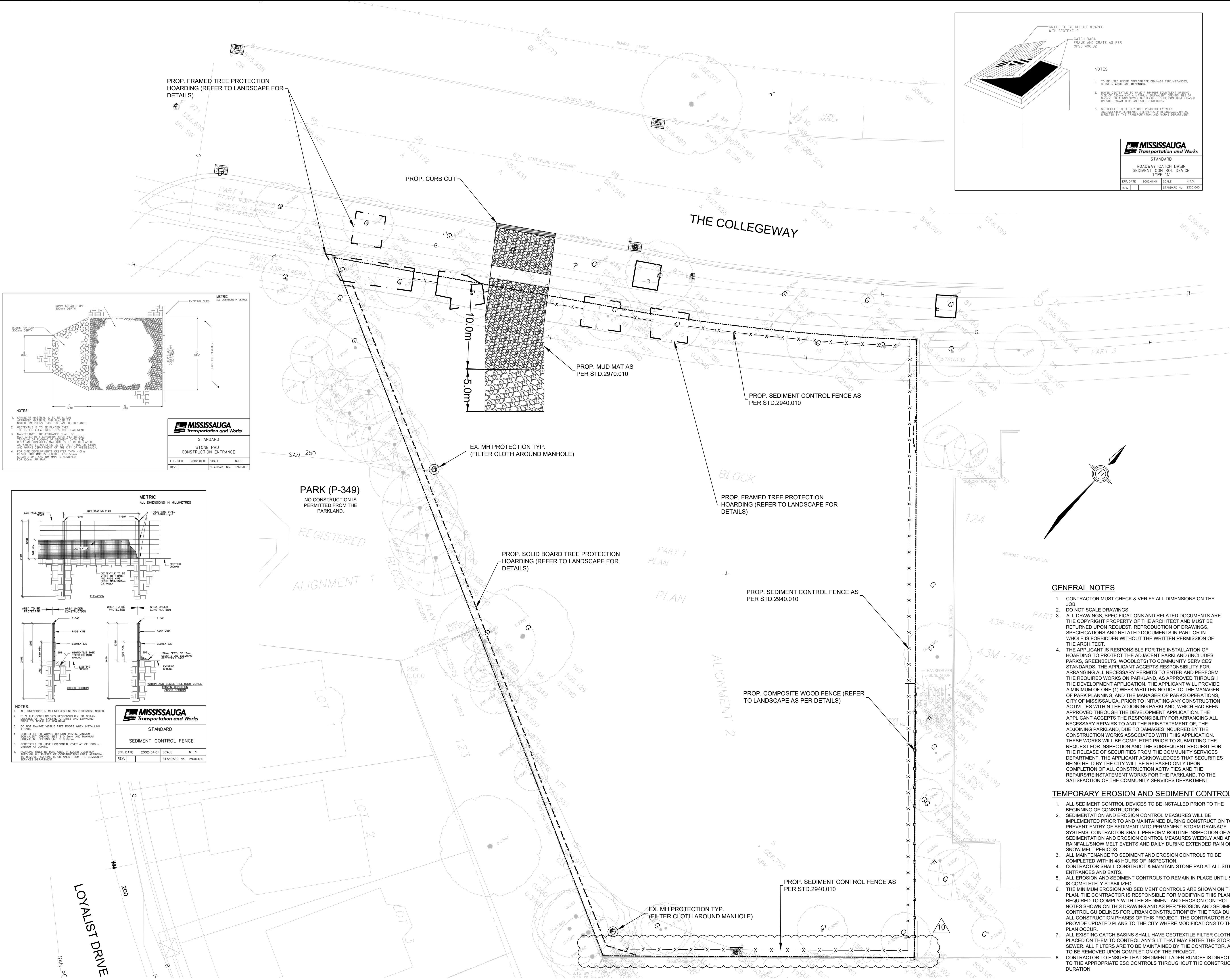
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8	ISSUED FOR SITE SERVICES PERMIT	2024-05-01	GB	FM
7	ISSUED FOR BUILDING PERMIT	2024-05-01	GB	FM
6	RE-ISSUED FOR SPA	2024-05-01	GB	FM
5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
No.	Revision	Date	By	App



625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 0R6, Canada
Tel: (905)470-0015
Fax: (905)470-0030



Owner/Client: CITY OF MISSISSAUGA FIRE STATION 123		
APPLICANT INFO DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220		OWNER INFO CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395
Location: 3010 THE COLLEGEWAY		
Title: CROSS SECTIONS		
Designed By: G.B.	Drawn By: G.B.	Checked By: F.M.
Scale: 1:150	Date: MAY, 2023	Drawing No.: C-03
Project No.: 23394.01	Site Plan Application No.: SP 24-3	



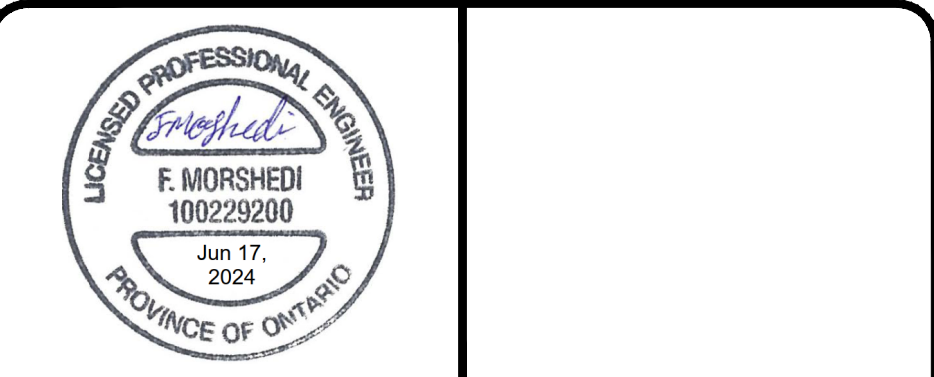
LEGEND:

- CATCHBASIN TO BE PROTECTED - 2930.040 (SEE NOTE 7 - TEMPORARY EROSION AND SEDIMENT CONTROL NOTES ON THIS DWG)
- CONSTRUCTION ENTRANCE
- PROPOSED SEDIMENT CONTROL FENCE
- PROPOSED HOARDING WITH SEDIMENT CONTROL FENCE (REFER TO LANDSCAPE FOR DETAILS)
- EXISTING CURB
- PROPERTY LINE
- EXISTING CONTOUR LINE
- EXISTING CATCHBASIN (TO BE PROTECTED WITH FILTER CLOTH)
- EXISTING LIGHT STAND
- EXISTING TREE
- EXISTING TREE TO BE RETAINED
- EXISTING MANHOLE (TO BE PROTECTED WITH FILTER CLOTH)
- PROPOSED SOLID BOARD TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)
- EXISTING CHAIN LINK FENCE TO REMAIN (REFER TO LANDSCAPE FOR DETAILS)
- PROPOSED FRAMED TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)
- PROP. SEDIMENT CONTROL FENCE AS PER STD.2940.010
- PROPOSED 1.8m PRIVACY FENCE (REFER TO LANDSCAPE FOR DETAILS)

BENCHMARK:

- ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM-1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 624, HAVING A PUBLISHED ELEVATION OF 170.552.

10	ISSUED FOR ADDENDUM #1	2024-06-17	GB	FM
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8	ISSUED FOR SITE SERVICES PERMIT	2024-05-01	GB	FM
7	ISSUED FOR BUILDING PERMIT	2024-05-01	GB	FM
6	RE-ISSUED FOR SPA	2024-05-01	GB	FM
5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
No.	Revision	Date	By	App.



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Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030



Owner/Client:
CITY OF MISSISSAUGA FIRE STATION 123

APPLICANT INFO
DAVID PREMI, 24 MAIN ST. W., SUITE 1800,
HAMILTON, ON L8P 1H1
(905)522-0220

OWNER INFO
CITY OF MISSISSAUGA, ADRIANA TANTALO,
300 CITY CENTRE DRIVE
(905)615-3200 EXT. 3395

Location:
3010 THE COLLEGEWAY

Title:
EROSION AND SEDIMENT CONTROL PLAN

Designed By:	G.B.	Drawn By:	G.B.	Checked By:	F.M.
Scale:	1:200	Date:	MAY, 2023	Drawing No.:	C-04
Project No.:	23394.01	Site Plan Application No.:	SP 24-3		

GENERAL NOTES

- CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.
- DO NOT SCALE DRAWINGS.
- ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE ARCHITECT AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECT.
- THE APPLICANT IS RESPONSIBLE FOR THE INSTALLATION OF HOARDING TO PROTECT THE ADJACENT PARKLAND (INCLUDES PARKS, GREENBELTS, WOODLOTS) TO COMMUNITY SERVICES' STANDARDS. THE APPLICANT ACCEPTS RESPONSIBILITY FOR ARRANGING ALL NECESSARY PERMITS TO ENTER AND PERFORM THE REQUIRED WORKS ON PARKLAND, AS APPROVED THROUGH THE DEVELOPMENT APPLICATION. THE APPLICANT WILL PROVIDE A MINIMUM OF ONE (1) WEEK WRITTEN NOTICE TO THE MANAGER OF PARK PLANNING, AND THE MANAGER OF PARKS OPERATIONS, CITY OF MISSISSAUGA, PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES WITHIN THE ADJOINING PARKLAND, WHICH HAD BEEN APPROVED THROUGH THE DEVELOPMENT APPLICATION. THE APPLICANT ACCEPTS THE RESPONSIBILITY FOR ARRANGING ALL NECESSARY PERMITS TO ENTER AND PERFORM THE REQUIRED WORKS ON PARKLAND, AS APPROVED THROUGH THE DEVELOPMENT APPLICATION. THE APPLICANT WILL PROVIDE A MINIMUM OF ONE (1) WEEK WRITTEN NOTICE TO THE MANAGER OF PARK PLANNING, AND THE MANAGER OF PARKS OPERATIONS, CITY OF MISSISSAUGA, PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES WITHIN THE ADJOINING PARKLAND, WHICH HAD BEEN APPROVED THROUGH THE DEVELOPMENT APPLICATION. THE APPLICANT ACCEPTS THE RESPONSIBILITY FOR ARRANGING ALL NECESSARY PERMITS TO ENTER AND PERFORM THE REQUIRED WORKS ON PARKLAND, AS APPROVED THROUGH THE DEVELOPMENT APPLICATION. THE APPLICANT WILL PROVIDE A MINIMUM OF ONE (1) WEEK WRITTEN NOTICE TO THE MANAGER OF PARK PLANNING, AND THE MANAGER OF PARKS OPERATIONS, CITY OF MISSISSAUGA, PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES WITHIN THE ADJOINING PARKLAND, WHICH HAD BEEN APPROVED THROUGH THE DEVELOPMENT APPLICATION.

TEMPORARY EROSION AND SEDIMENT CONTROL NOTES

- ALL SEDIMENT CONTROL DEVICES TO BE INSTALLED PRIOR TO THE BEGINNING OF CONSTRUCTION.
- SEDIMENTATION AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING CONSTRUCTION TO PREVENT ENTRY OF SEDIMENT INTO PERMANENT STORM DRAINAGE SYSTEMS. CONTRACTOR SHALL PERFORM ROUTINE INSPECTION OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES WEEKLY AND AFTER RAINFALL/SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOW MELT PERIODS.
- ALL MAINTENANCE TO SEDIMENT AND EROSION CONTROLS TO BE COMPLETED WITHIN 48 HOURS OF INSPECTION.
- CONTRACTOR SHALL CONSTRUCT & MAINTAIN STONE PAD AT ALL SITE ENTRANCES AND EXITS.
- ALL EROSION AND SEDIMENT CONTROLS TO REMAIN IN PLACE UNTIL SITE IS COMPLETELY STABILIZED.
- THE MINIMUM EROSION AND SEDIMENT CONTROLS ARE SHOWN ON THIS PLAN. THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THIS PLAN AS REQUIRED TO COMPLY WITH THE SEDIMENT AND EROSION CONTROL NOTES SHOWN ON THIS DRAWING AND AS PER "EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN CONSTRUCTION" BY THE TRCA DURING ALL CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR SHALL PROVIDE UPDATED PLANS TO THE CITY WHERE MODIFICATIONS TO THIS PLAN OCCUR.
- ALL EXISTING CATCH BASINS SHALL HAVE GEOTEXTILE FILTER CLOTH PLACED ON THEM TO CONTROL ANY SILT THAT MAY ENTER THE STORM SEWER. ALL FILTERS ARE TO BE MAINTAINED BY THE CONTRACTOR, AND TO BE REMOVED UPON COMPLETION OF THE PROJECT.
- CONTRACTOR TO ENSURE THAT SEDIMENT LADEN RUNOFF IS DIRECTED TO THE APPROPRIATE ESC CONTROLS THROUGHOUT THE CONSTRUCTION DURATION.

GENERAL NOTES

- ALL SITE LAYOUT INFORMATION, INCLUDING BUILDING DIMENSIONS, SETBACKS, CURBS, DEPRESSED CURB LOCATIONS, SIDEWALKS, PARKING AND LANDSCAPE FEATURES MUST BE REFERENCED FROM THE ARCHITECT'S PLANS.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST VERIFY ALL DIMENSIONS AND LAYOUT INFORMATION. ANY DISCREPANCIES MUST BE REPORTED TO THE CONSULTANT BEFORE RESUMING CONSTRUCTION OPERATIONS.
- ALL SERVICES MUST BE INSTALLED TO THE CURRENT CITY OF MISSISSAUGA STANDARDS, REGION OF PEEL STANDARDS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS), AND ONTARIO BUILDING CODE (OBC) UNLESS OTHERWISE SPECIFIED, TO THE SPECIFICATION OF THE CITY AND CONSULTANT.
- THE REGION OF PEEL AND CITY OF MISSISSAUGA STANDARD DRAWINGS, MATERIAL SPECIFICATIONS AND CONSTRUCTION SPECIFICATIONS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) SHALL FORM PART OF THE CONTRACT DOCUMENTS.
- THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. THIS MAY REQUIRE EXCAVATION TO EXPOSE UTILITIES AS REQUIRED BY CONTRACTORS.
- ALL TRENCHING TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
- ALL TRENCHES SHALL BE BACKFILLED TO THE CITY'S OF STANDARDS AND IN ACCORDANCE WITH THE GEOTECHNICAL REPORT OR AS OTHERWISE NOTED ON THE DRAWINGS.
- ALL DIMENSIONS ARE IN METRES(m) AND ALL DIAMETERS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS FOR THE CITY AND ONTARIO TRAFFIC MANUAL FOR TEMPORARY CONDITIONS AND MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
- THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE CITY.
- EXISTING STRUCTURES ARE NOT TO BE DISTURBED, NOR ENCROACHMENT ON ADJACENT PROPERTIES UNLESS INSTRUCTED BY THE ENGINEER.
- DEWATERING, IF REQUIRED, SHALL BE THE RESPONSIBILITY AND SOLE EXPENSE OF THE CONTRACTOR. REFER TO THE GEOTECHNICAL REPORT FOR EXISTING SITE CONDITIONS.
- CONTRACTOR TO EXPOSE AND VERIFY LOCATION, ELEVATION, AND SIZE OF ALL SERVICE CONNECTIONS PRIOR TO CONSTRUCTION. THE OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS WITH EXISTING SERVICES
- CONTRACTOR SHALL RED-LINE ALL AS CONSTRUCTED INFORMATION ON A SET OF DRAWINGS AND PROVIDE TO THE OWNER AT THE END OF CONSTRUCTION, SEALED BY AN OLS OR P.ENG.
- CONTRACTOR SHALL SUPPORT AND PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION AS PER OPSD AND CITY OF MISSISSAUGA STANDARDS AND SPECIFICATIONS.
- THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNERS CONTRACTOR FROM OBTAINING AND PAYING FOR, BUT NOT LIMITED TO THE FOLLOWING PERMITS, ROAD CUTS, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC. ALL RESTORATION AS PER CITY STANDARDS.
- THE CONTRACTOR SHALL ENDEAVOR TO PREVENT MUD TRACKING ONTO EXISTING RIGHT-OF-WAYS AND SHALL PROVIDE FOR CLEANUP AT HIS OWN EXPENSE AS DIRECTED BY THE CITY. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST ON THE PROJECT AND HE SHALL PROVIDE AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE CITY.
- FOR ELECTRICAL, ARCHITECTURAL AND MECHANICAL DETAILS BY OTHERS, SEE RESPECTIVE DRAWINGS. WORKS SHOWN ON THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PLANS.
- ALL EXISTING SERVICES ARE TO REMAIN IN SERVICE AT ALL TIMES DURING CONSTRUCTION.
- ITEMS DESIGNATED TO BE REMOVED SHALL BE DISPOSED OFF-SITE.
- CONSTRUCTION LAYOUT SHALL BE UNDERTAKEN BY CONTRACTOR'S SURVEYOR AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL REVIEW THE GEOTECHNICAL REPORT FOR THE SITE TO CONFIRM EXISTING SOIL CONDITIONS AND TO CONFIRM RECOMMENDED GEOTECHNICAL PROCEDURES FOR THE ADDITION.

CONSTRUCTION & RESTORATION WORKS FOR MUNICIPAL R.O.W.S. - THE COLLEGEWAY

- PROPOSED STORM AND WATER SERVICE CONNECTIONS WITHIN EXISTING MUNICIPAL R.O.W.S ARE TO BE BACKFILLED WITH UNSHRINKABLE FILL UP TO BASE OF EXISTING ROAD GRANULAR. AND ASPHALT TO BE MATCHED WITH MINIMUM THICKNESS IN ACCORDANCE WITH CITY STANDARD 2220.03.
- TRENCH CONSTRUCTION / RESTORATION SHALL BE IN ACCORDANCE WITH CITY STANDARDS 2220.03, 2220.031, AND 2220.032.
- BOULEVARD AREAS SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

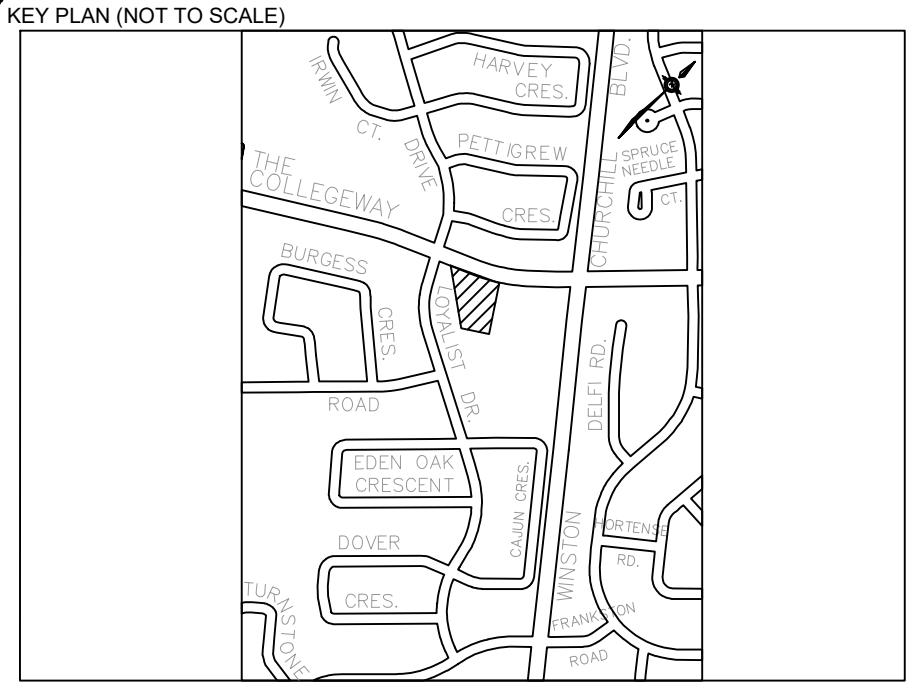
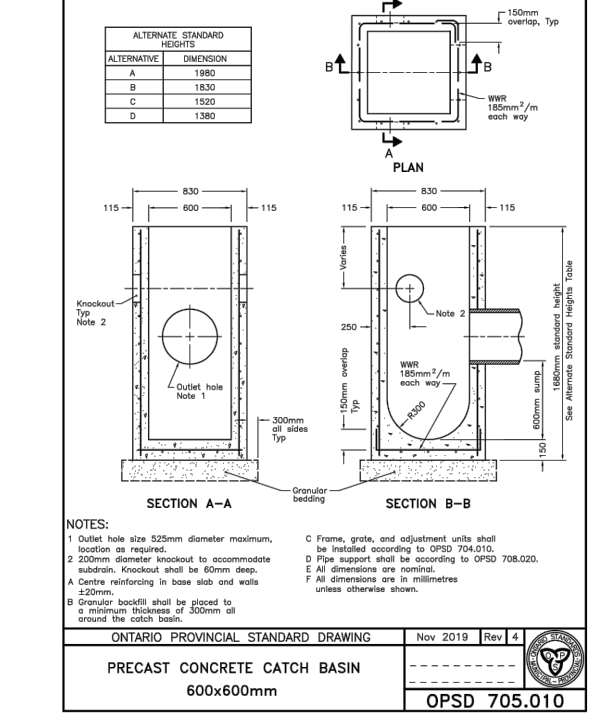
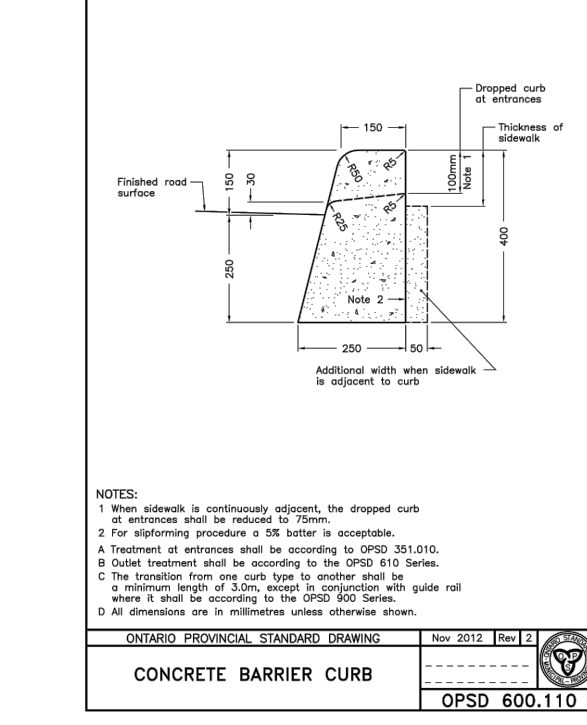
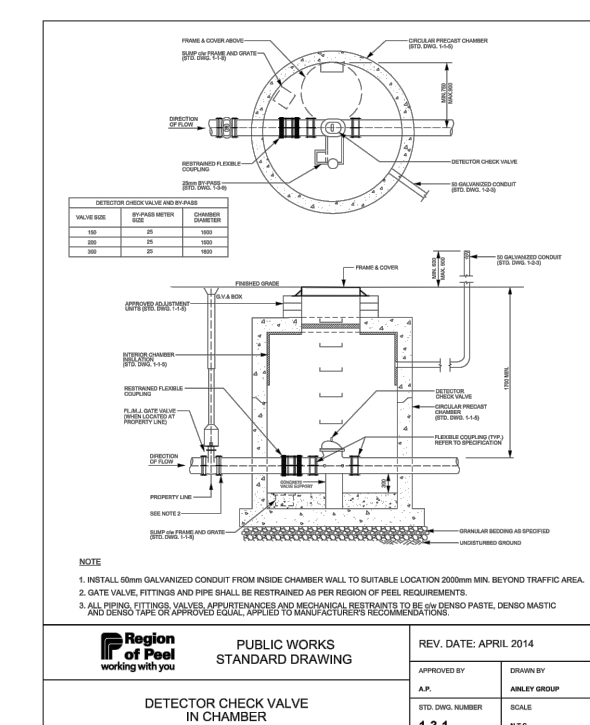
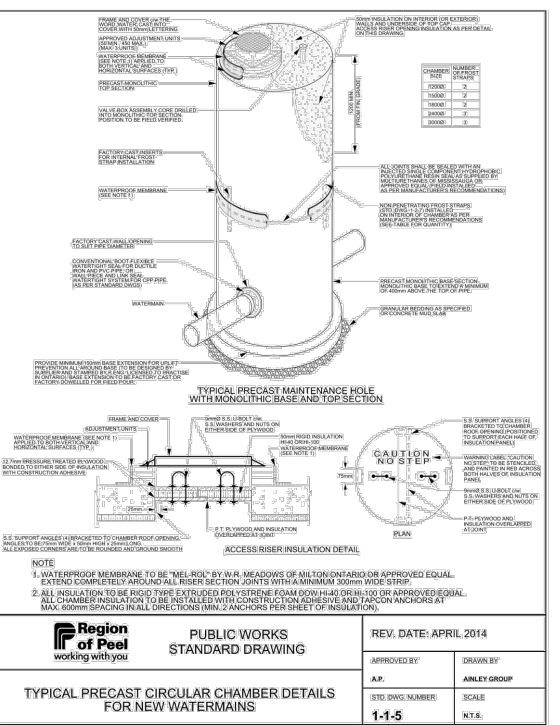
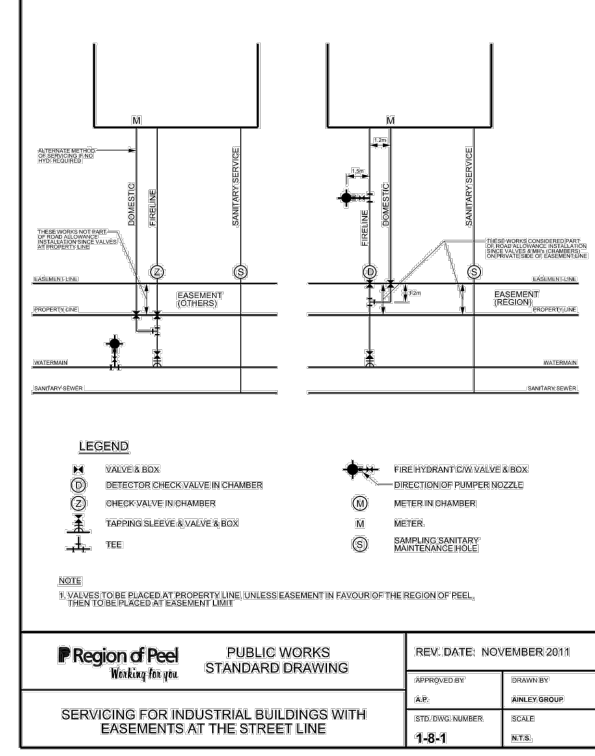
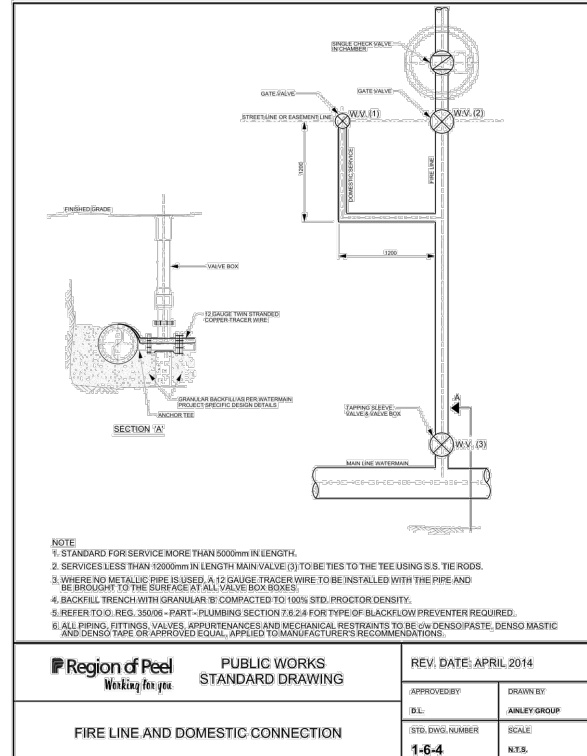
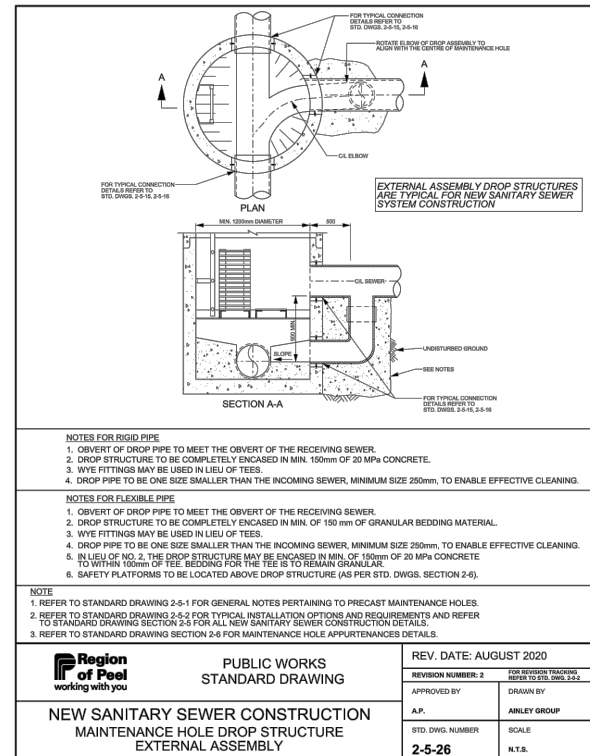
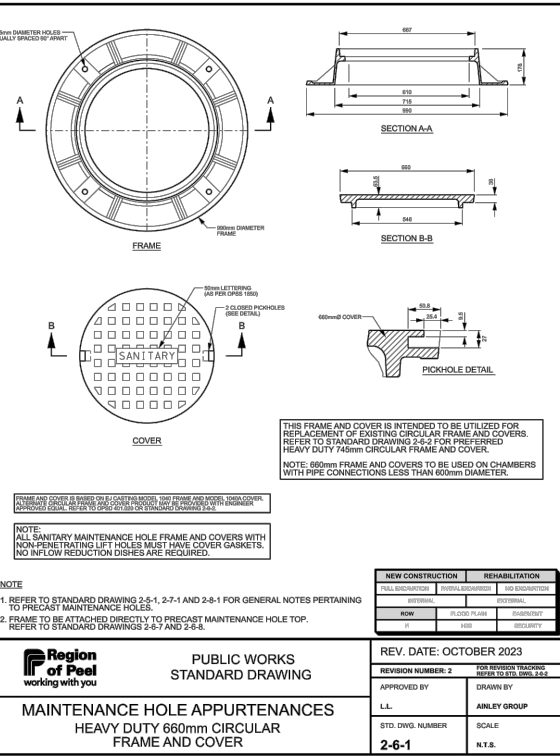
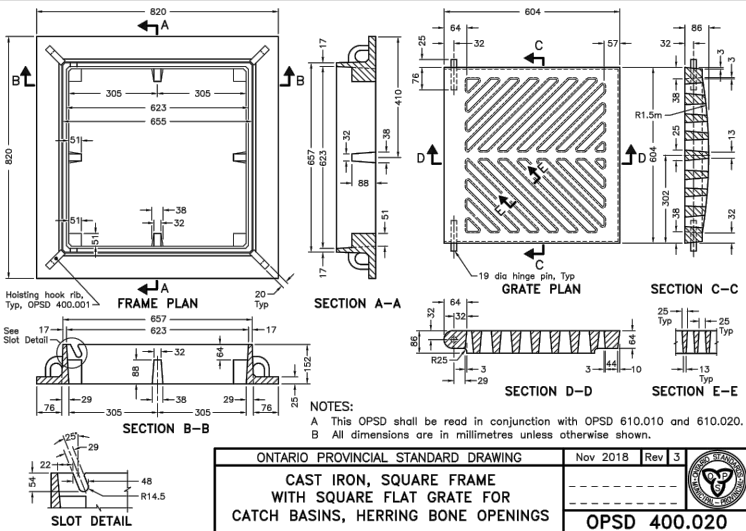
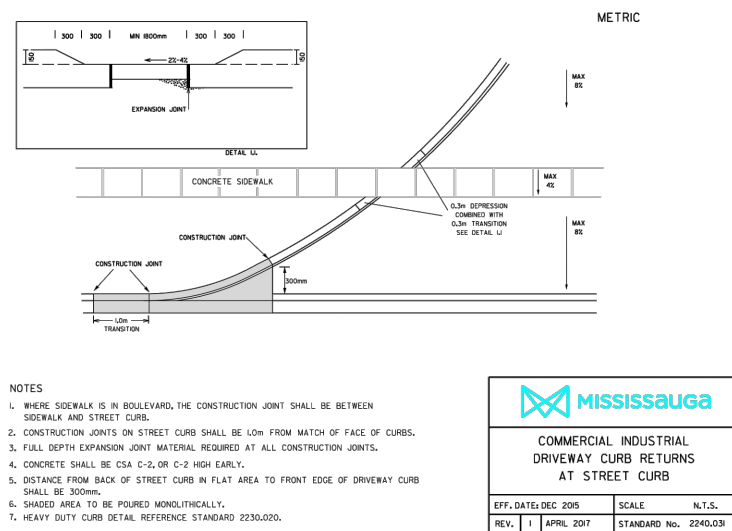
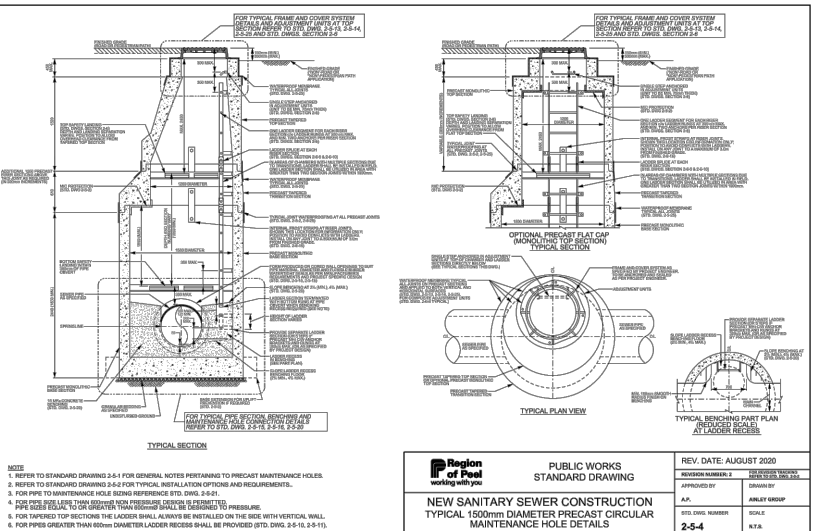
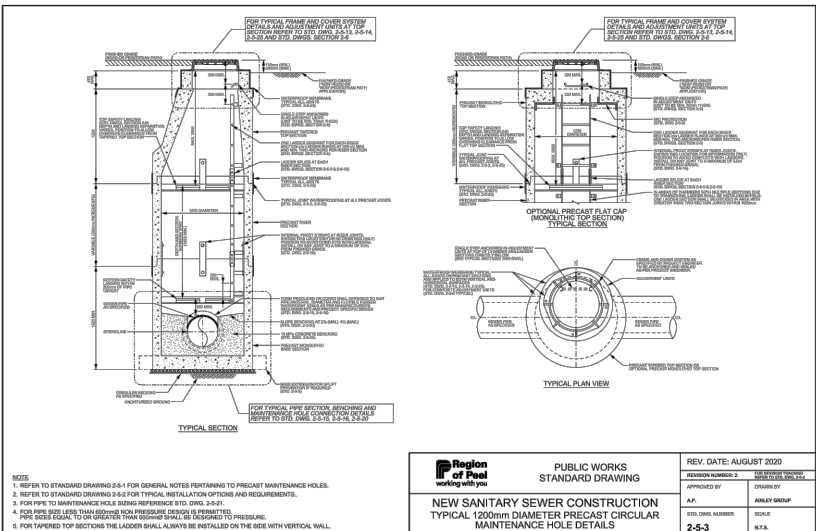
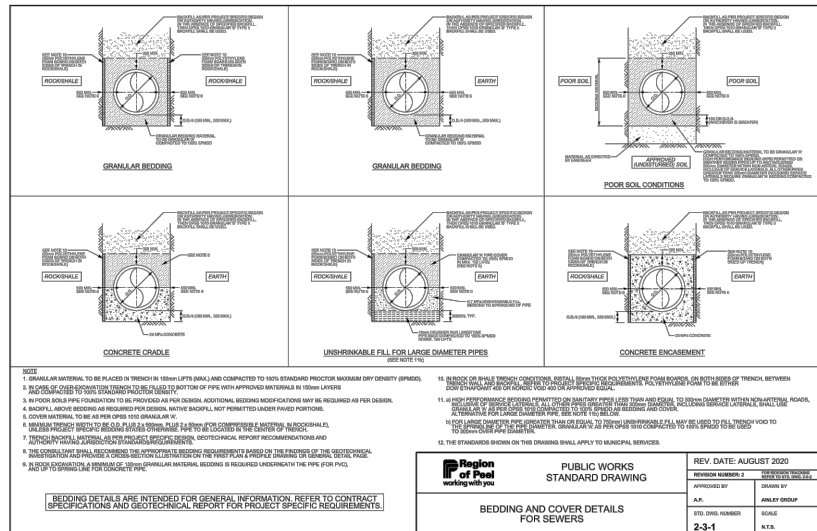
SANITARY, STORM AND WATERMAIN NOTES

- PERFORATED SUB-DRAIN PIPES OF 150mm DIA. TO BE INSTALLED WITHIN THE PAVEMENT OF THE PARKING LOT.
- ALL UTILITY COMPANIES WILL BE NOTIFIED BY CONTRACTOR FOR LOCATES PRIOR TO THE INSTALLATION OF PROPOSED SERVICE CONNECTIONS.
- ALL PIPE MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT MANUFACTURERS APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES.
- ALL SANITARY MAINTENANCE HOLES SHALL CONFORM TO THE CURRENT MANUFACTURER'S APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES, REGIONAL STANDARD DRAWING 2-1-1 WHICH MUST BE MODIFIED IN THE FIELD TO PREVENT INFLOW AND INFILTRATION.
- SANITARY SERVICE CONNECTION MATERIAL MUST BE PVC SDR28.
- STORM SERVICE CONNECTION MATERIAL MUST BE PVC DR35.
- ALL MAINTENANCE HOLE ARE TO BE SUPPLIED OR CONSTRUCTED IN ACCORDANCE WITH OPSD 701 SERIES.
- CATCH BASINS SHALL BE PRECAST AS PER OPSD 705 SERIES.
- SANITARY SEWERS SHALL BE INSTALLED WITH BEDDING AS PER REGIONAL STANDARD DRAWING 2-3-1.
- BEDDING FOR PVC STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD DRAWING NO. 2112.080.
- SEWER BEDDING SHALL CONFORM WITH OPSS 1010 FOR GRANULAR "A" OR CITY STANDARD DRAWING NO. 2112.100 OR 2112.140.

- ALL GRANULAR BEDDING AND BACKFILL MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF OPSS 1010 AND MUST NOT CONTAIN RCM/RAP.
- ALL VALVE 300MM DIAMETER AND SMALLER SHALL BE EQUIPPED WITH VALVE BOXES AND RESTRAINED AND VALVE FITTING WRAPPED IN CORROSION PROTECTION TAPE.
- ALL APPROVED NATIVE MATERIAL SHALL BE FREE OF FROZEN LUMPS, CINDERS, ASHES, ASPHALT REFUSE, ORGANIC MATTER, ROCKS AND BOULDERS OR OTHER DELETERIOUS MATERIALS.
- ALL WATERMAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED. DETAILS OF RESTRAINTS SHALL BE DESIGNED, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER AS PART OF SHOP DRAWINGS BY THE CONTRACTOR.
- THE CONTRACTOR SHALL RETAIN THE SERVICES OF A MOECC LICENSED CONTRACTOR SPECIALIZING IN THE PROVISION OF DISINFECTION SERVICES FOR ALL WATERMAIN TESTING REQUIRED IN THIS CONTRACT.
- TRACER WIRE IS TO BE INSTALLED ON ALL NEW PVC WATERMAIN PIPES.
- THE TOP OF VALVE BOX AND CHAMBER COVERS SHALL BE SET FLUSH WITH FINISHED GRADE AND REMAIN ACCESSIBLE AT ALL TIMES.
- WATER SERVICES, A 12-GAUGE TWU STANDARD COPPER, LIGHT COLORED, PLASTIC COATED TRACER WIRE MUST BE INSTALLED WITH AND ALONG THE PIPE AND BROUGHT TO THE SURFACE AT EACH SERVICE BOX. TRACER WIRE IS TO BE ATTACHED TO THE PIPE AND OUTSIDE OF EACH SERVICE BOX BY MEANS OF TAPE OR RUBBER GROMMET.
- CHAMBER AS PER REGION STANDARD DRAWING NUMBER 1-1-5.
- PROPOSED WATER CONNECTION AS PER REGION STANDARD NUMBER 1-6-4 AND 1-8-3
- FOR DETAILS OF THE PROPOSED TRENCH DRAIN, ROOF DRAIN, SERVICE CONNECTIONS, WATER METER AND BACKFLOW PREVENTER REFER TO MECHANICAL DRAWING.
- CONTRACTOR TO PROVIDE SITE GRADING AND SITE SERVICING "AS-BUILT" AND "RECORD DRAWINGS" AND "SEWERS CCTV SURVEY" FOR THE PROJECT CLOSEOUT SUBMITTALS, AT NO EXTRA COST TO THE OWNER.
- "SEWERS CCTV SURVEY" FOR THE PROJECT CLOSEOUT SUBMITTAL SHALL BE IN ACCORDANCE WITH OPSS 409 "CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF PIPELINES".
- STORM TANK MODEL AS PER LAYFIELD'S BRANTWOOD MODULE. FOR ADDITIONAL INFORMATION, PLEASE CONTACT JON FEENSTRA AT JON.FEENSTRA@LAYFIELDGROUP.COM OR (780) 451-7232. CONTRACTOR MUST PREPARE SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW BY ENGINEER.
- OIL GRIT SEPARATOR MODEL AS PER STORMCEPTOR EF04. FOR ADDITIONAL INFORMATION, PLEASE CONTACT JESSICA STEFFLER AT JESSICA.STEFFLER@RINKERPIPE.COM. CONTRACTOR MUST PREPARE SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW BY ENGINEER.

REGION OF PEEL STANDARD NOTES

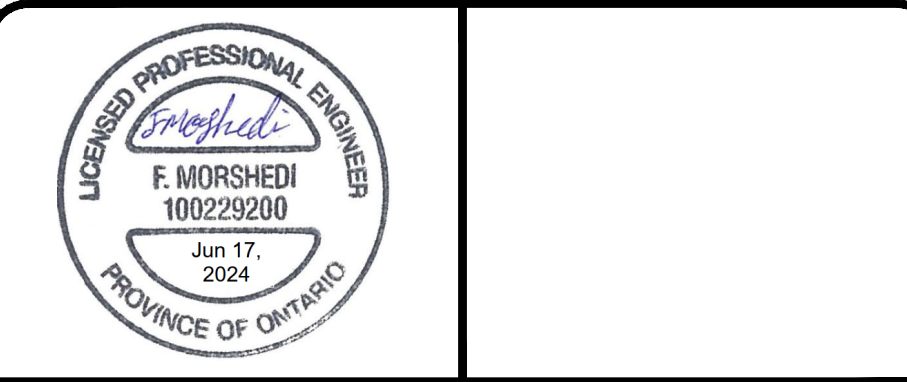
- PUBLIC AND PRIVATE SERVICES, APPURTENANCES, MATERIALS AND CONSTRUCTION METHODS MUST COMPLY WITH THE MOST CURRENT REGION OF PEEL STANDARDS AND SPECIFICATIONS. THE LOCAL MUNICIPALITY'S REQUIREMENTS FOR THE ONTARIO BUILDING CODE AND ONTARIO PROVINCIAL STANDARDS. ALL WORKS SHALL ADHERE TO ALL APPLICABLE LEGISLATION, INCLUDING REGIONAL BY-LAWS.
- WATERMAIN AND / OR WATER SERVICE MATERIALS 100 mm (4") AND LARGER MUST BE PVC DR18 CONSTRUCTED AS PER AWWA C900-16. SIZE 50 mm (2") AND SMALLER MUST BE TYPE K SOFT COPPER CONSTRUCTED AS PER ASTM B88-49 OR POLYETHYLENE CONSTRUCTED AS PER AWWA C901 AND CSA B.137-10 (CHOOSE ONLY ONE MATERIAL).
- WATERMAINS AND / OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7 m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2 M (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
- PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50 mm (2") OUTLET ON 100 mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100 MM (4") DIAMETER MINIMUM ON A HYDRANT.
- ALL CURB STOPS TO BE 3.0 m (10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
- HYDRANT AND VALVE SET TO REGION STANDARD 1 - 6 - 1 DIMENSION A AND B, 0.7 m (2') AND 0.9 m (3') AND TO HAVE PUMPER NOZZLE.
- WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
- WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3 m (12") OVER / 0.5 m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
- ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
- LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK, WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.
- ALL WATER METERS MUST BE INSTALLED IN HEATED AND ACCESSIBLE SPACE.



LEGEND:



10	ISSUED FOR ADDENDUM #1	2024-06-17	GB	FM
9	ISSUED FOR TENDER	2024-05-01	GB	FM
8	ISSUED FOR SITE SERVICES PERMIT	2024-05-01	GB	FM
7	ISSUED FOR BUILDING PERMIT	2024-05-01	GB	FM
6	RE-ISSUED FOR SPA	2024-05-01	GB	FM
5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
No.	Revision	Date	By	App



625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 0P8, Canada
Tel: (905)470-0015
Fax: (905)470-0030



Owner/Client:	
CITY OF MISSISSAUGA FIRE STATION 123	
APPLICANT INFO DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220	OWNER INFO CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395
Location:	

3010 THE COLLEGEWAY

GENERAL NOTES AND STANDARD DETAILS

Designed By:	G.B.	Drawn By:	G.B.	Checked By:	F.M.
Scale:	NTS	Date:	MAY, 2023	Drawing No.:	C-05
Project No.:	23394.01	Site Plan Application No.:	SP 24-3		












New FIRE STATION 123
23394

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

**3050 THE COLLEGEWAY
MISSISSAUGA, ON
L5L 4X9**

MARCH 8, 2024

REVISION HISTORY

Rev.	Date	Description		Prepared by	Reviewed by	Approved by
1	2023-12-01	Issued for SPA	Name	G. Bustos	F. Morshedi	F. Morshedi
			Signature			
2	2023-12-15	Re-issued for SPA	Name	G. Bustos	F. Morshedi	F. Morshedi
			Signature			
3	2024-03-08	Re-issued for SPA	Name	G. Bustos	F. Morshedi	F. Morshedi
			Signature			



SIGNATURES

Prepared by

Gabriel Bustos
Civil Designer

Approved by

Farshid Morshedi, P.Eng.
Senior Project Manager-Civil



Stamp



Disclaimer

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1 INTRODUCTION

1.1 SCOPE

LEA Consulting Ltd. has been retained by DPA Architecture Inc (the “Lead Architect”), to prepare a Functional Servicing and Stormwater Management Report in support of the Site Plan Approval applications for the proposed fire station at 3050 The Collegeway, in the City of Mississauga (The “City”). The proposed development involves building a brand new two-truck one-storey fire station on a vacant site free of trees and covered in grass. This report shall:

- ▶ Review the water supply, storm, and sanitary servicing requirement of the proposed development, and propose a preliminary site servicing plan.
- ▶ Examine the potential water quality, quantity, and water balance impacts of the proposed development, and summarize how each will be addressed in accordance with the City of Mississauga and Credit Valley Conservation.

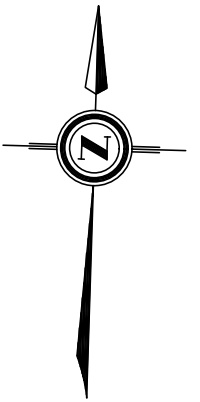
Servicing and stormwater management design shall follow the standards below:

- ▶ City of Mississauga, Transportation and Works Development Requirements Manual (2020);
- ▶ Peel Region, Watermain Design Criteria (2010);
- ▶ Credit Valley Conservation, Stormwater Management Guideline (2022);
- ▶ Fire Underwriter Survey Water Supply for Public Fire Protection (2020).

1.2 SITE LOCATION

The proposed development site is located at the south-east quadrant of The Collegeway and Loyalist Drive and bounded by The Collegeway to the north, existing Erin Mills United Church property to the east, and Greenbelt Zones and existing stormwater management pond to the west and south, contributory to Loyalist Creek subwatershed and under the jurisdiction of Credit Valley Conservation (CVC). Site access, currently via The Collegeway. The site is approximately 0.3995 ha in area. The site is located west of Winston Churchill Boulevard in the Loyalist Creek subwatershed.

Figure 1 shows the site location.



LEGEND:

--- PROPERTY LINE

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
SITE LOCATION



Drawn By:	G.B.	Checked By:	F.M.
Scale:	N.T.S.	Date:	DECEMBER 1, 2023
Project No.:	23394	Figure No.:	1

1.3 PRE-DEVELOPMENT CONDITIONS

The site is currently vacant land free of trees and entirely covered in grass. Existing trees surround the site along the property line.

1.4 EXISTING THIRD-PARTY UTILITIES

The existing land is surrounded by several third-party utilities located along The Collegeway and within the Greenbelt Zone (public park) to the west. A summary of these utilities is provided below:

- ▶ 4 Alectra Hydro Lines on the south side of The Collegeway.
- ▶ 5 Hydro Lines on the north side of The Collegeway.
- ▶ NPS 4 PE IP gasmain on the south side of The Collegeway.
- ▶ TV Cable line on the south side of The Collegeway.
- ▶ Streetlight Cable on the south side of The Collegeway.
- ▶ 2 Bell Canada on the south side of The Collegeway.
- ▶ Rogers FO on the north side of The Collegeway.
- ▶ Electrical Cable on the north side of The Collegeway.
- ▶ Alectra Hydro Lines and Box within Greenbelt Zone (public park).

1.5 POST-DEVELOPMENT CONDITIONS

The proposed development of “City of Mississauga Fire Station 123” includes the construction of a 1,020 sq.m one-storey fire station with two drive-through apparatus bays. There will be a 7m wide drive aisle with 21 total parking spaces provided to accommodate the staff. There will be some opportunities for landscape and green space along the property line and around the building, however most of the site will be occupied by building and driveway.

Figure 2 shows the post-development plan.

2 WATER SERVICING

2.1 WATERMAIN DESIGN CRITERIA

The domestic water demands for the proposed site are based on the following Peel Region design criteria for industrial, commercial or institutional (ICI):

- ▶ Water demand rate of 300 L/employee-day
- ▶ Peaking Factor of ICI – 3.0 (Peak Hour) and 1.4 (Maximum Day).

The demand and peaking factors are based on Region of Peel, *Watermain Design Criteria, June 2010*.

2.2 EXISTING WATER NETWORK

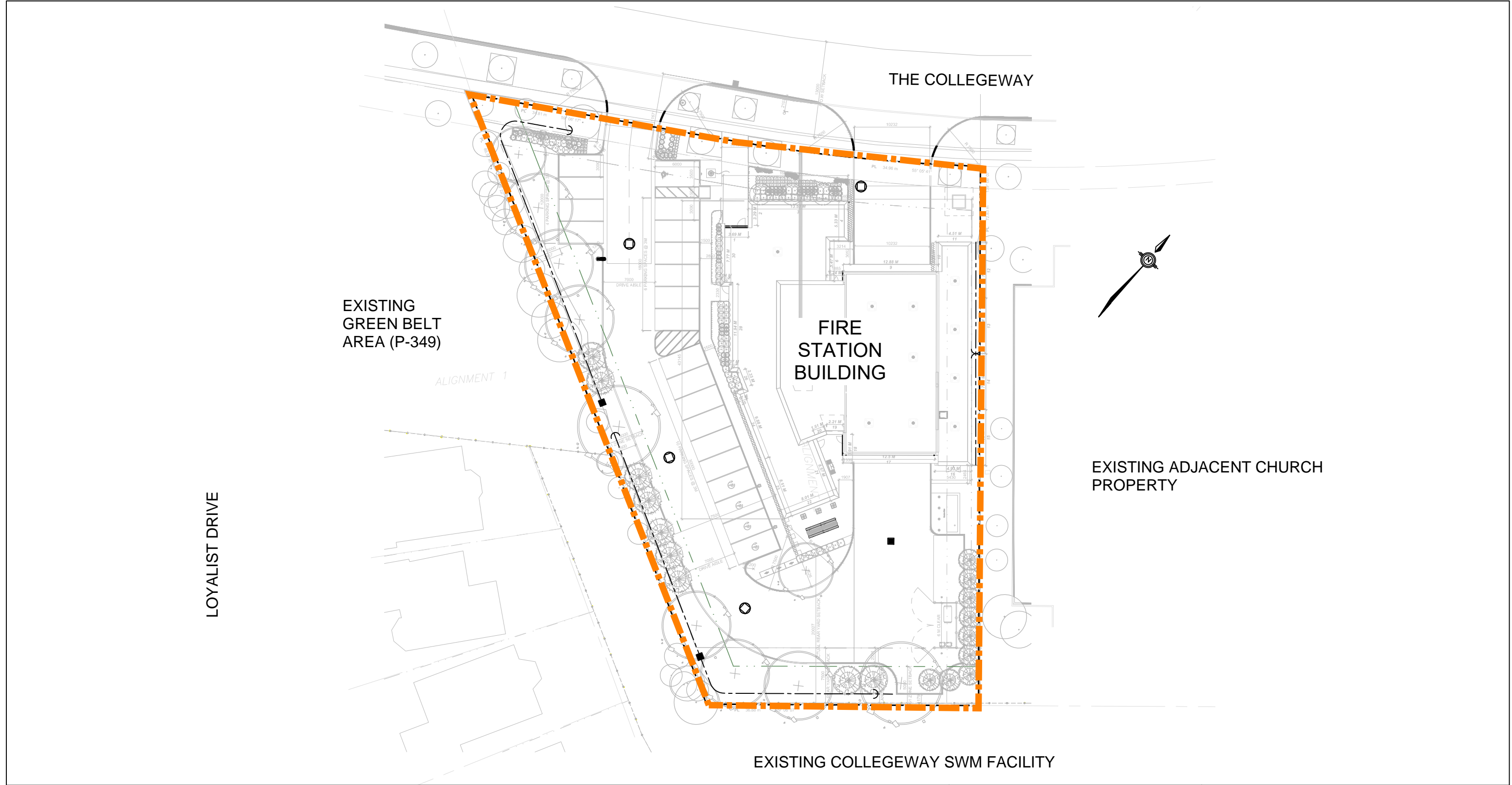
Based on the survey and City’s records and the results from the SUE results by Multiview prepared on September 5, 2023, the existing underground watermains in the vicinity of the proposed development site are summarized below:

The Collegeway:

- ▶ A 300mm dia. PVC watermain line on the north side;

Loyalist Drive:

- ▶ A 200mm dia. PVC watermain line on the west side;



LEGEND:

— — — — — PROPERTY LINE

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
POST DEVELOPMENT
PLAN



Drawn By:	G.B.	Checked By:	F.M.
Scale:	1:500	Date:	DECEMBER 1, 2023
Project No.:	23394	Figure No.:	2

2.3 PROPOSED WATER SERVICE & APPURENTANCES

The new water service connections for the proposed fire station are described as following:

- ▶ Domestic Water Service: A new 150mm dia. domestic water service connection will be installed to service the proposed fire station and will be connected to the proposed 200mm dia. fire protection water service with a cut-in Tee.
- ▶ Fire Protection Service: A new 200mm dia. fire protection service will be installed and will be connected to the existing 300mm PVC watermain on The Collegeway with tapping sleeve and valve. A detector check valve in chamber will be installed outside the Alectra easement and within the property.
- ▶ A new fire hydrant will be installed at the northeast corner of the site along The Collegeway and will connect to the existing 300mm PVC watermain on The Collegeway trough a 200mm PVC hydrant lead with tapping sleeve and valve.

Through discussion with the design team mechanical engineer, the locations and sizes of the proposed water service connections have been determined to satisfy the requirements of the City of Mississauga and Ontario Building Code (OBC).

Refer to **C-02** (Site Servicing Plan) in **Appendix F** for details of the proposed proposed water service connection locations.

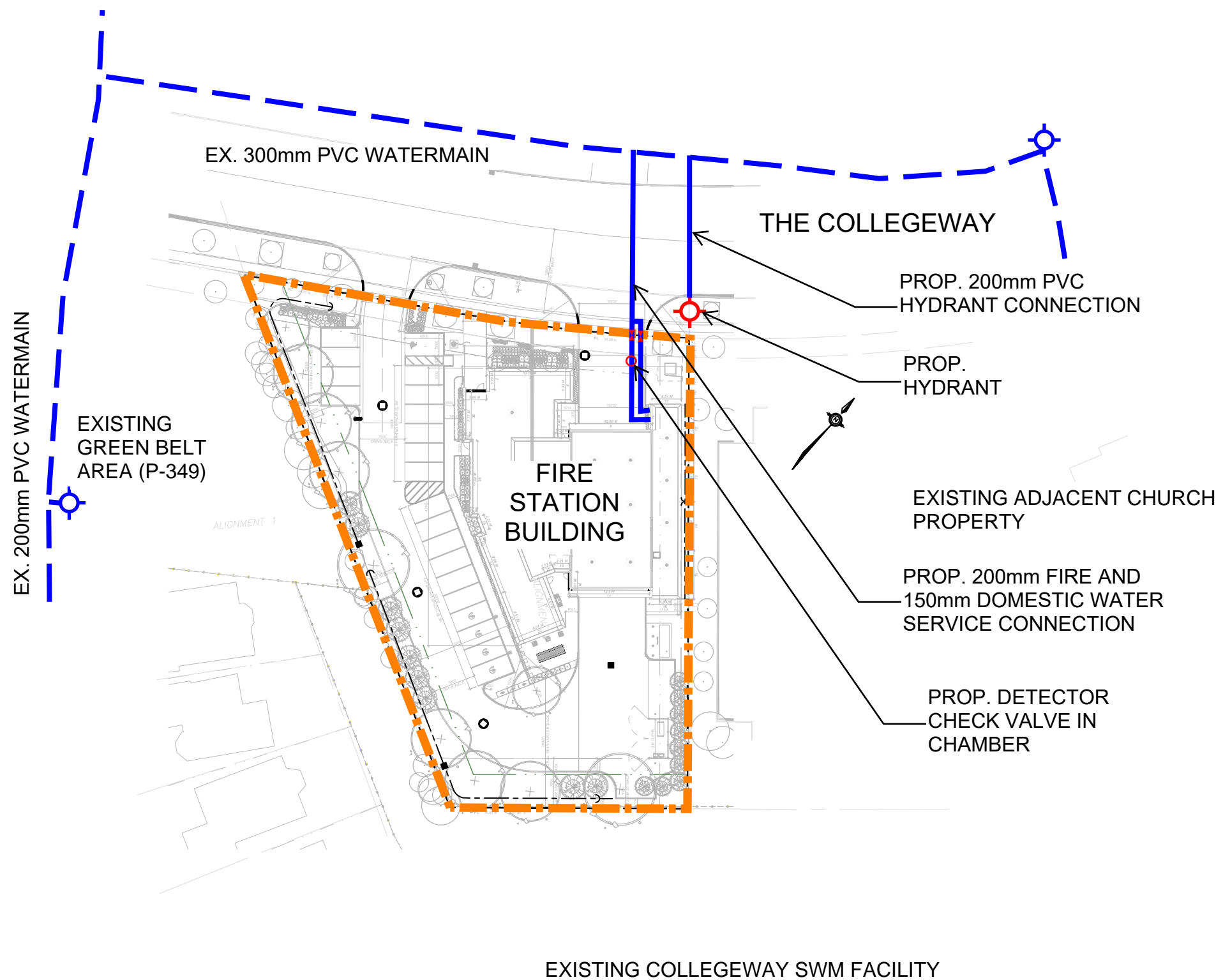
2.4 DOMESTIC WATER DEMANDS AND FIRE FLOW REQUIREMENT

Based on the project statistics of proposed development provided by the architect in **Appendix A**, and the design criteria of the Region, domestic water demand is estimated in **Appendix A** and summarized in **Table 1** below. The fire station will have 11 employees/shift. Assuming there is one shift per day, the total number of employees per day is 11. The domestic demand calculated by Mechanical based on the fixture units is also included in the same table. The calculation also accounts for four hose reels in the apparatus bay at 2.5 L/s (or 40 US GPM) each used for washing the fire truck vehicles.

Table 1: Domestic Water Demand

Building	Peak Hour Demand (L/s)	Maximum Day Demand (L/s)	Domestic Water Demand by Mechanical (L/s)
Proposed Fire Station (ICI)	0.11	0.05	15.29

The proposed building will be constructed of non-combustible materials as per FUS standards, and vertical openings and exterior communications will be properly protected. The proposed building will also have an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Refer to **Appendix A** for the letter from architect for the construction type. A recommended fire flow demand of 66.67 L/s (1057 US GPM) is determined based on these building characteristics and in accordance with the FUS standards. Refer to **Appendix A** for detailed FUS fire calculations. Therefore, the total design water demand is 66.8 L/s or 1058.5 US GPM based on the Civil calculations and 82.0 L/s or 1299.0 US GPM based on the Mechanical calculations. To be conservative, the Mechanical calculations has been considered in the design.



LEGEND:

 PROPERTY LINE PROP. V&B

— — EX. WATERMAIN

 EX. HYDRANT

 PROP. HYDRANT

— PROP. WATERMAIN

- PROP. DETECTOR CHECK VALVE IN CHAMBER

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
PROPOSED WATER
SERVICING PLAN



Drawn By: G.B.

Checked By:	F.M.
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Scale: 1:750

Date: DECEMBER 1, 2023

Project No.:	23394
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Figure No.:	3
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2.5 HYDRANT FLOW TEST

In order to evaluate the adequacy of the existing watermain located on The Collegeway and Loyalist Drive, a hydrant flow test were conducted for both watermain by LHS Inc. on August 17, 2023. Test results are included in **Appendix A**.

Test #1 – 3010 The Collegeway (300mm PVC)

As shown by the test readings, the available water pressure ranges from 73 psi with a flow of 1299 US GPM to 65 psi with a flow of 1984 US GPM during the flow test with a static pressure of 83 psi. At the design water demand of 82.0 L/s (or 1299.5 US GPM) generated from the proposed fire station, the extrapolated flow test results show a residual pressure of 74.5 psi, which is greater than the minimum requirement of 20 psi (150 kPa). Therefore, adequate water supply and pressure are available to serve the proposed fire station.

The Region of Peel single use demand table is completed and provided in **Appendix C** for review the adequacy of the existing watermain by the region.

2.6 WATERMAIN APPURTENANCES

Building code requirements stipulate that each building be serviced by a fire hydrant that is located no more than 45m away from the building's Siamese connection. Therefore, a new fire hydrant will be installed at the northeast corner of the site and will connect to the existing 300mm PVC watermain on The Collegeway with tapping sleeve and valve. The Siamese connection to the building will be located at the northeast corner of the building and approximately 15.0 m distance from the hydrant. The location of the Siamese connection and distance to the existing fire hydrant has been shown on the engineering drawing **C-01** (Site Grading Plan) and **C-02** (Site Servicing Plan) in **Appendix D**.

The on-site watermain located inside the building will be designed by the Site Mechanical Engineer. In accordance with Region of Peel Standards 1-8-1, a water meter and a backflow preventer valve will be installed on the domestic line within the mechanical room. A check valve in chamber will be installed on the fire service line in compliance with the OBC within the property lines and outside Alectra's easement. The meter room will need to be accessible to the City and Region and provide remote read-out locations for the Region's use in reading the meters. Details of the room's layout will be provided by the Mechanical Engineer at the detailed design stage.

3 SANITARY SERVICING

3.1 SANITARY SEWER DESIGN CRITERIA

The sanitary demands for the proposed site are based on the following Region of Peel design criteria:

- ▶ Sanitary demand rate of 270 L/employee/day for non-residential land use;
- ▶ Infiltration Allowance of 0.26 L/s/ha; and,
- ▶ Peaking Factor based on the Harmon Equation.

The demand and peaking factors are based on Region of Peel, *Linear Wastewater Standards, March 2023*.

3.2 EXISTING SANITARY SEWERS

Based on the survey and City's records and the results from the SUE results by Multiview prepared on September 5, 2023, the existing underground sanitary sewers within and in the vicinity of the proposed development site are summarized below:

Existing Services Within Site:

- ▶ A 200mm dia. PVC sanitary sewer connection from adjacent existing property to the northeast;
- ▶ A 250mm dia. PVC sanitary sewer connection towards Loyalist Drive.

Loyalist Drive:

- ▶ A 600mm dia. CONC sanitary sewer line.

3.3 PROPOSED SANITARY SERVICE

A new 200mm dia. PVC sanitary pipe and sanitary control MH1A will be installed within the site. The sanitary flow from the proposed building will discharge to the sanitary control MH1A and then into the existing manhole 113A in the east of the site via 200mm dia. PVC sanitary pipe. The existing 250mm sanitary service will discharge the site sanitary flow into the existing 600mm CONC sanitary sewer on Loyalist Drive. The existing manhole 113A has an existing connection from the adjacent Church property and under post development condition will provide shared services to both Church and proposed fire Station properties. Refer to **C-02** (Site Servicing Plan) in **Appendix F** for details and **Figure 4** for the proposed sanitary servicing connection.

The actual flow velocity of the 200mm dia. PVC sanitary service at 2.0% is 1.48m/s, which is greater than the minimum required cleansing velocity of 0.75m/s for as per the Region of Peel Linear Wastewater Standards. Refer to **Appendix B** for details.

Through discussion with the design team mechanical engineer, the location and size of the proposed sanitary service connection has been determined to satisfy the requirements of the Region of Peel and Ontario Building Code (OBC).

3.4 PROPOSED SANITARY FLOW

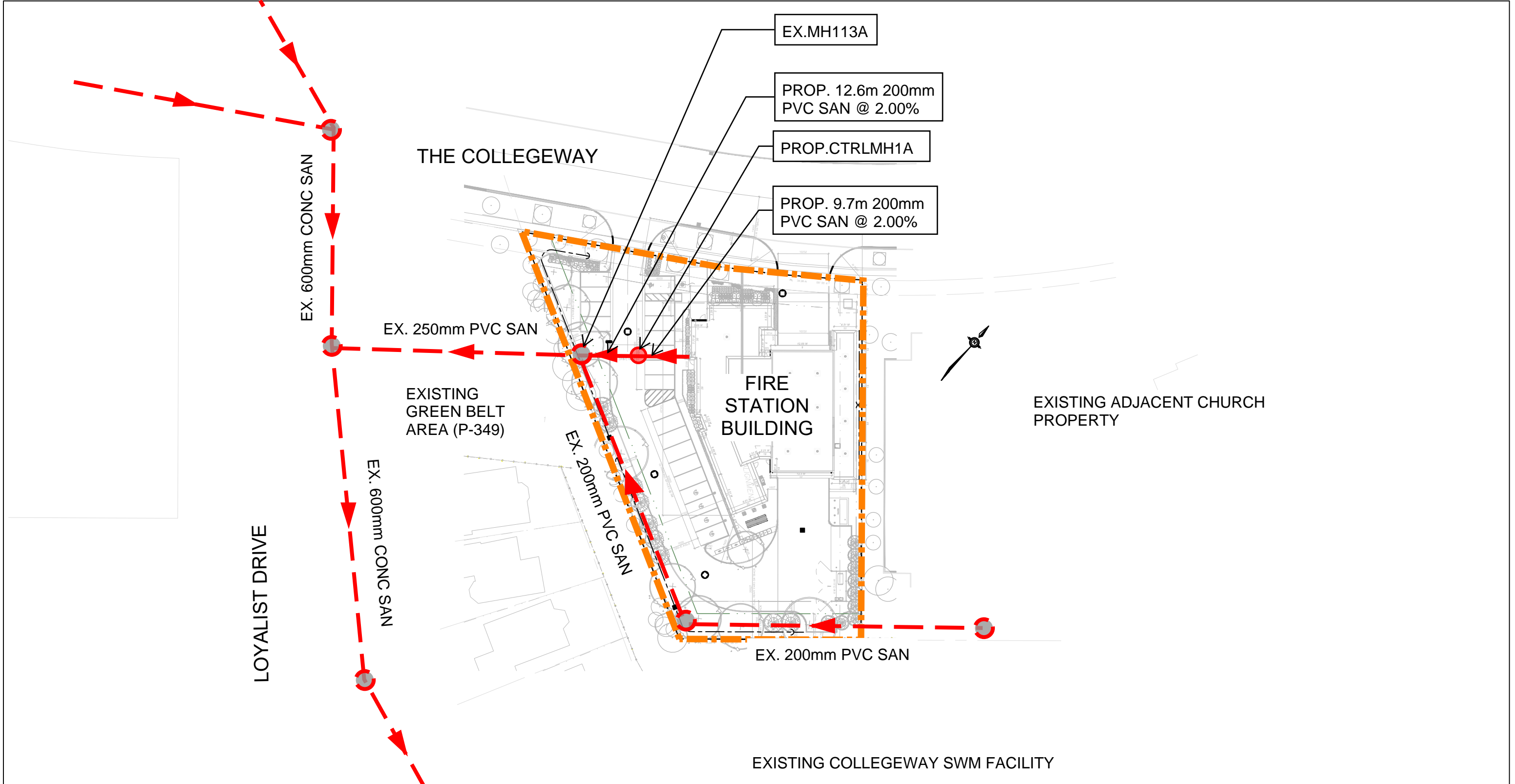
Based on the proposed development site statistics provided by the architect in **Appendix B**, and the design criteria of the Region of Peel, sanitary design flow is estimated in **Appendix B** and summarized in **Table 2**. The fire station will have 11 employees/shift. Assuming there is one shift in a day, the total number of employees per day is 11.

Table 2: Sanitary Flow Rate

Building	Sanitary Design Flow (L/s)
Proposed Fire Station (ICI)	0.25

Please note the sanitary flow rate for Proposed Fire Station includes an infiltration flow rate of 0.10 L/s, as per the infiltration allowance of 0.26 L/sec/ha as outlined in the Region of Peel Linear Wastewater Standards.

The Region of Peel single use demand table is completed and provided in **Appendix C** for review the adequacy of the existing sanitary by the region.



LEGEND:

PROPERTY LINE

EX. SANITARY SEWER

PROP. SANITARY SEWER

EX. SANITARY MANHOLE

PROP. CONTROL MANHOLE

DIRECTION OF FLOW

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
PROPOSED SANITARY
SERVICING PLAN

LEA



Drawn By: G.B.

Checked By: F.M.

Scale: 1:750

Date: DECEMBER 1, 2023

Project No.: 23394

Figure No.: 4

4 STORM SERVICING

4.1 STORM SEWER DESIGN CRITERIA

Storm sewer design will be in accordance with the City of Mississauga's Transportation and Works Development Requirements Manual (Section 8 Storm Drainage Design Requirements) dated August 12, 2020.

4.2 EXISTING STORM SEWERS

Based on the survey and City's records and the SUE results by Multiview prepared on September 5, 2023, the existing underground storm sewers in the vicinity of the proposed development site are summarized below:

Existing Services Within Site:

- ▶ A 450mm dia. PVC storm sewer connection from the northeast adjacent existing property flowing directly to the 2750mm concrete trunk sewer at the southwest corner of the site.

City of Mississauga Parkland/Easement:

- ▶ A 2750mm dia. concrete trunk sewer at the southwest of the site.

The Collegeway:

- ▶ A 450mm dia. PVC storm sewer line.

Loyalist Drive:

- ▶ A 675mm dia. CONC storm sewer line.

4.3 PROPOSED STORM SEWERS

A new 150mm PVC storm service connection will be installed and will discharge to the existing 450mm concrete storm sewer on The Collegeway. A control MH will be provided within the site at the property line and outside of Alectra's easement connecting the storm tank outlet to the storm service connection. An orifice plate will be installed at the inlet of the proposed OGS and has been sized to control the flow at the 10-year calculated pre-development allowable release rate of 27.51 L/s. The actual flow velocity of the 150mm PVC storm service connection at 1.0% is 0.86 m/s which is greater than the minimum required cleansing velocity of 0.75m/s as per the City of Mississauga Storm Drainage Design Requirements.

Through discussion with the design team mechanical engineer, the location and size of the proposed storm service connection has been determined to satisfy the requirements of the City and Ontario Building Code (OBC).

Refer to **C-02** (Site Servicing Plan) in **Appendix F** for details and **Figure 5** for the proposed storm servicing connection.

5 STORMWATER MANAGEMENT PLAN

5.1 STORMWATER MANAGEMENT PLAN OBJECTIVES

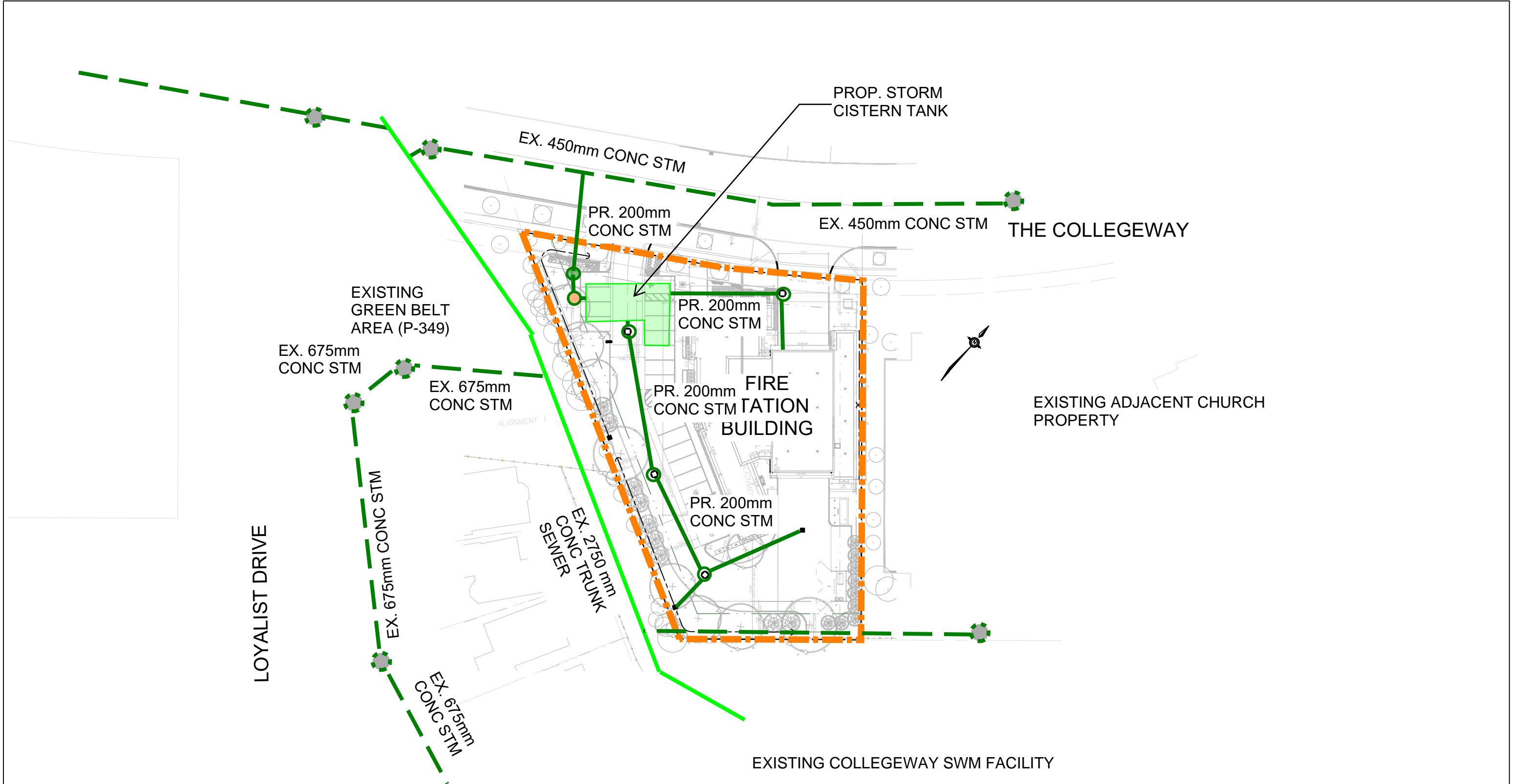
The objectives of the stormwater management plan are as follows:











- ▶ Determine site specific stormwater management requirements to ensure that the development project is in conformance with the *Storm Drainage Design Requirements* issued by the City of Mississauga and *Stormwater Management Criteria* issued by the Credit Valley Conservation Authority;
- ▶ Determine site specific stormwater management requirements to achieve Level 1 Stormwater Management in conformance with the *Corporate Green Building Standard Program Manual (CGBS)* by the City of Mississauga;
- ▶ Preparing a stormwater management plan documenting the strategy along with the technical information necessary for the sizing of the proposed stormwater management measures.

5.2 STORMWATER MANAGEMENT DESIGN CRITERIA

The City of Mississauga has issued the Stormwater Drainage Design Requirements (November 2020) to provide direction on how to manage rainfall and runoff inside the City's jurisdiction. A summary of the stormwater management criteria applicable to this project is as follows:

- ▶ **Stormwater Quality Control:** Under the Stormwater Drainage Design Requirements, the site is required to provide a long-term removal of 80% of total suspended solids (TSS) on an average annual basis unless the site drains to an existing downstream stormwater management facility designed to provide enhanced (Level 1) protection.
- ▶ **Stormwater Runoff Volume Reduction:** Under the Stormwater Drainage Design Requirements, the first 5mm of runoff shall be retained on-site and managed by way of infiltration, evapotranspiration, re-use or filtration with the goal to reduce stormwater runoff volume. This is calculated as the product of impervious site area times 5mm, excluding initial abstraction. To achieve Level 1 of the CGBS, 80% of the runoff generated from a minimum 15mm depth of a single rainfall event from all site surfaces shall be retained through infiltration, evapotranspiration, water harvesting and reuse.
- ▶ **Stormwater Quantity Control:** The stormwater quantity control requirements are outlined by the Stormwater Management Criteria by the Credit Valley Conservation Authority. The site is within the Loyalist Creek subwatershed and therefore the runoff for all design storms must not exceed the respective peak runoff rate from the site under pre-development conditions. To achieve Level 1 of the CGBS, an 85% reduction of the 100-year post-development to pre-development conditions of the site shall be provided.



LEGEND:			Owner/Client:			
	PROPERTY LINE			CITY OF MISSISSAUGA DPAI ARCHITECTURE INC.		
	EX. STORM SEWER			Title:	Drawn By: G.B.	Checked By: F.M.
	PROP. STORM SEWER			3050 THE COLLEGE WAY PROPOSED STORM SERVICING PLAN	Scale: 1:750	Date: DECEMBER 1, 2023
	EX. STORM TRUNK SEWER				Project No.: 23394	Figure No.: 5

5.3 PRE-DEVELOPMENT CONDITIONS

5.3.1 General

The site is currently vacant and entirely covered in grass. The total drainage area is 4.0 ha. For the purpose of this SWM analysis, the development site is divided into one sub-catchment area based on the survey, drainage pattern and post-development condition, i.e.

- Sub-Catchment EC1: includes entire vacant grass area. This sub-catchment drains to the front (northwest) and south of the site via surface flow to the existing catchbasins and 450mm concrete storm sewer on The Collegeway and eventually discharges into the existing 2700mm concrete trunk sewer which outlets to the SWM pond directly south of the site. The drainage area plan for the existing SWM pond includes the project site, as shown in the Existing Drainage Plan prepared by others in June 2012 in **Appendix D1**. There is an existing catchbasin at the south property line which also collects a portion of the surface flow from the site. This catchbasin connects directly to the 2700mm concrete trunk sewer which outlets to the SWM pond directly south of the site.

Sub-catchment area and runoff coefficient are summarized below in **Table 4**. Refer to **Appendix D2** for land-use areas and runoff coefficient calculations.

Table 4: Areas of Existing Sub-Catchment

Sub-catchment ID	Description	Catchment Area (m ²)	Runoff Coefficient	Outlet
EC1	Grass Area	3995	0.25	The Collegeway, Ex SWM pond

Based on our review of topographic survey and site observation, there are no on-site stormwater management facilities under existing conditions. Drainage area boundaries, overland flow routes, grading and land use details under existing conditions are illustrated in **Figure 6**.

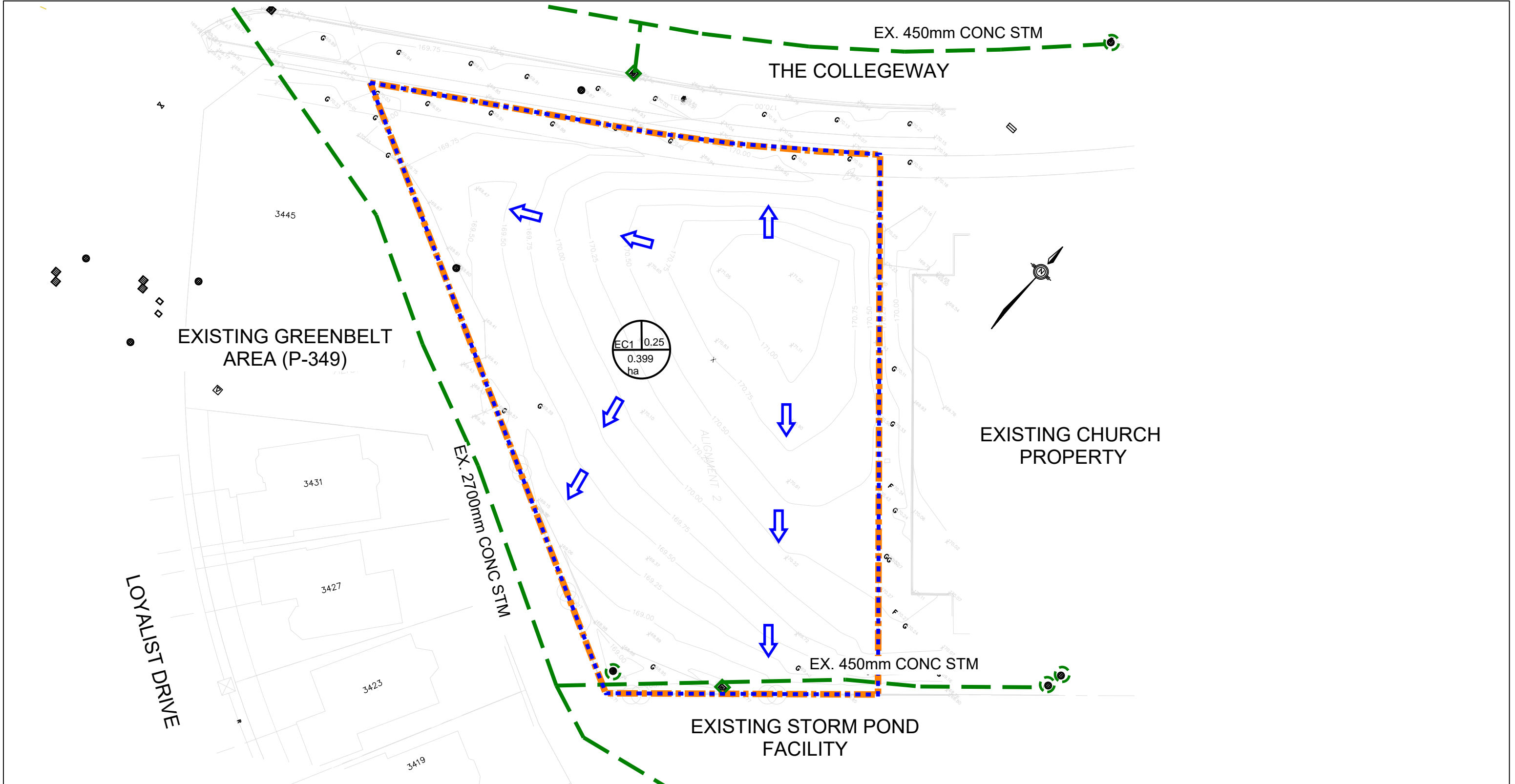
5.3.2 Rainfall Information

The rainfall runoff and intensity under proposed conditions are calculated using the following equations:

Rational Formula: $Q = 2.78CIA \text{ (L/s)}$
 Where: C: runoff coefficient
 I: rainfall intensity (mm/hr)
 A: drainage area (ha)

IDF Curve Equation: $I = a/(T+b)^c \text{ (for the City of Mississauga)}$
 Where: I: rainfall intensity (mm/hr)
 T: time of concentration (hour)
 a, b, c: parameters

The parameters (a, b and c) recommended for use in the City of Mississauga are defined in City Standard 2111.010 and are summarized in **Table 5**.



LEGEND:

PROPERTY LINE

EX. STORM SEWER

DRAINAGE AREA BOUNDARY

EX. STORM MANHOLE

EX. CATCHBASIN

OVERLAND FLOW DIRECTION

ID

0.57

1000

SUB-CATCHMENT ID.

AVERAGE RUNOFF COEFFICIENT

DRAINAGE AREA (ha)

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
PRE-DEVELOPMENT
DRAINAGE PLAN

LEA

Drawn By: G.B.

Scale: 1:500

Project No.: 23394

Checked By: F.M.

Date: DECEMBER 1, 2023

Figure No.: 6

Table 5: Values of a, b and c Parameters for the City of Mississauga

Return Period (Year)	2	5	10	25	50	100
a	610	820	1010	1160	1300	1450
b	4.6	4.6	4.6	4.6	4.7	4.9
c	0.78	0.78	0.78	0.78	0.78	0.78

An initial time of concentration, T, of 15 minutes (or 0.25 hours) is recommended in the City of Mississauga Storm Drainage Design Requirements document.

5.3.3 Peak Flow Rates Under Existing Conditions

Based on the existing site condition and rainfall parameters, the Rational Method is adopted to calculate peak flows at different design storm events.

The calculated peak flow rates for the EC1 sub-catchment areas in the pre-development condition are summarized below in **Table 6**. Detailed calculations are provided in **Appendix D2**.

Table 6: Pre-Development Flow Rates (L/s)

Sub-catchment ID	Description	Return Period (Year)					
		2	5	10	25	50	100
EC1	Grass Area	16.62	22.34	27.51	31.60	35.27	39.03

5.3.4 Allowable Flow Rate

The site will have different land-uses, including fire station building, paved driveway and parking and landscaped area. The proposed site is under Loyalist Creek and requires post to pre control for all storms (i.e. 2, 5, 10, 25, 50 and 100 year) based on the CVC and City of Mississauga Storm Drainage Requirements. To achieve Level 1 of the CGBS, an 85% reduction of the 100-year post-development to pre-development conditions of the site shall be provided.

Relevant policies from the City of Mississauga restrict flow rates on this site to 10-year storm design flow as the allowable flow rates for discharge to municipal sewers. Therefore, the allowable release rates from the proposed existing grass area to the municipal storm sewer on The Collegeway is 27.51L/s based on the 10-year pre-development flow rate calculated with a runoff coefficient value of 0.25.

5.4 POST-DEVELOPMENT CONDITIONS

5.4.1 General

The proposed development. To maintain the existing drainage pattern under the proposed condition, the sub-catchment area is defined as follows:

Sub-Catchment PC1: includes the entire proposed site, including the fire station, paved areas, and landscaped area. During rainfall events, the rainfall runoff of this sub-catchment will be captured by building roof drains, proposed at-grade area catch basins, discharged into the proposed storm cistern through underground piping below the driveway and ultimately outlets to the 450mm dia. concrete storm sewer on The Collegeway at the allowable or lower release rate.

Figure 7 shows the proposed drainage conditions.

5.4.2 Peak Flow Rates Under Proposed Conditions

Based on the proposed site condition and rainfall parameters, the Rational Method is adopted to calculate peak flows at different design storm events. **Table 7** summarizes the runoff coefficient adjustment factors were used, as per City of Mississauga criteria.

Table 7: Post-Development Peak Flow Rates (L/s)

Return Period (Year)	Adjustment Factors	Adjusted Runoff Coefficient
2-10	1.00	0.72
25	1.10	0.79
50	1.20	0.90
100	1.25	0.90

The calculated peak flow rates for the sub-catchment area under the post-development conditions are summarized in **Table 8**. Detailed calculations are provided in **Appendix D2**.

Table 8: Post-Development Peak Flow Rates (L/s)

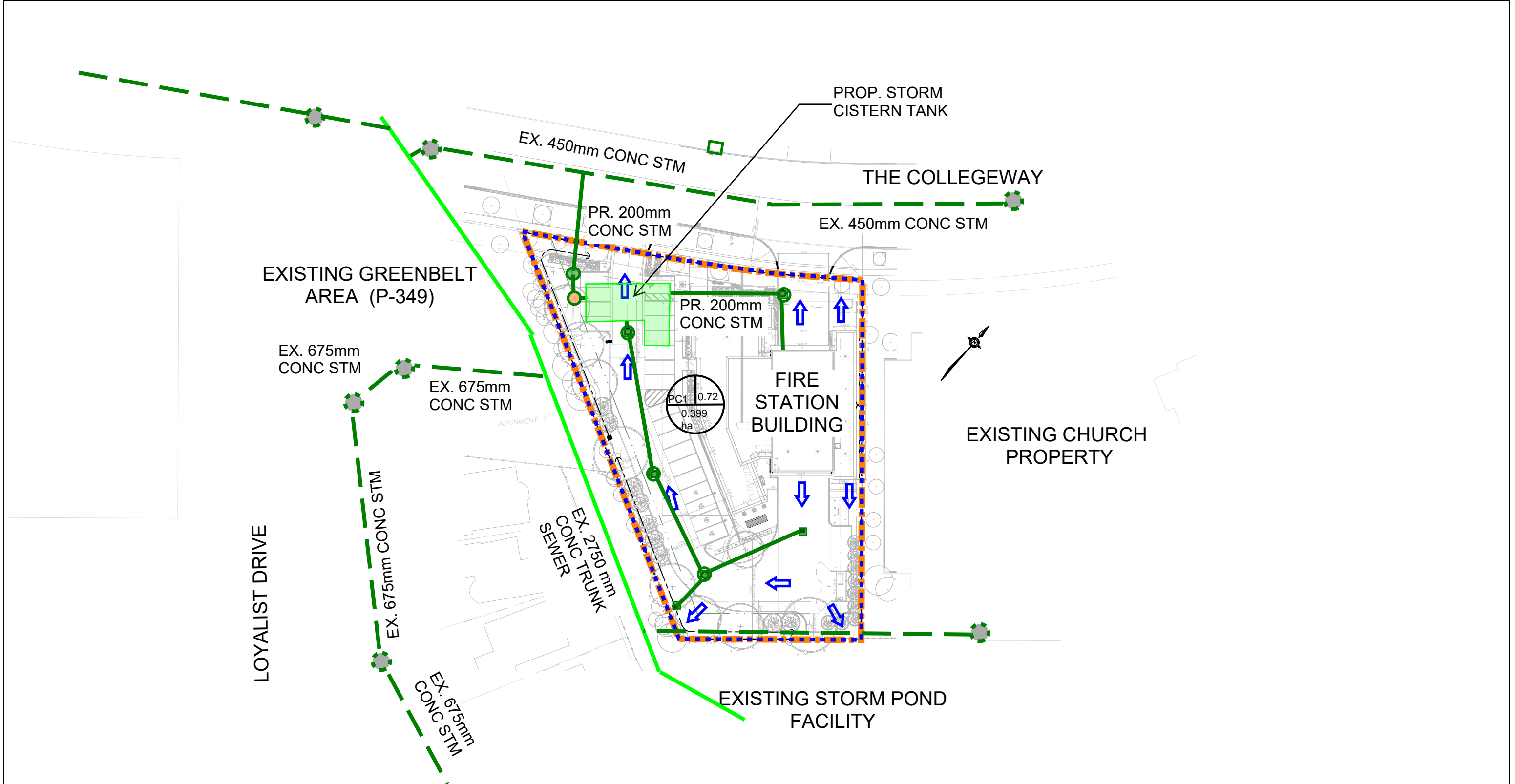
Sub-catchment ID	Description	Return Period (Year)					
		2	5	10	25	50	100
PC1	Without Adjustment Factors	47.71	64.13	78.99	90.73	101.27	112.07
	With Adjustment Factors	47.71	64.13	78.99	99.80	121.53	140.09

5.4.3 Impact on Water Environment

Based on the review and analysis for existing and proposed site conditions, **Table 8** summarizes the key hydrologic parameters of the site under the proposed condition.

Table 9: Key Hydrologic Parameters

Sub-catchment ID	Description	Area (m ²)		Imperviousness (%)		Runoff Coefficient		100-year Peak Flow Rate (L/s)	
		Pre-Dev	Post-Dev	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev
PC-1	Proposed Fire Station	0.40	0.40	0	72	0.25	0.72	39.03	140.09



LEGEND:

--- PROPERTY LINE

--- EX. STORM SEWER

--- DRAINAGE AREA BOUNDARY

--- PROP. STORM SEWER

--- PROP. STORM TRUNK SEWER

EX. STORM MANHOLE

EX. CATCHBASIN

PROP. CONTROL MANHOLE

PROPOSED OGS

PROP. CATCHBASIN MANHOLE

PROPOSED CATCHBASIN

OVERLAND FLOW DIRECTION

SUB-CATCHMENT ID.

AVERAGE RUNOFF COEFFICIENT

DRAINAGE AREA (ha)

Owner/Client:

CITY OF MISSISSAUGA
DPAI ARCHITECTURE INC.

Title:

3050 THE COLLEGE WAY
POST-DEVELOPMENT
DRAINAGE PLAN

Drawn By:	G.B.	Checked By:	F.M.
Scale:	1:750	Date:	DECEMBER 1, 2023
Project No.:	23394	Figure No.:	7

Based on the proposed site condition and pre and post development storm flow rate, the stormwater management requirement for each sub-catchment is as follows:

Sub-Catchment PC1: As shown in **Table 9**, the imperviousness and runoff coefficient of sub-catchment PC1 will be increased under post-development conditions. Therefore, mitigation measures will be required for the proposed development in accordance with the City's design criteria and to control the all post development storm events to the 10-year pre-development allowable release rate of 27.51 L/s.

5.5 PROPOSED SWM PLAN

5.5.1 Stormwater Runoff Volume Reduction

Based on the City of Mississauga's Storm Drainage Design Requirements, the first 5mm of runoff shall be retained on-site and managed by way of infiltration, evapotranspiration, re-use of filtration. This is calculated as the product of impervious site area times 5mm, Excluding initial abstraction. Therefore, the required volume for on-site retention for 5mm runoff is 14.4m³.

However, to achieve Level 1 of the CGBS, 80% of the runoff generated from a minimum 15mm depth of a single rainfall event from all site surfaces shall be retained through infiltration, evapotranspiration, water harvesting and reuse.

For the required on-site retention volume for 80% of a 15mm runoff, the total required volume for the sub-catchment PC1 is 14.m³ which needs to be re-used or infiltrated on site.

Refer to **Appendix D2** and **Table 10** for details.

Table 10: Water Retention Requirement

Subcatchment ID	Drainage Area (ha)	Proposed Impervious Area (ha)	5mm Water Balance Volume (m ³ /day)	80% of 15mm Water Balance Volume (m ³ /day)
PC1	0.40	0.29	14.4	34.5

The strategy for re-using 80% of 15mm stormwater is infiltration. The open-bottom stormwater management tank proposed for site will provide an effective volume of 35.04 m³ through infiltration.

Based on the provided Hydrogeological report by G2S Consulting Inc. dated November 21, 2023, the highest measured ground water level at Monitoring Well BH/MW 104 is at depth of 6.85m and elevation 163.51m. The invert of the proposed storm tank is 167.51m that provides 4m separation from the groundwater level.

To estimate the site soil infiltration rate, two in-situ tests have been conducted. Based on the results. The infiltration rate at test pit DRI 01-23 which is close to the proposed tank location is estimated 21mm/hr with safety factor of 2.5. the drawdown calculations show that the total 35.04 m3 retention water will be infiltrated in 27.91 hours. Refer to Section 6 for the summary of Hydrogeological investigation results and **Appendix D4** for drawdown calculation.

5.5.2 Water Quantity Control

As noted in Section 5.3.4, the allowable discharge rates to the municipal sewers from the site are equivalent to the peak runoff rate under pre-development conditions during a 10-year design storm event.

Based on post-development conditions of sub-catchment PC1, the stormwater detention requirements for the proposed condition at different storm events are estimated in **Appendix D2** and summarized in **Table 11**.

Table 11: Required Stormwater Storage Volumes -Drainage to The Collegeway

Storm Event	Target Flow (L/s)	Required Storage (m ³)	Provided Underground Storage (m ³)
2-Year	27.51	18.18	154.05
5-Year		32.96	
10-Year		46.38	
25-Year		67.29	
50-Year		91.14	
100-Year		113.21	

In the post-development condition, the storm runoff from sub-catchment PC1 will be collected by the proposed roof drains and catchbasins and conveyed through the internal storm pipes to the proposed storm water tank. Based on the proposed site condition, the on-site stormwater retention of 34.5m³ for water balance demand and detention of 113.21m³ for 100-year event requirement, a minimum 147.71 m³ of stormwater storage is required. A Layfield Brantwood or approved equivalent underground storage tank will be placed within the driveway and parking lot and will provide approximately 154.05 m³ of volume and an area of 149.48 m². The proposed tank will have a depth of 0.914 m and storm flow discharging from the tank will be designed as a gravity flow system at an allowable flow rate of 27.51 L/s to the existing 450mm concrete storm sewer on The Collegeway. Refer to **Appendix D5** for the proposed storm tank drawings.

An orifice tube will be installed at the outlet of the stormwater tank to the proposed OGS unit to ensure that the allowable flow rate of 27.51 L/s is met. The orifice tube will be 100mm in diameter and is designed in accordance with the City's Design Criteria. Refer to **Appendix D3** for the orifice size calculations.

The location and dimension of the proposed storm tank is shown on **Figure 5**.

5.5.3 Water Quality Control

Under the post-development condition, the proposed land use in the development site consists of a fire station building, paved driveway and parking lot and landscape area. Among the proposed land use, the soft landscaped area shall remove TSS from the rainfall runoff. Based on the SWM design criteria, the building rooftop area and walkway areas are not subject to vehicular traffic, and the application of sand and de-icing salt constituents, petroleum hydrocarbons and heavy metals. As such, the stormwater generated from these areas is considered clean for the purposes of the WWFMG water quality control.

The TSS removal efficiencies for different stormwater management measures within the site under post-develop conditions are summarized in **Table 9** below and are based on the City of Mississauga Guidelines.

Table 9: TSS Removal Assessment

Water Quality Control Component	Area (m2)	TSS Removal Efficiency	Composite TSS Removal Efficiency
Building Roof	1017.0	80	20.4
Paved Area	1858.0	0	0
Landscaped Area	1120.0	80	22.4
OGS	3995	50	50
Total	3995		>80

However, stormwater generated from driveways and parking lots is considered 'dirty' for the purposes of the water quality control. To achieve a TSS removal of 80% for the site, a Stormceptor EF04 is proposed to be installed downstream of the tank. Refer to **Appendix D6** for sizing details from the manufacturer.

6 GROUNDWATER DISCHARGE & DEWATERING

6.1 HYDROGEOLOGICAL STUDY

To obtain information about the subsurface conditions, assess any potential subsurface environmental impacts, groundwater condition and the soil infiltration rate in the development site, G2S Consulting Inc. was retained by DPAI Architecture Inc. to conduct a hydrogeological review for the proposed redevelopment site. Please refer to the hydrogeological report by G2S Consulting Inc. dated November 21, 2023 (Reference No. G2S23256B). Three monitoring wells were installed in boreholes in August 2023 at the property as part of the concurrent Geotechnical Investigation.

As part of the Geotechnical investigations conducted by G2S Consulting Inc. dated November, 2023, twelve (12) boreholes were completed in August 2023, three of which were completed as groundwater monitoring wells installed by G2S to depths ranging from 1.7 m to 8.2 m below ground surface (mbgs). Refer to **Appendix E** for the Borehole and Monitoring Well Location Plan and the soil infiltration rate results.

The hydrogeological study provided the following conclusions with respect to subsurface soil and groundwater conditions:

- ▶ Based on the 12 boreholes within the site, the general stratigraphy at the development site consists of topsoil overlying clayey silt/silty clay or sandy silt/silty sand fill materials, underlain by clayey silt to silty clay till, and silty sand to sandy silt till.
- ▶ Groundwater depths at installed monitoring wells ranged from 3.62 to 7.41 meters below ground surface as measured between September 1, 2023 to October 26, 2023. The corresponding geodetic groundwater elevations range from approximate elevations of 167.15 to 163.30 meters above sea level (masl).

Based on the design of the proposed development, the FFE for proposed ground level is set at 170.15 masl. Since the proposed development is a slab on grade building with the highest water level found at 3.62m below ground surface, long-term dewatering should not be required.

To estimate the infiltration rate of existing soil, field tests were undertaken, in conjunction with grain size analysis (sieve and hydrometer). Hydrogeology Consulting Services Inc. (HCS) was retained by G2S to assess the soil infiltration capacity using a double ring infiltrometer (DRI). On October 11, 2023, a DRI from AMS Samplers was used to assess the surficial soil infiltration rate at two locations, DRI 01-23 and DRI 02-23, as

shown on plan in Appendix D. Calculated estimated soil infiltration rates and t-times based on the DRI test results are provided in **Table 10** below.

Table 10: Calculated Estimated Soil Infiltration Rates and T-Times

DRI Test Location	Measured Soil Infiltration Rate – Unfactored (mm/hr)	Estimated Soil T-Time (min/cm) (OBC)	Estimated Soil Infiltration Rate – Factored* (mm/hr)
DRI-01-23 (silt and sand)	52.4	17-25	21.0
DRI-02-23 (silt and sand, some gravel)	11.5	20-30	4.6

*Factor of 2.5 applied

7 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

During site construction, it is recommended that all erosion and sediment control Best Management Practices (BMPs) shall be constructed and maintained in accordance with the Greater Golden Horseshoe Area Conservation Authorities' (GGHA CAs) Erosion & Sediment Control Guidelines for Urban Construction (December 2006) and Toronto and Region Conservation Authority's (TRCA) Erosion and Sediment Control Guide for Urban Construction (2019). In brief, the measures below are proposed to be provided on site during the entire period of construction:

- ▶ Siltation control fence along the perimeter of the construction site before commencement of construction;
- ▶ Sediment control measures to prevent silt entry at all the existing catch basins;
- ▶ Granular mud-mats at all construction egress locations (see mud-mat details);
- ▶ An inspection and monitoring program following the GGHA CA's Erosion and Sediment Control Guidelines for Urban Construction (December 2006) and TRCA's Erosion and Sediment Control Guide for Urban Construction (2019).

To control the erosion and sediment during construction, refer to **Appendix F** for drawing C-04 (Erosion and Sediment Control Plan).

8 CONCLUSIONS

8.1 WATER SERVICING

The proposed development will be fed by the existing 300mm PVC watermain on The Collegeway. New water services for the site will consist of a 200mm domestic water and a 150mm fire service connection. The total water demand for the development is 82.09 L/s (as per the Mechanical engineer).

8.2 SANITARY SERVICING

The proposed development will be serviced by 200mm dia. PVC pipes and proposed sanitary control MH1A connected to the existing 600mm concrete sanitary sewer on Loyalist Drive via the existing manhole MH113A and 250mm PVC sanitary sewer on site.

8.3 STORM SERVICING

The proposed storm service connection for the proposed fire station will be a 150mm PVC pipe that is connected to the existing 450mm concrete storm sewer on The Collegeway. A 100mm orifice tube will be installed at the tank to the OGS unit to control the 100-year post development flow to the 10-year post development flow.

8.4 STORMWATER MANAGEMENT PLAN

- ▶ **Water Balance:** A total of 14.4m³ is required per 72 hours to meet water balance and water reuse requirements. This volume will be reused through infiltration from the bottom of the proposed storm tank in 11.73hours.
- ▶ **Water Quantity:** On-site storage volume of approximately 113.21 m³ for the proposed fire station will be required in order to control the post-development stormwater flows to 10-year pre-development level. A cistern with 115.70 m³ is provided below the driveway/parking lot to satisfy the on-site storage requirement as shown on **Figure 5**.
- ▶ **Water Quality:** In addition to landscaped areas, green roof and clean roof, an OGS unit model EFO 4 is provided downstream of the stormwater management tank to satisfy the water quality control requirement, i.e., 80% of TSS removal. **Table 12** below provides a summary of the stormwater management design.

Table 12: Summary of Stormwater Management Design

	Discharge to The Collegeway
Allowable release rate (L/s)	27.51
Required Detention storage (m ³)	113.21
Provided Detention Storage (m ³)	115.70.00
Required Water Balance Volume (m ³)	14.4
Provided Water Balance Volume (m ³)	14.56
Orifice Tube size (mm)	100

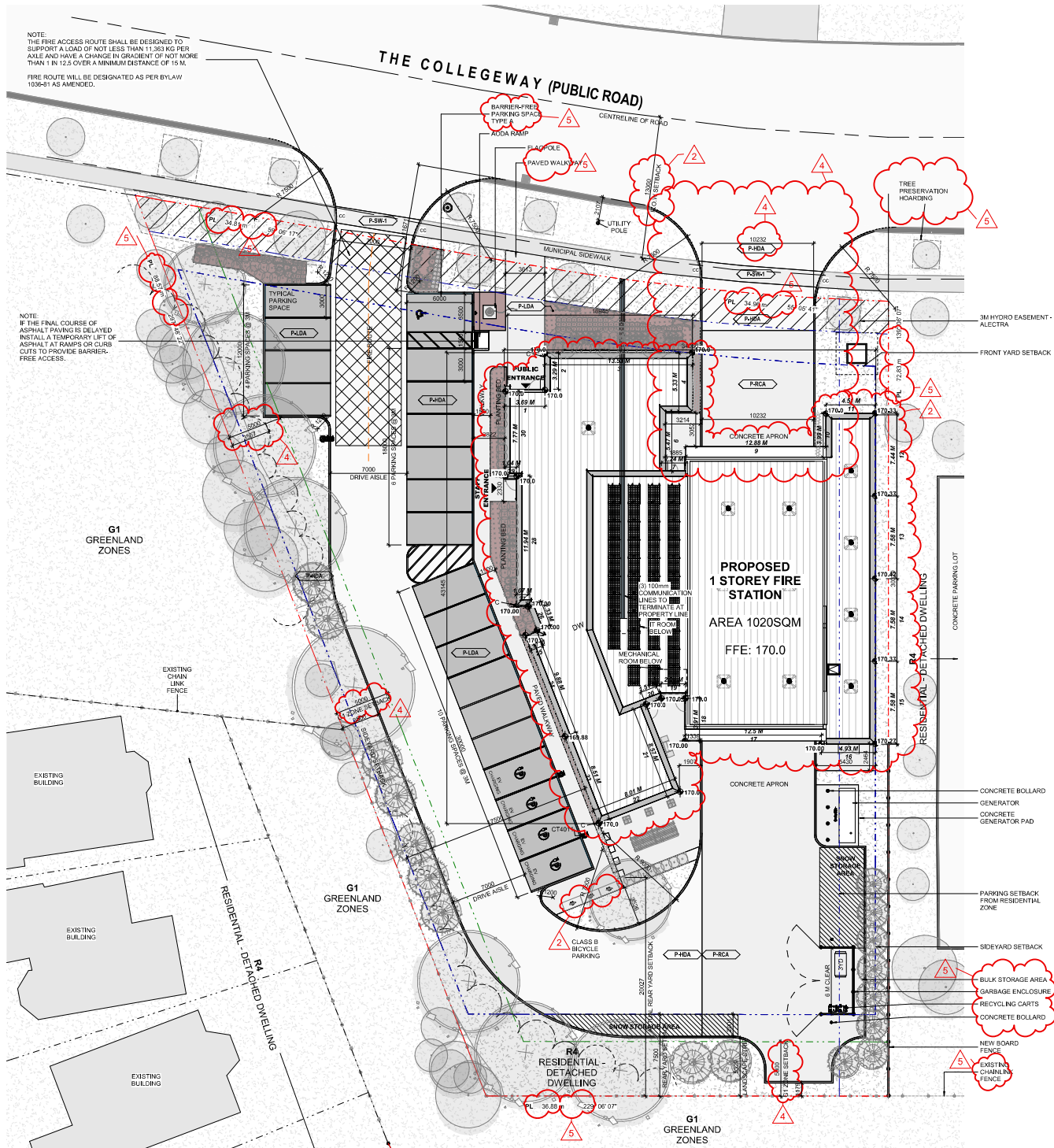
- ▶ **Erosion Control:** Temporary erosion and sediment control measures should be installed prior to construction and maintained during construction in accordance with the City of Mississauga, Region of Peel, and Credit Valley Conservation Authority.

8.5 GROUNDWATER DISCHARGE & DEWATERING

Based on the updated hydrogeological study, the lowest footing of the proposed building will be approximately 2.8m above the groundwater level, and therefore it is anticipated that groundwater will not be encountered during excavation as noted by G2S Consulting.

APPENDIX A

WATER CALCULATIONS AND HYDRANT FLOW TEST RESULTS



2 SITE PLAN
1 : 200

ESTABLISHED GRADE CALCULATION				
LENGTH NO.	BEGIN ELEV.	END ELEV.	LENGTH	CALCULATION
1	170	170	3.61	613.70
2	170	170	3.59	610.30
3	170	170	13.53	2,300.10
4	170	170	5.41	919.70
5	170	170	2.57	436.90
6	170	170	5.4	918.00
7	170	170	2.24	380.80
8	170	170	1.27	215.90
9	170	170	12.88	2,189.60
10	170	170	3.99	678.30
11	170	170.33	4.51	767.44
12	170.33	170.37	7.44	1,267.40
13	170.37	170.42	7.58	1,291.59
14	170.42	170.37	7.58	1,291.59
15	170.37	170.27	7.58	1,291.03
16	170.27	170	4.93	836.77
17	170	170	12.5	2,125.00
18	170	170	3.91	664.70
19	170	170	2.21	375.70
20	170	170	1.51	256.70
21	170	170	8.57	1,456.90
22	170	170	8.01	1,361.70
23	170	169.88	8.51	1,446.19
24	169.88	170	9.97	1,694.30
25	170	170	1.17	198.90
26	170	170	2.33	396.10
27	170	170	1.07	181.90
28	170	170	11.94	2,029.80
29	170	170	1.04	176.80
30	170	170	7.77	1,320.90
TOTAL			152.8	25,987.32
EG				170.07

SOFTSCAPE AREA CALCULATION		
	AREA	%
FRONT YARD AREA	919	100.00%
MIN. SOFT LANDSCAPE	328	40.00%
ALLOWABLE HARDSCAPE	491	60.00%
SOFT LANDSCAPE		
SOD AREAS	282	34.43%
LANDSCAPE BEDS	100	12.21%
TOTAL SOFT LANDSCAPE	382	46.64%
HARD LANDSCAPE		
PORCH AREA	0	0.00%
WALKWAYS	66	8.06%
DRIVEWAY	353	43.10%
OTHER HARD SURFACES	18	2.20%
TOTAL HARD LANDSCAPE	437	53.36%

GENERAL NOTES - CITY OF MISSISSAUGA TRAFFIC

I. ALL DAMAGED OR DISTURBED AREAS WITHIN THE MUNICIPAL RIGHT-OF-WAY ARE TO BE REINSTATE AT THE OWNERS EXPENSE.

II. ALL LANDSCAPING AND GRADING WITHIN CLOSE PROXIMITY TO THE PROPOSED ACCESS POINTS IS TO BE DESIGNED TO ENSURE THAT ADEQUATE SIGHT DISTANCES ARE AVAILABLE FOR ALL APPROACHING AND EXITING MOTORISTS AND PEDESTRIANS.

III. THE PORTION OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD IS TO BE PAVED BY THE OWNER.

IV. DRIVEWAY ACCESSES SHALL MAINTAIN A 1.5M SETBACK FROM ABOVEGROUND UTILITIES SUCH AS UTILITIES AND TREES.

V. ANY ABOVE GROUND UTILITIES LOCATED WITHIN 1.5M OF A PROPOSED ACCESS ARE TO BE RELOCATED AT THE OWNERS EXPENSE.

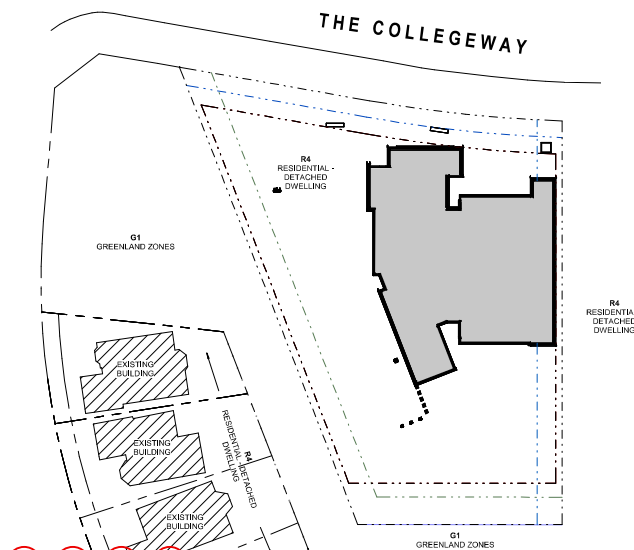
VI. THE COST FOR ANY/ALL ROAD IMPROVEMENTS REQUIRED IN SUPPORT OF THIS DEVELOPMENT APPLICATION WILL BE BORNE BY THE OWNER.

VII. THE OWNER SHALL MAKE SATISFACTORY ARRANGEMENTS WITH THE TRANSPORTATION AND WORKS DEPARTMENT FOR THE DESIGN, CONSTRUCTION AND PAYMENT OF ALL COSTS ASSOCIATED WITH WORKS NECESSARY TO SUPPORT ACCESS TO THIS SITE.

VIII. ANY ACCESS TO INTERNAL SERVICES SHALL BE PROVIDED INTERNALLY THROUGH THE SITE.

IX. DETAILS OF THE SITE SPECIFIC ACCESS CONFIGURATIONS WILL BE FINALIZED IN CONJUNCTION WITH THE SITE PLAN REVIEW/ APPROVAL PROCESS.

1 KEY PLAN
1 : 500



PROJECT SITE STATISTICS DATA				
ZONING INFORMATION				
ITEM	DESCRIPTION	DESCRIPTION		
1	ZONING BY-LAW	R4		
2	ZONING CATEGORY	R4 (RESIDENTIAL)		
3	PERMITTED USES	DETACHED DWELLING (ESSENTIAL EMERGENCY SERVICE PERMITTED)		
4	LOT AND PLAN NUMBER	43M-745 BLOCK 124 PART 1		
5	BUILDING TENURE			
6	CoA DECISIONS			
LOT REQUIREMENTS		REQUIRED		PROPOSED
7	LOT AREA	3785.5...	m²...	3785.5... m²...
8	LOT FRONTAGE MINIMUM	12	m	69.77 m
9	LOT COVERAGE MAXIMUM %	40	%	27 %
10	FRONT YARD MINIMUM	6	m	6 m
11	GREEN ROOF AREA	40	m²	N/A m²
12	YARD SOFT LANDSCAPE MINIMUM	40	%	64 %
13	HARDSCAPED AREA (HIGH ALBEDO)	N/A	m²	N/A m²
14	PAVED AREA	N/A	m²	N/A m²
PRINCIPAL BUILDING REQUIREMENTS		REQUIRED		PROPOSED
15	BUILDING HEIGHT MAXIMUM	10.7	m	7.73 m
16	FLOOR SPACE INDEX	N/A	FSI	N/A FSI
17	BUILDING FOOTPRINT	1514.2	m²	1020 m²
18	GROSS BUILDING AREA	N/A	m²	1020 m²
19	ESTABLISHED GRADE	N/A	m	170.0 m
PARKING, LOADING, BICYCLE SPACES		REQUIRED		PROPOSED
PARKING SPACES CALCULATION: *1 space per staff on duty with a minimum of 2.0 spaces		11 STAFF PER SHIFT		21
20				
21	BARRIER-FREE PARKING SPACES			
Type A		1	spaces	1 spaces
Type B		N/A	spaces	N/A spaces
22	BICYCLE PARKING			
Class A		N/A	spaces	N/A spaces
Class B		2	spaces	3 spaces
23	LOADING SPACES	N/A		N/A
BUILDING TO PROPERTY SETBACKS		REQUIRED		PROPOSED
24	FRONT YARD SETBACK	6	m	6 m
25	SIDE YARD SETBACK	1.2	m	18.6 m
26	REAR YARD SETBACK	7.5	m	20 m
27	SIDE YARD SETBACK	1.2	m	1.2 m
LANDSCAPE BUFFER PROPERTY SETBACKS		REQUIRED		PROPOSED
28	LANDSCAPE BUFFER FRONT YARD	N/A	m	6 m
29	LANDSCAPE BUFFER SIDE YARD	N/A	m	3.5 m
30	LANDSCAPE BUFFER REAR YARD	N/A	m	5.3 m
31	LANDSCAPE BUFFER SIDE YARD	N/A	m	1.2 m
ADDITIONAL SITE REQUIREMENTS		REQUIRED		PROPOSED
32	G1 ZONE SETBACK			
SIDE YARD SETBACK		5	m	N/A m
REAR YARD SETBACK		5	m	N/A m

CITY OF MISSISSAUGA FIRE STATION 123

123 THE COLLEGEWAY
MISSISSAUGA, ONTARIO
CANADA

SITE PLAN APPLICATION # TO BE CONFIRMED

DEVELOPMENT TYPE EMERGENCY SERVICES

LEGAL DESCRIPTION PART OF BLOCK 124 REGISTERED PLAN 43M-745

CPAI 25 Main Street West
Hamilton, Ontario
L8P 1H1 Canada
T: 905-522-0220

architecture
interiors
urban design

DRAWINGS ARE NOT TO BE SCALED.

CONTRACTOR MUST VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCY TO ARCHITECTS BEFORE PROCEEDING WITH WORK.

ALL DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK.

SEALS

NOT FOR CONSTRUCTION

5 PAM 1 RE-SUBMISSION 10/02/23

4 MINOR VARIANCE APPLICATION 08/02/23

3 PRELIMINARY ZONING REVIEW 08/08/23

2 PRELIMINARY ZONING REVIEW 08/02/23

1 PRELIMINARY ZONING REVIEW ONLY 08/26/23

0 SPA PRE-CONSULTATION 03/28/23

NO. ISSUES/REVISIONS DATE

DRAWING TITLE: SITE PLAN

ISSUE DATE: 10/02/23

DRAWN BY: SRJ/AF CHECKED BY: SRL

PROJECT NO.: 12301 SCALE: AS INDICATED

DRAWN BY: SRJ/AF REVISION:

A100

5

Mississauga Planning and Building Department
Development and Design Division
300 City Centre Drive
Mississauga, ON L5B 3C1

2023-11-29

Re: Mississauga Fire Station 123

To whom it may concern,

This letter is to confirm that the proposed construction of the FS 123 shall be of combination of combustible and non-combustible and fire-resistive construction as required by the Ontario Building Code. As per the OBC, a building of this size and number of storeys is required to provide a fire resistive rating as follows:

- Floors (including floors over basements): 45min
- Roofs (where there is an occupancy above proposed): 45min
- Roofs (where no occupancy above): 0 hr
- Construction type required: combustible and non-combustible

The proposed building will be fully sprinklered as per NFPA 13 for a building classification of Group D and F3 Low Hazard Industrial.


Please also refer to the Functional Servicing and Storm Water Management report for further details regarding water flow rates and calculations.

Yours Sincerely,



Sebastian Lubczynski
Per:

Design Partners in Architecture and Interiors

 LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation			
	Prepared:	G.B.	Page No.	A-01
	Checked:	F.M.		
Project: New Fire Station 123 3050 Collegeway, Mississauga, ON	Proj. #	23394		
	Date:	01-Dec-23		

PROPOSED 1-STOREY FIRE STATION

This calculation is following the "Water Supply for Public Fire Protection (2020)" by Fire Underwriters Survey.

Formula: $F = 220C\sqrt{A}$
 where F = the required fire flow in litres per minute
 C = Construction Coefficient (CC)
 = 0.8 for Type II Noncombustible Construction
 A = Effective Area*
 = 1020 m² (vertical openings protected)
 With a Construction Coefficient less than 1.0 with protected vertical openings protected, the Effective Area (A) is calculated using the largest single floor plus 25% of the area of the two adjoining floors

According the building stats, Area (m²)
 GFA 1020
 A 1020
 Therefore, $F = 220 \times 0.8 \times \sqrt{1020}$
 $F = 6000$ l/min

Occupancy reduction:

Occupancy Type Limited Combustible Contents
 For Limited Combustible Contents, an adjustment of -15% shall be applied
 Therefore: $F = 5100$ l/min

Reduction for sprinkler protection: NFPA Compliant
 Using the NFPA sprinkler system, a reduction rate of 30% is used.

Therefore: $F = 3570$ l/min


Separation charge, Calc type: Simple
 Charge for the separations on each side:

Sprinkler	Separation	description	Charge	Direction
<input type="checkbox"/>	50 m	>30.1m	0%	South
<input type="checkbox"/>	50 m	>30.1m	0%	North
<input type="checkbox"/>	50 m	>30.1m	0%	East
<input type="checkbox"/>	50 m	>30.1m	0%	West

	▼
	▼
	▼
	▼

Total charge in % 0%
 Total charge in l/min 0

Required Fire Flow: 4000 l/min
 or 66.67 l/s
 or 1057 US GPM

 LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation			
	Prepared:	G.B.	Page No.	A-02
	Checked:	F.M.		
	Proj. #	23394		
Project: New Fire Station 123		Date:	01-Dec-23	
3050 Collegeway, Mississauga, ON				

PROPOSED 1-STOREY FIRE STATION

Proposed Total GFA: 0.102 ha

Peak Hour Demand Calculation:

Number of Employees	11 staff/day
Average Consumption Rate	300 L/emp*day
Peaking Factor	3.00
Peak Hour Demand	0.11 L/sec

Maximum Day Demand Calculation:

Number of Employees	11 staff/day
Average Consumption Rate	300 L/emp*day
Peaking Factor	1.4
Maximum Day Demand	0.05 L/sec

Fire Flow: 66.7 L/sec

Max. Day Demand plus Fire Flow: 66.7 L/sec

Design Water Demand 66.7 L/sec
1057.5 US GPM

Maximum Day Demand Calculation by Mechanical:

Domestic Water Demand by Mechanical (Fixture Unit Based Calculations) 15.29 L/sec
(Includes 4 hose reels in the apparatus bay @ 2.5 L/s each)

Fire Flow: 66.7 L/sec

Max. Day Demand plus Fire Flow: 82.0 L/sec

Design Water Demand 82.0 L/sec
1299.0 US GPM



LEA Consulting Ltd.
Consulting Engineers and
Planners

Watermain Adequacy Calculation Sheet

Prepared:	G.B.	Page No.	A-03
Checked:	F.M.		
Proj. #	23394		
Date:	01-Dec-23		

Project: New Fire Station 123
3050 Collegeway, Mississauga, ON

Existing 300mm Watermain

Hydrant Test Results - 3010 The Collegeway, LHS Inc., August 17, 2023

Flow (L/s)	Flow (US GPM)	Residual Pressure (PSI)	
0.0	0	83.0	Static
82.0	1299	73.0	Flow response 1
125.2	1984	65.0	Flow response 2

241.4	3826	20.0	Estimated
-------	------	------	-----------

Fire Flow + Max Day Demand

Flow (L/s)	Flow (US GPM)	Residual Pressure (PSI)
81.96	1,299	74.5

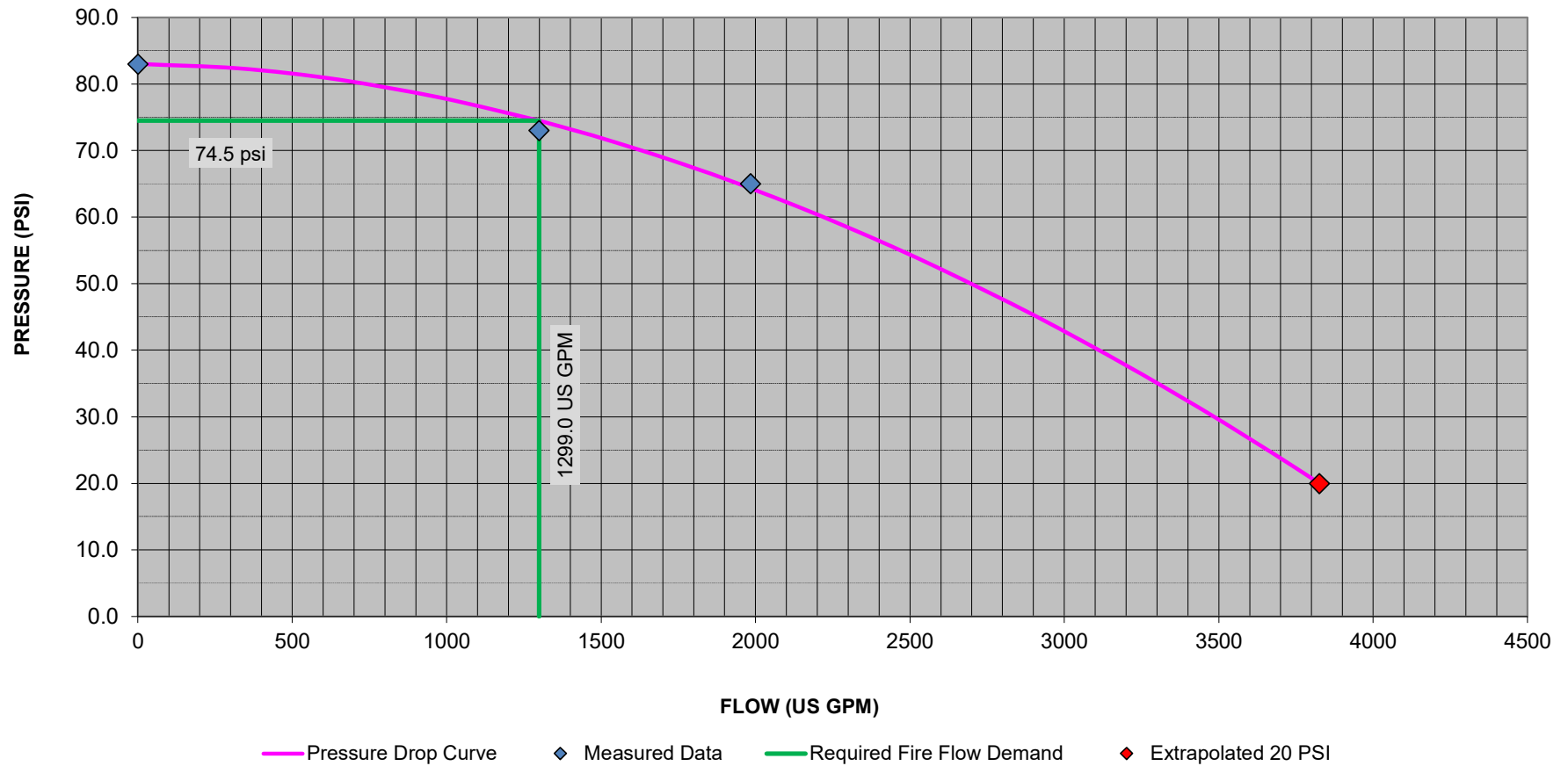
Residual Pressure based on Best Fit Curve

Flow (L/s)	Flow (US GPM)	Residual Pressure (psi)
0.0	0.0	83.0
20.5	324.8	82.3
41.0	649.5	80.6
61.5	974.3	78.0
82.0	1,299.0	74.5
82.0	1,299.0	74.5
92.8	1,470.3	72.3
103.6	1,641.5	69.9
114.4	1,812.8	67.2
125.2	1,984.0	64.3
134.9	2,137.5	61.6
144.5	2,290.9	58.6
154.2	2,444.4	55.5
163.9	2,597.9	52.2
173.6	2,751.3	48.8
183.3	2,904.8	45.2
192.9	3,058.3	41.4
202.6	3,211.7	37.4
212.3	3,365.2	33.3
222.0	3,518.7	29.0
231.7	3,672.1	24.6
241.4	3,825.6	20.0



Existing 300mm Watermain on The Collegeway

FLOW TEST CHART
(BASED ON HYDRANT FLOW TEST REPORT, BY LHS Inc., DATED 2023-08-17)





LHS INC.

P.O. Box 712 Cobourg ON K9A 4R5

905-377-0715 / 1-866-622-4022

Email: info@lhsinc.com

Client	City of Mississauga (Test #1) 300 City Centre Dr. Mississauga, On	Site	3010 The Collegeway
		Site Contact Phone	Utility

FIRE FLOW TEST

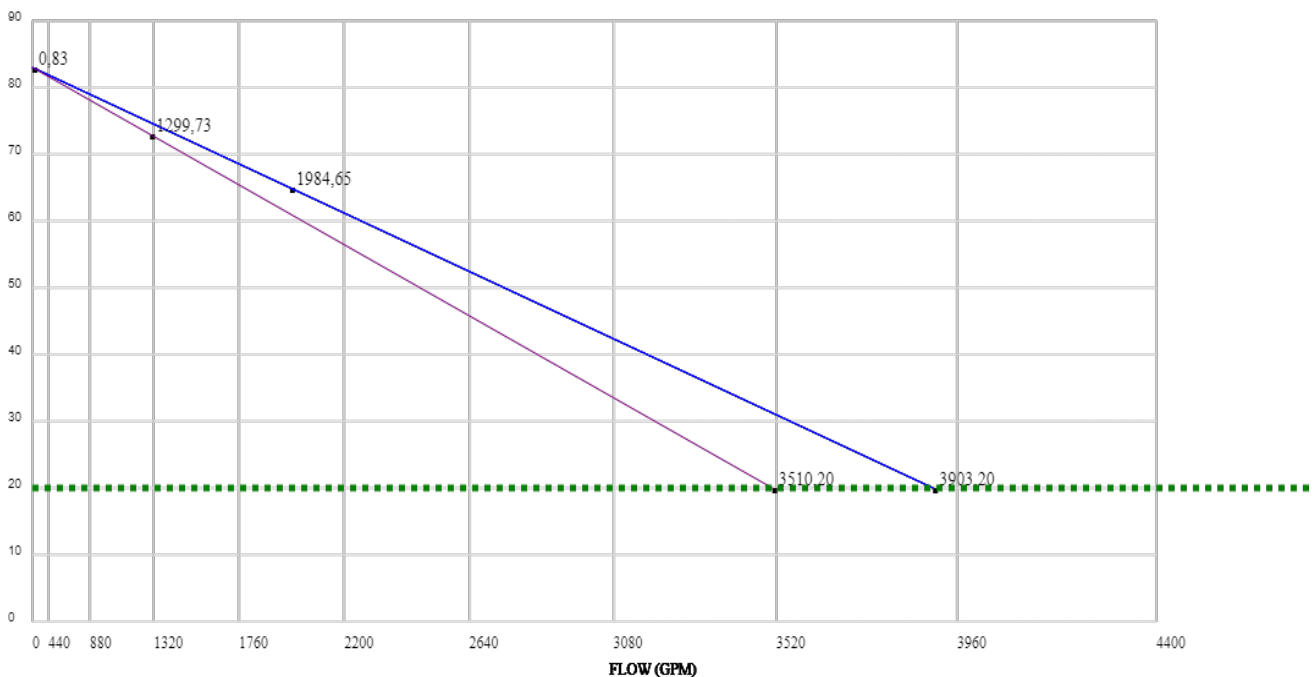
Fire Flow Date	August 17, 2023 - 10:15 am		
Site	3010 The Collegeway		
Static Hydrant	Hydrant #2028160	Hydrant Colours	RED - C 0-500
Flow Hydrant	Hydrant #2028161		ORANGE - B 500-1000
Notes	300mm PVC		GREEN - A 1000-1500
			BLUE - AA >1500

Single Port

Static	83 psi
Residual 1	73 psi
Flow	60 psi
Observed	1299 US GPM 1082 IMP GPM 4918 L / MIN
Projected @ 20psi	3510 US GPM 2923 IMP GPM 13287 l/min.

Two Port

Static	83 psi
Residual 2	65 psi
Flow 2 (x2)	35 psi
Observed	1984 US GPM 1652 IMP GPM 7512 L / MIN
Projected @ 20psi	3903 US GPM 3250 IMP GPM 14774 l/min.



NOTE: MECHANICAL CALCULATIONS RECEIVED FROM QUASAR CONSULTING GROUP

Sanitary and Domestic Pipe Sizing Calculation

Job Name: CoM Fire Station By: KO
Job Number: CM-22-281 Date: November 20, 2023
System: 0 Page: 3 OF 4

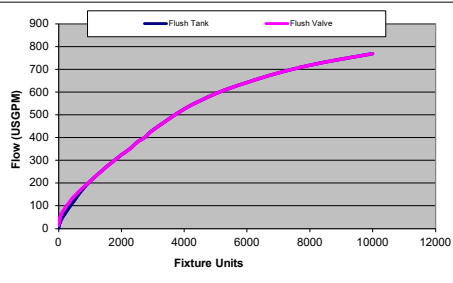
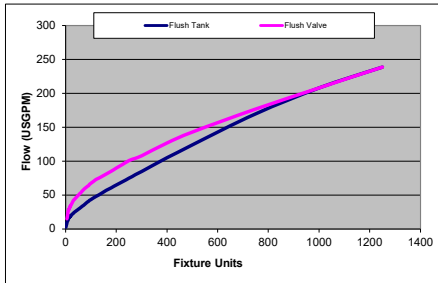
DOMESTIC LOAD CALCULATION FORM

Fixtures	Type (pr/pu)	Quantity	CW FU's	HW FU's	Total FU's
Bathroom group w/ 6 LPF tank	Pr	0	0	0	0
Bathroom group w/ > 6 LPF tank	Pr	0	0	0	0
Bathtub with or without shower head	Pu	0	0	0	0
Bathtub with 3/4 in spout	Pu	0	0	0	0
Bedpan washer	Pu	0	0	0	0
Bidet	Pr	0	0	0	0
Clothes Washer, 3.5 kg	Pr	0	0	0	0
Clothes Washer, 6.8 kg	Pu	3	9	9	12
Clothes Washer, commercial	Pu	0	0	0	0
Dental lavatory	Pu	0	0	0	0
Dental unit, cuspidor	Pu	0	0	0	0
Dishwasher, commercial	Pu	0	0	0	0
Dishwasher, domestic	Pr	1	0	1.4	1.4
Drinking fountain or water cooler	Pu	0	0	0	0
Hose bibb, 1/2 in	Pu	0	0	0	0
Hose bibb, 3/4 in	pr	6	18	0	18
Hose bibb, combination hot and cold	Pu	0	0	0	0
Lavatory, 8.3 L/min or less	Pr	5	2.5	2.5	3.5
Lavatory, > 8.3 L/min	Pu	0	0	0	0
Shower head, 9.5 L/min or less per head	pr	5	5	5	7
Shower head, > 9.5 L/min per head	pr	0	0	0	0
Shower spray, multi-head, FU per head	Pu	0	0	0	0
Sink					
Sink, bar	Pu	0	0	0	0
Sink, clinic service faucet	Pu	0	0	0	0
Sink, clinic service faucet with direct FV	Pu	0	0	0	0
Sink, kitchen, commercial, per faucet	Pu	0	0	0	0
Sink, kitchen, domestic, 8.3 L/min or less	Pu	1	1	1	1.4
Sink, kitchen, domestic, > 8.3 L/min	Pu	0	0	0	0
Sink, laboratory	Pu	0	0	0	0
Sink, laundry (1 or 2 compartments)	Pu	1	1	1	1.4
Sink, service or mop basin	Pu	2	4.5	4.5	6
Sink, washup, per faucet	Pu	0	0	0	0
Urinal, with direct Flush Valve (FV)	Pu	0	0	0	0
Urinal, with Flush Tank (FT)	Pu	0	0	0	0
Urinal, with self-closing metering valve	Pu	0	0	0	0
Water Closet, 6 LPF or less with Flush Tank	Pu	0	0	0	0
Water Closet, > 6 LPF with Flush Tank	Pu	0	0	0	0
Water Closet, with direct Flush Valve (FV)	Pu	5	115	0	115
Fixtures Not Listed in Table 7.6.3.2A					
3/8 in Supply Pipe	Pu	0	0	0	0
1/2 in Supply Pipe	Pu	0	0	0	0
3/4 in Supply Pipe	Pu	0	0	0	0
1 in Supply Pipe	Pu	0	0	0	0
pr = private, pu = public					
TOTAL			156	24.4	165.7

Type of System	FV	(FT or FV)
Total FU	165.7	
Total Flow	82.3	USGPM
Min. Pipe Size	0.0	in
CW FU	156	
CW Flow	80.2	USGPM
Min. Pipe Size	0.0	in
HW FU	24	
HW Flow	37.6	USGPM
Min. Pipe Size	0.0	in

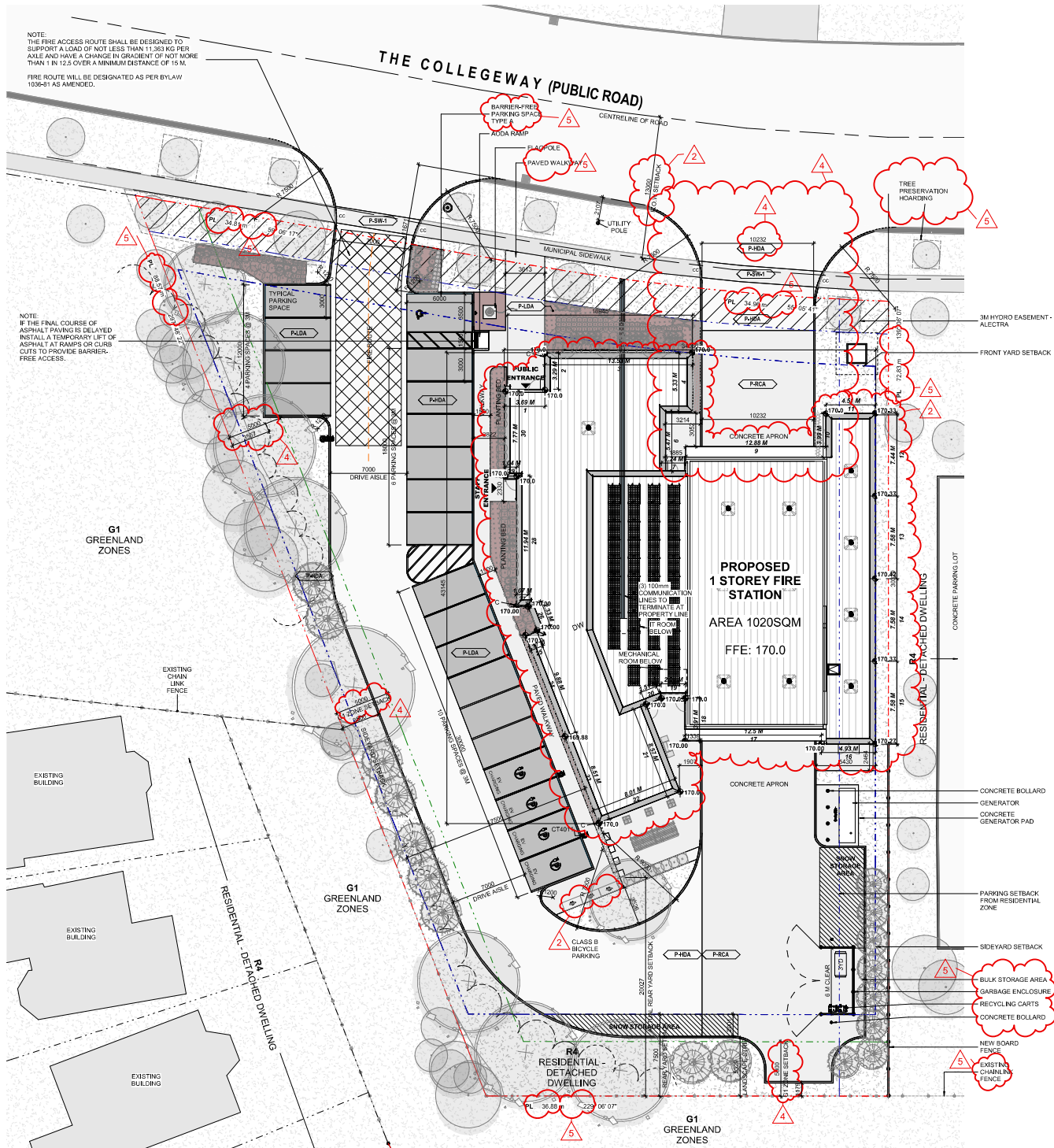
Domestic Water			
Demand Load	Demand Flush	Demand	Demand
Fixture Units	Tank (USGPM)	Fixture Units	Flush Valve (USGPM)
1	3	1	
2	5	2	
3	7	3	
4	8	4	
5	9	5	15
6	11	6	17
7	12	7	20
8	13	8	22
9	14	9	25
10	15	10	27
11	15	11	28
12	16	12	29
13	17	13	29
14	17	14	30
15	18	15	31
16	18	16	32
17	18	17	33
18	19	18	33
19	19	19	34
20	20	20	35
25	22	25	38
30	23	30	42
35	25	35	44
40	26	40	46
45	28	45	48
50	29	50	50
60	32	60	54
70	35	70	58
80	38	80	61
90	41	90	64
100	44	100	68
120	48	120	73
140	53	140	77
160	57	160	81
180	61	180	86
200	65	200	90
225	70	225	96
250	75	250	101
275	80	275	105
300	85	300	108
400	105	400	127
500	124	500	143
750	170	750	177
1000	208	1000	208
1250	239	1250	239
1500	269	1500	269
1750	297	1750	297
2000	325	2000	325
2250	348	2250	348
2500	380	2500	380
2750	402	2750	402
3000	433	3000	433
4000	525	4000	525
5000	593	5000	593
6000	643	6000	643
7000	685	7000	685
8000	718	8000	718
9000	745	9000	745
10000	769	10000	769

Adding in 4 hose reels in the apparatus bay @ 2.5L/S(40GPM) each. Total of 160 GPM + 82.3 GPM = 242.3 GPM.



APPENDIX B

SANITARY FLOW CALCULATIONS



2 SITE PLAN
1 : 200

ESTABLISHED GRADE CALCULATION				
LENGTH NO.	BEGIN ELEV.	END ELEV.	LENGTH	CALCULATION
1	170	170	3.61	613.70
2	170	170	3.59	610.30
3	170	170	13.53	2,300.10
4	170	170	5.41	919.70
5	170	170	2.57	436.90
6	170	170	5.4	918.00
7	170	170	2.24	380.80
8	170	170	1.27	215.90
9	170	170	12.88	2,189.60
10	170	170	3.99	678.30
11	170	170.33	4.51	767.44
12	170.33	170.37	7.44	1,267.40
13	170.37	170.42	7.58	1,291.59
14	170.42	170.37	7.58	1,291.59
15	170.37	170.27	7.58	1,291.03
16	170.27	170	4.93	836.77
17	170	170	12.5	2,125.00
18	170	170	3.91	664.70
19	170	170	2.21	375.70
20	170	170	1.51	256.70
21	170	170	8.57	1,456.90
22	170	170	8.01	1,361.70
23	170	169.88	8.51	1,446.19
24	169.88	170	9.97	1,694.30
25	170	170	1.17	198.90
26	170	170	2.33	396.10
27	170	170	1.07	181.90
28	170	170	11.94	2,029.80
29	170	170	1.04	176.80
30	170	170	7.77	1,320.90
TOTAL			152.8	25,987.32
EG				170.07

SOFTSCAPE AREA CALCULATION		
	AREA	%
FRONT YARD AREA	919	100.00%
MIN. SOFT LANDSCAPE	328	40.00%
ALLOWABLE HARDSCAPE	491	60.00%
SOFT LANDSCAPE		
SOD AREAS	282	34.43%
LANDSCAPE BEDS	100	12.21%
TOTAL SOFT LANDSCAPE	382	46.64%
HARD LANDSCAPE		
PORCH AREA	0	0.00%
WALKWAYS	66	8.06%
DRIVEWAY	353	43.10%
OTHER HARD SURFACES	18	2.20%
TOTAL HARD LANDSCAPE	437	53.36%

GENERAL NOTES - CITY OF MISSISSAUGA TRAFFIC

I. ALL DAMAGED OR DISTURBED AREAS WITHIN THE MUNICIPAL RIGHT-OF-WAY ARE TO BE REINSTATE AT THE OWNERS EXPENSE.

II. ALL LANDSCAPING AND GRADING WITHIN CLOSE PROXIMITY TO THE PROPOSED ACCESS POINTS IS TO BE DESIGNED TO ENSURE THAT ADEQUATE SIGHT DISTANCES ARE AVAILABLE FOR ALL APPROACHING AND EXITING MOTORISTS AND PEDESTRIANS.

III. THE PORTION OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD IS TO BE PAVED BY THE OWNER.

IV. DRIVEWAY ACCESSES SHALL MAINTAIN A 1.5M SETBACK FROM ABOVEGROUND UTILITIES SUCH AS UTILITIES AND TREES.

V. ANY ABOVE GROUND UTILITIES LOCATED WITHIN 1.5M OF A PROPOSED ACCESS ARE TO BE RELOCATED AT THE OWNERS EXPENSE.

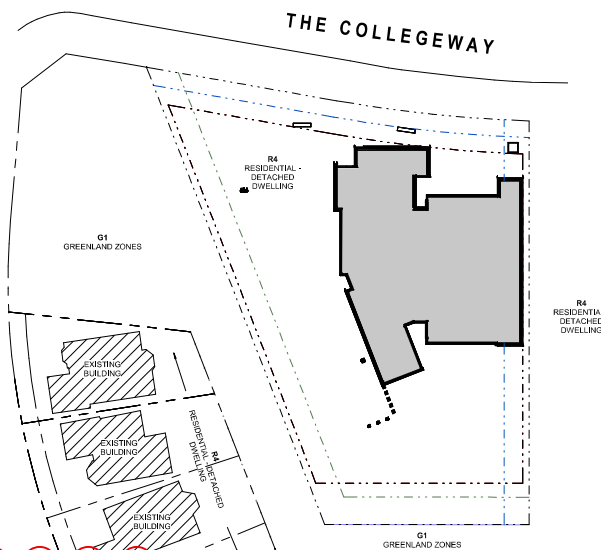
VI. THE COST FOR ANY/ALL ROAD IMPROVEMENTS REQUIRED IN SUPPORT OF THIS DEVELOPMENT APPLICATION WILL BE BORNE BY THE OWNER.

VII. THE OWNER SHALL MAKE SATISFACTORY ARRANGEMENTS WITH THE TRANSPORTATION AND WORKS DEPARTMENT FOR THE DESIGN, CONSTRUCTION AND PAYMENT OF ALL COSTS ASSOCIATED WITH WORKS NECESSARY TO SUPPORT ACCESS TO THIS SITE.

VIII. ANY ACCESS TO INTERNAL SERVICES SHALL BE PROVIDED INTERNALLY THROUGH THE SITE.

IX. DETAILS OF THE SITE SPECIFIC ACCESS CONFIGURATIONS WILL BE FINALIZED IN CONJUNCTION WITH THE SITE PLAN REVIEW/ APPROVAL PROCESS.

PROJECT SITE STATISTICS DATA				
ZONING INFORMATION				
ITEM	DESCRIPTION	DESCRIPTION		
1	ZONING BY-LAW	R4		
2	ZONING CATEGORY	R4 (RESIDENTIAL)		
3	PERMITTED USES	DETACHED DWELLING (ESSENTIAL EMERGENCY SERVICE PERMITTED)		
4	LOT AND PLAN NUMBER	43M-745 BLOCK 124 PART 1		
5	BUILDING TENURE			
6	CoA DECISIONS			
LOT REQUIREMENTS		REQUIRED		PROPOSED
7	LOT AREA	3785.5...	m²...	3785.5... m²...
8	LOT FRONTAGE MINIMUM	12	m	69.77 m
9	LOT COVERAGE MAXIMUM %	40	%	27 %
10	FRONT YARD MINIMUM	6	m	6 m
11	GREEN ROOF AREA	40	m²	N/A m²
12	YARD SOFT LANDSCAPE MINIMUM	40	%	64 %
13	HARDSCAPED AREA (HIGH ALBEDO)	N/A	m²	N/A m²
14	PAVED AREA	N/A	m²	N/A m²
PRINCIPAL BUILDING REQUIREMENTS		REQUIRED		PROPOSED
15	BUILDING HEIGHT MAXIMUM	10.7	m	7.73 m
16	FLOOR SPACE INDEX	N/A	FSI	N/A FSI
17	BUILDING FOOTPRINT	1514.2	m²	1020 m²
18	GROSS BUILDING AREA	N/A	m²	1020 m²
19	ESTABLISHED GRADE	N/A	m	170.0 m
PARKING, LOADING, BICYCLE SPACES		REQUIRED		PROPOSED
PARKING SPACES CALCULATION: *1 space per staff on duty with a minimum of 2.0 spaces		11 STAFF PER SHIFT		21
20				
21	BARRIER-FREE PARKING SPACES			
	Type A	1	spaces	1 spaces
	Type B	N/A	spaces	N/A spaces
22	BICYCLE PARKING			
	Class A	N/A	spaces	N/A spaces
	Class B	2	spaces	3 spaces
23	LOADING SPACES	N/A		N/A
BUILDING TO PROPERTY SETBACKS		REQUIRED		PROPOSED
24	FRONT YARD SETBACK	6	m	6 m
25	SIDE YARD SETBACK	1.2	m	18.6 m
26	REAR YARD SETBACK	7.5	m	20 m
27	SIDE YARD SETBACK	1.2	m	1.2 m
LANDSCAPE BUFFER PROPERTY SETBACKS		REQUIRED		PROPOSED
28	LANDSCAPE BUFFER FRONT YARD	N/A	m	6 m
29	LANDSCAPE BUFFER SIDE YARD	N/A	m	3.5 m
30	LANDSCAPE BUFFER REAR YARD	N/A	m	5.3 m
31	LANDSCAPE BUFFER SIDE YARD	N/A	m	1.2 m
ADDITIONAL SITE REQUIREMENTS		REQUIRED		PROPOSED
32	G1 ZONE SETBACK			
	SIDE YARD SETBACK	5	m	N/A m
	REAR YARD SETBACK	5	m	N/A m



1 KEY PLAN
1 : 500

MISSISSAUGA
CITY OF MISSISSAUGA FIRE STATION 123

MISSISSAUGA, ONTARIO CANADA

SITE PLAN APPLICATION # TO BE CONFIRMED

DEVELOPMENT TYPE EMERGENCY SERVICES

LEGAL DESCRIPTION PART OF BLOCK 124 REGISTERED PLAN 43M-745

25 Main Street West
Hamilton, Ontario
L8P 1H1 Canada

T: 905-522-0220

architecture interiors urban design

DRAWINGS ARE NOT TO BE SCALED.

CONTRACTOR MUST VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCY TO ARCHITECTS BEFORE PROCEEDING WITH WORK.

ALL DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK.

SEALS

NOT FOR CONSTRUCTION

5 PAM 1 RE-SUBMISSION 10/02/23

4 MINOR VARIANCE APPLICATION 08/02/23

3 PRELIMINARY ZONING REVIEW 08/08/23

2 PRELIMINARY ZONING REVIEW 08/02/23

1 PRELIMINARY ZONING REVIEW ONLY 08/26/23

0 SPA PRE-CONSULTATION 03/28/23

NO. ISSUES/REVISIONS DATE

DRAWING TITLE: SITE PLAN

ISSUE DATE: 10/02/23


DRAWN BY: SRJ/AF CHECKED BY: SRL

PROJECT NO.: 12301 SCALE: AS INDICATED

DRAWN BY: SRJ/AF REVISION:

A100

5

 LEA Consulting Ltd. Consulting Engineers and Planners	Sanitary Flow Rate Calculation		
	Prepared:	G.B.	Page No. B-01
	Checked:	F.M.	
Project: New Fire Station 123 3050 Collegeway, Mississauga, ON	Proj. #	23394	
	Date:	01-Dec-23	

PROPOSED 1-STOREY FIRE STATION

POPULATION CALCULATION

(Based on the Architect Statistics from DPAI Architecture dated 2023-10-02)

Site Area	3785.0 m ²
Proposed Total GFA	1020.0 m ²

SANITARY FLOW DEMAND CALCULATION

Flow generated based on calculations using the harmon peaking factor and 270 liters daily sanitary flow per employee from the Region of Peel Linear Wastewater Standards

Design flow used for analysis of the downstream sewer network


Harmon Peaking Factor: $M=1+14/(4+(P/1000)^{0.5})$

Peaking Factor	4.41
Number of Employees	11 emp/day
Daily Sanitary Flow per Employee (non Residential)	270 L/emp/day
Total Daily Flow	0.15 L/sec
Infiltration Allowance (@ 0.26 L/sec/ha)	0.10 L/sec
Design Flow	0.25 L/sec

Full Flow velocity of the proposed 250mm pvc pipe @ 2.0%	1.71 m/s
Actual Flow velocity of the proposed 250mm pvc pipe @ 2.0%	1.48 m/s

APPENDIX C

SINGLE USE DEMAND TABLE

 LEA Consulting Ltd. Consulting Engineers and Planners	Connection Demand Table			
	Prepared:	G.B.	Page No.	C-01
	Checked:	F.M.		
	Proj. #	23394		
Project: New Fire Station 123 3050 Collegeway, Mississauga, ON	Date:	01-Dec-23		

Connection Demand Table

WATER CONNECTION

Connaction Point	The Collegeway
Pressure zone of connection point	
Total equivalent population to be serviced	11 Person- Based on Architectural Building Statistics
Total lands to be serviced	0.4 ha

HYDRANT FLOW TEST

Hydrant flow test location	The Collegeway		
	Pressure	Flow	Time
	(kPa)	(l/s)	
Minimum water pressure	150	221.45	
Maximum water pressure	503	81.96	

*See fire hydrant flow tests

No.	Wate Demand	Demand	Units
	Demand type		
1	Average day flow	0.04	l/s
2	Maximum day flow	0.05	l/s
3	Peak hour flow	0.11	l/s
4	*Fire flow	66.70	l/s
Analysis			
5	Maximum day plus fire flow	66.8	l/s

*As per Water Supply for Public Fire Protection dated 2020 & Region of Peel Watermain Design Standard

Wastewater Connection

Connaction Point	Loyalist Drive
Total equivalent population to be serviced	11 Person- Based on Architectural Building Statistics
Total lands to be serviced	0.4 ha
Wastewater sewers effluent (l/s)	*0.25

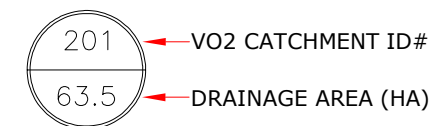
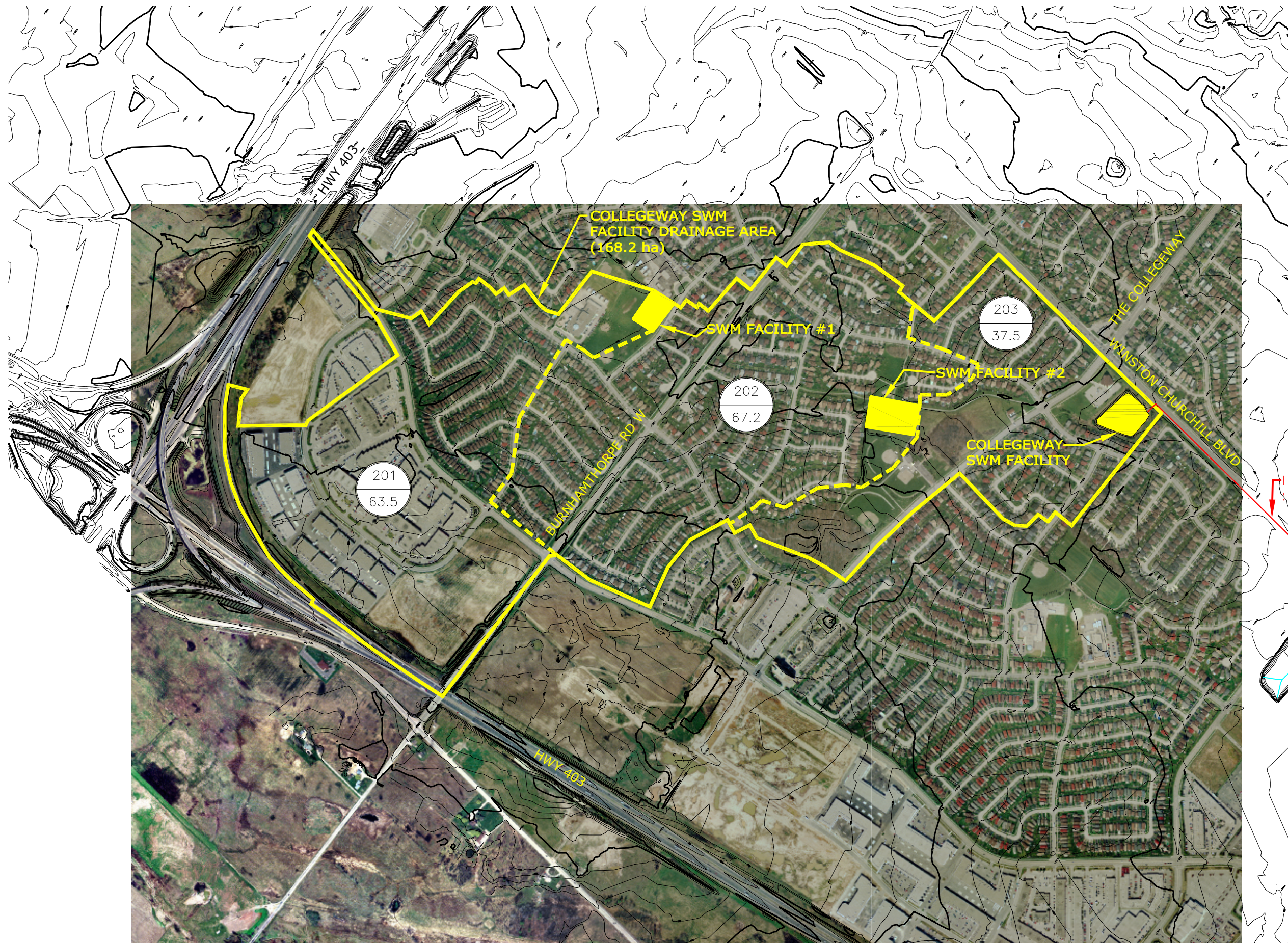
*As per Region of Peel Linear Wastewater Standards dated 2023

APPENDIX D

SWM CALCULATIONS AND DESIGN

APPENDIX D1

EXISTING DRAINAGE PLAN FOR SWM POND



PROJECT
**COLLEGEWAY SWM FACILITY RETROFIT,
CITY OF MISSISSAUGA**


TITLE
EXISTING DRAINAGE PLAN

 **VALDOR ENGINEERING INC.**
Consulting Engineers - Project Managers
741 ROWNTREE DAIRY ROAD, SUITE 2, WOODBRIDGE, ONTARIO, L4L 5T9
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY P.A.	CKD. BY B.C.
SCALE NTS	DATE JUNE 2012
PROJECT 09136	FIGURE 2

APPENDIX D2

SWM CALCULATIONS

 LEA Consulting Ltd. Consulting Engineers and Planners	Land Use			
	Prepared:	G.B.	Page No.	D-01
	Checked:	F.M.		
	Proj. #	23394.01		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Date:	08-Mar-24		

Pre-Development CONDITION


Sub-Catchment EC1

Existing Land Use	Area (m ²)
Grass	3995.0
Sum. Area:	3995.0

Post-Development Condition:

Sub-Catchment PC1

Proposed Land Use	Area (m ²)
Building Roof	1017.0
Paved Area	1858.0
Landscaped Area	1120.0
Sum. Area:	3995.0

 LEA Consulting Ltd. Consulting Engineers and Planners	Composite "C" Calculation			
	Prepared:	G.B.	Page No.	D-02
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Pre-Development Composite Runoff Coefficient "C"


Sub-Catchment EC1

Existing Land Use	Area (ha)	C	Composite "C"
Grass	0.400	0.25	
Total	0.400		0.25
Imperviousness Percent:	0.0		0.25

Post-Development Composite Runoff Coefficient "C"

Sub-Catchment PC1

Proposed Land Use	Area (ha)	C	Composite "C"
Building Roof	0.102	0.90	
Paved Area	0.186	0.90	
Landscaped Area	0.112	0.25	
Total	0.400		0.72
Imperviousness Percent:	72.0		0.72 As per City's Criteria

 LEA Consulting Ltd. Consulting Engineers and Planners	5mm Rainfall Retention Volume (Water Balance)			
	Prepared:	G.B.	Page No.	D-03
	Checked:	M.D.		
	Proj. #	23394.01		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Date:	08-Mar-24		

According to the CVC Guidelines, in order to achieve the water balance target, it is required to retain all runoff from a small event - typically 5mm through infiltration, evapotranspiration & rainwater reuse.


However, to achieve Level 1 of the City of Mississauga's Corporate Green Building Standard Program, it is required to retain 80% runoff generated from a minimum of 15mm depth of a single rainfall event from all site surfaces through infiltration, evapotranspiration, water harvesting and reuse.

Site Area: 0.400 ha
Proposed Impervious Area: 0.288

Runoff volume from 80% of 15mm rainfall event on site:

$$V = 0.288 \times 10 \times 15 \times 80\% = 34.5 \quad \text{m}^3$$

Required on-site retention volume for 80% of 15mm rainfall event: 34.5 m³

 LEA Consulting Ltd. Consulting Engineers and Planners	Pre-Development Peak Flow Rates Calculation			
	Prepared:	G.B.	Page No.	D-04
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Checked:	F.M.		
	Proj. #	23394.01		
	Date:	08-Mar-24		

Rational Formulae: $Q = 2.78 \text{ CIA (L/s)}$

Site Area: 0.400 ha
Time of Concentration 15 minutes as per City Guidelines
Runoff Coefficient : 0.25

Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rate (L/s):


Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under existing site conditions (L/s):	16.62	22.34	27.51	31.60	35.27	39.03

As per the City of Mississauga guidelines, the allowable discharge rate to the municipal sewers is limited to the 10-year pre-development storm design flow.

To achieve Level 1 of the City of Mississauga's Corporate Green Building Standard Program, it is required to achieve 85% reduction of the 100-year post-development flow to pre-development conditions of the site.

Allowable discharge rate at 10-year Pre-development to City Sewer:	27.51 L/s
100-year Pre Development Peak Flow Rate:	39.03 L/s
Adjusted 100-year Post Development Peak Flow Rate:	140.09 L/s
85% of the 100-yr post to pre:	85.90 L/s
Allowable discharge rate to Achieve 85% of the 100-yr post to pre:	54.19 L/s

Therefore, designing for the allowable discharge rate at 10-year Pre-development to City Sewer will satisfy Level 1 of the City of Mississauga's CGBS Program.

 LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates Calculation (Uncontrolled)			
	Prepared:	G.B.	Page No.	D-05
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Rational Formulae: $Q = 2.78 \text{ CIA (L/s)}$

Area: 0.400 ha
Time of Concentration: 15 minutes as per City Guidelines
Runoff Coefficient : 0.72 As per City criteria


Runoff Coefficient Adjustment Factors	Adjusted runoff coefficient
1.00 (2-10-year)	0.717772
1.10 (25-year)	0.789549
1.20 (50-year)	0.9
1.25 (100-year)	0.9

Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

**Peak Flow Rates (L/s):
Sub-Catchment PC1**

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under Post development site conditions (L/s):	47.71	64.13	78.99	90.73	101.27	112.07
Under Post development condition with Adjustment Factors (L/s):	47.71	64.13	78.99	99.80	121.53	140.09

 LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates to Jellyfish Filter			
	Prepared:	G.B.	Page No.	D-06
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Rational Formulae: $Q = 2.78 \text{ CIA (L/s)}$

Non-clean drainage area 0.186 ha
Time of Concentration: 15 minutes as per City Guidelines
Runoff Coefficient : 0.90 As per City's request

Runoff Coefficient Adjustment Factors	Adjusted runoff coefficient
1.00 (10-year)	0.9
1.10 (25-year)	0.99
1.20 (50-year)	1.0
1.25 (100-year)	1.0


Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rates (L/s):

Non-clean drainage area

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under Post development site conditions (L/s):	27.82	37.40	46.07	52.91	59.06	65.36
Under Post development condition with Adjustment Factors (L/s):	27.82	37.40	46.07	58.20	65.62	72.62


 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (2-Year Storm)			
	Prepared:	G.B.	Page No.	D-07
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 2 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m³)	Release Rate (L/s)	Release Flow Volume (m³)	Required Storage Volume (m³)
15	59.89	47.71	42.94	27.51	24.76	18.18
20	50.16	39.96	47.95	27.51	33.02	14.93
25	43.42	34.59	51.89	27.51	41.27	10.62
30	38.45	30.63	55.13	27.51	49.52	5.61
35	34.60	27.57	57.89	27.51	57.78	0.11
40	31.54	25.12	60.30	27.51	66.03	-5.73
45	29.03	23.13	62.44	27.51	74.29	-11.85
50	26.94	21.46	64.37	27.51	82.54	-18.17
55	25.16	20.04	66.13	27.51	90.80	-24.67
60	23.62	18.82	67.75	27.51	99.05	-31.30
65	22.29	17.76	69.25	27.51	107.30	-38.05
70	21.12	16.82	70.64	27.51	115.56	-44.92
75	20.07	15.99	71.96	27.51	123.81	-51.85
80	19.14	15.25	73.19	27.51	132.07	-58.88
85	18.30	14.58	74.36	27.51	140.32	-65.96
90	17.54	13.98	75.47	27.51	148.57	-73.10
95	16.85	13.43	76.52	27.51	156.83	-80.31
100	16.22	12.92	77.53	27.51	165.08	-87.55
105	15.64	12.46	78.50	27.51	173.34	-94.84
110	15.11	12.03	79.42	27.51	181.59	-102.17

Required Storage Volume = 18.18 m³


 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (5-Year Storm)			
	Prepared:	G.B.	Page No.	D-08
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 5.00 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m³)	Release Rate (L/s)	Release Flow Volume (m³)	Required Storage Volume (m³)
15	80.51	64.13	57.72	27.51	24.76	32.96
20	67.43	53.72	64.46	27.51	33.02	31.44
25	58.37	46.50	69.75	27.51	41.27	28.48
30	51.68	41.17	74.10	27.51	49.52	24.58
35	46.52	37.06	77.82	27.51	57.78	20.04
40	42.40	33.77	81.05	27.51	66.03	15.02
45	39.02	31.09	83.93	27.51	74.29	9.64
50	36.21	28.84	86.53	27.51	82.54	3.99
55	33.82	26.94	88.89	27.51	90.80	-1.91
60	31.76	25.30	91.07	27.51	99.05	-7.98
65	29.96	23.87	93.08	27.51	107.30	-14.22
70	28.38	22.61	94.96	27.51	115.56	-20.60
75	26.98	21.49	96.73	27.51	123.81	-27.08
80	25.73	20.50	98.39	27.51	132.07	-33.68
85	24.60	19.60	99.96	27.51	140.32	-40.36
90	23.58	18.79	101.45	27.51	148.57	-47.12
95	22.66	18.05	102.87	27.51	156.83	-53.96
100	21.81	17.37	104.22	27.51	165.08	-60.86
105	21.03	16.75	105.52	27.51	173.34	-67.82
110	20.31	16.18	106.77	27.51	181.59	-74.82

Required Storage Volume = 32.96 m³


 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (10-Year Storm)			
	Prepared:	G.B.	Page No.	D-09
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 10 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m ³)	Release Rate (L/s)	Release Flow Volume (m ³)	Required Storage Volume (m ³)
15	99.17	78.99	71.10	27.51	24.76	46.34
20	83.06	66.16	79.40	27.51	33.02	46.38
25	71.90	57.27	85.91	27.51	41.27	44.64
30	63.66	50.71	91.27	27.51	49.52	41.75
35	57.30	45.64	95.85	27.51	57.78	38.07
40	52.22	41.60	99.84	27.51	66.03	33.81
45	48.07	38.29	103.38	27.51	74.29	29.09
50	44.60	35.53	106.58	27.51	82.54	24.04
55	41.65	33.18	109.49	27.51	90.80	18.69
60	39.11	31.16	112.17	27.51	99.05	13.12
65	36.91	29.40	114.65	27.51	107.30	7.35
70	34.96	27.85	116.97	27.51	115.56	1.41
75	33.24	26.48	119.14	27.51	123.81	-4.67
80	31.69	25.25	121.19	27.51	132.07	-10.88
85	30.31	24.14	123.12	27.51	140.32	-17.20
90	29.05	23.14	124.96	27.51	148.57	-23.61
95	27.90	22.23	126.70	27.51	156.83	-30.13
100	26.86	21.40	128.37	27.51	165.08	-36.71
105	25.90	20.63	129.97	27.51	173.34	-43.37
110	25.01	19.92	131.50	27.51	181.59	-50.09

Required Storage Volume = 46.38 m³


 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (25-Year Storm)			
	Prepared:	G.B.	Page No.	D-010
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 25 2
adjusted Runoff coefficient = 1.1
Adjustment runoff coefficient = 0.789549

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m ³)	Release Rate (L/s)	Release Flow Volume (m ³)	Required Storage Volume (m ³)
15	113.89	99.80	89.82	27.51	24.76	65.06
20	95.40	83.59	100.31	27.51	33.02	67.29
25	82.58	72.36	108.54	27.51	41.27	67.27
30	73.11	64.06	115.31	27.51	49.52	65.79
35	65.80	57.66	121.09	27.51	57.78	63.31
40	59.98	52.55	126.13	27.51	66.03	60.10
45	55.21	48.37	130.61	27.51	74.29	56.32
50	51.22	44.88	134.65	27.51	82.54	52.11
55	47.84	41.92	138.33	27.51	90.80	47.53
60	44.92	39.36	141.71	27.51	99.05	42.66
65	42.39	37.14	144.85	27.51	107.30	37.55
70	40.15	35.18	147.77	27.51	115.56	32.21
75	38.17	33.45	150.52	27.51	123.81	26.71
80	36.40	31.90	153.10	27.51	132.07	21.03
85	34.81	30.50	155.55	27.51	140.32	15.23
90	33.36	29.23	157.86	27.51	148.57	9.29
95	32.05	28.08	160.07	27.51	156.83	3.24
100	30.85	27.03	162.18	27.51	165.08	-2.90
105	29.74	26.06	164.20	27.51	173.34	-9.14
110	28.73	25.17	166.14	27.51	181.59	-15.45

Required Storage Volume = 67.29 m³


 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (50-Year Storm)			
	Prepared:	G.B.	Page No.	D-011
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 50 Year
Runoff coefficient adjustment factor = 1.2
Adjustment runoff coefficient = 0.9

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m ³)	Release Rate (L/s)	Release Flow Volume (m ³)	Required Storage Volume (m ³)
15	127.13	121.53	109.38	27.51	24.76	84.62
20	106.57	101.87	122.25	27.51	33.02	89.23
25	92.30	88.23	132.34	27.51	41.27	91.07
30	81.75	78.15	140.66	27.51	49.52	91.14
35	73.60	70.36	147.75	27.51	57.78	89.97
40	67.10	64.14	153.93	27.51	66.03	87.90
45	61.77	59.05	159.43	27.51	74.29	85.14
50	57.32	54.79	164.38	27.51	82.54	81.84
55	53.54	51.18	168.89	27.51	90.80	78.09
60	50.28	48.07	173.04	27.51	99.05	73.99
65	47.45	45.36	176.89	27.51	107.30	69.59
70	44.95	42.97	180.48	27.51	115.56	64.92
75	42.74	40.85	183.84	27.51	123.81	60.03
80	40.76	38.96	187.00	27.51	132.07	54.93
85	38.97	37.25	190.00	27.51	140.32	49.68
90	37.36	35.71	192.84	27.51	148.57	44.27
95	35.89	34.31	195.55	27.51	156.83	38.72
100	34.54	33.02	198.13	27.51	165.08	33.05
105	33.31	31.84	200.60	27.51	173.34	27.26
110	32.17	30.75	202.98	27.51	181.59	21.39

Required Storage Volume = 91.14 m³

 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (100 - Year Storm)			
	Prepared:	G.B.	Page No.	D-012
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		

Total Drainage Area (ha) = 0.400 ha
Drainage Area Composite C = 0.72
Allowable Release Rate = 27.51 L/s
Return Period = 100 Year
Runoff coefficient adjustment factor = 1.25
Adjustment runoff coefficient = 0.9


Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m ³)	Release Rate (L/s)	Release Flow Volume (m ³)	Required Storage Volume (m ³)
15	140.69	140.09	126.08	27.51	24.76	101.32
20	118.12	117.62	141.14	27.51	33.02	108.12
25	102.41	101.97	152.96	27.51	41.27	111.69
30	90.77	90.39	162.70	27.51	49.52	113.18
35	81.77	81.42	170.99	27.51	57.78	113.21
40	74.58	74.26	178.23	27.51	66.03	112.20
45	68.68	68.39	184.65	27.51	74.29	110.36
50	63.75	63.48	190.44	27.51	82.54	107.90
55	59.56	59.31	195.72	27.51	90.80	104.92
60	55.95	55.71	200.57	27.51	99.05	101.52
65	52.81	52.58	205.06	27.51	107.30	97.76
70	50.03	49.82	209.25	27.51	115.56	93.69
75	47.58	47.37	213.18	27.51	123.81	89.37
80	45.38	45.18	216.87	27.51	132.07	84.80
85	43.39	43.21	220.37	27.51	140.32	80.05
90	41.60	41.42	223.69	27.51	148.57	75.12
95	39.97	39.80	226.84	27.51	156.83	70.01
100	38.47	38.31	229.86	27.51	165.08	64.78
105	37.10	36.94	232.74	27.51	173.34	59.40
110	35.84	35.68	235.51	27.51	181.59	53.92

Required Storage Volume = 113.21 m³

APPENDIX D3

ORIFICE SIZE CALCULATIONS

 LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation			
	Prepared:	G.B.	Page No.	D-013
	Checked:	F.M.		
Project: 3010 THE COLLEGEWAY CITY OF MISSISSAUGA FIRE STATION 123	Proj. #	23394.01		
	Date:	08-Mar-24		


Orifice Discharge Formula: $Q = CA \times \sqrt{2gh}$

Calculate Approximate Diameter		Calculate Flows	
Max. Flow:	27.51 L/s	Diameter:	100 mm
Max. Depth:	1.07 m	Area:	0.008 m ²
Req'd Area:	0.008 m ²	Coeff (Orifice Plate):	0.8
Req'd Dia.:	100 mm	Gravitational Accel:	9.81 m/s ²
Orifice C/L Elev.:	167.69 m	Invert	167.64 m
H.W.L	167.39 m		

Depth (m)	Head (m)	Q (L/s)	Elevation (m)	Remarks
0	0.00	0.0	167.64	Orifice Invert
0.05	0.00	0.0	167.69	Center Elev. of Orifice
0.10	0.05	6.2	167.74	Top Elev. of Orifice
0.25	0.20	12.4	167.89	Ditch Inlet Grate Elevation
0.50	0.45	18.7	168.14	
0.75	0.70	23.3	168.39	
1.00	0.95	27.1	168.64	100-yr water level
1.25	1.20	30.5	168.89	
1.41	1.36	32.5	169.05	

APPENDIX D4

INFILTRATION DRAWDOWN CALCULATIONS

 LEA Consulting Ltd. Consulting Engineers and Planners	Bio-Retention 1-Clear Stone Retention & Drawdown Time Calculation			
	Prepared:	G.B.	Table No.	D-014
	Checked:	F.M.		
	Proj. #	23394		
PROJECT: 3010 The Collegeway CITY OF MISSISSAUGA FIRE STATION 123	Date:	08-Mar-24		

Based on the hydrogeological investigation conducted by G2S Consulting Inc. dated Nov 21, 2023

Calculated estimated Infiltration rate (P) with a factor of 2.5 for the subject site is 21 mm/hr

Clear Stone Detention Design Parameters:

Depth of Granular Stones (y_{max}): 0.200 m
Porosity (n): 0.40
Tank Footprint Area (A): 149.5 m²
*Total Retention Storage Volume within the Granular and Module (V): 35.0 m³

$A = (1000V) / Pnt$

Drawdown time (t) 27.91 hrs 27.91

A = Bottom Area n = Porosity

V = Volume t = Drawdown time

P = Infiltration Rate (5mm/hr)

***Refer to Stage Storage Calculation for the Storm Tank by Layfield**

APPENDIX D5

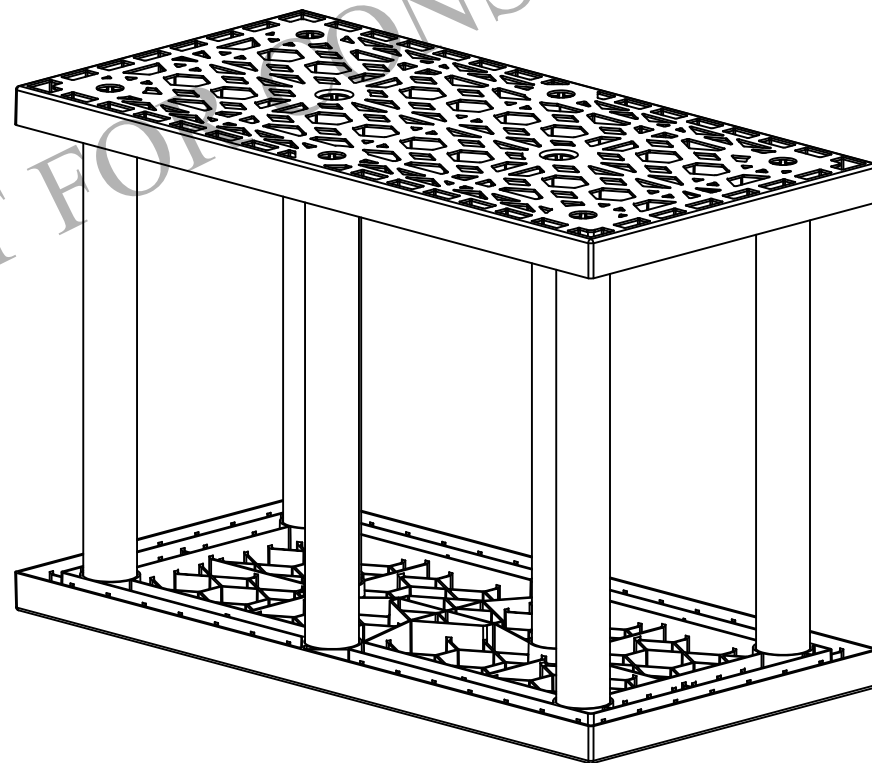
STORM TANK DRAWINGS



BRENTWOOD STORMTANK
MODULE LAYOUT DRAWINGS

3050 THE COLLEGEWAY

Mississauga, ON



Pages:

Cover Page	01 OF 07
Module Layout	02 OF 07
TYP. Construction Details	03 OF 07
TYP. Pipe Penetration Details	04 OF 07
TYP. Debris Row Details	05 OF 07
Supplementary Notes	06 OF 07
Supplementary Notes	07 OF 07



REFER TO STORMTANK
INSTALLATION INSTRUCTIONS



117 Basaltic Rd,
Concord, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	154.05 m ³
Module Storage Volume	118.10 m ³
Stone Storage Volume	35.95 m ³
System Footprint	149.48 m ²
Estimated Geotextile Fabric	NuBarrier 350 m ² LP8 842 m ²
Estimated Liner	421 m ²
Estimated Stone Volume	89.87 m ³
Excavation Required	256.27 m ³
Minimum Excavation Depth	1.71 m
Stone Type	19mm Clear Stone
Stone Void Space	40%
Model Type	25 Series ST-36

3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

Page Name: Cover Page

Drawn by: PE	Checked By: JF
Scale: NTS	Date: 16FEB2024

THIS LAYOUT DRAWING WAS PREPARED TO SUPPORT THE ENGINEER OF RECORD FOR THE PROPOSED SYSTEM. IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO REVIEW THE INFORMATION AND ENSURE THAT THE LAYOUT AND DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS AND THAT THE STORMTANK SYSTEM HAS BEEN DESIGNED IN ACCORDANCE WITH BRENTWOOD'S REQUIREMENTS. LAYFIELD DOES NOT REVIEW OR APPROVE PLANS, SIZING OR DESIGNS.

Sheet:

01 OF 07

SINGLE STACK MODULE SYSTEM

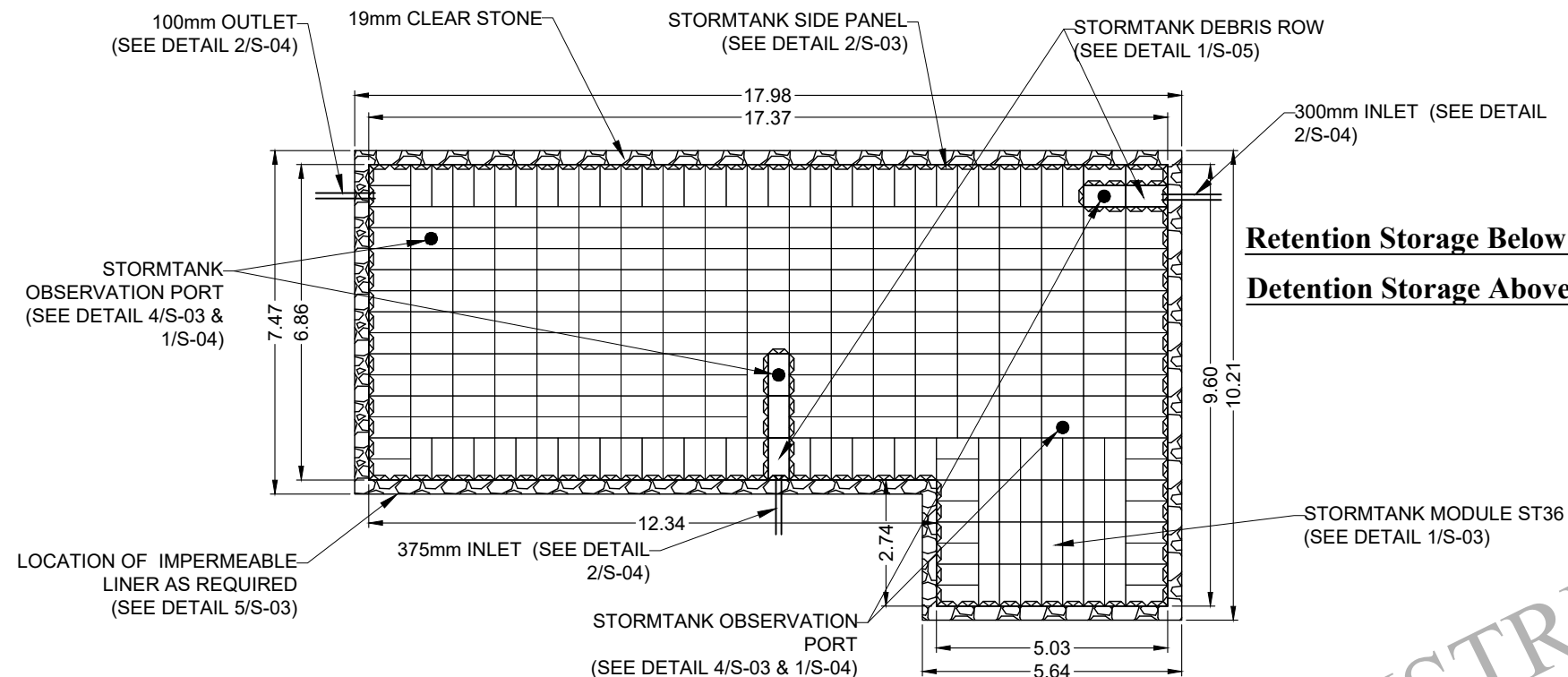
Total Storage Volume	154.05 m ³
Module Storage Volume	118.10 m ³
Stone Storage Volume	35.95 m ³
System Footprint	149.48 m ²
Estimated Geotextile Fabric	NuBarrier 350 m ² LP8 842 m ²
Estimated Liner	421 m ²
Estimated Stone Volume	89.87 m ³
Excavation Required	256.27 m ³
Minimum Excavation Depth	1.71 m
Stone Type	19mm Clear Stone
Stone Void Space	40%
Model Type	25 Series ST-36

3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855	
Page Name:	Module Layout
Drawn by: PE	Checked By: JF
Scale: NTS	Date: 16FEB2024

THIS LAYOUT DRAWING WAS PREPARED TO SUPPORT THE ENGINEER OF RECORD FOR THE PROPOSED SYSTEM. IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO REVIEW THE INFORMATION AND ENSURE THAT THE LAYOUT AND DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS AND THAT THE STORMTANK SYSTEM HAS BEEN DESIGNED IN ACCORDANCE WITH BRENTWOOD'S REQUIREMENTS. LAYFIELD DOES NOT REVIEW OR APPROVE PLANS, SIZING OR DESIGNS.



Retention Storage Below Inv. Elev. 167.67 = 35.04 m3
Detention Storage Above Inv. Elev. 167.67 = 119.01 m3

2
S-02

MODULE LAYOUT

SCALE: NTS

- NOTES:
- All dimensions are measured in feet unless noted otherwise.
 - Reference Brentwood Industries standard drawings and notes for detailed information.
 - Reference current Brentwood Module installation instructions for proper installation practices.
<https://stormwater.brentwoodindustries.com/resources/>
 - Engineer of record to confirm conformance to manufacturer's allowable proximity to other structures and slopes.
 - All inlet and pipe locations and designs by others.
 - The sub-grade and side backfill needs to be compacted to 95%, unless noted otherwise.
 - During and after installation, the Brentwood Module area should be clearly marked and roped off to prevent unauthorized construction and equipment trafficking over the modules.
 - Top of Ground water is to be maintained 610 mm (2 ft) below the module to prevent buoyancy, unless otherwise noted by engineer.
 - The quantities related to stone and geosynthetics are estimated values as the roll size, overlaps, waste, ect. may vary.
 - Materials must be stored in a manner to prevent prolonged exposure to UV light.
 - Materials shall not be handled in temperatures lower than 4.4 °C to prevent damage.
 - Storm tank system is not considered complete until all backfill is installed to the minimum depth shown on Detail 5 Typical System Cross-Section. The installer MUST insure that the project site remains dry and free of water (both surface and groundwater) until the installation is complete, including the backfill as noted, to avoid damage to the tank system due to buoyancy.

1
S-02

NOTES

Material Quantity (ST-36)

ST-36	318
Platens	636
36" Columns	2544
36" Side Panels	140
10" Observation Port	4
6" Saddle Port (By Others)	1

Elevations

Leveling Stone Bottom	167.30
Module Bottom	167.50
Module Invert	167.55
Top of Module	168.41
Top of Stone Backfill	168.71
Minimum Finished Grade	169.01
Maximum Finished Grade	170.85

Contractor to confirm that quantities shipped to site match those listed above. Please report any discrepancy or damage to Layfield immediately.



117 Basaltic Rd,
Concord, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	154.05 m ³
Module Storage Volume	118.10 m ³
Stone Storage Volume	35.95 m ³
System Footprint	149.48 m ²
Estimated Geotextile Fabric	NuBarrier 350 m ² LP8 842 m ²
Estimated Liner	421 m ²
Estimated Stone Volume	89.87 m ³
Excavation Required	256.27 m ³
Minimum Excavation Depth	1.71 m
Stone Type	19mm Clear Stone
Stone Void Space	40%
Model Type	25 Series ST-36

3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

Page Name: TYP. Construction Details

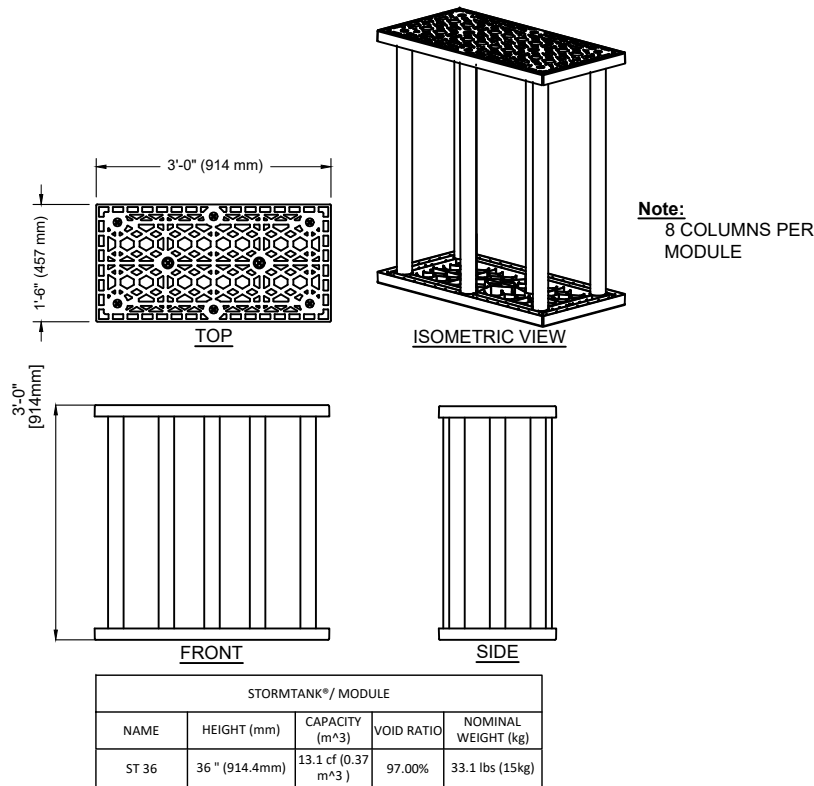
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Scale: NTS	Date: 16FEB2024

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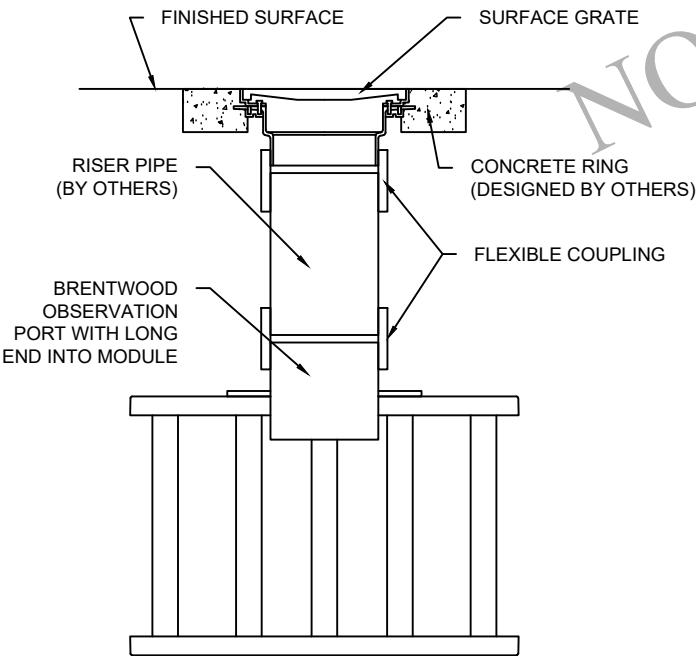
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03 OF 07

ANSI B Size Page (Horizontal)

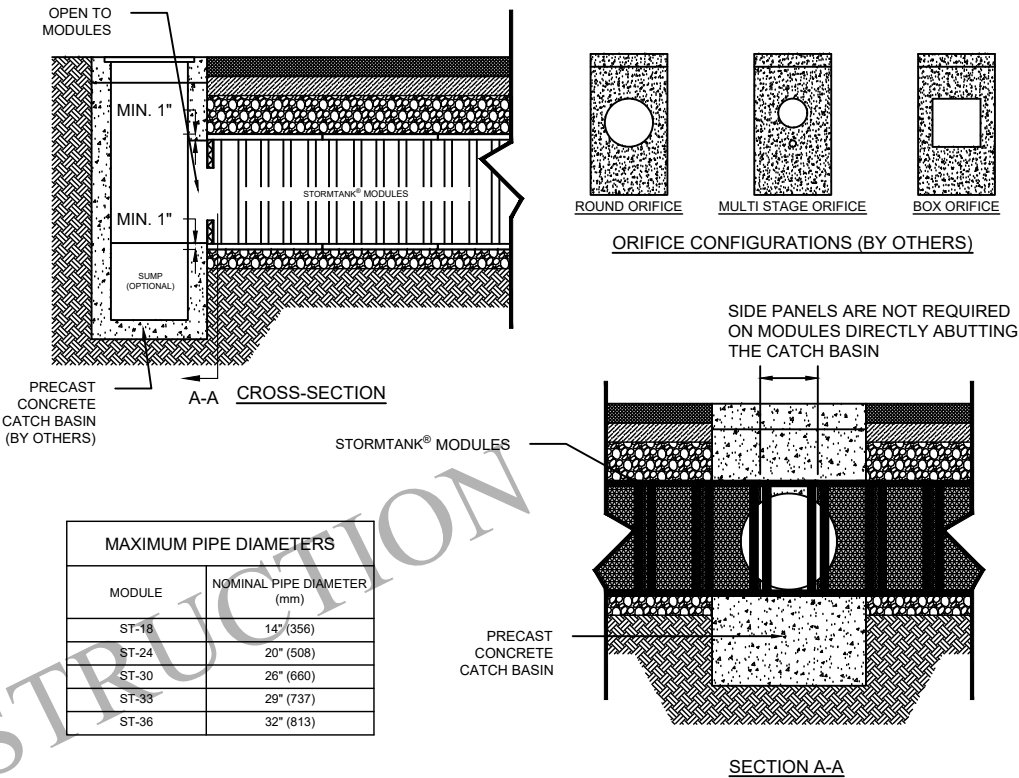
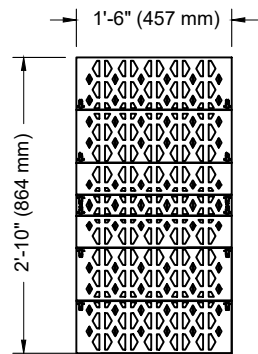


1
S-03 36" (914 mm) MODULE DETAIL

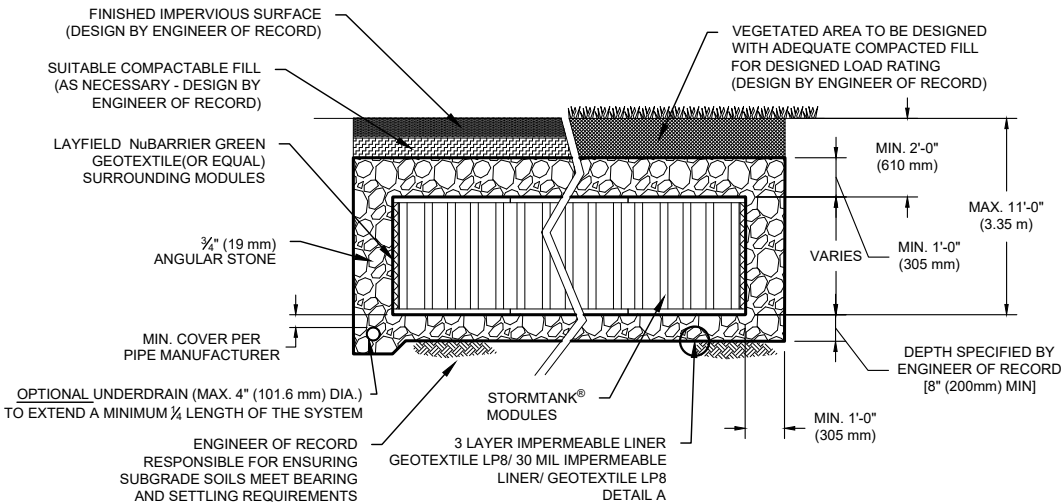


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S-03 SINGLE STACK
OBSERVATION PORT DETAIL

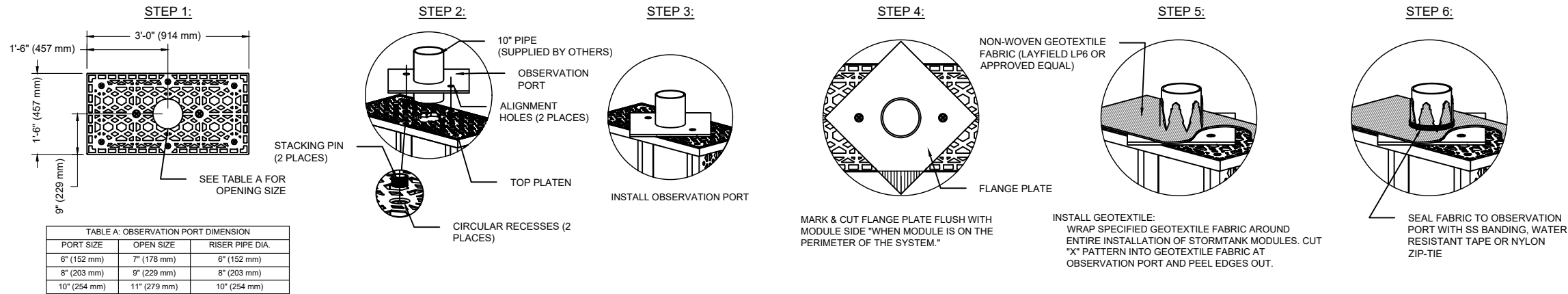
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S-03 36" (914 mm) SIDE PANEL DETAIL



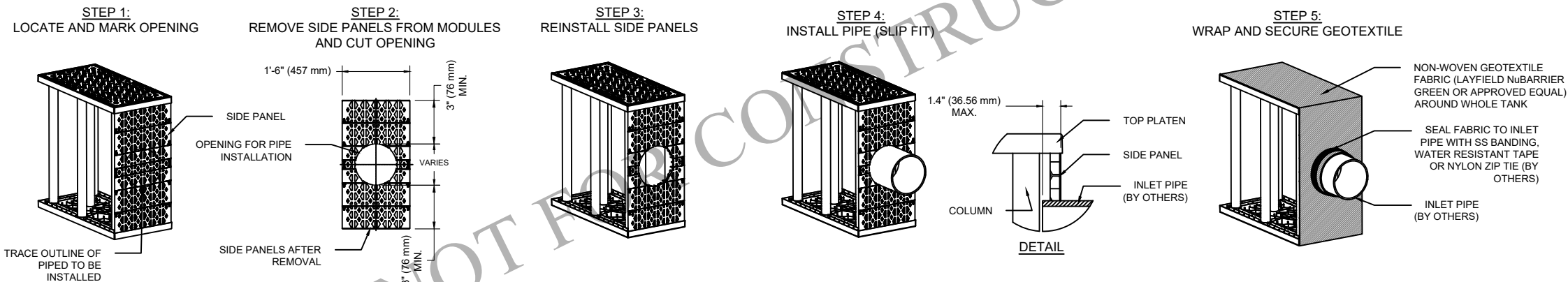
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S-03 TYP. CATCH BASIN ABUTMENT DETAIL
(IF APPLICABLE)



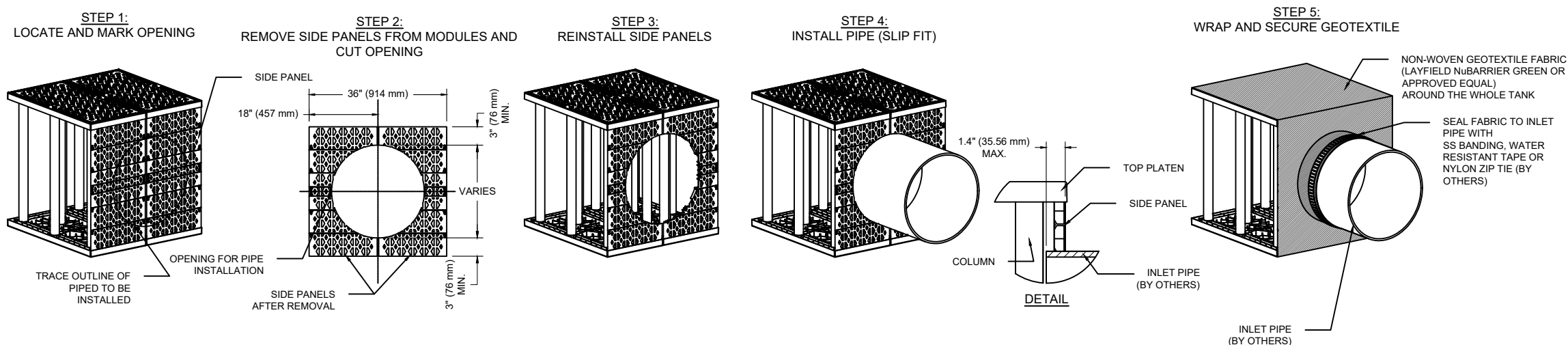
5
S-03 TYPICAL SINGLE STACKED SYSTEM
BASIC CROSS-SECTION



1 TYP. OBSERVATION PORT S-04 INSTALLATION DETAIL



2 SMALL DIAMETER (14" [356 mm] AND SMALLER) S-04 PIPE CONNECTION DETAIL



3 LARGE DIAMETER (15" [381 mm] AND GREATER) S-04 PIPE CONNECTION DETAIL

SINGLE STACK MODULE SYSTEM

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3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

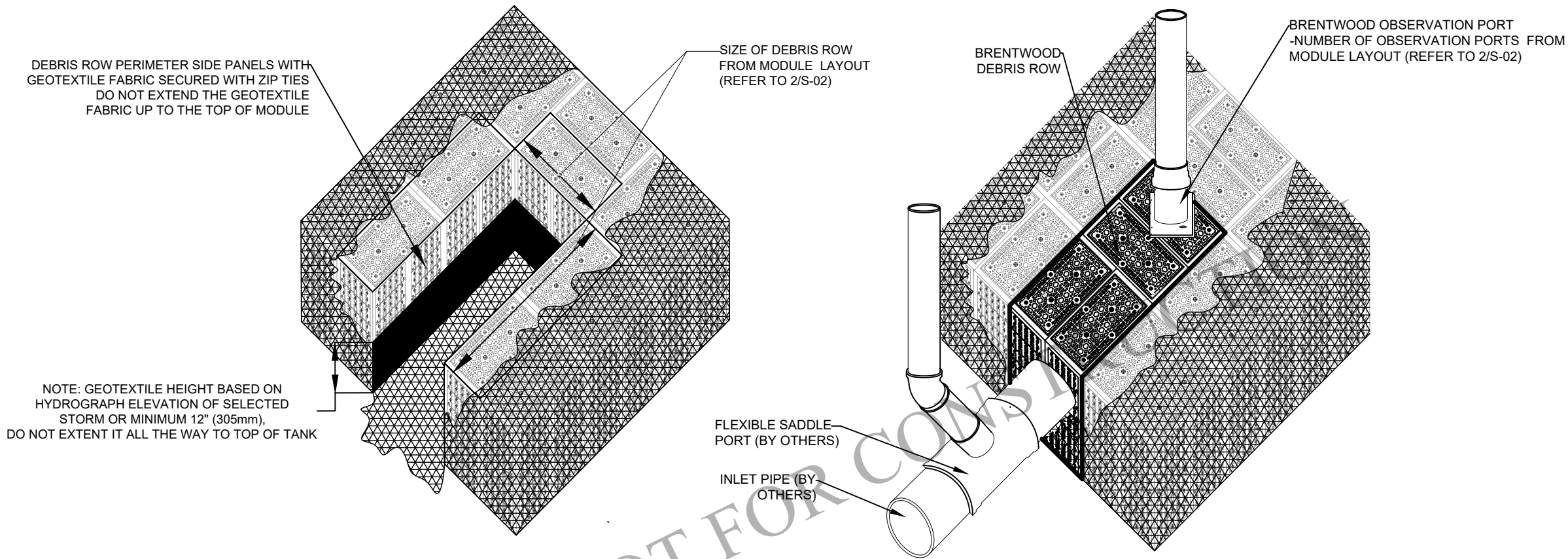
Page Name: TYP. Pipe Penetration Details

Drawn by: PE	Checked By: JF
Scale: NTS	Date: 16FEB2024

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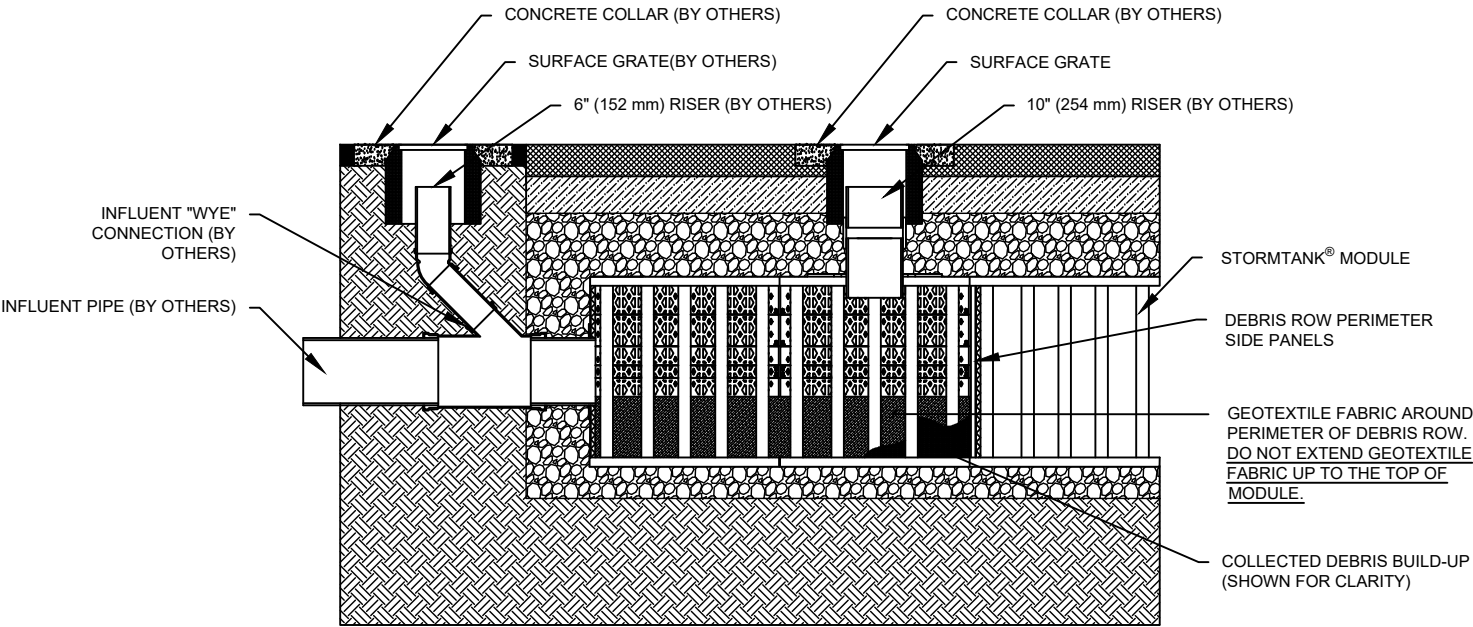
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04 OF 07

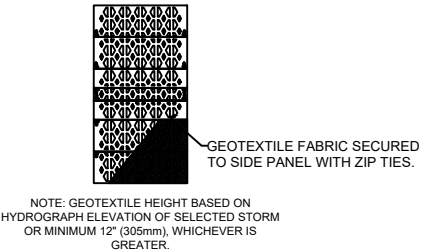



SIDE PANELS AND GEOTEXTILE FABRIC ALONG THE PERIMETER OF DEBRIS ROW

FINISHED DEBRIS ROW WITH INLET AND OBSERVATION PORT



TYP. DEBRIS ROW CROSS SECTION





117 Basaltic Rd,
Concord, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM	
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3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

Page Name: TYP. Debris Row Details

Drawn by: PE

Checked By: JF

Scale: NTS

Date: 16FEB2024

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Sheet:

05 OF 07

ANSI B Size Page (Horizontal)

- General Conditions
- Review installation procedures and coordinate the installation with other construction activities, such as grading, excavation, utilities, construction access, erosion control, etc.
 - Engineered Contract Drawings supersede all provided documentation, as the information furnished in this document is based on a typical installation.
 - Coordinate the installation with manufacturer’s representative/distributor to be on-site to review start up procedures and installation instructions.
 - Components shall be unloaded, handled and stored in an area protected from traffic and in a manner to prevent damage.
 - Assembled modules may be walked on, but vehicular traffic is prohibited until backfilled per Manufacturer’s requirements. Protect the installation against damage with highly visible construction tape, fencing, or other means until construction is complete.

Ensure all construction occurs in accordance with Federal, Provincial and Local Laws, Ordinances, Regulations and Safety Requirements.

- Extra care and caution should be taken when temperatures are at or below 40° F (4.4° C).

NOT FOR CONSTRUCTION

These drawings shall not be used for construction until they have been reviewed for all design aspects (structural, geotechnical, stormwater) and approved by the Engineer of Record for the Project.

It is the Buyer's responsibility to ensure that the design into which the Product will be used has been approved by the Engineer of Record (not Layfield) with a review that may include, but not be limited to, Inlet and outlet configurations including inverts and pipe connections, storage volume, system footprint, Stormtank elevations including cover soil requirements, and proximity to structures and slopes.

Site design / engineering elements may include but not be limited to the following:

- Review elevations and if necessary adjust grading to ensure the chamber cover requirements are met.
- Evaluating site-specific information on soil conditions and/or bearing capacity
- Assessing the bearing resistance (allowable bearing capacity) of the sub-grade soils and the depth of foundation stone with consideration for the range of expected soil moisture conditions

1.0 StormTank® Assembly

StormTank® Modules:

StormTank® modules are delivered to the site as palletized components requiring simple assembly. No special equipment, tools or bonding agents are required; only a rubber mallet. A single worker can typically assemble a module in two minutes.

ASSEMBLY INSTRUCTIONS:

- Place a platen on a firm level surface and insert the eight (8) columns into the platen receiver cups. Firmly tap each column with a rubber mallet to ensure the column is seated.
- Place a second platen on a firm level surface. Flip the previously assembled components upside down onto the second platen, aligning the columns into the platen receiver cups.
- Once aligned, seat the top assembly by alternating taps, with a rubber mallet at each structural column until all columns are

- firmly seated.
- SIDE PANEL
- If side panels are required, firmly tap the top platen upward to raise the top platen. Insert the side panel into the bottom platen.
 - Align the top of the side panel with the top platen and firmly seat the top platen utilizing a rubber mallet.

GENERAL NOTES:

- Remove packaging material and check for any damage. Report any damaged components to a StormTank® Distributor or Brentwood personnel.
- StormTank® components are backed by a one year warranty, when installed per manufacturer’s recommendations.

2.0 Basin Excavation

- Stake out and excavate to elevations per approved plans.Excavation Requirements:
 - Sub-grade excavation must be a minimum of 6” (152 mm) below designed StormTank® Module invert.
 - The excavation should extend a minimum of 12” (305 mm) beyond the StormTank® dimensions in each length and width (an additional 24” [610 mm] in total length and total width) to allow for adequate placement of side backfill material.
 - Remove objectionable material encountered within the excavation, including protruding material from the walls.
 - Furnish, install, monitor and maintain excavation support (e.g., shoring, bracing, trench boxes, etc.) as required by Federal, Provincial and Local Laws, Ordinances, Regulations and Safety Requirements.

3.0 Sub-Grade Requirements

- Sub-grade shall be unfrozen, level (plus or minus 1%), and free of lumps or debris with no standing water, mud or muck. Do not use materials nor mix with materials that are frozen and/or coated with ice or frost.
- Unstable, unsuitable and/or compromised areas should be brought to the Engineer’s attention and mitigating efforts determined prior to compacting the sub-grade.
- Sub-grade must be compacted to 95% Standard Proctor Density or as approved by the Engineer of Record. If code requirements restrict subgrade compaction, it is the requirement of the geotechnical Engineer to verify that the bearing capacity and settlement criteria for support of the system are met.

* The Engineer of Record shall reference Brentwood StormTank Module Installation document Appendix A for minimum soil bearing capacity required based on Load Rating and top cover depth. Minimum soil bearing capacity is required so that settlements are less than 1” through the entire sub-grade and do not exceed long-term 1/2” differential settlement between any two adjacent units within the system. Sub-grade must be designed to ensure soil bearing capacity is maintained throughout all soil saturation levels.

4.0 Leveling Bed Installation

- Install geotextile fabric and/or liner material, as specified.
 - Geotextile fabric shall be placed per manufacturer’s recommendations.

- Additional material to be utilized for wrapping above the system must be protected from damage until use.
- After the geotextile is secured, place a minimum 6” (152 mm) Leveling Bed.
 - Material should be a 3/4” (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
 - Material should be raked free of voids, lumps, debris, sharp objects and plate vibrated to a level with a maximum 1% slope.
- Correct any unsatisfactory conditions.

5.0 StormTank® Module Placement

1. Install geotextile fabric and/or liner material, as specified.
 - Geotextile fabric shall be placed per manufacturer’s recommendations.
 - Additional material to be utilized for wrapping above the system must be protected from damage until use.
- Mark the footprint of the modules for placement.
 - Ensure module perimeter outline is square or similar prior to Module placement.
 - Care should be taken to note any connections, ports or other irregular units to be placed.
- Install the individual modules by hand, as detailed below.
 - The modules should be installed as shown in the StormTank® submittal drawings with the short side of perimeter modules facing outward, except as otherwise required.
 - Make sure the top/bottom platens are in alignment in all directions to within a maximum 1/4” (6.4 mm).
 - For double stack configurations:
 - Install the bottom module first. **DO NOT INTERMIX VARIOUS MODULE HEIGHTS ACROSS LAYERS.** Backfilling prior to proceeding to second layer is optional.
 - Insert stacking pins (2 per module) into the top platen of the bottom module.
 - Place the upper module directly on top of the bottom module in the same direction, making sure to engage the pins.
- Install the modules to completion, taking care to avoid damage to the geotextile and/or liner material.
- Locate any ports or other penetration of the StormTank®.
 - Install ports/penetrations in accordance with the approved submittals, contract documents and manufacturer’s recommendations.
- Upon completion of module installation, wrap the modules in geotextile fabric and/or liner.
 - Geotextile fabric shall be wrapped and secured per manufacturer’s recommendations.
 - Seal any ports/penetrations per Manufacturer’s requirements

Notes:

- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer’s recommendations.



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SINGLE STACK MODULE SYSTEM

Total Storage Volume	154.05 m³
Module Storage Volume	118.10 m³
Stone Storage Volume	35.95 m³
System Footprint	149.48 m²
Estimated Geotextile Fabric	NuBarrier 350 m² LP8 842 m²
Estimated Liner	421 m²
Estimated Stone Volume	89.87 m³
Excavation Required	256.27 m³
Minimum Excavation Depth	1.71 m
Stone Type	19mm Clear Stone
Stone Void Space	40%
Model Type	25 Series ST-36

3050 THE COLLEGEWAY
Mississauga, ON

REV	Record of Changes	Date	By
△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

Page Name:	Supplementary Notes
Drawn by: PE	Checked By: JF
Scale: NTS	Date: 16FEB2024

THIS LAYOUT DRAWING WAS PREPARED TO SUPPORT THE ENGINEER OF RECORD FOR THE PROPOSED SYSTEM. IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO REVIEW THE INFORMATION AND ENSURE THAT THE LAYOUT AND DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS AND THAT THE STORMTANK SYSTEM HAS BEEN DESIGNED IN ACCORDANCE WITH BRENTWOOD'S REQUIREMENTS. LAYFIELD DOES NOT REVIEW OR APPROVE PLANS, SIZING OR DESIGNS.

Sheet:

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6.0 Side Backfill

1. Inspect all geotextile, ensuring that no voids or damage exists; which will allow sediment into the StormTank® system.
2. Adjust the stone/soil interface geotextile along the side of the native soil to ensure the geotextile is taught to the native soil.
3. Once the geotextile is secured, begin to place the Side Backfill.
 - a. a. Material should be a 3/4” (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
 - b. b. Backfill sides “evenly” around the perimeter without exceeding single 12” (305 mm) lifts.
 - c. Place material utilizing an excavator, dozer or conveyor boom.
 - d. Utilize a plate vibrator to settle the stone and provide a uniform distribution.

Notes:

- Do not apply vehicular load to the modules during placement of side backfill. All material placement should occur with equipment located on the native soil surrounding the system.
- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer’s recommendations

7.0 Top Backfill (Stone)

1. Begin to place the Top Backfill.
 - a. Material should be a 3/4” (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
 - b. Place material utilizing an excavator, dozer or conveyor boom (Tech Bulletin Stormtank Module 25 Series Construction Equipment) and use a walk-behind plate vibrator to settle the stone and provide an even distribution.

DO NOT DRIVE ON THE MODULES WITHOUT A MINIMUM 12” (305 mm) COVER.

2. Upon completion of Top Backfilling, wrap the system in geotextile fabric and/or liner per manufacturer’s recommendations.
3. Install metallic tape around the perimeter of the system to mark the area for future utility detection.

Notes:

- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer’s recommendations.

8.0 Suitable Compactable Fill

Following Top Backfill placement and geotextile fabric wrapping; complete the installation as noted below.

Vegetated Area

1. Place fill onto the geotextile.

- a. Maximum 12” (305 mm) lifts, compacted with a vibratory plate or walk behind roller to a minimum of 90% Standard Proctor Density.
 - b. The minimum top cover/backfill to finished grade must not be less then that shown on Detail 5 Typical System Cross Section, and the maximum depth from final grade to the bottom of the lowest module should not exceed that shown on Detail 5.
2. Finish to the surface and complete with vegetative cover.

Impervious Area

1. Place fill onto the geotextile.
 - a. Maximum 12” (305 mm) lifts, compacted with a vibratory plate or walk behind roller to a minimum of 90% Standard Proctor Density.
 - b. The minimum top cover/backfill to finished grade must not be less then that shown on Detail 5 Typical System Cross Section, and the maximum depth from final grade to the bottom of the lowest module should not exceed that shown on Detail 5.
2. Finish to the surface and complete with asphalt, concrete, etc.

Notes:

- A vibratory roller may only be utilized after a minimum 24” (610 mm) of compacted material has been installed or for the installation of the asphalt wearing course.
- If damage occurs to the geotextile fabric, repair the material in accordance with the geotextile Manufacturer’s recommendations.
- For most recent installation guidelines visit: <http://www.brentwoodindustries.com/resources/>

9.0 Inspection and Maintenance

If the following inspections and maintenance procedures are not followed as specified below then the end-user is responsible for the performance of the modules. These Maintenance procedure must be performed after a heavy rainfall, flooding or any incident that will vary the flow of water drastically.

Inspection

1. Inspect all observation ports, inflow and outflow connection and the discharge area
2. Identify and log any sediment and debris accumulation, system backup, or discharge rate changes.
3. If there is a sufficient need for a cleanout, contact a local cleaning company for assistance.

Cleaning:

1. If a pretreatment device is installed, follow manufacturer recommendations.
2. Using vacuum pump truck, evacuate debris from the inflow and outflow points.
3. Flush the system with clean water, forcing debris from the system.
4. Repeat steps 2 and 3 until no debris is evident



TECH BULLETIN

Revision 2

02/08/21

StormTank® Module 25 Series Construction Equipment

Background

To provide clarity on construction equipment that can travel over a StormTank Module system during construction, the below table has been created. This table is not all inclusive and evaluation by the contractor on a case by case equipment may be necessary before proceeding.

Cover Depth over Module	Wheel Load (Vehicles and Equipment)		Maximum Tracked Equipment		Roller Loads
	Maximum (Vehicle)	Maximum (Equipment)	Track Width	Maximum Weight (including material)	Maximum Drum Weight
6 in.	Not Permitted	Not Permitted	N/A	LGP Equipment (< 5 psi) Only	Not Permitted
12 in.	6,500 lbs.	8,000 lbs.	N/A	LGP Equipment (< 10 psi) Only	< 10 psi
18 in.	11,000 lbs.	14,500 lbs.	12 in.	20,000 lbs.	20,000 lbs. (Static Only)
			18 in.	30,000 lbs.	
			24 in.	40,000 lbs.	
			36 in.	60,000 lbs.	
24 in.	16,000 lbs.	20,000 lbs.	12 in.	40,000 lbs.	40,000 lbs. (Including Dynamic)
			18 in.	50,000 lbs.	
			24 in.	60,000 lbs.	
			36 in.	80,000 lbs.	

1. Vehicle has a tire contact area of 10"x10"
2. Equipment has a tire contact area of 10"x20" (duel wheel trucks like dump trucks)
3. Cover depth is based on angular material, utilization of other materials impacts load rating
4. Dumping directly over the system is prohibited, excluding asphalt into a paver unit
5. Consideration must be given for rutting into cover material when utilizing table
6. Excavation equipment cannot operate (excavate) from over the system
7. Material is prohibited from being stockpiled over a system
8. For specialty equipment (material handles, cranes, units with outriggers, etc.) contact a StormTank Rep. before utilization over the system



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SINGLE STACK MODULE SYSTEM

Total Storage Volume	154.05 m ³
Module Storage Volume	118.10 m ³
Stone Storage Volume	35.95 m ³
System Footprint	149.48 m ²
Estimated Geotextile Fabric	NuBarrier 350 m ² LP8 842 m ²
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△	Preliminary Drawing	16FEB2024	PE

Project Number: OP2023-7855

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Sheet:

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Stage Storage Calculator

Inputs:

Module Type= StormTank 25 Series
 Storage Invert = 167.3 m

Input Heights to be included in stage storage:

Leveling Bed Depth = 0.2 m
 Module Height = 0.9144 m
 Top Cover Depth = 0.3 m

System Footprints:

Module Footprint = 132.94 m²
 Stone Footprint = 149.4824 m²

Void Space %:

Module Avg. Void = 97.15 %

* Note, this calculator works to a maximum storage height of 15' including stone leveling bed, module unit and top cover.

Increment Step 0.0508 m
 Outlet Elevation 167.67 m

Height (m)	Elevation (m)	Dead Storage (m ³)	Active Storage (m ³)
0.37	167.67	35.04	119.01

<u>Stage Storage Table</u>					
Height (m)	Elevation (m)	Stone Stage Storage (m ³)	Module Stage Storage (m ³)	Cumulative Stage Storage (m ³)	Cumulative Total Storage (m ³)
0.0000	167.3000	0.00	0.00	0.00	0.00
0.0508	167.3508	3.04	0.00	3.04	3.04
0.1016	167.4016	3.04	0.00	3.04	6.07
0.1524	167.4524	3.04	0.00	3.04	9.11
0.2000	167.5000	2.85	0.00	2.85	11.96
0.2032	167.5032	0.02	0.41	0.43	12.39
0.2540	167.5540	0.34	6.56	6.90	19.29
0.3048	167.6048	0.34	6.56	6.90	26.19
0.3556	167.6556	0.34	6.56	6.90	33.08
0.3700	167.6700	0.10	1.86	1.96	35.04
0.4064	167.7064	0.24	4.70	4.94	39.98
0.4572	167.7572	0.34	6.56	6.90	46.88
0.5080	167.8080	0.34	6.56	6.90	53.78
0.5588	167.8588	0.34	6.56	6.90	60.67
0.6096	167.9096	0.34	6.56	6.90	67.57
0.6604	167.9604	0.34	6.56	6.90	74.47
0.7112	168.0112	0.34	6.56	6.90	81.37
0.7620	168.0620	0.34	6.56	6.90	88.26
0.8128	168.1128	0.34	6.56	6.90	95.16
0.8636	168.1636	0.34	6.56	6.90	102.06
0.9144	168.2144	0.34	6.56	6.90	108.96
0.9652	168.2652	0.34	6.56	6.90	115.85
1.0160	168.3160	0.34	6.56	6.90	122.75
1.0668	168.3668	0.34	6.56	6.90	129.65
1.1144	168.4144	0.31	6.15	6.46	136.11
1.1176	168.4176	0.19	0.00	0.19	136.30
1.1684	168.4684	3.04	0.00	3.04	139.34
1.2192	168.5192	3.04	0.00	3.04	142.38
1.2700	168.5700	3.04	0.00	3.04	145.41
1.3208	168.6208	3.04	0.00	3.04	148.45

1.3716	168.6716	3.04	0.00	3.04	151.49
1.4144	168.7144	2.56	0.00	2.56	154.05
1.4224	168.7224	0.00	0.00	0.00	0.00
1.4732	168.7732	0.00	0.00	0.00	0.00
1.5240	168.8240	0.00	0.00	0.00	0.00
1.5748	168.8748	0.00	0.00	0.00	0.00
		35.95	118.10	154.05	

APPENDIX D6

OGS UNIT DETAILS

Stormceptor®EF Sizing Report

Imbrium® Systems

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/30/2023

Province:	Ontario	Project Name:	Fire Station 123
City:	Mississauga	Project Number:	-
Nearest Rainfall Station:	TORONTO INTL AP	Designer Name:	Jessica Steffler
Climate Station Id:	6158731	Designer Company:	Forterra Pipe & Precast
Years of Rainfall Data:	20	Designer Email:	jessica.steffler@RinkerPipe.com
		Designer Phone:	519-239-6958
Site Name:	Fire Station 123 3010 The Collegeway	EOR Name:	Farshid Morshedi
		EOR Company:	Lea Consulting Ltd.
Drainage Area (ha):	0.40	EOR Email:	fmorshedi@lea.ca
Runoff Coefficient 'c':	0.72	EOR Phone:	905-470-0015

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	8.96
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	306
Estimated Average Annual Sediment Volume (L/yr):	249

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	89
EFO6	96
EFO8	98
EFO10	99
EFO12	100

Recommended Stormceptor EFO Model:	EFO4
Estimated Net Annual Sediment (TSS) Load Reduction (%):	89
Water Quality Runoff Volume Capture (%):	> 90

Stormceptor®EF Sizing Report

THIRD-PARTY TESTING AND VERIFICATION

► **Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

► **Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

► The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

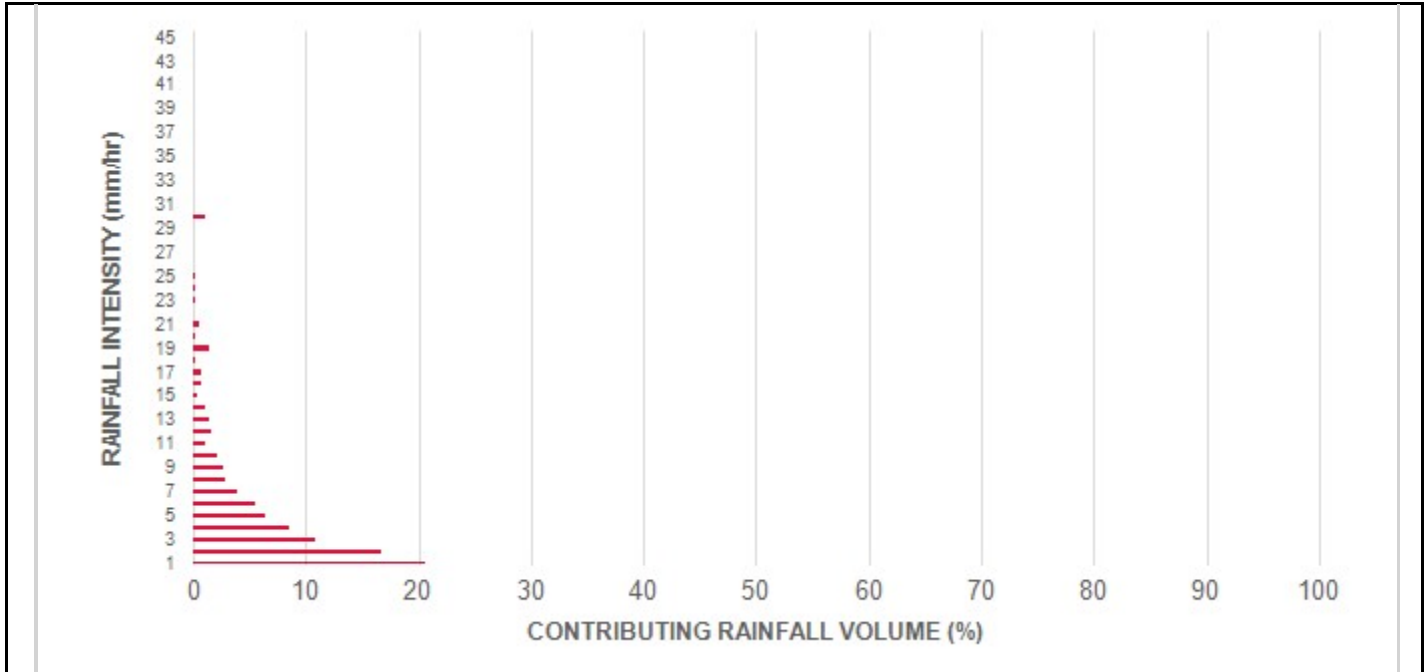
Stormceptor®EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	0.40	24.0	20.0	100	8.5	8.5
1.00	20.6	29.1	0.80	48.0	40.0	100	20.6	29.1
2.00	16.8	45.9	1.60	96.0	80.0	98	16.5	45.7
3.00	10.8	56.7	2.40	144.0	120.0	93	10.0	55.7
4.00	8.5	65.2	3.20	192.0	160.0	88	7.5	63.2
5.00	6.4	71.6	4.00	240.0	200.0	83	5.3	68.5
6.00	5.5	77.0	4.80	288.0	240.0	81	4.4	72.9
7.00	3.9	81.0	5.60	336.0	280.0	79	3.1	76.1
8.00	2.9	83.9	6.41	384.0	320.0	78	2.2	78.3
9.00	2.7	86.5	7.21	432.0	360.0	76	2.0	80.3
10.00	2.2	88.7	8.01	480.0	400.0	74	1.6	81.9
11.00	1.0	89.7	8.81	528.0	440.0	72	0.7	82.7
12.00	1.7	91.3	9.61	576.0	480.0	70	1.2	83.8
13.00	1.4	92.8	10.41	624.0	520.0	68	1.0	84.8
14.00	1.0	93.7	11.21	673.0	560.0	66	0.6	85.4
15.00	0.3	94.0	12.01	721.0	600.0	65	0.2	85.6
16.00	0.8	94.8	12.81	769.0	641.0	64	0.5	86.1
17.00	0.8	95.7	13.61	817.0	681.0	64	0.5	86.7
18.00	0.2	95.8	14.41	865.0	721.0	64	0.1	86.8
19.00	1.5	97.3	15.21	913.0	761.0	63	0.9	87.7
20.00	0.2	97.5	16.01	961.0	801.0	63	0.1	87.9
21.00	0.6	98.2	16.81	1009.0	841.0	63	0.4	88.2
22.00	0.0	98.2	17.61	1057.0	881.0	62	0.0	88.2
23.00	0.2	98.4	18.41	1105.0	921.0	62	0.1	88.4
24.00	0.2	98.6	19.22	1153.0	961.0	62	0.1	88.5
25.00	0.2	98.9	20.02	1201.0	1001.0	62	0.2	88.7
30.00	1.1	100.0	24.02	1441.0	1201.0	57	0.7	89.3
35.00	0.0	100.0	28.02	1681.0	1401.0	52	0.0	89.3
40.00	0.0	100.0	32.03	1922.0	1601.0	46	0.0	89.3
45.00	0.0	100.0	36.03	2162.0	1801.0	41	0.0	89.3
Estimated Net Annual Sediment (TSS) Load Reduction =								89 %

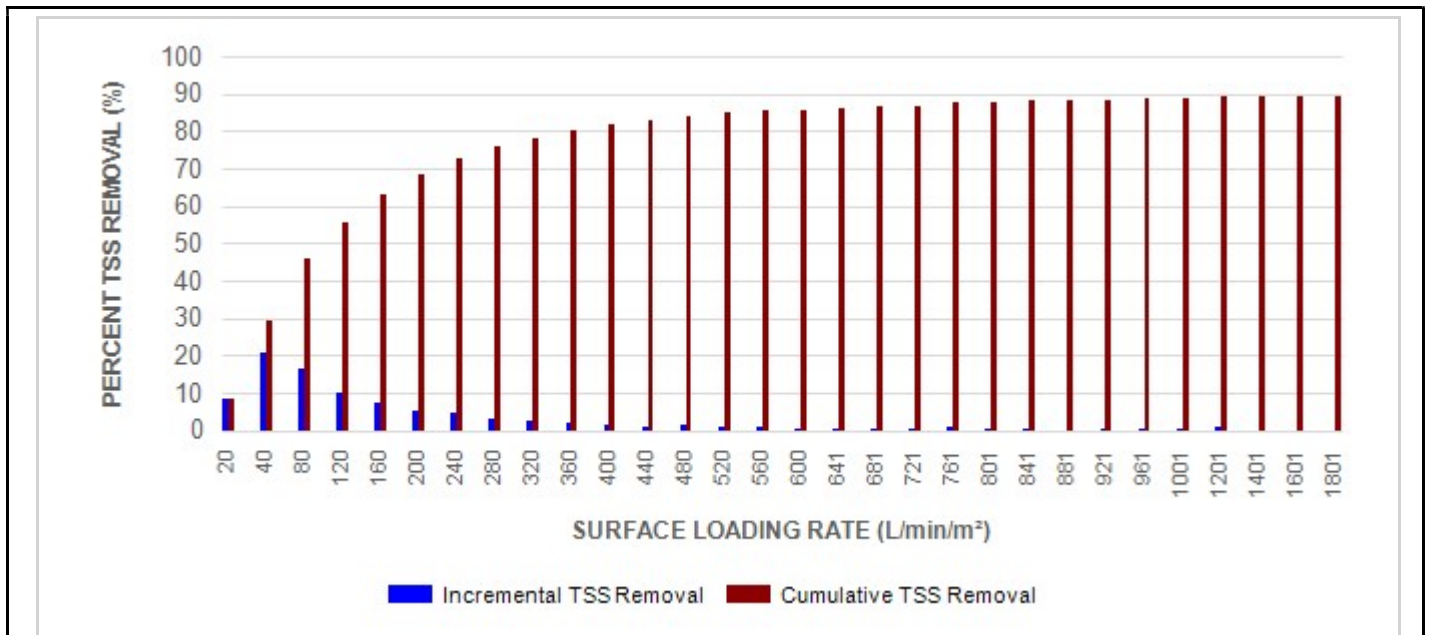
Climate Station ID: 6158731 Years of Rainfall Data: 20

Stormceptor®EF Sizing Report

RAINFALL DATA FROM TORONTO INTL AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

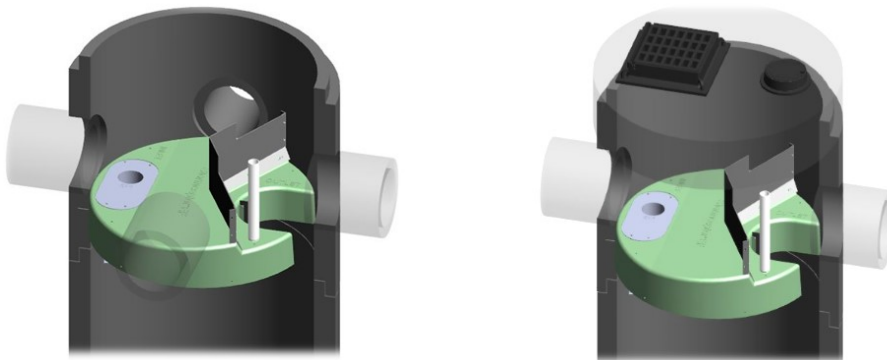
► **Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

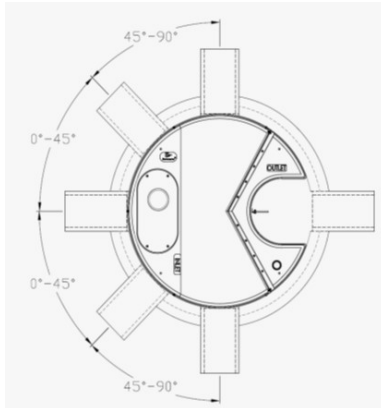
► **Stormceptor® EF and EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



Stormceptor®EF Sizing Report



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1.

For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>



Stormceptor®EF Sizing Report



Stormceptor®EF Sizing Report

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m ³ sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m ³ sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m ³ sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m ³ sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m ³ sediment / 2,476 L oil

Stormceptor®EF Sizing Report

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m² to 1400 L/min/m², and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m² and 1400 L/min/m² shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m².

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in

Stormceptor®EF Sizing Report

accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

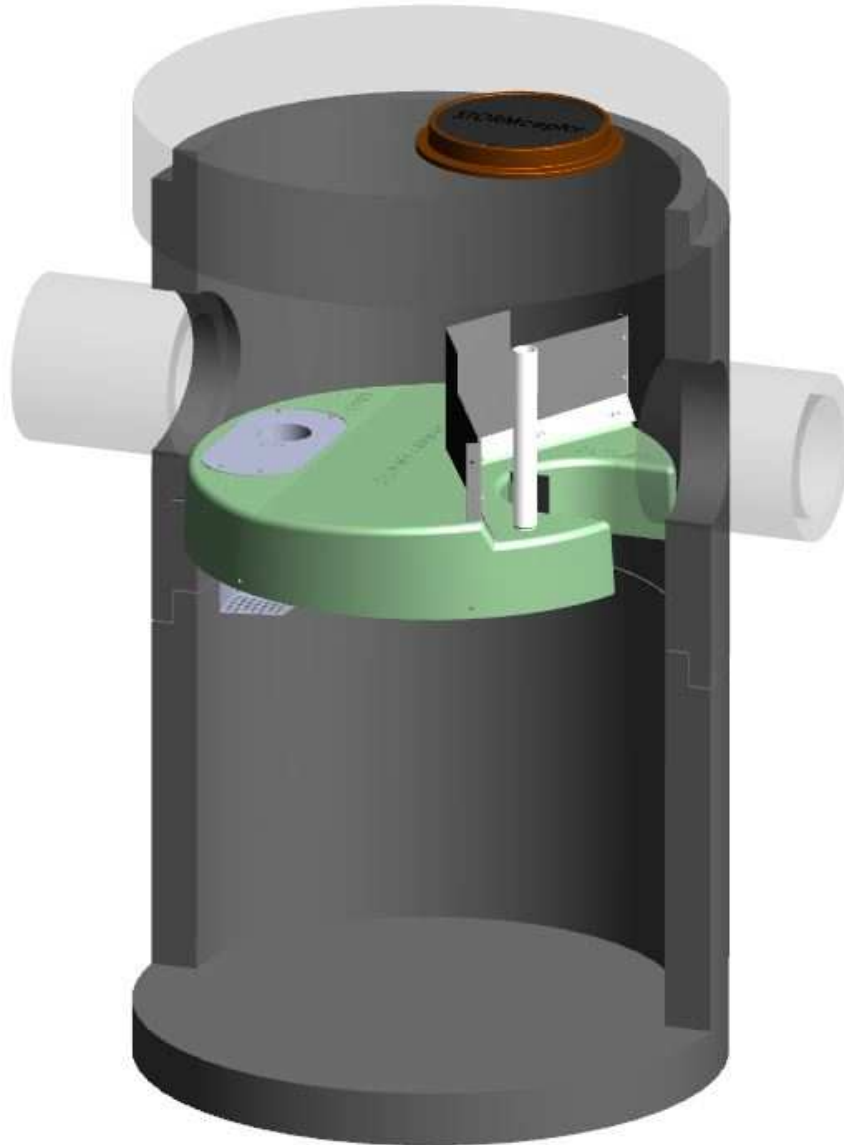
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor[®] **EF**

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,180,305
Canadian Patent No. 2,327,768
Canadian Patent No. 2,694,159
Canadian Patent No. 2,697,287
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 729,096
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Japanese Patent No. 5,997,750
Japanese Patent No. 5,555,160
Korean Patent No. 0519212
Korean Patent No. 1451593
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Patent pending

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2 - Stormceptor EF Operation, Components

3 - Stormceptor EF Model Details

4 - Stormceptor EF Identification

5 - Stormceptor EF Inspection & Maintenance

6 – Stormceptor Contacts

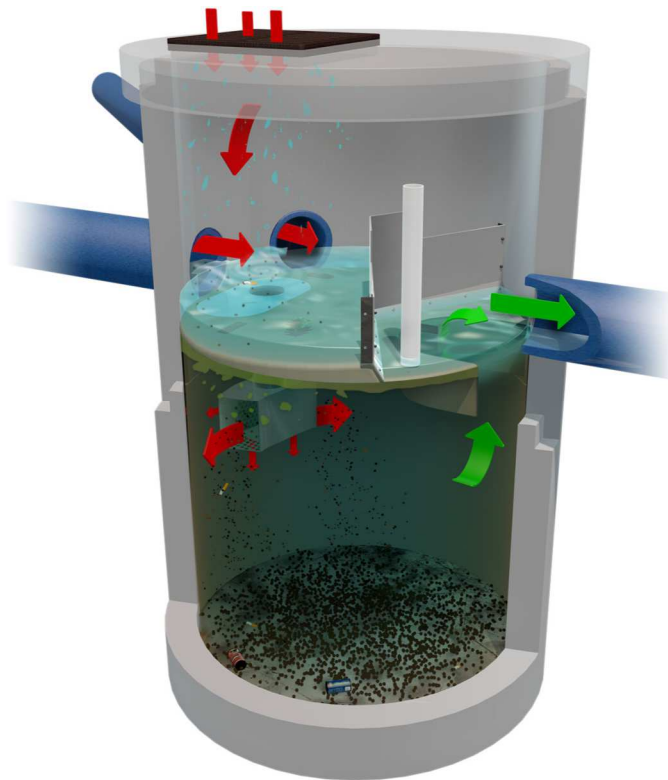
OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - **Stormceptor®**. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS

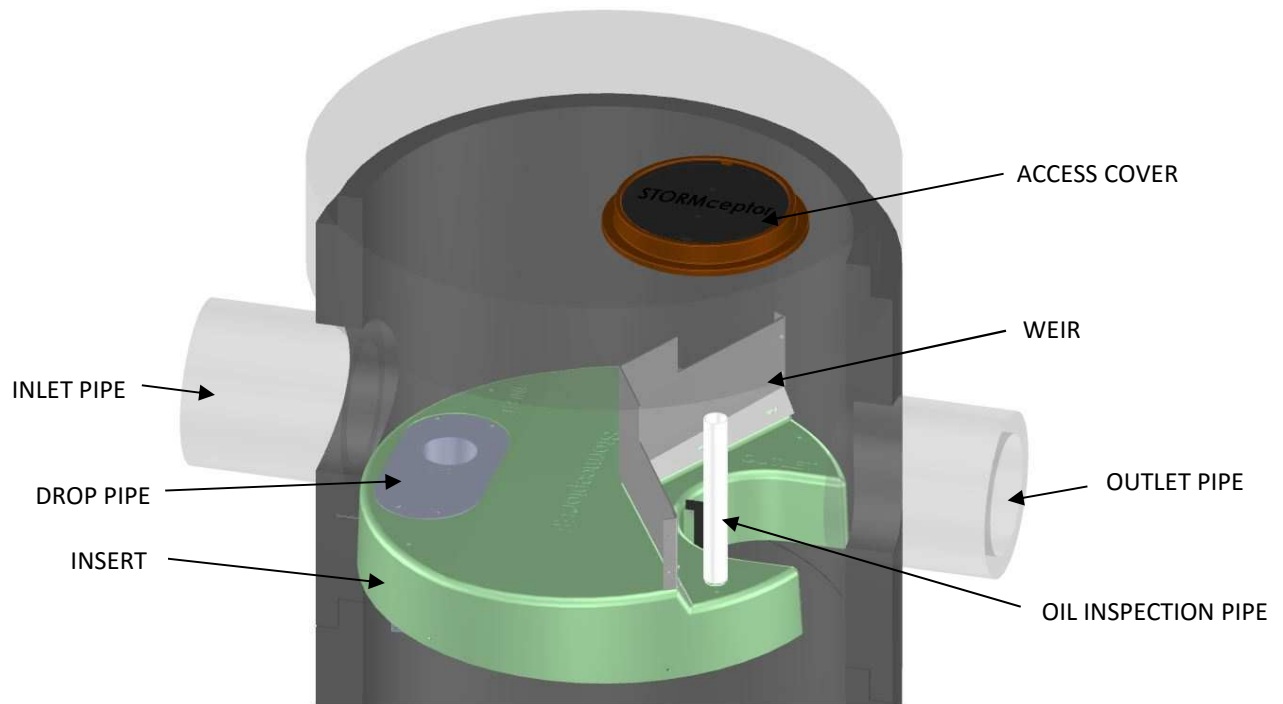


Figure 1

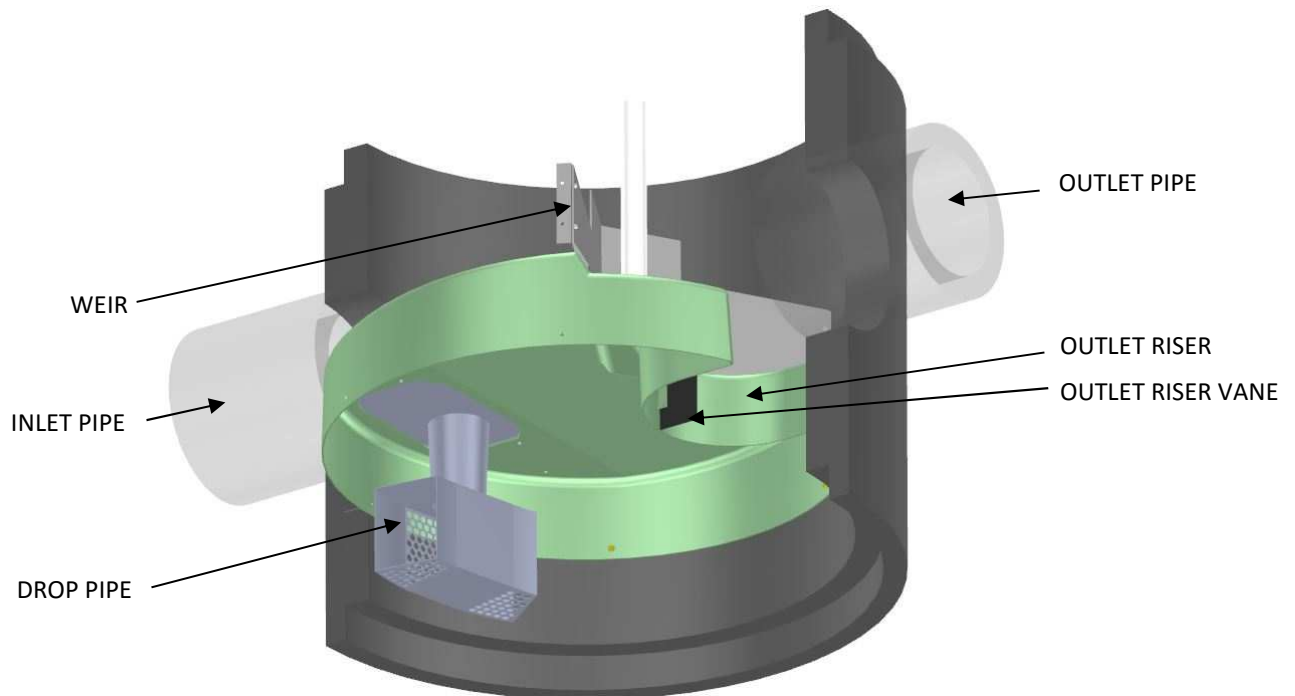


Figure 2

OUTLET PLATFORM (UP position)

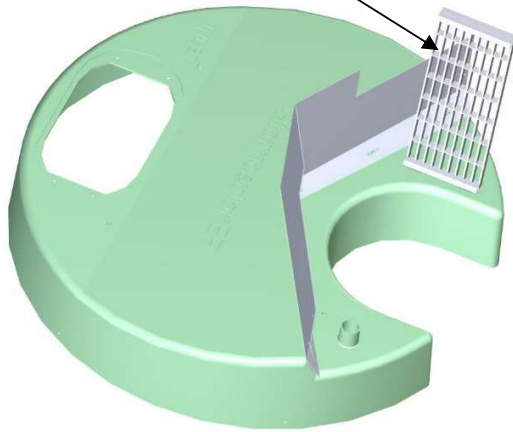


Figure 3A

OUTLET PLATFORM (DOWN position)

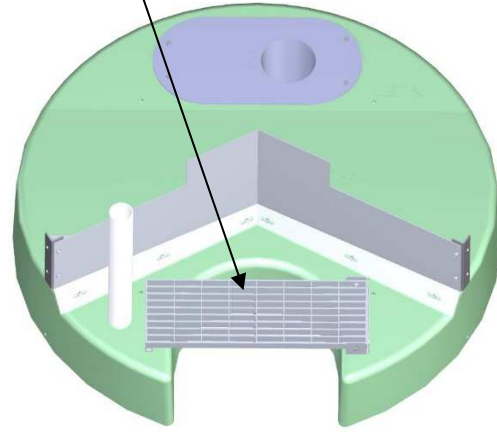


Figure 3B

- **Insert** – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- **Weir** – creates stormwater ponding and driving head on top side of insert
- **Drop pipe** – conveys stormwater and pollutants into the lower chamber
- **Outlet riser** – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** – prevents formation of a vortex in the outlet riser during high flow rate conditions
- **Outlet platform (optional)** – safety platform in the event of manned entry into the unit
- **Oil inspection pipe** – primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity ¹ (m ³)	Hydrocarbon Storage Capacity ² (L)	Maximum Flow Rate into Lower Chamber ³ (L/s)	Peak Conveyance Flow Rate ⁴ (L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

¹ Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

² Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

³ EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m². EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m².

⁴ Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity ¹ (ft ³)	Hydrocarbon Storage Capacity ² (gal)	Maximum Flow Rate into Lower Chamber ³ (cfs)	Peak Conveyance Flow Rate ⁴ (cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

¹ Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

² Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

³ EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft². EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft².

⁴ Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name **Stormceptor®** embossed on the access cover at grade as shown in **Figure 3**. The tradename **Stormceptor®** is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

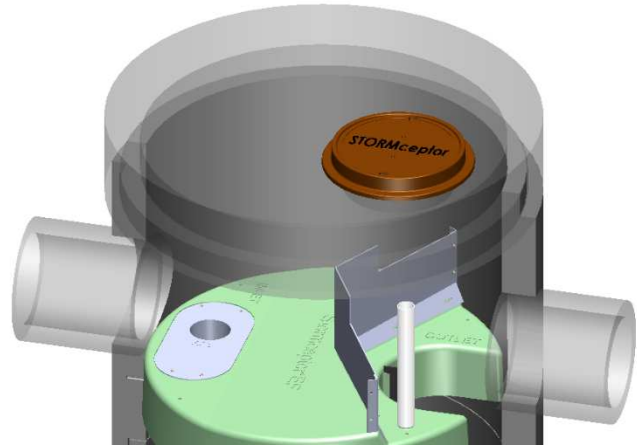


Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

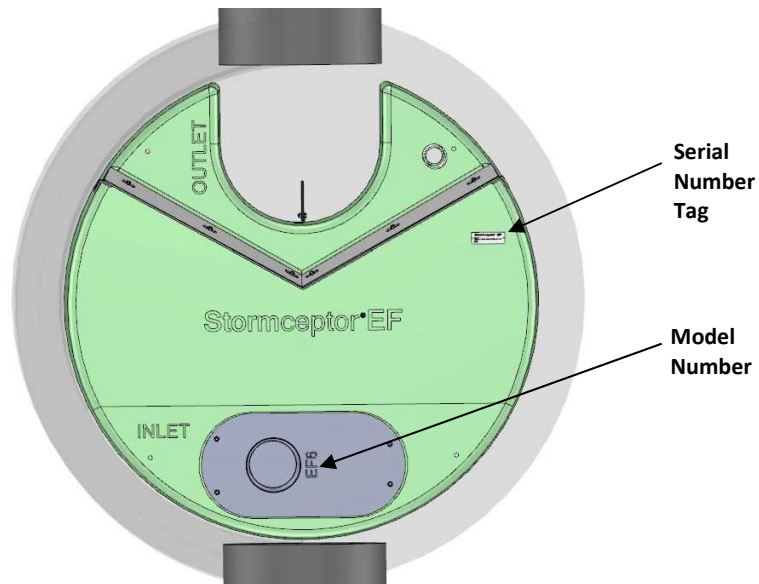


Figure 5

INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole **cover(s)** or **inlet grate** to access insert and lower chamber
NOTE: EF4/EFO4 requires the removal of a **flow deflector** beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the **oil inspection pipe**
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the **drop pipe** opening for blockage, remove blockage if present
- Visually inspect **insert** and **weir** for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

Table 3

Recommended Sediment Depths for Maintenance Service*	
MODEL	Sediment Depth (in/mm)
EF4 / EFO4	8 / 203
EF6 / EFO6	12 / 305
EF8 / EFO8	24 / 610
EF10 / EFO10	24 / 610
EF12 / EFO12	24 / 610

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

Maintenance Procedures

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.
- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.

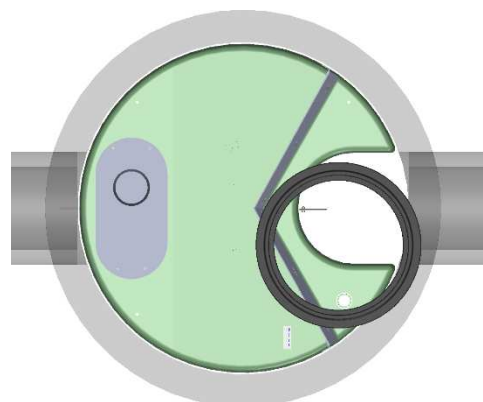


Figure 6

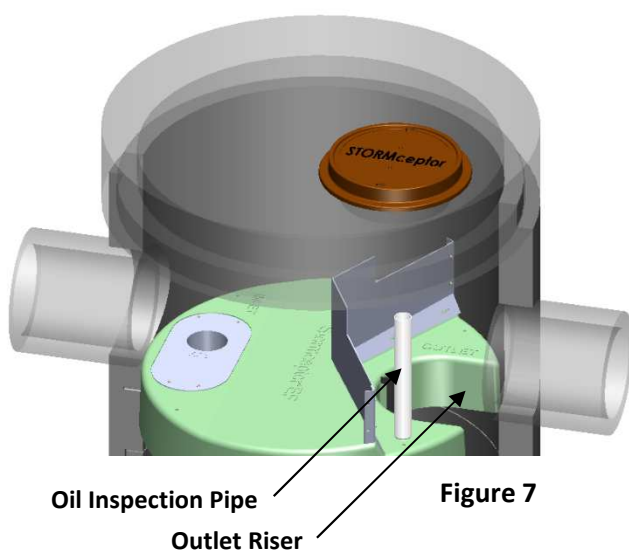


Figure 7



Figure 8

- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.



Figure 9

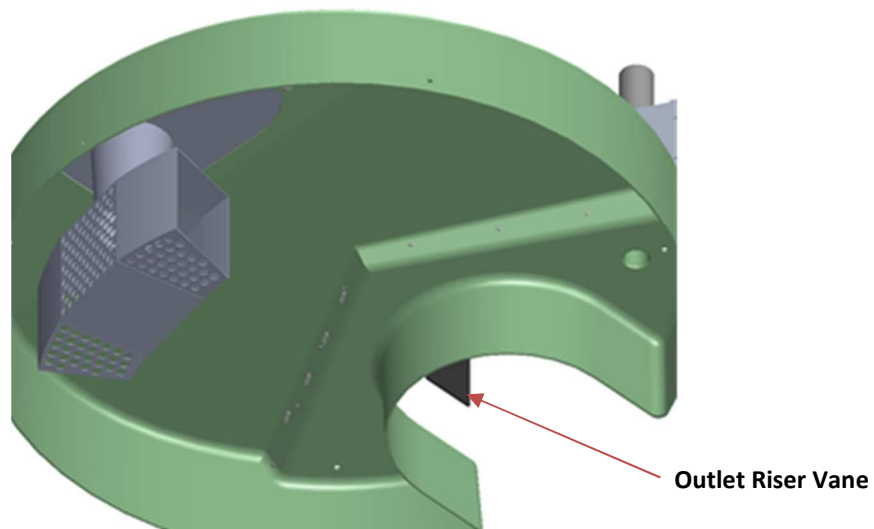


Figure 10

NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

Removable Flow Deflector

- Top grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.

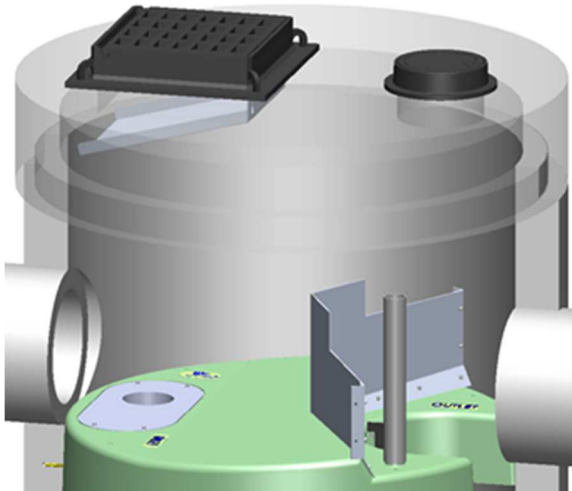
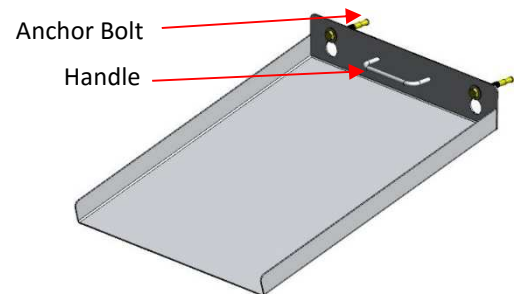


Figure 11

How to Remove:

1. Loosen anchor bolts
2. Pull up and out using the handle



Removable Flow Deflector

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations ($< 10 \text{ mg/L}$). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems>.

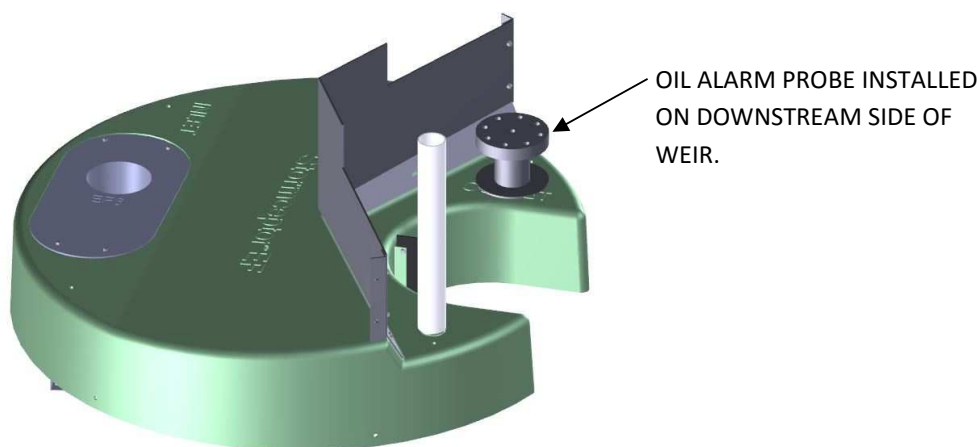


Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative or by visiting our website at www.stormceptor.com.

Imbrium Systems Inc. & Imbrium Systems LLC

Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
International	+1-416-960-9900 / +1-301-279-8827

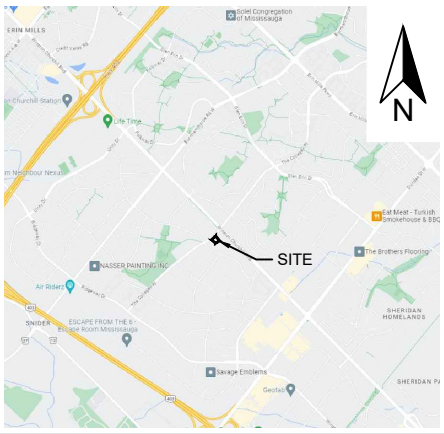
www.imbriumsystems.com

www.stormceptor.com

info@imbriumsystems.com

APPENDIX E

HYDROGEOLOGICAL BOREHOLES PLAN AND INFILTRATION ESTIMATE



- LEGEND**
- SITE BOUNDARY
 - BOREHOLE ADVANCED BY G2S (AUGUST 2023)
 - BOREHOLE/MONITORING WELL ADVANCED BY G2S (AUGUST 2023)
 - APPROXIMATE DOUBLE RING INFILTRMETER TEST PIT LOCATIONS (OCTOBER 2023)
 - ▲ TBM
 - 101.11 GROUND ELEVATION (m)
 - 93.70 GROUNDWATER ELEVATION (OCTOBER 26, 2023) (m)

REFERENCE:
DRAWING REPRODUCED FROM GOOGLE MAPS AERIAL IMAGERY

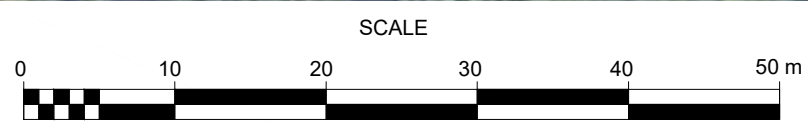
TITLE:
BOREHOLE AND MONITORING WELL LOCATION PLAN

CLIENT:
CITY OF MISSISSAUGA

LOCATION:
VACANT LAND PARCEL WEST OF 3010 THE COLLEGEWAY
MISSISSAUGA, ONTARIO

PROJECT NO.: G2S23256B

DRAWING:	2
SCALE:	AS SHOWN
DATE:	NOVEMBER 2023
DRAWN BY:	DB/JP
FILE NAME:	G2S23256B.dwg





November 13, 2023

G2S Environmental Consulting Inc.
4361 Harvester Road, Unit 12
Burlington, ON
L7L 5M4
ATTN: Melissa King

Re: 3010 The Collegeway
Mississauga, ON
Soil Infiltration Assessment
Project 10272
REVISION 1

Hydrogeology Consulting Services Inc. (HCS) was retained by G2S Environmental Consulting Inc. to assess the near-surface soil infiltration capacity at the above-referenced property.

Double Ring Infiltrometer Results

A double ring infiltrometer (DRI) from AMS Samplers was used to assess the surficial soil infiltration rate at the two locations shown on the attached Drawing 1 on October 11, 2023. At the time of testing the ground was not frozen. Surface vegetation, topsoil, and overburden material were excavated at the test locations to a depth of approximately 0.91 mBGS using an excavator to allow the DRI to seat into the native soils. It is important to consider that factors such as roots and wormholes (which create preferential pathways for infiltrating water), and rocks and debris (which can prevent a proper seal of the infiltrometer rings into the soil and cause escape of water under the bottom of the ring) can result in erroneously high measured infiltration rates.

Water was added to the outer ring of the DRI during the test to maintain a vertical "curtain" of saturated soil around the inner ring. This curtain of saturated soil ensured that the DRI test only measured vertical percolation of water through the soil matrix beneath the inner ring. The water level of the outer ring was monitored to ensure it remained similar to the water level in the inner ring during the test. Water was added to the inner ring and the rate of infiltration timed with a stopwatch at regular intervals by measuring the drop in water level inside the inner ring. When the rate of change of water level reached an equilibrium, the test was considered complete.

The Toronto Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) provide a method of assessing soil infiltration rate in the Low Impact Development (LID) Stormwater Management (SWM) Planning and Design Guide (TRCA and CVC, 2010). Following the methodology outlined in Appendix C of the Guide the measured infiltration rates from the DRI tests were factored. Additionally, an estimated soil "T-Time" value based on the Ontario Building Code (OBC) classifications for major soil types is provided.

The measured and estimated factored soil infiltration rates, plus OBC T-Time values, are included in Table 1 below.

Table 1: Calculated Estimated Soil Infiltration Rates and T-Times

DRI Test Location	Measured Soil Infiltration Rate – <u>Unfactored</u> (mm/hr)	Estimated Soil T-Time (mins/cm) (OBC)	Estimated Soil Infiltration Rate – Factored * (mm/hr)
DRI-01-23 (silt and sand)	52.4	17-25	21.0
DRI 02-23 (silt and sand, some gravel)	11.5	20-30	4.6

* - Factor of 2.5 applied

As shown in Table 1 it is important to consider that the LID SWM Planning and Design Guide requires implementation a Safety Correction factor to calculate “Design Infiltration Rates” (e.g. for subdivision soakaway pits and infiltration galleries). The measured unfactored rates listed in the table are considered reasonable for comparative purposes and for design of sewage effluent leaching beds, while the factored rates would be applicable for design of high volume infiltration facilities.

The factored infiltration values show the near-surface native silt and sand deposits underlying topsoil beneath the subject property have a moderate to low infiltration rate, varying quite significantly between the two tested areas.

Grain Size Analysis Results

A sample of soil from each DRI test pit collected during excavation was submitted for analysis of particle size distribution (grain size). As shown on the appended grain size analysis graph, the near-surface soil consists of sandy silt. The grain size analysis results were used to estimate soil hydraulic conductivity (K) values by applying the Kaubisch, Breyer, Hazen, and Kozeny-Carman formulae where appropriate based on the limitations of each formula. The hydraulic conductivity estimates are summarized in Table 2 below:

Table 2: Calculated soil hydraulic conductivity values

Location	Sample Depth (mBGS)	Analysis Method	Hydraulic Conductivity (m/sec)
DRI-01-23	0.91	Kaubisch	2.1×10^{-8}
DRI 02-23	0.91	Kaubisch	6.3×10^{-9}

The hydraulic conductivity values of 2.8×10^{-11} to 6.0×10^{-10} m/sec indicates a low permeability.

The hydraulic conductivity estimates from the grain size analysis correlate relatively well with published ranges for major soil types (Freeze and Cherry, 1979); however, it is noted the grain size analyses suggest a significantly lower permeability than the DRI test results.

As discussed previously, there are many factors which can influence DRI tests and cause anomalously higher percolation rates to be measured. It is suggested the test results from DRI 02-23 and from the grain size analyses should be considered more accurate for the purposes of assessing on-site infiltration potential.

Soil Infiltration Rate and T-Time Calculations – Grain Size Analysis Results

The Toronto Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) provide a method of assessing soil infiltration rate in the Low Impact Development (LID) Stormwater Management (SWM) Planning and Design Guide (TRCA and CVC, 2010). Following the methodology outlined in Appendix C of the Guide the highest and lowest estimated soil hydraulic conductivity values from Table 2 above were converted into the infiltration rate listed in Table 3 below. Additionally, an estimated soil “T-Time” value based on the Ontario Building Code (OBC) classifications for major soil types is provided.

Table 3: Estimated Soil Infiltration Rates from Grain Size Analysis Hydraulic Conductivity Values

Borehole Location and Sample Depth (m)	Estimated Soil Infiltration Rate – <u>Unfactored</u> (mm/hr)	Estimated Soil T-Time (mins/cm) (OBC)	Estimated Soil Infiltration Rate – Factored * (mm/hr)
DRI-02-23 (lowest)	10	17-25	<5
DRI 01-23 (highest)	17	20-30	6.8

* - Factor of 2.5 applied

As discussed previously it is important to consider the LID SWM Planning and Design Guide requires implementation of a Safety Correction factor to calculate “Design Infiltration Rates” (e.g. for subdivision soakaway pits and infiltration galleries). The measured unfactored rates listed in the table are considered reasonable for comparative purposes and for design of sewage effluent leaching beds, while the factored rates would be applicable for design of high volume infiltration facilities.

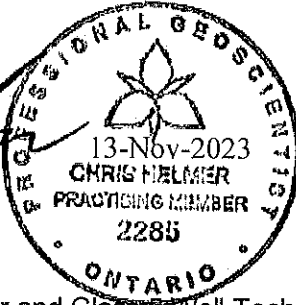
The factored infiltration value shows the near-surface native soil deposits underlying topsoil beneath the subject property have a very low infiltration rate, with three of the four calculated rates notably lower than the DRI-estimated infiltration rate for DRI-01-23. The rates listed in Table 3 can be considered more conservative for the purposes of infiltration facility design as the empirical test data from grain size analyses is not subject to the potential issues that can occur with DRI testing.



I trust this information is sufficient for your present requirements. If any further questions or comments arise, please feel free to contact me directly.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Chris Helmer', is written over the 'Respectfully submitted,' text.



Chris Helmer, B.Sc., P.Geo.
Senior Hydrogeologist
MECP Licensed Well Contractor and Class 5 Well Technician
www.hydrog.ca

encl. Drawing 1 – Location Plan
encl. Grain Size Analysis Graphs

APPENDIX F

CIVIL ENGINEERING DRAWINGS

THE COLLEGEWAY

LOYALIST DRIVE

PARK (P-349)
NO CONSTRUCTION IS PERMITTED FROM THE PARKLAND.

RECONSTRUCT APPROX. 11.9m EXISTING SIDEWALK WITH HEAVY DUTY CONTINUOUS SIDEWALK AND ENTRANCE AS PER CITY OF MISSISSAUGA STANDARDS (STD. 2211.158)

APPROX. 29.96m EX. FULL CURB TO BE REPLACED WITH DEPRESSED CURB (STD. 2230.020)

PROPOSED DRIVEWAY AS PER OPSD 350.010

RECONSTRUCT APPROX. 13.3m EXISTING SIDEWALK WITH HEAVY DUTY CONTINUOUS SIDEWALK AND ENTRANCE AS PER CITY OF MISSISSAUGA STANDARDS (STD. 2211.158)

APPROX. 27.78m EX. FULL CURB TO BE REPLACED WITH DEPRESSED CURB (STD. 2230.020)

PROP. HYDRANT

CURB RETURNS AS PER CITY OF MISSISSAUGA STANDARDS (STD. 2240.031)

PROP. 200mm V8B FOR FIRE LINE AND 150mm V8B FOR DOMESTIC WATER 3m WIDE ELECTRICAL EASEMENT

PROP. DETECTOR CHECK VALVE IN CHAMBER

FRONT YARD SETBACK

PROP. 30.0m SWALE/DRAIN LINE (0.15m TO 0.3m DEPTH)

EXM113A TO REMAIN

PROP. SOLID BOARD TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)

EXM113A TO REMAIN

PROP. CHAIN LINK FENCE TO REMAIN

PROPERTY LINE

PROP. 55.5m SWALE (0.15m TO 0.3m DEPTH)

EX. CHAIN LINK FENCE TO REMAIN

PROP. 23.5m SWALE

PROP. 1.8m PRIVACY FENCE (REFER TO LANDSCAPE FOR DETAILS)

PROPOSED GENERATOR (REFER TO ELECTRICAL DRAWINGS FOR DETAILS)

MINIMUM PAVEMENT STRUCTURE FOR THE LIGHT DUTY AND HEAVY DUTY AS PER GEOTECHNICAL REPORT PREPARED BY G2S CONSULTING INC. DATED NOVEMBER 17, 2023

PAVEMENT STRUCTURAL LAYERS	LIGHT DUTY	HEAVY DUTY
ASPHALTIC CONCRETE WEARING COURSE OPSD HL 3 OR HL 3A	40mm	40mm
BINDER COURSE OPSD HL 8	50mm	65mm
BASE COURSE OPSD GRANULAR A	150mm	150mm
SUB-BASE COURSE OPSD GRANULAR B TYPE II	200mm	350mm
TOTAL THICKNESS	440mm	605mm

I HAVE REVIEWED THE PLANS FOR THE CONSTRUCTION OF FIRE STATION 123 LOCATED AT 3010 THE COLLEGEWAY AND HAVE PREPARED THIS PLAN TO INDICATE THE COMPATIBILITY OF THE PROPOSAL TO THE EXISTING ADJACENT PROPERTIES AND MUNICIPAL SERVICES. IT IS MY BELIEF THAT ADHERENCE TO THE PROPOSED GRADES AS SHOWN WILL PRODUCE ADEQUATE SURFACE DRAINAGE AND PROPER FACILITY OF THE MUNICIPAL SERVICES WITHOUT ANY DETRIMENTAL EFFECT TO THE EXISTING DRAINAGE PATTERNS OR ADJACENT PROPERTIES.

FARSHD MORSHEDI, P. ENG

(a) ALL SURFACE DRAINAGE WILL BE SELF-CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.

(b) THE VARIATIONS OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD WILL BE PAID BY THE APPLICANT.

(c) AT THE ENTRANCES TO THE SITE, THE MUNICIPAL CURB AND SIDEWALK WILL BE CONTINUOUS THROUGH THE DRIVEWAY AND A CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE.

(d) PROPOSED CURBING WITHIN THE MUNICIPAL BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS:

(i) FOR ALL SINGLE FAMILY RESIDENTIAL PROPERTIES INCLUDING ON STREET TOWNHOUSES, ALL CURBING IS TO STOP AT THE PROPERTY LIMIT OR THE BACK OF THE MUNICIPAL SIDEWALK, WHERE WATER IS APPLIED TO THE CURB.

(ii) FOR ALL OTHER PROPOSALS INCLUDING INDUSTRIAL, COMMERCIAL AND MULTI-UNIT RESIDENTIAL DEVELOPMENTS, ALL ENTRANCES TO THE SITE ARE TO BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARDS 2240.030 OR 2240.031 (AS APPLICABLE) AND 2230.020. DRIVEWAY AND SIDEWALK CURB RADIUS DIMENSIONS SHALL BE 10' TO 12' (AS APPLICABLE) TO 350.010.

(e) ALL EXCESS EXCAVATED MATERIAL WILL BE REMOVED FROM THE SITE.

(f) THE EXISTING DRAINAGE PATTERN WILL BE MAINTAINED EXCEPT WHERE NOTED.

(g) THE APPLICANT SHALL BE REQUIRED TO OBTAIN A PERMIT TO EXCAVATE TO OBTAIN ALL INFORMATION LOCATES PRIOR TO THE INSTALLATION OF HOARDING WITHIN THE MUNICIPAL RIGHT-OF-WAY.

(h) THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF ANY UTILITY RELATIONS NECESSITATED BY THE SITE PLAN.

(i) FOR ALL HOARDING CONSTRUCTION, ALL REQUIRED HOARDING IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS, MUST BE ERECTED AND THEN MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION. SHOULD ANY WORKS BE REQUIRED WITHIN THE MUNICIPAL RIGHT-OF-WAY, A ROAD OCCUPATION PERMIT WILL BE REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH THE INFORMATION PLEASE CONTACT THE PUC/P/PERMIT TECHNOLOGIST, LOCATED AT 3185 MAVIS ROAD.

LEGEND:

- MH1
- MH1A
- PROPOSED VALVE BOX & WATER SERVICE
- PROPERTY LINE
- OUTLINE OF UNDERGROUND PARKING GARAGE
- EXISTING CATCHBASIN
- EXISTING AREA DRAIN
- EXISTING MANHOLE
- EXISTING TREE
- PROPOSED TREE
- EXISTING FIRE HYDRANT
- EXISTING HYDRO POLE
- EXISTING LIGHT POLE

PROPOSED BOTTOM OF SWALE

PROPOSED GRADE

PROPOSED TOP OF CURB

PROPOSED BOTTOM OF CURB

EXISTING GRADE TO REMAIN

PROPOSED TOP OF RETAINING WALL

EXISTING ELEVATION TO REMAIN

TOP ELEVATION OF PROPOSED MANHOLE/AREA DRAIN/CATCH BASIN

PROPOSED BOTTOM OF TIE / RETAINING WALL ELEVATION

PROPOSED AREA DRAIN

PROPOSED CATCH BASIN/DITCH INLET CATCHBASIN

FLOW DIRECTION & SLOPE

BUILDING DOOR

PROPOSED TREE PROTECTION ZONE (REFER TO LANDSCAPE DRAWINGS FOR DETAILS)

PROPOSED SOLID BOARD TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)

EXISTING CHAIN LINK FENCE TO REMAIN (REFER TO LANDSCAPE FOR DETAILS)

PROPOSED 1.8m PRIVACY FENCE (REFER TO LANDSCAPE FOR DETAILS)

PROPOSED TREE PROTECTION FENCE (REFER TO LANDSCAPE FOR DETAILS)

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM-1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 824, HAVING A PUBLISHED ELEVATION OF 170.552.

1. ALECTRA TO BE NOTIFIED AND BE ON SITE TO ENCASE THE HYDRO CABLES THAT RUN BELOW THE CONCRETE APRON. THIS WORK MAY OCCUR AT THE SAME TIME AS CONSTRUCTION.

5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
3	ISSUED FOR BUILDING PERMIT	2024-01-22	GB	FM
2	RE-ISSUED FOR SPA	2023-12-15	GB	FM
1	ISSUED FOR SPA	2023-12-01	GB	FM
No.	Revision	Date	By	App

MINIMUM PAVEMENT STRUCTURE FOR THE LIGHT DUTY AND HEAVY DUTY AS PER GEOTECHNICAL REPORT PREPARED BY G2S CONSULTING INC. DATED NOVEMBER 17, 2023		
PAVEMENT STRUCTURAL LAYERS	LIGHT DUTY	HEAVY DUTY
ASPHALTIC CONCRETE WEARING COURSE OPSS HL 3 OR HL 3A	40mm	40mm
BINDER COURSE OPSS HL 6	50mm	65mm
BASE COURSE OPSS GRANULAR A	150mm	150mm
SUB-BASE COURSE OPSS GRANULAR B TYPE II	200mm	350mm
TOTAL THICKNESS	440mm	605mm

I HAVE REVIEWED THE PLANS FOR THE CONSTRUCTION OF FIRE STATION 123 LOCATED AT 3010 THE COLLEGEWAY AND HAVE PREPARED THIS PLAN TO INDICATE THE COMPATIBILITY OF THE PROPOSAL TO THE EXISTING ADJACENT PROPERTIES AND MUNICIPAL SERVICES. IT IS MY BELIEF THAT ADHERENCE TO THE PROPOSED GRADES AS SHOWN WILL PROVIDE ADEQUATE SURFACE DRAINAGE AND PROPER FACILITY OF THE MUNICIPAL SERVICES WITHOUT ANY DETRIMENTAL EFFECT TO THE EXISTING DRAINAGE PATTERNS OR ADJACENT PROPERTIES.

FARSHID MORSHEDI, P. ENG.

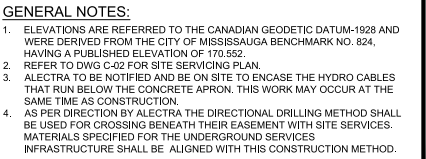
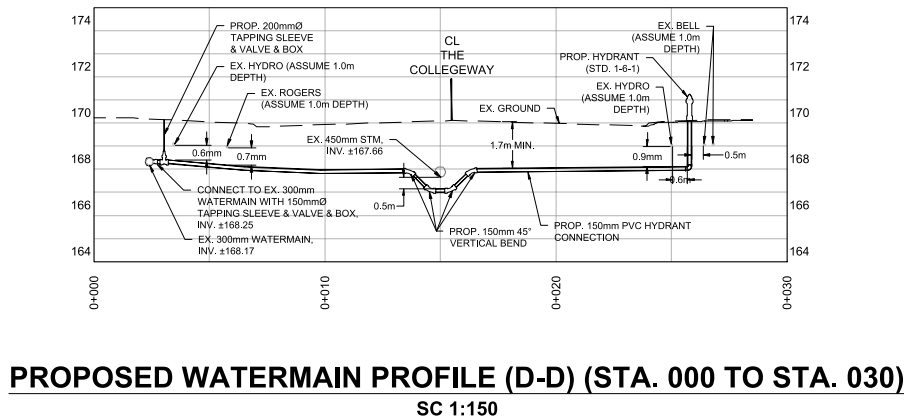
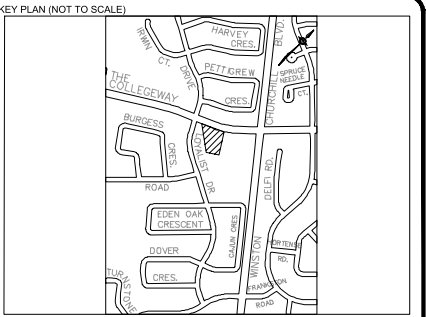
Owner/Client:

APPLICANT INFO	OWNER INFO
DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220	CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395

Location:

Title: **SITE GRADING PLAN**

Designed By: G.B.	Drawn By: G.B.	Checked By: F.M.
Scale: 1:200	Date: MAY, 2023	Drawing No.: C-01
Project No.: 23394.01	Site Plan Application No.: SP 24-3	

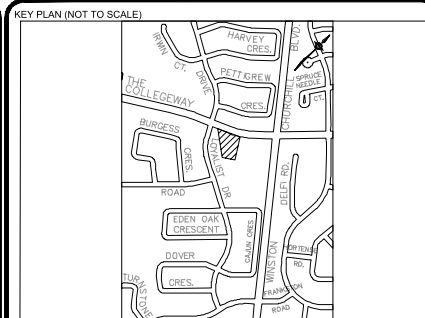
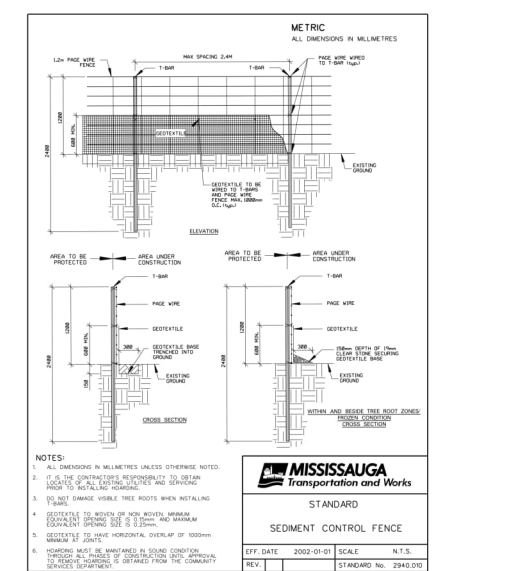


5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
3	ISSUED FOR BUILDING PERMIT	2024-01-22	GB	FM
2	RE-ISSUED FOR SPA	2023-12-15	GB	FM
1	ISSUED FOR SPA	2023-12-01	GB	FM
No.	Revision	Date	By	App.

525 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:	
CITY OF MISSISSAUGA FIRE STATION 123	
<p>APPLICANT INFO</p> <p>DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220</p>	<p>OWNER INFO</p> <p>CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395</p>

Location:			
3010 THE COLLEGEWAY			
Title:			
CROSS SECTIONS			
Designed By:	G.B.	Drawn By:	G.B.
Scale:	1:150	Date:	MAY, 2023
Project No.:	23394.01	Site Plan Application No.:	SP 24-3
			C-03



CATCHING TO BE PROTECTED - 2930.040
(SEE NOTE 7 - TEMPORARY EROSION AND SEDIMENT
CONTROL NOTES ON THIS DWG)

CONSTRUCTION ENTRANCE

— X — X — X —
PROPOSED SEDIMENT CONTROL FENCE

— [] — [] —
PROPOSED HOARDING WITH SEDIMENT CONTROL FENCE
(REFER TO LANDSCAPE FOR DETAILS)

— — — — —
EXISTING CURB

— — — — —
PROPERTY LINE

— — — — —
EXISTING CONTOUR LINE

CB []
EXISTING CATCHBASIN
(TO BE PROTECTED WITH FILTER CLOTH)

LS
EXISTING LIGHT STAND

()
EXISTING TREE

([])
EXISTING TREE TO BE RETAINED

()
EXISTING MANHOLE
(TO BE PROTECTED WITH FILTER CLOTH)

— — — — —
PROPOSED SOLID BOARD TREE PROTECTION FENCE
(REFER TO LANDSCAPE FOR DETAILS)

— — — — —
EXISTING CHAIN LINK FENCE TO REMAIN
(REFER TO LANDSCAPE FOR DETAILS)

— [] — [] —
PROPOSED 1.8m PRIVACY FENCE
(REFER TO LANDSCAPE FOR DETAILS)

— — — — —
PROPOSED TREE PROTECTION FENCE
(REFER TO LANDSCAPE FOR DETAILS)

No.	Revision	Date	By	A
5	RE-ISSUED FOR SPA	2024-03-08	GB	F
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	F
3	ISSUED FOR BUILDING PERMIT	2024-01-22	GB	F
2	RE-ISSUED FOR SPA	2023-12-15	GB	F
1	ISSUED FOR SPA	2023-12-01	GB	F



<p>APPLICANT INFO</p> <p>DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220</p>	<p>OWNER INFO</p> <p>CITY OF MISSISSAUGA, ADRIANA TANTAL 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395</p>
------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------

Title:

EROSION AND SEDIMENT CONTROL PLAN			
Designed By:	G.B.	Drawn By:	G.B.
Scale:	1/200	Date:	MAY, 2023
Project No.:	23394.01	Site Plan Application No.:	SP 24-3
			Checked By: F.M. Drawing No.: C-04

GENERAL NOTES

- ALL SITE LAYOUT INFORMATION, INCLUDING BUILDING DIMENSIONS, SETBACKS, CURBS, DEPRESSED CURB LOCATIONS, SIDEWALKS, PARKING AND LANDSCAPE FEATURES MUST BE REFERENCED FROM THE ARCHITECT'S PLANS.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST VERIFY ALL DIMENSIONS AND LAYOUT INFORMATION. ANY DISCREPANCIES MUST BE REPORTED TO THE CONSULTANT BEFORE RESUMING CONSTRUCTION OPERATIONS.
- ALL SERVICES MUST BE INSTALLED TO THE CURRENT CITY OF MISSISSAUGA STANDARDS, REGION OF PEEL STANDARDS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS), AND ONTARIO BUILDING CODE (OBC) UNLESS OTHERWISE SPECIFIED, TO THE SPECIFICATION OF THE CITY AND CONSULTANT.
- THE REGION OF PEEL AND CITY OF MISSISSAUGA STANDARD DRAWINGS, MATERIAL SPECIFICATIONS AND CONSTRUCTION SPECIFICATIONS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) SHALL FORM PART OF THE CONTRACT DOCUMENTS.
- THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. THIS MAY REQUIRE EXCAVATION TO EXPOSE UTILITIES AS REQUIRED BY CONTRACTORS.
- ALL TRENCHING TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
- ALL TRENCHES SHALL BE BACKFILLED TO THE CITY'S OF STANDARDS AND IN ACCORDANCE WITH THE GEOTECHNICAL REPORT OR AS OTHERWISE NOTED ON THE DRAWINGS.
- ALL DIMENSIONS ARE IN METRES(m) AND ALL DIAMETERS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS FOR THE CITY AND ONTARIO TRAFFIC MANUAL FOR TEMPORARY CONDITIONS AND MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
- THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE CITY.
- EXISTING STRUCTURES ARE NOT TO BE DISTURBED, NOR ENCROACHMENT ON ADJACENT PROPERTIES UNLESS INSTRUCTED BY THE ENGINEER.
- DEWATERING, IF REQUIRED, SHALL BE THE RESPONSIBILITY AND SOLE EXPENSE OF THE CONTRACTOR. REFER TO THE GEOTECHNICAL REPORT FOR EXISTING SITE CONDITIONS.
- CONTRACTOR TO EXPOSE AND VERIFY LOCATION, ELEVATION, AND SIZE OF ALL SERVICE CONNECTIONS PRIOR TO CONSTRUCTION. THE OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS WITH EXISTING SERVICES
- CONTRACTOR SHALL RED-LINE ALL AS CONSTRUCTED INFORMATION ON A SET OF DRAWINGS AND PROVIDE TO THE OWNER AT THE END OF CONSTRUCTION, SEALED BY AN OLS OR P.ENG.
- CONTRACTOR SHALL SUPPORT AND PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION AS PER OPSD AND CITY OF MISSISSAUGA STANDARDS AND SPECIFICATIONS.
- THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNERS CONTRACTOR FROM OBTAINING AND PAYING FOR, BUT NOT LIMITED TO THE FOLLOWING PERMITS, ROAD CUTS, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC. ALL RESTORATION AS PER CITY STANDARDS.
- THE CONTRACTOR SHALL ENDEAVOR TO PREVENT MUD TRACKING ONTO EXISTING RIGHT-OF-WAYS AND SHALL PROVIDE FOR CLEANUP AT HIS OWN EXPENSE AS DIRECTED BY THE CITY. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST ON THE PROJECT AND HE SHALL PROVIDE AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE CITY.
- FOR ELECTRICAL, ARCHITECTURAL AND MECHANICAL DETAILS BY OTHERS, SEE RESPECTIVE DRAWINGS. WORKS SHOWN ON THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PLANS.
- ALL EXISTING SERVICES ARE TO REMAIN IN SERVICE AT ALL TIMES DURING CONSTRUCTION.
- ITEMS DESIGNATED TO BE REMOVED SHALL BE DISPOSED OFF-SITE.
- CONSTRUCTION LAYOUT SHALL BE UNDERTAKEN BY CONTRACTOR'S SURVEYOR AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL REVIEW THE GEOTECHNICAL REPORT FOR THE SITE TO CONFIRM EXISTING SOIL CONDITIONS AND TO CONFIRM RECOMMENDED GEOTECHNICAL PROCEDURES FOR THE ADDITION.

CONSTRUCTION & RESTORATION WORKS FOR MUNICIPAL R.O.W.S. - THE COLLEGEWAY

- PROPOSED STORM AND WATER SERVICE CONNECTIONS WITHIN EXISTING MUNICIPAL R.O.W.S ARE TO BE BACKFILLED WITH UNSHRINKABLE FILL UP TO BASE OF EXISTING ROAD GRANULAR, AND ASPHALT TO BE MATCHED WITH MINIMUM THICKNESS IN ACCORDANCE WITH CITY STANDARD 2220.03.
- TRENCH CONSTRUCTION / RESTORATION SHALL BE IN ACCORDANCE WITH CITY STANDARDS 2220.03, 2220.031, AND 2220.032.
- BOULEVARD AREAS SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

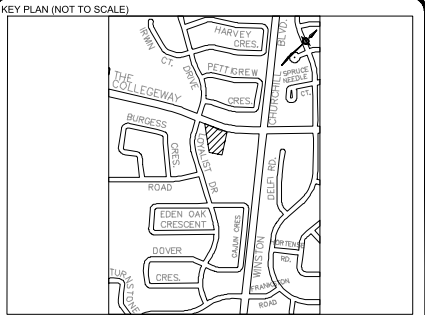
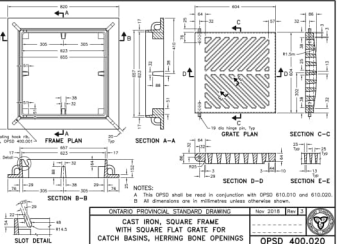
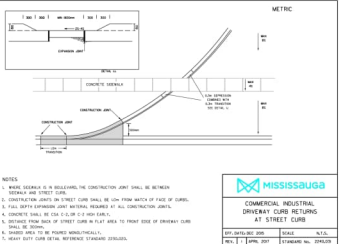
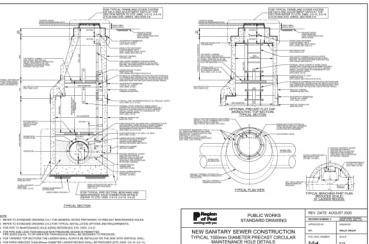
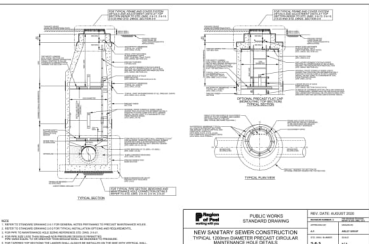
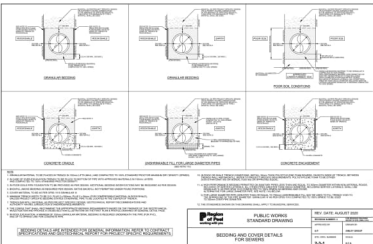
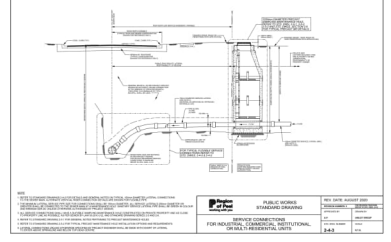
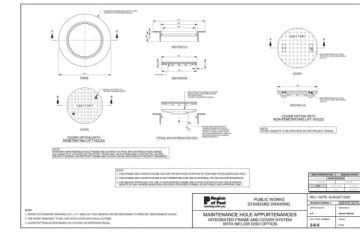
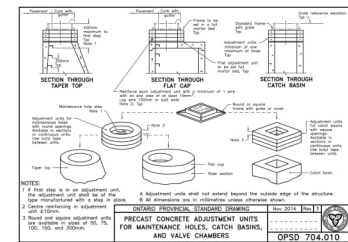
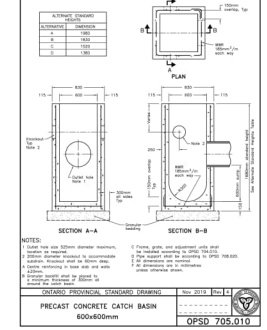
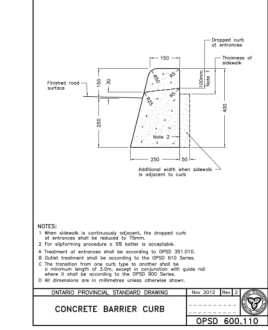
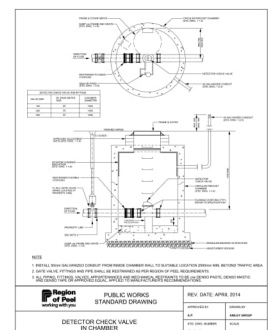
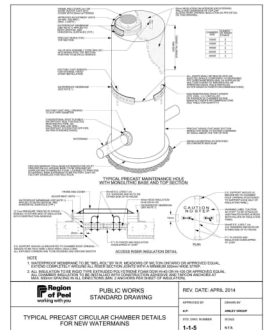
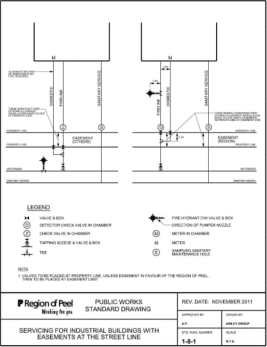
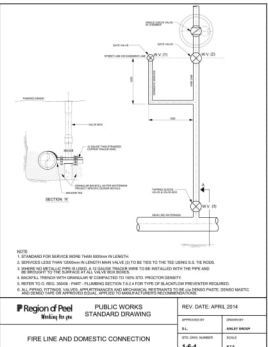
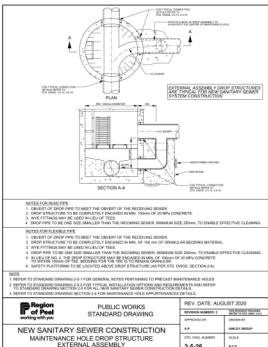
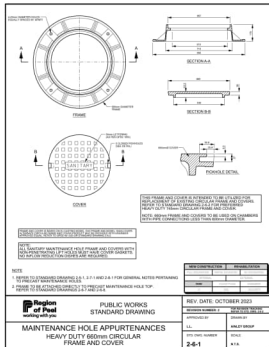
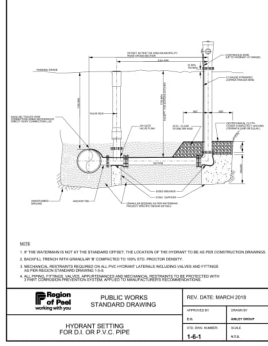
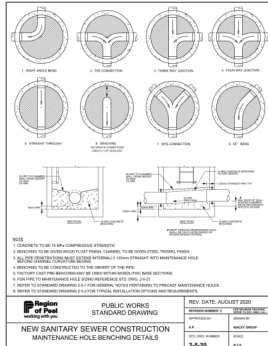
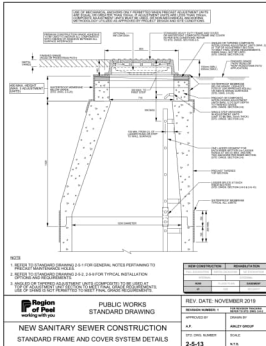
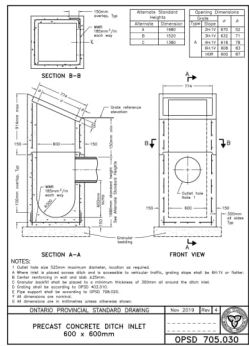
SANITARY, STORM AND WATERMAIN NOTES

- FULL LENGTH PERFORATED SUB-DRAIN PIPES OF 150mm DIA. TO BE INSTALLED AROUND THE PERIMETER OF PARKING LOT.
- ALL UTILITY COMPANIES WILL BE NOTIFIED BY CONTRACTOR FOR LOCATES PRIOR TO THE INSTALLATION OF PROPOSED SERVICE CONNECTIONS.
- ALL PIPE MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT MANUFACTURERS APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES.
- ALL SANITARY MAINTENANCE HOLES SHALL CONFORM TO THE CURRENT MANUFACTURER'S APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES, REGIONAL STANDARD DRAWING 2-1-1 WHICH MUST BE MODIFIED IN THE FIELD TO PREVENT INFLOW AND INFILTRATION.
- SANITARY SERVICE CONNECTION MATERIAL MUST BE PVC SDR28.
- STORM SERVICE CONNECTION MATERIAL MUST BE PVC DR35.
- ALL MAINTENANCE HOLE ARE TO BE SUPPLIED OR CONSTRUCTED IN ACCORDANCE WITH OPSD 701 SERIES.
- CATCH BASINS SHALL BE PRECAST AS PER OPSD 705 SERIES.
- SANITARY SEWERS SHALL BE INSTALLED WITH BEDDING AS PER REGIONAL STANDARD DRAWING 2-3-1.
- BEDDING FOR PVC STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD DRAWING NO. 2112.080.
- SEWER BEDDING SHALL CONFORM WITH OPSS 1010 FOR GRANULAR "A" OR CITY STANDARD DRAWING NO. 2112.100 OR 2112.140.

- ALL GRANULAR BEDDING AND BACKFILL MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF OPSS 1010 AND MUST NOT CONTAIN RCM/RAP.
- ALL VALVE 300MM DIAMETER AND SMALLER SHALL BE EQUIPPED WITH VALVE BOXES AND RESTRAINED AND VALVE FITTING WRAPPED IN CORROSION PROTECTION TAPE.
- ALL APPROVED NATIVE MATERIAL SHALL BE FREE OF FROZEN LUMPS, CINDERS, ASHES, ASPHALT REFUSE, ORGANIC MATTER, ROCKS AND BOULDERS OR OTHER DELETERIOUS MATERIALS.
- ALL WATERMAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED. DETAILS OF RESTRAINTS SHALL BE DESIGNED, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER AS PART OF SHOP DRAWINGS BY THE CONTRACTOR.
- THE CONTRACTOR SHALL RETAIN THE SERVICES OF A MOECC LICENSED CONTRACTOR SPECIALIZING IN THE PROVISION OF DISINFECTION SERVICES FOR ALL WATERMAIN TESTING REQUIRED IN THIS CONTRACT.
- TRACER WIRE IS TO BE INSTALLED ON ALL NEW PVC WATERMAIN PIPES.
- THE TOP OF VALVE BOX AND CHAMBER COVERS SHALL BE SET FLUSH WITH FINISHED GRADE AND REMAIN ACCESSIBLE AT ALL TIMES.
- WATER SERVICES, A 12-GAUGE TWU STANDARD COPPER, LIGHT COLORED, PLASTIC COATED TRACER WIRE MUST BE INSTALLED WITH AND ALONG THE PIPE AND BROUGHT TO THE SURFACE AT EACH SERVICE BOX. TRACER WIRE IS TO BE ATTACHED TO THE PIPE AND OUTSIDE OF EACH SERVICE BOX BY MEANS OF TAPE OR RUBBER GROMMET.
- CHAMBER AS PER REGION STANDARD DRAWING NUMBER 1-1-5.
- PROPOSED WATER CONNECTION AS PER REGION STANDARD NUMBER 1-6-4 AND 1-8-3
- FOR DETAILS OF THE PROPOSED TRENCH DRAIN, ROOF DRAIN, SERVICE CONNECTIONS, WATER METER AND BACKFLOW PREVENTER REFER TO MECHANICAL DRAWING.
- PROVIDE SITE GRADING AND SITE SERVING "AS-BUILT" AND "RECORD DRAWINGS" AND "SEWERS CCTV SURVEY" FOR THE PROJECT CLOSEOUT SUBMITTALS, AT NO EXTRA COST TO THE OWNER.
- "SEWERS CCTV SURVEY" FOR THE PROJECT CLOSEOUT SUBMITTAL SHALL BE IN ACCORDANCE WITH OPSS 409 "CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF PIPELINES".
- STORM TANK MODEL AS PER LAYFIELD'S BRANTWOOD MODULE. FOR ADDITIONAL INFORMATION, PLEASE CONTACT JON FEENSTRA AT JON.FEENSTRA@LAYFIELDGROUP.COM OR (780) 451-7232. CONTRACTOR MUST PREPARE SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW BY ENGINEER.
- OIL GRIT SEPARATOR MODEL AS PER STORMCEPTOR EFO4. FOR ADDITIONAL INFORMATION, PLEASE CONTACT JESSICA STEFFLER AT JESSICA.STEFFLER@RINKERPIPE.COM. CONTRACTOR MUST PREPARE SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW BY ENGINEER.

REGION OF PEEL STANDARD NOTES

- PUBLIC AND PRIVATE SERVICES, APPURTENANCES, MATERIALS AND CONSTRUCTION METHODS MUST COMPLY WITH THE MOST CURRENT REGION OF PEEL STANDARDS AND SPECIFICATIONS, THE LOCAL MUNICIPALITY'S REQUIREMENTS FOR THE ONTARIO BUILDING CODE AND ONTARIO PROVINCIAL STANDARDS. ALL WORKS SHALL ADHERE TO ALL APPLICABLE LEGISLATION, INCLUDING REGIONAL BY-LAWS.
- WATERMAIN AND / OR WATER SERVICE MATERIALS 100 mm (4") AND LARGER MUST BE PVC DR18 CONSTRUCTED AS PER AWWA C900-16. SIZE 50 mm (2") AND SMALLER MUST BE TYPE K SOFT COPPER CONSTRUCTED AS PER ASTM B88-49 OR POLYETHYLENE CONSTRUCTED AS PER AWWA C901 AND CSA E.137.10 (CHOOSE ONLY ONE MATERIAL).
- WATERMAINS AND / OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7 m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2 M (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
- PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50 mm (2") OUTLET ON 100 mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100 MM (4") DIAMETER MINIMUM ON A HYDRANT.
- ALL CURB STOPS TO BE 3.0 m (10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
- HYDRANT AND VALVE SET TO REGION STANDARD 1 - 6 - 1 DIMENSION A AND B, 0.7 m (2') AND 0.9 m (3') AND TO HAVE PUMPER NOZZLE.
- WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
- WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3 m (12") OVER / 0.5 m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
- ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
- LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK. WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTIOSYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.
- ALL WATER METERS MUST BE INSTALLED IN HEATED AND ACCESSIBLE SPACE.



LEGEND:

No.	Revision	Date	By	App
5	RE-ISSUED FOR SPA	2024-03-08	GB	FM
4	ISSUED FOR CLASS A ESTIMATE	2024-01-22	GB	FM
3	ISSUED FOR BUILDING PERMIT	2024-01-22	GB	FM
2	RE-ISSUED FOR SPA	2023-12-15	GB	FM
1	ISSUED FOR SPA	2023-12-01	GB	FM

625 Cochrane Drive, Suite 900 Markham, Ontario L3R 9R9, Canada Tel: (905)470-0015 Fax: (905)470-0030			
Owner/Client:		CITY OF MISSISSAUGA FIRE STATION 123	
APPLICANT INFO DAVID PREMI, 24 MAIN ST. W., SUITE 1800, HAMILTON, ON L8P 1H1 (905)522-0220		OWNER INFO CITY OF MISSISSAUGA, ADRIANA TANTALO, 300 CITY CENTRE DRIVE (905)615-3200 EXT. 3395	
Location: 3010 THE COLLEGEWAY			
Title: GENERAL NOTES AND STANDARD DETAILS			
Designed By:	G.B.	Drawn By:	G.B.
Scale:	NTS	Date:	MAY, 2023
Project No.:	23394.01	Site Plan Application No.:	SP 24-3
Checked By:	F.M.	Drawing No.:	C-05

