RENFROE LAND MANAGEMENT

103 SCHNEIDER ROAD, COMMERCIAL DEVELOPMENT, OTTAWA, ON

SERVICING REPORT

NOVEMBER 23, 2021
1ST SUBMISSION
2ND SUBMISSION
3RD SUBMISSION
4TH SUBMISSION

RENFROE LAND MANAGEMENT

wsp

103 SCHNEIDER ROAD, COMMERCIAL DEVELOPMENT, OTTAWA, ON

SERVICING REPORT

RENFROE LAND MANAGEMENT

SITE PLAN APPLICATION
4TH SUBMISSION

PROJECT NO.: 211-01794-00
DATE: SEPTEMBER 2021

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November 23, 2021

David Renfroe
Renfroe Land Management

Attention: David Renfroe,

Dear Sir:

Subject: 103 Schneider Road – Commercial Development - Servicing Report

Please find attached our revised servicing report, including civil engineering design drawings, prepared for your review prior to fourth submission.

Yours sincerely,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer

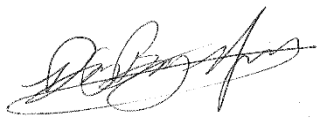
WSP ref.: 211-01794-00

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Issued for Site Plan Application	Issued for Site Plan Application	Issued for Site Plan Application	Issued for Site Plan Application
Date	April 6th, 2021	June 23rd, 2021	September 17th, 2021	November 23rd, 2021
Prepared by	Ding Bang (Winston) Yang	Ding Bang (Winston) Yang	Ding Bang (Winston) Yang	Ding Bang (Winston) Yang
Signature				
Checked by	Ishaque Jafferjee	Ishaque Jafferjee	Ishaque Jafferjee	Ishaque Jafferjee
Signature				
Project number	211-01794-00	211-01794-00	211-01794-00	211-01794-00

SIGNATURES

PREPARED BY



Ding Bang (Winston) Yang, P.Eng
Project Engineer

REVIEWED BY

Ishaque Jafferjee, P.Eng.
Senior Project Manager

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1 GENERAL

1.1 EXECUTIVE SUMMARY

WSP was retained by Renfroe Land Management to provide servicing and grading design services for the proposed new commercial development, including three new commercial buildings, located at 105A Schneider Road, north of Carling Ave, south of Legget Dr, west of Herzberg Road and east of Schneider Road. This report outlines findings and calculations pertaining to the servicing of the proposed development for building A, B and C with a gross lot area of 42,860 m².

Currently the land proposed for the commercial development is natural landscaping area with mainly covered by grass and trees. The gross building footprint for Building A, B and C is 4,481.6 m², 2,378.0 m and 1,808.0 m² respectively. The site is surrounded by commercial and light industrial development. It is part of lot 6 concession 4, and part of easement between concession 4 and existing development, Geographic Township of March, now City of Ottawa (refer to Appendix A for the Topographical Survey Plan by Annis, O'Sullivan, Vollebekk Ltd, February 2021). Based on the topographic survey, the ground, predominantly grass and shrubs, sloping from the high elevation of 77.91 m in the west of the easement adjacent to Schneider road to a low elevation of 74.68 m in the northeast comer of the site. The overall topography of the three south existing developed sites including 101 and 101A Schneider Road and 4017 Carling Ave are draining south to north toward the Kizell Drain via the proposed development area. Existing on-site detention facilities have not been constructed in the existing sites. The existing topographic conveys overland runoff to Kizell Drain. Quality control will be provided as specified by the MVCA.

The City of Ottawa required that the design of a drainage and stormwater management system in this development must be prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from available sources, and outlines the design for water, sanitary wastewater, and stormwater facilities.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available within Schneider Road to the development as recorded from as-built drawings from City of Ottawa:

Schneider Road:

- 250 mm sanitary sewer and 305mm watermain.

It is proposed that:

- On-site stormwater management systems, employing surface and roof storage will be provided to attenuate flow rates leaving the new parking lot and new building roof. Existing drainage patterns, previously established controlled flow rates will be maintained. Refer to the stormwater management report for details.

1.2 DATE AND REVISION NUMBER

This version of the report is the fourth revision, dated November 23rd, 2021.

1.3 LOCATION MAP AND PLAN

The proposed commercial development at 105A Schneider Road, in the City of Ottawa at the location shown in Figure 1-1 below.

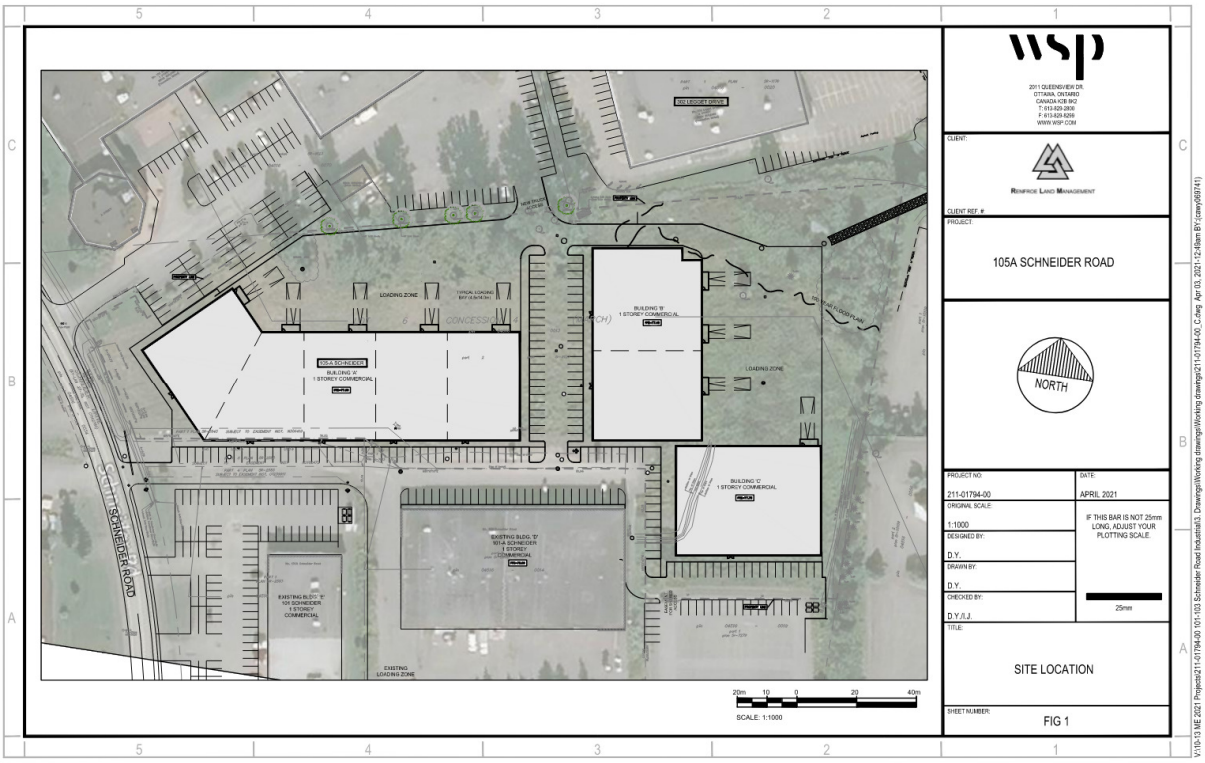


Figure 1-1 Site Location

1.4 ADHERENCE TO ZONING AND RELATED REQUIREMENTS

The proposed property use will be in conformance with zoning and related requirements prior to approval and construction and is understood to be in conformance with current zoning.

1.5 PRE-CONSULTATION MEETINGS

A pre-consultation meeting was held with the City of Ottawa on December 15, 2020. Notes from this meeting are provided in Appendix A.

1.6 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
    - Technical Bulletin ISDTB-2012-4 (20 June 2012)
    - Technical Bulletin ISDTB-2014-01 (05 February 2014)
    - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
    - Technical Bulletin ISDTB-2018-01 (21 March 2018)
    - Technical Bulletin ISDTB-2018-04 (27 June 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.

1.7 STATEMENT OF OBJECTIVES AND SERVICING CRITERIA

The objective of the site servicing is to meet the requirements for the proposed modification of the site while adhering to the stipulations of the applicable higher-level studies and City of Ottawa servicing design guidelines.

1.8 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

A municipal sanitary sewer and a watermain are located within Schneider Road right of way. And a private watermain is servicing 101A Schneider Road via the Easement. A new sanitary sewer will be connected to the existing sewers along Schneider Road from the proposed development. New private water service will be connected to the existing private watermain at the Easement east of Schneider Road. A new piped stormwater system conveys both external developed and proposed drainage to Kizell Drain. Quantity control is required to restrict the discharge leaving the development areas, as noted in the Stormwater Management Report. The existing boundary road at the site will remain open.

1.9 ENVIRONMENTALLY SIGNIFICANT AREAS, WATERCOURSES AND MUNICIPAL DRAINS

The proposed development site is surrounded by commercial and light industrial lands. Portions of the property are located within the 1:100-year flood plain of the Kizell Drain, which was approved by the MVCA Board of Directors in 2017. Runoff

from the development site is directed to Kizell Drain Watershed. Oil grit separator has been proposed to provide quality control as specified by the MVCA.

1.10 CONCEPT LEVEL MASTER GRADING PLAN

A detailed grading plan for the development site has been developed, matching the existing overland flow pattern of directing overflow drainage to Kizell Drain to the northeast corner. The site topographic survey, included in Appendix A, provides evidence of direction of overland flow of the site from west to east.

Grading will employ terraced slopes of 3H:1V to provide transitions from the new work areas to existing grades. No changes will be made to grades at the property perimeter.

1.11 IMPACTS ON PRIVATE SERVICES

The existing 250 mm dia. watermain running west-east across the development area to provide domestic and fire demand to 101A Schneider Road has been verified as active, and will be rerouted to the south via the Easement south of proposed building A. The existing fire hydrant located within the proposed building A footprint has to be relocated to the south at the same time of rerouting. It will be connected to the mains along Schneider Road at present location. Temporary shut down for the existing water services will be required for making the final connection. 101A Schneider Road, located to the south, will be out of service when making the final connection. The rerouting and exiting fire hydrant relocation have to be completed prior to the excavation of the remaining portion of the existing watermain running under the proposed building A. The existing 250 mm valve box close to the main connection will be replaced by a DMA chamber at the same time of rerouting.

1.12 DEVELOPMENT PHASING

No development phasing is expected for the current proposal.

1.13 GEOTECHNICAL SUTDY

A geotechnical investigation report has been prepared by Paterson Group (Report PG5682-1, March 31, 2021), and its recommendations has been taken into account in developing the engineering specifications.

1.14 DRAWING REQUIREMENT

The engineering plans submitted for site plan approval are in compliance with City requirements.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

There is an existing 305mm diameter public watermain along Schneider Road providing water to 101A Schneider Road via the existing 250mm diameter private watermain. For the proposed development, the existing 250mm diameter private watermain extended from the existing 305mm municipal watermain along Schneider Road will continue to provide water demand and fire protection to the proposed and existing development at 105A and 101A Schneider Road. Four water services connections will be extended to the 101A Schneider Road, proposed Building A, B and C mechanical room. An existing private fire hydrant will be relocated south of the Easement within 45m of the Siamese connection. An addition fire hydrant will be installed to provide fire protection for Building B and C. The municipal fire hydrant at the current entrance to 101A Schneider Road will be relocated south as per the new entrance layout. No changes are required to the existing City water distribution system to allow servicing for this property.

The existing 250 mm diameter watermain running west-east across the development area. This existing water service is serves 101A Schneider Road, and supplies nearby private fire hydrant. Rerouting the existing 250 mm diameter watermain must be done prior to the construction of the building A foundation.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been obtained from the City of Ottawa at the 305 mm diameter watermain on Schneider Road for the development, and are included in Appendix B. A max fire flow demand of 150 l/s (9,000 l/min) has been calculated for the proposed development and a fire flow demand of 150 l/s (9,000 l/min) has also been calculated for the existing building at 101A Schneider Road as noted in Section 2.4.

Table 2-1: Boundary Conditions

BOUNDARY CONDITIONS		
SCENARIO	HGL (m)	HGL (m)
Maximum HGL	130.0	130.0
Minimum HGL (Peak Hour)	126.5	126.5
Max Day + Fire Flow	125.2	125.2

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as commercial development, consisting of three one-storey commercial buildings. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

Proposed 103 Existing 101A

Average Day	0.28 l/s	0.10 l/s
Maximum Day	0.41 l/s	0.15 l/s
Peak Hour	0.74 l/s	0.26 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

A water model software, WaterGEMS was used to perform the water distribution analyze for the proposed development including proposed 103 and existing 101A Schneider Road. The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 476 kPa for Building A, 477 kPa for Building C, 481 kPa for Building B and 478 kPa for 101A which exceeds the minimum requirement of 276 kPa per the guidelines. Refer to Appendix B for detail water distribution analyze output.

Table 2-2: Summary of the minimum water pressure under peak hour scenario

Peak Hour @ 126.5m	
ID	Pressure (kPa)
J-8	481
J-10	477
J-13	476
J-14	478
J-15	476

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. Assuming non-combustible construction and with sprinkler system, a fire flow demand of 150 l/s for Building A, 133 l/s for Building B, 117 l/s for Building C and 150 l/s for the existing building at 101A Schneider Road have been calculated. A copy of the calculation is included in Appendix B.

The proposed and existing development can be serviced through the combination of existing and proposed hydrants. There areis one existing private fire hydrant on site, one municipal fire hydrant at the site entrance and one new private hydrant

in the middle of all four buildings. The new private hydrant is within 45 m of the building fire department connection for both Building B and c. The relocated existing private fire hydrant is within 45 m of the building fire department connection of both proposed Building A and existing Building 101A. all the proposed and existing hydrants are rated at 5700 l/min.

The proposed building A, B and C on site and the existing building at 101A Schneider Road will be serviced by a single 203 mm service off the 250 mm private watermain. The service will run into the water entry room. The proposed building will be sprinklered and fire protection will be provided with the fire department Siamese connection within 45 m of the new private fire hydrant from the private access road.

The boundary condition for Maximum Day and Fire Flow results in a pressure of 298 kPa and 150 kPa at the ground floor level for Building A, B and C respectively. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As a pressure of 298 kPa and 150 are achieved, the fire flow requirement is exceeded.

Table 2-3: Summary of the Residual Pressure under Max Day + Fire scenario

Max Day + Fire @ 267 l/s	
ID	Residual Pressure (kPa)
H-2	298
H-3	150
H-4	150

2.5 CHECK OF HIGH PRESSURE

High pressure is not concern for Building A, B, C and existing 101A. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in the range of 510-515 kPa which is slightly less than the 552 kPa threshold in the guideline in which pressure control is not required.

2.6 PHASING CONSTRAINTS

No phasing constraints exist.

2.7 RELIABILITY REQUIREMENTS

DMA chamber as per city of Ottawa standard W3 and shot off valve will be provided at the study boundary from Schneider Road. The existing 250mm private watermain is connected to a looped section of the 305mm City watermain at Schneider Road. Water flow can be isolated from either direction along Schneider Road. A redundant service is not required as the buildings use are non-residential.

2.8 NEED FOR PRESSURE ZONE BOUNDAY MODIFICATION

There is no need for a pressure zone boundary modification.

2.9 CAPABILITY OF MAJOR INFRASTRUCTURE TO SUPPLY SUFFICIENT WATER

The current infrastructure is capable of meeting the domestic demand based on City requirements and fire demand as determined by FUS requirements for the proposed townhouses and apartment buildings.

2.10 DESCRIPTION OF PROPOSED WATER DISTRIBUTION NETWORK

The existing 250 mm private watermain will continue to be used to service both the development and existing site. The existing private hydrant will be relocated to the south of the easement and is located within 45 metres of the fire department connection to both Building A and existing building at 101A Schneider Road. A new private hydrant will be installed in the middle of the four buildings and is located within 45 metres of the fire department connection to both Building B and C.

2.11 OFF-SITE REQUIREMENTS

No off-site improvements to watermains, feedermains, pumping stations, or other water infrastructure are required to maintain existing conditions and service the adjacent buildings, other than the connection of the new private watermain to the City watermain in the west frontage of the site.

2.12 CALCULATION OF WATER DEMANDS

Water demands were calculated by as described in Sections 2.3 and 2.4 above.

2.13 MODEL SCHEMATIC

The water works consist a 250mm watermain, two private fire hydrants, one existing and one new, four water services for buildings A, B, C and existing building 101A Schneider Road. A model schematic is provided with WaterGEMs for this development.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

- Minimum Velocity 0.6 m/s
- Maximum Velocity 3.0 m/s
- Manning Roughness Coefficient 0.013
- Average sanitary flow for Commercial Flow 28,000 L/Ha/day
- Average sanitary flow for Light Industrial Flow 35,000 L/Ha/day
- Commercial Peaking Factor 1.5
- Infiltration Allowance (Total) 0.33 L/s/Ha
- Minimum Sewer Slopes – 200 mm diameter 0.32%

3.2 CONSISTENCY WITH MASTER SERVICING STUDY

The outlet for the sanitary service from the proposed three buildings is the 250 mm diameter municipal sewer on Schneider Road. The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on commercial development. The anticipated average flow based on an estimated development area of 1.90 Ha out of Gross area of 2.32 Ha is 0.77 L/s. Applying the peaking factor of 1.5, and adding the extraneous flow, the estimated ultimate peak flow is 1.79 L/s.

The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on commercial development. A sanitary drainage area plan C06 and the sanitary design sheet have been attached to Appendix C for reference.

3.3 REVIEW OF SOIL CONDITIONS

There are no specific local subsurface conditions that suggest the need for a higher extraneous flow allowance.

3.4 DESCRIPTION OF EXISTING SANITARY SEWER

The outlet sanitary sewer for is the existing 250 mm diameter sewer on Schneider Road. This local sewer will outlet to a pumping station at Legget Drive via 900 mm diameter sanitary trunk sewer, then discharge to municipal wastewater treatment facility.

3.5 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

The capacity of the downstream 250 mm diameter sewer on Schneider Road at 1.37% slope is 69.60 L/s, which is adequate for the flow assumptions from the proposed development as noted above. As noted above, the expected flow based on the proposed development will be lower than the flow allowance assumed for the site based on the Sewer Design Guidelines.

3.6 CALCULATIONS FOR NEW SANITARY SEWER

A sanitary sewer design sheet is provided for the proposed development. See Appendix C for details.

3.7 DESCRIPTION OF PROPOSED SEWER NETWORK

The proposed sanitary sewer network on site will consist of series manholes and 200 mm diameter private sanitary sewers with 200 mm diameter building services.

3.8 ENVIRONMENTAL CONSTRAINTS

There are no previously identified environmental constraints that impact the sanitary servicing design in order to preserve the physical condition of watercourses, vegetation, or soil cover, or to manage water quantity or quality.

3.9 PUMPING REQUIREMENTS

The proposed development will have no impact on existing pumping stations and will not require new pumping facilities.

3.10 FORCE-MAINS

No force-mains are required specifically for this development.

3.11 EMERGENCY OVERFLOWS FROM SANITARY PUMPING STATIONS

No pumping stations are required for this site, except as required internally for the plumbing design to service the lower area of the building.

3.12 SPECIAL CONSIDERATIONS

There is no known need for special considerations for sanitary sewer design related to existing site conditions.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

Drainage from the site currently flows overland to a receiving Kizell Drain on the north east of the property. Further downstream, drainage is conveyed to Ruisseau Watts Creek.

As noted in the pre-consultation meeting and associated notes from Mississippi Valley Conservation Authority and the City of Ottawa, the stormwater design for the site modifications is required to result post-development peak flows for the site will be controlled to pre-development peak flows.

Portions of the property are located within the 1:100-year flood plain of the Kizell Drain. The MVCA has asked that new development should be directed outside the flood plain and 80% TSS removal to be provide for stormwater discharge.

4.2 ANALYSIS OF AVAILABLE CAPACITY IN PUBLIC INFRASTRUCTURE

The allowable release rate for the 2.32 Ha site has been calculated in SWM memo. The total allowable release rate is 246 L/s L/s. Detailed calculations are provided in SWM memo. The receiving Kizell Drain and downstream Watts Creek already accept uncontrolled flow from the site equal to or greater than the allowable release rate of 246 L/s that will be generated from the proposed development under the 100-year return period storm event. Existing on-site detention facilities have not been constructed in the existing sites including 101 and 101A Schneider Road, 4017 Carling Ave. The existing topography conveys overland runoff to Kizell Drain.

4.3 DRAINAGE DRAWING

Drawing C04 shows the receiving storm sewer and site storm sewer network. Drawing C03 provides proposed grading and drainage and includes existing grading information. Drawing C05 provide a post-construction drainage sub-area plan, including both site and roof information. Site sub-area information is also provided on the storm sewer design sheet attached in Appendix D.

4.4 WATER QUANTITY CONTROL OBJECTIVE

Refer to the Stormwater Management Memo for the water quantity objective for the site.

4.5 WATER QUALITY CONTROL OBJECTIVE

As noted previously, the designated water quality control objective is the achieve 80% TSS removal. This objective will be achieved through the use of oil and grit separator for the runoff generated from the developed and existing sites, achieving the approximate TSS removal required as well as oil capture. Also, hydrocarbon capture and retention will be provided with the designed oil and grit separator.

4.6 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow.

Some of the key criteria include the following:

- Design Storm (minor system) — 1:2-year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.25
  - Asphalt/Concrete — C = 0.90
  - Traditional Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads and service pipes)

4.7 PROPOSED MINOR SYSTEM

The detailed design for this site provides a storm sewer outlet to the northeast Kizell Drain and small areas of uncontrolled surface drainage entering the roadside ditch within the Schneider Road ROW to the west. A limited amount of uncontrolled surface flow will also enter the 105 Schneider Road to the north for parking expansion and the undisturbed grass area to the east and northeast, (consistent with existing conditions), with both directed to the existing drains to the northeast.

Using the above noted criteria, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in Appendix D. Please note that an allocation for flows from the adjacent developed lands to the south of the site will be directed to the developed site and conveys to the storm piped system without any restriction.

It is also customary for larger buildings to be provided with piped storm services for roof drainage. There are no downspouts proposed. Separate outlet pipes are provided for foundation drains and roof drains, and therefore roof drainage will not negatively impact the foundation. The storm services are connected to the storm sewer downstream of the controlled flow point, ensuring an unobstructed flow for these areas.

Using the above noted criteria, the on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated post development storm sewer drainage area plan are included in Appendix D.

4.8 STORMWATER MANAGEMENT

Refer to Stormwater Management Memo for details.

4.9 INLET CONTROLS

Refer to Stormwater Management Memo for details.

4.10 ON-SITE DETENTION

Refer to Stormwater Management Memo for details.

4.11 WATERCOURSES

The minor and major flow will be ultimately directed to the Kizell Drain then to Ruisseau Watts Creek.

4.12 PRE AND POST DEVELOPMENT PEAK FLOW RATES

Pre and post development peak flow rates for the impacted areas of the site have been noted in the Stormwater Management Memo and storm sewer design sheet.

4.13 DIVERSION OF DRAINAGE CATCHMENT AREAS

There will be diversion of existing drainage catchment areas arising from the proposed work described in this report. The major and minor flow from the external drainage to the south of the proposed site will be eventually directed to Kizell Drain via piped system and overland. No quantity control has been implemented, but quality control will be provided from the oil and grit separator.

4.14 DOWNSTREAM CAPACITY WHERE QUANTITY CONTROL IS NOT PROPOSED

This checklist item is not applicable to this development as quantity control is provided.

4.15 IMPACTS TO RECEIVING WATERCOURSES

No significant negative impact is anticipated to downstream receiving watercourses due to proposed quantity and quality control measures.

4.16 MUNICIPAL DRAINS AND RELATED APPROVALS

Kizell Drain is the receiving watercourse for the proposed development. Drainage from the proposed and existing sites will be ultimately directed to the Kizell Drain then the Ruisseau Watts Creek.

4.17 MEANS OF CONVEYANCE AND STORAGE CAPACITY

The means of flow conveyance and storage capacity are described in the Stormwater Management Memo.

4.18 HYDRAULIC ANALYSIS

Hydraulic calculations for the site storm sewers are provided in the storm sewer design sheet and the Stormwater Management Memo.

4.19 IDENTIFICATION OF FLOODPLAINS

Portion of the property are located within the 1:100-year flood plain of the Kizell Drain. The proposed stormwater management measures will be directed outside the flood plain which are described in the Stormwater Management Memo.

4.20 FILL CONSTRAINTS

There are no known fill constraints applicable to this site related to Kizell Drain floodplain. The site is generally being raised higher relative to existing conditions. No fill constraints related to soil conditions are anticipated, as confirmed in the geotechnical report.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

During construction, existing storm sewer system can be exposed to sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings will be used including;

- The installation of straw bales within existing drainage features surrounding the site;
- Bulkhead barriers will be installed in the outlet pipes;
- Filter cloths will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a "filter sock." Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed, these structures will be covered to prevent sediment from entering the minor storm sewer system. These measures will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are placed in stockpiles. Mitigative measures and proper management to prevent these materials entering the sewer system are needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally placed before any catchbasins are installed.

Refer to the Erosion and Sedimentation Control Plan C07 provided in Appendix E.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval and building permit approval.

MVCA will provide review or direction to the 1:100 year flood plain of Kizell Drain.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

This is the fourth submission, responses to city and MVCA comments have been attached.

APPENDIX

A

- PRE-CONSULTATION MEETING NOTES
- TOPOGRAPHIC SURVEY PLAN
- UPDATED R-PLAN

File No.: PC2020-0342
Date: December 22, 2020

101A, 103 and 105A Schneider Road
Pre-Consultation Meeting Minutes
Meeting Date: December 15, 2020

Attendee	Role	Organization
Lisa Stern	Planner	City of Ottawa
Josiane Gervais	Transportation PM	
Justyna Garbos	Parks	
Adam Palmer	Forestry	
Justin Armstrong	Engineering PM	
Erica Ogden	Planner	Mississippi Valley CA
David Renfroe		Applicant

Additional comments have been provided by email from Urban Design and CREO.

Comments from the Applicant:

1. Will be providing an expansion to 101 Schneider, and two industrial buildings and an office/warehouse at 103 Schneider.
2. Proposing a public park for workers adjacent to Schneider.
3. Proposing to realign access as well as modify the internal circulation. Proposing a one-way access around 101(A) Schneider to allow trucks to come back out to Schneider vs. Carling. Proposing access into the 105 Schneider site.

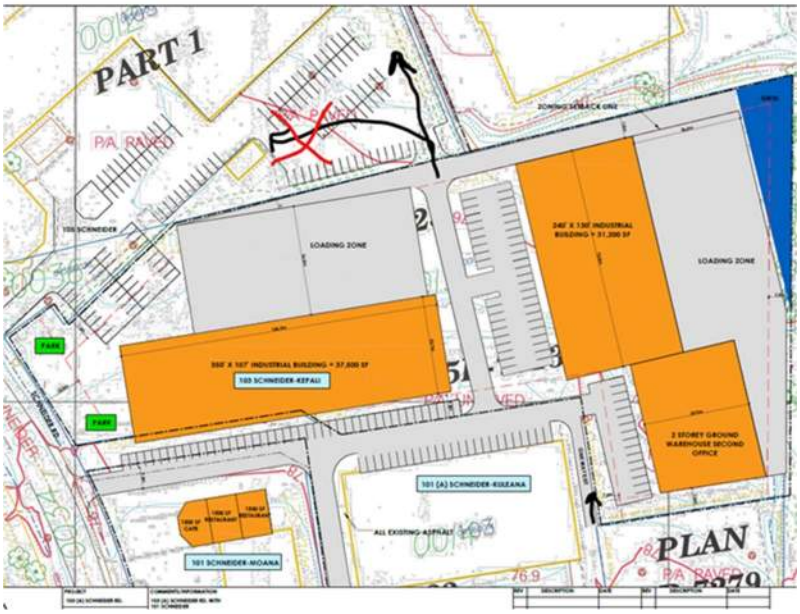
Planning Comments:

1. This is a Complex Site Plan Control Application subject to manager approval and public consultation. The application form, timeline and fees can be found here. A portion of the site is regulated by the Mississippi Valley Conservation Authority, as such CA fees are required.
2. The subject lands are designated Urban Employment Area within the City's Official Plan and are zoned General Industrial Subzone 6 (IG6), 101A Schneider Road is zoned IG6(300) which allows for additional restaurant and service uses.
3. The site will be considered one site for zoning purposes.
4. Please show the entire property on the plans.
5. A consent application is required to formalize any lot line adjustments or easements that are required for access.
6. The site is located within 300m of a rail line, as such a noise and vibration study will be required. Emphasis should be placed on outdoor amenity space and patios.
7. Please show pedestrian pathways on a site plan and ensure that there are no conflicts with vehicle movements.
8. Please provide landscape plans. Hard surfacing should be minimized, including loading areas. Parking and drive aisles should be further broken up by additional landscaping. Landscaped areas should be provided along the north and east lot lines as well as the Schneider Road frontage.
9. Cash-in-lieu of parkland and associated appraisal fee will be required as a condition of approval as per the Parkland Dedication Bylaw.
10. Please consult with the Ward Councillor prior to submission.

Engineering Comments:

1. See attached memo

Transportation Comments:

1. Follow Traffic Impact Assessment Guidelines
    a. A TIA is required. The Scoping report can be submitted directly to josiane.gervais@ottawa.ca
    b. Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    c. Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
2. ROW protection on Carling Ave between March Road and Herzberg is 44.5m even. Subject to unequal widening, the 44.5m is measured from the existing south ROW limit. The required property line should be shown on the site plan.
3. The 101 Schneider Rd property falls within 600m of the Teron/March Road BRT transit station.
4. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required (measure on the property line/ROW protected line; no structure above or below this triangle): Local Road to Arterial Road: 5 m x 5 m
5. Sight triangle as per Zoning by-law is 6 m x 6 m measure on the curb line.
6. Utilizing the existing access on Schneider Rd as identified on the site plan is supported.
7. Access consolidation along Schneider is encouraged.
8. Providing access through the 105 Schneider site is possible. However from a transportation perspective, consideration should be given to the impacts to the neighboring site. If vehicles turn left towards Schneider, then the driving aisle on 105 Schneider separates the parking and building, and therefore sending heavy vehicles through the site raises concern for pedestrian safety. If heavy vehicles travel northbound directly to Legget, then it's less a concern. Signage/geometric changes could be provided to address this concern.
9. 

10. Ensure that all movements can be accommodated so that a heavy vehicle may both enter and exit from the main site access off Schneider.

11. Parking lots are preferred over parking along the drive aisles. This encourage separation of pedestrians/personal vehicles from heavy vehicles.
12. A clear throat length of 15m is encouraged off Schneider.
13. Clarify that the "One Way Exit" east of the 101 (A) building is northbound within the site.
14. On site plan:
    a. The site plan should show the entire property.
    b. Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    c. Ensure pedestrian pathways are provided.
    d. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    e. Turning movement diagrams required for internal movements (loading areas, garbage).
    f. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible.
    g. Show lane/aisle widths.
    h. Grey out any area that will not be impacted by this application.
15. The City recommends development on private property be in accordance with the City's Accessibility Design Standards (see attached Site Plan Checklist, which summarizes AODA requirements). As the proposed site is industrial and for general public use, AODA legislation applies.

Parks Comments:

1. Cash-in-lieu of parkland will be calculated as 2% of the gross land area of the vacant parcel at 103 Schneider Road. Thomas Quinn in Real Estate prepares land valuations, and the applicant will be required to pay the $565 (including HST) assessment fee.

Corporate Real Estate (CREO) Comments:

1. The proposed development at 101-103 Schneider Road is located within 300 m from the Renfrew Subdivision operating rail corridor. The adopted Guidelines for New Development in Proximity to Rail Operations were created by the Railway Association of Canada and the Federation of Canadian Municipalities, see: https://www.proximityissues.ca/wp-content/uploads/2017/09/2013_05_29_Guidelines_NewDevelopment_E.pdf. CREO's main objective in its adoption of these guidelines is to mitigate railway-oriented impacts such as noise, vibration, and safety hazards, to ensure that the quality of life of a building's occupants and users are not negatively affected and to the maintain the long-term integrity and viability of the rail corridor.
2. It is also recommended that a noise and vibration study should be conducted according to page 28 of the guidelines.

Urban Design Comments:

1. Please provide a landscape plan that illustrates the anticipated pedestrian circulation around the site, between the various parking zones and the buildings and with the public right of way.
2. In one location the drive aisle runs through parking while in other locations to the north there is a separate drive aisle running parallel to a parking drive aisle. Can these be consolidated and the extra land be dedicated to additional landscaping and trees?
3. We would like to better understand the restaurant building, how it is sited, its connectivity for pedestrians and vehicles and with the public right of way.

4. A Design Brief is a required submittal for all Site Plan/Re-zoning applications. Please see the Design Brief Terms of Reference (attached).

Conservation Authority:

1. The Mississippi Valley Conservation Authority (MVCA) confirms that a portion of the subject property is regulated under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Under Ontario Regulation 153/06, written permission is required from the MVCA prior to the initiation of development (which includes construction, site grading and the placement or removal of fill) within an area regulated by the Conservation Authority (regulation limit delineated in yellow on the attached regulation mapping) as well as straightening, changing, diverting or interfering in any way with the existing channel or the shoreline of a watercourse.
2. Portions of the property are located within the 1:100 year flood plain (delineated in orange on the enclosed mapping) of the Kizell Drain, which was approved by the MVCA Board of Directors in 2017. We note this updated mapping has not yet been carried forward in the City of Ottawa Zoning By-law.
3. The preliminary plan includes a stormwater management facility within the flood plain, which MVCA does not support. New development should be directed outside the flood plain.
4. The stormwater water quality requirement for the Kizell Drain is an enhanced level of protection, which requires 80% total suspended solids removal.
5. Low Impact Development techniques are recommended for stormwater management and water temperature controls should also be taken into consideration.
6. The Kizell Drain has been assessed as a part of the City Stream Watch Program. A copy of the Kizell Drain Summary Report from 2016 is available on our website https://mvc.on.ca/wp-content/uploads/2020/08/Kizell-2016.pdf
7. Digital copies of the flood plain mapping are available upon request.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.
Please contact me at Lisa.Stern@ottawa.ca or at 613-580-2424 extension 21108 if you have any questions.

Sincerely,

Lisa Stern, RPP MCIP
Planner

MEMO

Date: December 15, 2020

To / Destinataire	Lisa Stern, Planner
From / Expéditeur	Justin Armstrong, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** **101-105 Schneider Road, Ward 4** **Site Plan Control Application,**
File No.	PC2020-0342

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

    i. Post-development peak flows for the site will need to be controlled to pre-development peak flows. The existing drainage patterns for the site should be maintained.

    ii. Quality control to be provided as specified by the MVCA.

    iii. Note that any stormwater runoff for the site that currently drains to Kizzel Municipal Drain must cross a portion of 302 Legget Drive before reaching the Kizzel Municipal Drain. Drainage rights across this land are not maintained if the portion of the site draining to this location is modified. If this is the case, an agreement will need to be in place with the owner of 302 Leggett in order to maintain this drainage outlet.

5. There is a 250mm diameter concrete sanitary sewer in Schneider Road. The City's Asset Management Branch will be circulated as it relates to a connection to this sewer once a detailed civil design is complete and a formal application has been made.

6. There is a 305mm diameter DI watermain in Schneider Road. A water boundary condition request should be made as it relates to a connection to this main. Water boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide Justin Armstrong the following information:

    i. Location of service

    ii. Type of development and the amount of fire flow required (as per FUS, 1999).

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

7. Although most infrastructure related comments will largely be dependent on the proposed design, the following are some general comments to consider:

   i. Services should ideally be grouped in a common trench to minimize the number of road cuts.

   ii. A DMA chamber is needed for private developments serviced by a water connection 150mm in diameter or larger.

   iii. A monitoring maintenance hole should be provided for the sanitary connection – it should be located in an accessible location on private property near the property line (ie. Not in a parking area).

   iv. Sewer connections to rigid mains are to be made above the springline of the sewermain as per:

      a. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain,

      b. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,

      c. Laterals greater than 50% the diameter of the sewermain require a maintenance hole.

   v. There should be no stormwater ponding in parking areas or drive aisles during the 2-year storm.

8. MOECC ECA Requirements

   It is anticipated that an MOECC Environmental Compliance Approval (ECA) for stormwater works (Private Sewage Works &/or Industrial Sewage Works) will be required, however, this will be confirmed once a detailed civil design is complete and a formal application is made.

9. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x21746 or by email at Justin.Armstrong@ottawa.ca.

TOPOGRAPHICAL PLAN OF

PART OF LOT 6
CONCESSION 4
Geographic Township of March
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.
February 22, 2021
Revised to show additional topographical information northeast of the property
March 26, 2021.

Scale 1 : 300

12 9 6 3 0 6 12 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Date

E.H. Herweyer, O.L.S.

Notes & Legend

Symbol	Denotes	
(symbol)	"	Coniferous Tree
(symbol)	"	Deciduous Tree
FH	"	Fire Hydrant
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
OHW	"	Overhead Wires
B	"	Bollard
S	"	Sign
VC	"	Valve Chamber (Watermain)
BF	"	Board Fence
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ **65.00**	"	Top of Concrete Curb Elevation
C/L	"	Centreline
HTB	"	Hydro Transformer Bolt
BOS	"	Bottom of Slope
TOS	"	Top of Slope
CSP	"	Corrugated Steel Pipe
T/P	"	Top of Pipe
T/G	"	Top of Grate

SITE AREA = 23173 m²

BOUNDARY INFORMATION COMPILED FROM PLANS 5R-5843 AND 5R-9123.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°21'40" counter-clockwise was applied to bearings on plans 5R-9123.

ELEVATION NOTES

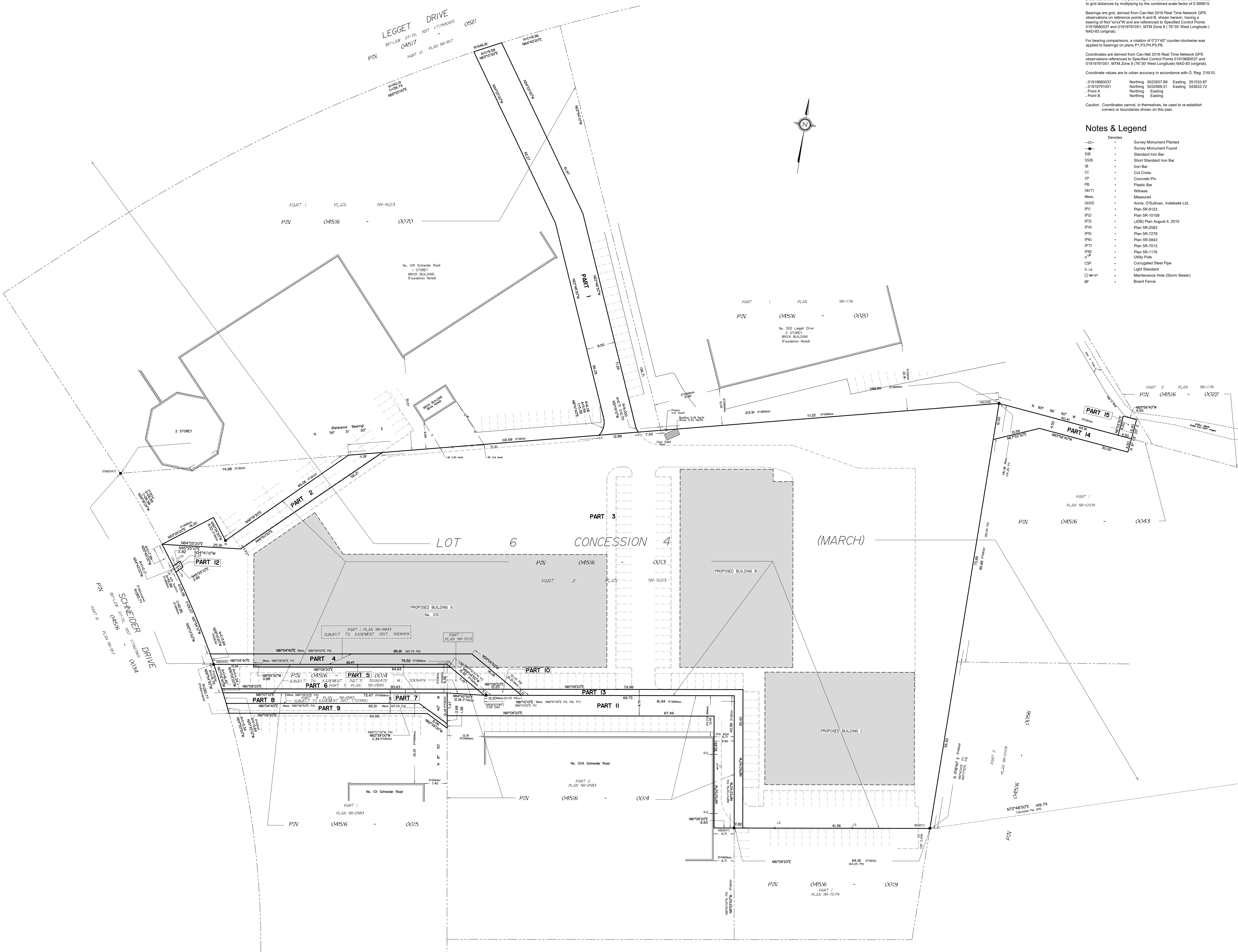
1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum, derived from vertical NCC control monument No. 019670014 having an elevation of 79.654 metres.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 21195-21 Kepali Holdings Pt6 C4 MarshTopo F2 | ig



I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT. DATE:____________ ________________ E. H. HERWEYER ONTARIO LAND SURVEYOR	PLAN 4R- RECEIVED AND DEPOSITED DATE: ____________ ________________ REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999915.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of Nxx°xx'xx"W and are referenced to Specified Control Points 01919680037 and 01919791051, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°21'40" counter-clockwise was applied to bearings on plans P1,P3,P4,P5,P6.

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919680037 and 01919791051, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919680037	Northing	5023507.89	Easting	351533.87
. 01919791051	Northing	5032569.51	Easting	343633.72
. Point A	Northing		Easting	
. Point B	Northing		Easting	

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
CP	"	Concrete Pin
PB	"	Plastic Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Plan 5R-9123
(P2)	"	Plan 5R-10109
(P3)	"	(JDB) Plan August 4, 2015
(P4)	"	Plan 5R-2583
(P5)	"	Plan 5R-7279
(P6)	"	Plan 5R-5843
(P7)	"	Plan 5R-7013
(P8)	"	Plan 5R-1176
O UP	"	Utility Pole
CSP	"	Corrugated Steel Pipe
O LS	"	Light Standard
O MH-ST	"	Maintenance Hole (Storm Sewer)
BF	"	Board Fence

SCHEDULE

AREA (Sq.m.)	PART	LOT	CONCESSION	PIN
···	1	PART OF 6	4 (MARCH)	PART OF 04516-0070
···	2			PART OF 04516-0013
···	3			
···	4			
···	5			PART OF 04516-0014
···	6			
···	7			
···	8			PART OF 04516-0015
···	9			
···	10			PART OF 04516-0013
···	11			PART OF 04516-0014
···	12			PART OF 04516-0013
···	13			
···	14			PART OF 04516-0043
···	15			PART OF 04516-0020

Parts 4, 5, 6, 7, 10: Subject to easement Inst. N306419.
Parts 5, 6, 7: Subject to easement Inst. NS182472.
Part 8: Subject to easement Inst. CT239911.

Parts 2, 3, 4, 10, 12, 13, 14 comprise all of PIN 04516-0013.

Parts 5, 6, 7, 11 comprise part of PIN 04516-0014.

PLAN OF SURVEY OF

PART OF LOT 6
CONCESSION 4
Geographic Township of March
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 400

16 12 8 4 0 8 16 Metres

Metric

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the __ day of _________, 2021.

__________ Date

__________________ E. H. Herweyer, Ontario Land Surveyor

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 21195-21 Kepali Holdings Pt6 C4 Marsh R D4 | ig

APPENDIX

APPENDIX

B

- WATERMAIN BOUNDARY CONDITIONS FROM CITY OF OTTAWA
- EMAILS FROM CITY OF OTTAWA
- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION
- WATER DEMAND CALCULATION
- WATER MODEL OUTPUT – WATERGEMS

Boundary Conditions
105A Schneider Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	56	0.94
Maximum Daily Demand	85	1.41
Peak Hour	152	2.53
Fire Flow Demand #1	9,000	150.00

Location

Results

Connection 1 – Schneider Rd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	73.3
Peak Hour	126.5	68.3
Max Day plus Fire 1	125.2	66.5

Ground Elevation = 78.7 m

Connection 2 – Schneider Rd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	73.4
Peak Hour	126.5	68.4
Max Day plus Fire 1	125.2	66.6

Ground Elevation = 78.4 m

Note: Two service connection required with a valve in between.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Fire Flow Design Sheet (FUS)
101 - 103 Schneider Road
City of Ottawa
WSP Project No. 211-01794-00
Date: 30-Mar-21

Existing Building 103A
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

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

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 3013 m^2
C = 0.8
F = 9660.8 L/min

rounded off to 10,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 10,000 = 8,500 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 8,500 = -3,400 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	22	10%	north side
Side 2	16	15%	east side
Side 3	44	5%	south side
Side 4	19	15%	west side
		45%	(Total shall not exceed 75%)

Increase due to separation 45% x 8,500 = 3,825 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 9,000 L/min (Rounded to nearest 1000 L/min)
or **150 L/sec**
or 2,378 gpm (us)
or 1,980 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
101 - 103 Schneider Road
City of Ottawa
WSP Project No. 211-01794-00
Date: 30-Mar-21

Building A
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

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

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 4578 m^2
C = 0.8
F = 11908.3 L/min

rounded off to 12,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 12,000 = 10,200 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 10,200 = -4,080 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	45	5%	north side
Side 2	24	10%	east side
Side 3	22	10%	south side
Side 4	56	0%	west side
		25%	(Total shall not exceed 75%)

Increase due to separation 25% x 10,200 = 2,550 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 9,000 L/min (Rounded to nearest 1000 L/min)
or **150 L/sec**
or 2,378 gpm (us)
or 1,980 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
101 - 103 Schneider Road
City of Ottawa
WSP Project No. 211-01794-00
Date: 16-Mar-21

Building B
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

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

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 2378 m^2
C = 0.8
F = 8582.6 L/min

rounded off to 9,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 9,000 = 7,650 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 7,650 = -3,060 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	28	10%	north side
Side 2	85	0%	east side
Side 3	1.5	25%	south side
Side 4	24	10%	west side
		45%	(Total shall not exceed 75%)

Increase due to separation 45% x 7,650 = 3,443 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 8,000 L/min (Rounded to nearest 1000 L/min)
or **133 L/sec**
or 2,113 gpm (us)
or 1,760 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
101 - 103 Schneider Road
City of Ottawa
WSP Project No. 211-01794-00
Date: 16-Mar-21

Building C
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

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

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 1808 m^2
C = 0.8
F = 7483.6 L/min

rounded off to 7,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard 0% x 7,000 = 7,000 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 7,000 = -2,800 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	1.5	25%	north side
Side 2	58	0%	east side
Side 3	51	0%	south side
Side 4	16	15%	west side
		40%	(Total shall not exceed 75%)

Increase due to separation 40% x 7,000 = 2,800 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 7,000 L/min (Rounded to nearest 1000 L/min)
or **117 L/sec**
or 1,849 gpm (us)
or 1,540 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Water Demand Calculation Sheet

Project:	**103 Schneider Road**	**Date:**	**2021-06-23**
Location:	**City of Ottawa**	**Design:**	**WY**
WSP Project No.	**211-01794-00**	**Page:**	**1 of 1**

Proposed Buildings	Residential				Non-Residentail			Average Daily Demand (l/s)			Maximum Daily Demand (l/s)			Maximum Hourly Demand (l/s)			Max Fire Demand
	Units			Pop.	Industrial	Institutional	Commercial										
	SF	APT	ST		(ha)	(ha)	(ha)	Res.	Non-Res.	Total	Res.	Non-Res.	Total	Res.	Non-Res.	Total	(l/s)
Proposed 103 - Bldg A							0.44		0.14	0.14		0.21	0.21		0.38	0.38	150
Proposed 103 - Bldg B							0.23		0.08	0.08		0.11	0.11		0.20	0.20	133
Proposed 103 - Bldg C							0.18		0.06	0.06		0.09	0.09		0.16	0.16	117
Existing 101A							0.30		0.10	0.10		0.15	0.15		0.26	0.26	150
Total							1.15			0.37			0.56			1.01	

Population Densities

Single Family	3.4	person/unit
Semi-Detached	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.4	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit
Avg. Apartment	1.8	person/unit

Average Daily Demand

Residentail	280	l/cap/day
Industrial	35000	l/ha/day
Institutional	28000	l/ha/day
Commercial	28000	l/ha/day

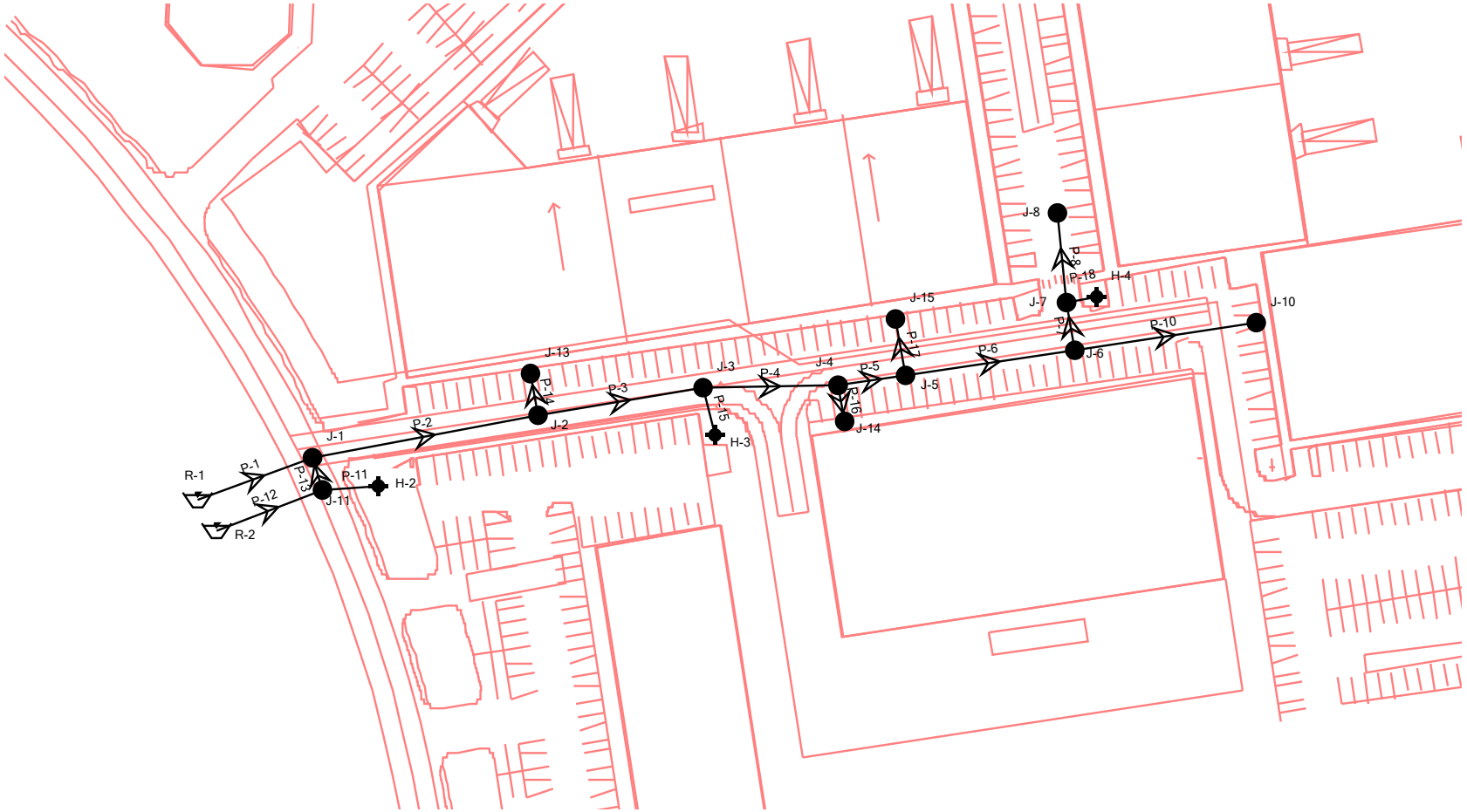
Maximum Daily Demand

Residential	2.5	x avg. day
Industrial	1.5	x avg. day
Institutional	1.5	x avg. day
Commercial	1.5	x avg. day

Maximum Hourly Demand

Residential	2.2	x max. day
Industrial	1.8	x max. day
Institutional	1.8	x max. day
Commercial	1.8	x max. day

211-01794-00 WaterGEMS Analysis



Basic Day Junction and Pipe Tables

	ID	Label	Elevation (m)	Zone	Demand Collection	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
31: J-1	31	J-1	78.05	Zone - 1	<Collection: 0 items>	0	130.00	508
33: J-2	33	J-2	77.72	Zone - 1	<Collection: 0 items>	0	130.00	512
35: J-3	35	J-3	77.50	Zone - 1	<Collection: 0 items>	0	130.00	514
37: J-4	37	J-4	77.45	Zone - 1	<Collection: 0 items>	0	130.00	514
39: J-5	39	J-5	77.54	Zone - 1	<Collection: 0 items>	0	130.00	513
41: J-6	41	J-6	77.24	Zone - 1	<Collection: 0 items>	0	130.00	516
43: J-7	43	J-7	77.10	Zone - 1	<Collection: 0 items>	0	130.00	518
45: J-8	45	J-8	77.40	Zone - 1	<Collection: 1 item>	0	130.00	515
49: J-10	49	J-10	77.75	Zone - 1	<Collection: 1 item>	0	130.00	511
51: J-11	51	J-11	78.10	Zone - 1	<Collection: 0 items>	0	130.00	508
59: J-13	59	J-13	77.90	Zone - 1	<Collection: 1 item>	0	130.00	510
63: J-14	63	J-14	77.62	Zone - 1	<Collection: 1 item>	0	130.00	513
65: J-15	65	J-15	77.90	Zone - 1	<Collection: 1 item>	0	130.00	510

	ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Has User Defined Length?	Length (User Defined) (m)
32: P-1	32	P-1	24	R-1	J-1	305.0	Ductile Iron	130.0	☐	0.000	0	0.01	0.000	☑	0
34: P-2	34	P-2	44	J-2	J-1	254.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
36: P-3	36	P-3	32	J-3	J-2	254.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
38: P-4	38	P-4	26	J-4	J-3	254.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
40: P-5	40	P-5	13	J-5	J-4	254.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
42: P-6	42	P-6	33	J-6	J-5	254.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
44: P-7	44	P-7	9	J-7	J-6	254.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
46: P-8	46	P-8	17	J-8	J-7	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
50: P-10	50	P-10	36	J-10	J-6	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
54: P-11	54	P-11	11	H-2	J-11	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
56: P-12	56	P-12	22	R-2	J-11	305.0	Ductile Iron	130.0	☐	0.000	0	0.00	0.000	☑	0
58: P-13	58	P-13	7	J-1	J-11	305.0	Ductile Iron	130.0	☐	0.000	0	0.00	0.000	☐	0
60: P-14	60	P-14	8	J-13	J-2	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
62: P-15	62	P-15	9	H-3	J-3	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
64: P-16	64	P-16	7	J-14	J-4	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
66: P-17	66	P-17	11	J-15	J-5	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
68: P-18	68	P-18	6	H-4	J-7	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0

Peak Hour Junction and Pipe Tables

	ID	Label	Elevation (m)	Zone	Demand Collection	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
31: J-1	31	J-1	78.05	Zone - 1	<Collection: 0 items>	0	126.50	474
33: J-2	33	J-2	77.72	Zone - 1	<Collection: 0 items>	0	126.50	477
35: J-3	35	J-3	77.50	Zone - 1	<Collection: 0 items>	0	126.50	480
37: J-4	37	J-4	77.45	Zone - 1	<Collection: 0 items>	0	126.50	480
39: J-5	39	J-5	77.54	Zone - 1	<Collection: 0 items>	0	126.50	479
41: J-6	41	J-6	77.24	Zone - 1	<Collection: 0 items>	0	126.50	482
43: J-7	43	J-7	77.10	Zone - 1	<Collection: 0 items>	0	126.50	483
45: J-8	45	J-8	77.40	Zone - 1	<Collection: 1 item>	0	126.50	481
49: J-10	49	J-10	77.75	Zone - 1	<Collection: 1 item>	0	126.50	477
51: J-11	51	J-11	78.10	Zone - 1	<Collection: 0 items>	0	126.50	474
59: J-13	59	J-13	77.90	Zone - 1	<Collection: 1 item>	0	126.50	476
63: J-14	63	J-14	77.62	Zone - 1	<Collection: 1 item>	0	126.50	478
65: J-15	65	J-15	77.90	Zone - 1	<Collection: 1 item>	0	126.50	476

	ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Has User Defined Length?	Length (User Defined) (m)
32: P-1	32	P-1	24	R-1	J-1	305.0	Ductile Iron	130.0	☐	0.000	1	0.01	0.000	☑	0
34: P-2	34	P-2	44	J-2	J-1	254.0	PVC	150.0	☐	0.000	-1	0.02	0.000	☐	0
36: P-3	36	P-3	32	J-3	J-2	254.0	PVC	150.0	☐	0.000	-1	0.02	0.000	☐	0
38: P-4	38	P-4	26	J-4	J-3	254.0	PVC	150.0	☐	0.000	-1	0.02	0.000	☐	0
40: P-5	40	P-5	13	J-5	J-4	254.0	PVC	150.0	☐	0.000	-1	0.01	0.000	☐	0
42: P-6	42	P-6	33	J-6	J-5	254.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
44: P-7	44	P-7	9	J-7	J-6	254.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
46: P-8	46	P-8	17	J-8	J-7	203.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
50: P-10	50	P-10	36	J-10	J-6	203.0	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
54: P-11	54	P-11	11	H-2	J-11	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
56: P-12	56	P-12	22	R-2	J-11	305.0	Ductile Iron	130.0	☐	0.000	0	0.00	0.000	☑	0
58: P-13	58	P-13	7	J-1	J-11	305.0	Ductile Iron	130.0	☐	0.000	0	0.00	0.000	☐	0
60: P-14	60	P-14	8	J-13	J-2	203.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
62: P-15	62	P-15	9	H-3	J-3	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0
64: P-16	64	P-16	7	J-14	J-4	203.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
66: P-17	66	P-17	11	J-15	J-5	203.0	PVC	150.0	☐	0.000	0	0.01	0.000	☐	0
68: P-18	68	P-18	6	H-4	J-7	152.4	PVC	150.0	☐	0.000	0	0.00	0.000	☐	0

Fire Flow Report (Max Day + Fire)

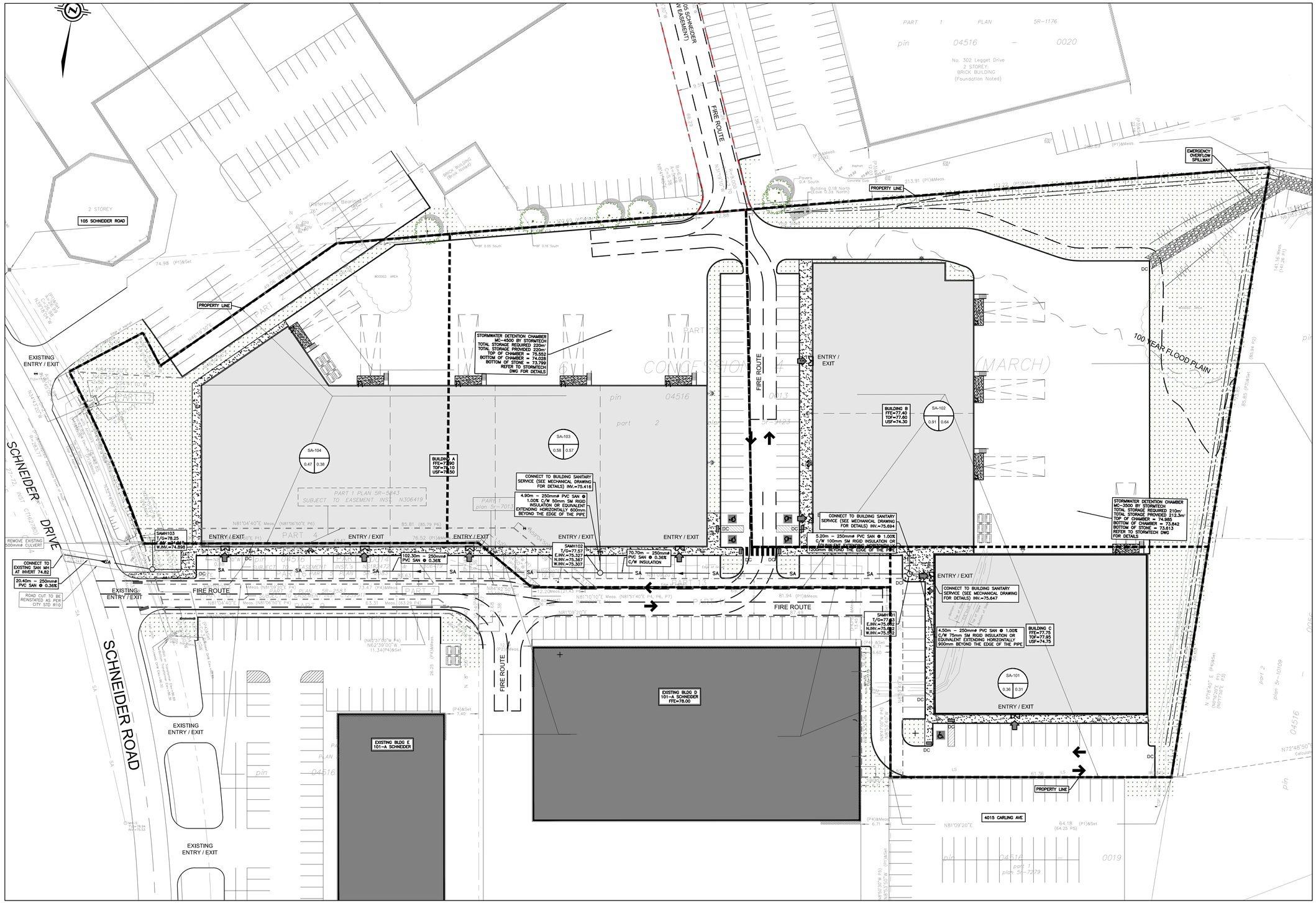
	Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Fire Flow (Available) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Pressure (Zone Lower Limit) (kPa)	Pressure (Calculated Zone Lower Limit) (kPa)	Junction w/ Minimum Pressure (Zone)	Pressure (System Lower Limit) (kPa)	Pressure (Calculated System Lower Limit) (kPa)	Junction w/ Minimum Pressure (System)	Is Fire Flow Run Balanced?
53: H-2	H-2	Zone - 1	2	☑	150	221	300	371	150	298	150	370	H-4	(N/A)	370	H-4	☑
61: H-3	H-3	Zone - 1	4	☑	150	219	300	369	150	150	150	258	H-4	(N/A)	258	H-4	☑
67: H-4	H-4	Zone - 1	3	☑	150	190	300	340	150	150	150	223	J-8	(N/A)	223	J-8	☑

APPENDIX

APPENDIX

C

- SANITARY DRAIANGE PLAN C06
- SANITARY SEWER DESIGN SHEET



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SEAL:

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2021-11-23
PROVINCE OF ONTARIO

NORTH

CLIENT:

RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:

103 SCHNEIDER ROAD

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
4		2021-11-23	REVISED AS PER CITY COMMENTS
3		2021-09-21	REVISED AS PER CITY COMMENTS
2		2021-06-23	REVISED AS PER CITY COMMENTS
1		2021-04-06	ISSUED FOR SPA

PROJECT NO: 211-01794-00
DATE: NOVEMBER 2021
ORIGINAL SCALE: 1:400
DESIGNED BY: D.Y.
DRAWN BY: D.Y.
CHECKED BY: D.Y./I.J.
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: CIVIL

TITLE: SANITARY DRAINAGE AREA PLAN

SHEET NUMBER: C06
SHEET #: 6 OF 7

ISSUE: REVISED AS PER CITY COMMENTS
REV #: 0
DATE OF: 2021-11-23

V:\10-13 ME 2021 Projects\211-01794-00 101-103 Schneider Road Industrial\3. Drawings\Working drawings\Working drawings\211-01794-00_C.dwg Nov 23, 2021 9:33am BY (caseyl)(69741)

D07-12-21-0044

#18430

SANITARY SEWER DESIGN SHEET

103 Schneider Road
Commercial Development
Project: 211-01794-00
Date: September, 2021

LOCATION				RESIDENTIAL AREA AND POPULATION												INDUSTRIAL				COMMERCIAL		INSTITUTIONAL		I+C+I	INFILTRATION			TOTAL	PIPE					
LOCATION	FROM M.H.	TO M.H.	SANITARY DRAINAGE AREA ID	INDV AREA (ha)	ACCU AREA (ha)	NUMBER OF UNITS						POPULATION		PEAK FACT.	PEAK FLOW (l/s)	GROSS AREA (ha)	DEVEL. AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR	INDIV AREA (ha)	ACCU. AREA (ha)	INDIV AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	INDIV AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	AVAIL. CAP. (%)
						SINGLES	SEMIS	TOWNS	1-BED APT.	2-BED APT.	3-BED APT.	INDIV POP.	ACCU POP.																					
TO SCHNEIDER ROAD																																	
	BLDG C	SAMH101	SA-101		0.000							0	0	3.80	0.00			0.00	1.50	0.36	0.36			0.17	0.360	0.36	0.12	**0.29**	4.50	250	1.00	59.47	1.21	**99.51%**
	BLDG B	SAMH101	SA-102		0.000							0	0	3.80	0.00			0.00	1.50	0.91	0.91			0.44	0.910	0.91	0.30	**0.74**	5.20	250	1.00	59.47	1.21	**98.75%**
	SAMH101	SAMH102			0.000							0	0	3.80	0.00			0.00	1.50		1.27			0.62	0.000	1.27	0.42	**1.04**	70.70	250	0.36	35.68	0.73	**97.10%**
	BLDG A	SAMH102	SA-103, SA-104		0.000								0	3.80	0.00			0.00	1.50	1.05	1.05			0.51	1.050	1.05	0.35	**0.86**	4.90	250	1.00	59.47	1.21	**98.56%**
	SAMH102	SAMH103			0.000								0	3.80	0.00			0.00	1.50		2.32			1.13	0.000	2.32	0.77	**1.89**	102.30	250	0.36	35.68	0.73	**94.69%**
Schneider Road	SAMH103	EXISTING SAMH			0.000								0	3.80	0.00			0.00	1.50		2.32			1.13	0.000	2.32	0.77	**1.89**	20.40	250	0.36	35.68	0.73	**94.69%**

DESIGN PARAMETERS

RESIDENTIAL AVG. DAILY FLOW =	280	l/cap/day	COMMERCIAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	PEAK POPULATION FLOW, (l/s) =	P*q*M/86400	UNIT TYPE	PERSONS/UNIT	
COMMERCIAL AVG. DAILY FLOW =	28,000	l/ha/day		1.0	(WHEN AREA < 20%)	PEAK EXTRANEOUS FLOW, (l/s) =	I*Ac	SINGLES	3.4	
	0.324	l/ha/s				RESIDENTIAL PEAKING FACTOR, M =	1+(14/(4+P^0.5))*K	SEMI-DETACHED	2.7	
INSTITUTIONAL AVG. DAILY FLOW =	28,000	l/ha/day	INSTITUTIONAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	Ac = CUMULATIVE AREA (ha)		TOWNHOMES	2.7	
	0.324	l/ha/s		1.0	(WHEN AREA < 20%)	P = POPULATION (THOUSANDS)		SINGLE APT. UNIT	1.4	
LIGHT INDUSTRIAL FLOW =	35,000	l/ha/day						2-BED APT. UNIT	2.1	
	0.405	l/ha/s	RESIDENTIAL CORRECTION FACTOR, K =	0.80		SEWER CAPACITY, Qcap (l/s) =	1/N S^(1/2) R^(2/3) Ac	3-BED APT. UNIT	3.1	
HEAVY INDUSTRIAL FLOW =	55,000	l/ha/day	MANNING N =	0.013		(MANNING'S EQUATION)				
	0.637	l/ha/s	PEAK EXTRANEOUS FLOW, I (l/s/ha) =	0.33						

DESIGNED:
Ding Bang Yang, P.Eng.
CHECKED:
Ishaque Jefferjee, P.Eng.
PROJECT:
105A Schneider Road
Industrial Development
LOCATION:
Ottawa, Ontario
PAGE NO:
1 of 1

NO.	REVISION	DATE
1.	City Submission No.1	2021-04-06
2.	City Submission No.2	2021-06-23
2.	City Submission No.3	2021-09-21

FILE & DWG. REFERENCE:
C06

APPENDIX

APPENDIX

D

- STORM SEWER DESIGN SHEET
- STORM DRAINAGE PLAN C05
- EXISTING DRAINAGE AREA PLAN FIG 2
- GRADING PLAN C03
- SERVICING PLAN C04
- STORMCEPTOR EFO12 DETAILS, SIZING REPORT, TEMPERATURE CONTROL SPEC
- STORMTECH CHAMBER
- 100 YEAR FLOOD PLAIN CUT-FILL ANALYSIS SK1 TO SK5

STORM SEWER DESIGN SHEET

103 Schneider Road
Commercial Development
Project: 211-01794-00
Date: November, 2021

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW												PROPSOED SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.35	C= 0.50	C= 0.60	C= 0.75	C= 0.90	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	ICD FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
External Drainage Areas																														
External	S-EXT1-3, S-U1, S-U3	CBMH101	CBMH102	0.072					0.856	2.192	2.192	10.00	10.63	76.81	104.19	178.56		168.34				168.34		CONC 100-D	450.0	0.60	52.65	221.07	1.39	0.63	52.73	23.85%
Proposed		BUILDING C FD	CBMH102							0.000	0.000	10.00	10.74	76.81	104.19	178.56		0.00				0.00		PVC DR-35	150.0	1.00	38.30	15.24	0.86	0.74	15.24	100.00%
	S-106	CB04	CBMH102-STMH103	0.012					0.090	0.234	0.234	10.00	10.02	76.81	104.19	178.56		17.94				17.94		PVC DR-35	200.0	1.00	1.55	32.83	1.04	0.02	14.90	45.37%
Proposed	S-EXT4, S-U2	CBMH102	STMH103	0.005					0.179	0.451	2.877	10.74	11.45	74.07	100.44	172.06		213.08				213.08		CONC 100-D	600.0	0.20	41.20	274.87	0.97	0.71	61.79	22.48%
		BUILDING A FD	STMH110							0.000	0.000	10.00	10.24	76.81	104.19	178.56		0.00				0.00		PVC DR-35	150.0	1.00	12.50	15.24	0.86	0.24	15.24	100.00%
		STMH103	STMH108							0.000	2.877	11.45	12.05	71.66	97.12	166.33		206.14				206.14		CONC 100-D	600.0	0.20	35.30	274.87	0.97	0.61	68.73	25.01%
	S-102	CB01	CBMH104-STMH107	0.007					0.189	0.478	0.478	10.00	10.03	76.81	104.19	178.56		36.69				36.69		PVC DR-35	250.0	1.00	2.40	59.53	1.21	0.03	22.83	38.36%
	S-101	CBMH104	STMH107	0.018					0.111	0.290	0.768	10.03	11.08	76.68	104.02	178.26		58.89				58.89		PVC DR-35	300.0	0.60	66.80	74.98	1.06	1.05	16.09	21.46%
	S-BA	BUILDING A RD	CBMH105						0.448	1.121	1.121	10.00	10.07	76.81	104.19	178.56		86.09				86.09		PVC DR-35	375.0	0.60	5.10	135.95	1.23	0.07	49.86	36.67%
		CBMH105	STORMTECH CHAMBER							0.000	1.121	10.07	10.09	76.54	103.83	177.93		85.79				85.79		PVC DR-35	375.0	0.60	1.60	135.95	1.23	0.02	50.15	36.89%
		STORMTECH CHAMBER	CBMH106							0.000	1.121	10.09	10.11	76.46	103.72	177.73		85.70				85.70		PVC DR-35	375.0	0.60	1.55	135.95	1.23	0.02	50.25	36.96%
		CBMH106	STMH107							0.000	1.121	10.11	10.30	76.38	103.61	177.54		85.61				85.61		PVC DR-35	375.0	0.60	13.65	135.95	1.23	0.19	50.34	37.03%
	S-103	CB02	STMH107-STMH108	0.014					0.074	0.195	0.195	10.00	10.03	76.81	104.19	178.56		14.97				14.97		PVC DR-35	200.0	1.00	2.00	32.83	1.04	0.03	17.86	54.41%
		STMH107	STMH108							0.000	2.084	11.08	11.44	72.88	98.80	169.22		151.86				151.86		CONC 100-D	525.0	0.25	21.35	215.25	0.99	0.36	63.38	29.45%
		STMH108	STMH109							0.000	2.084	11.44	11.93	71.68	97.15	166.37		149.36				149.36		CONC 100-D	675.0	0.30	37.35	460.87	1.29	0.48	311.51	67.59%
		BUILDING B FD	STMH109							0.000	0.000	10.00	10.03	76.81	104.19	178.56		0.00				0.00		PVC DR-35	200.0	1.00	1.70	32.83	1.04	0.03	32.83	100.00%
		STMH109	STMH112							0.000	2.084	11.93	12.30	70.13	95.01	162.68		146.12				146.12		CONC 100-D	675.0	0.30	28.95	460.87	1.29	0.38	314.75	68.29%
	S-BC	BUILDING C RD	CBMH115						0.181	0.453	0.453	10.00	10.06	76.81	104.19	178.56		34.78				34.78		PVC DR-35	250.0	1.00	4.55	59.53	1.21	0.06	24.75	41.57%
	S-BB	BUILDING B RD	CBMH115						0.238	0.595	0.595	10.00	10.07	76.81	104.19	178.56		45.74				45.74		PVC DR-35	250.0	1.00	5.00	59.53	1.21	0.07	13.79	23.17%
		CBMH110	STORMTECH CHAMBER							0.000	1.048	10.07	10.09	76.54	103.83	177.93		80.24				80.24		PVC DR-35	375.0	0.40	1.25	111.00	1.00	0.02	30.76	27.71%
		STORMTECH CHAMBER	CBMH111							0.000	1.048	10.09	10.11	76.46	103.72	177.74		80.16				80.16		PVC DR-35	375.0	0.40	1.35	111.00	1.00	0.02	30.84	27.79%
	S-105	CB03	CBMH111-STMH112	0.004					0.175	0.441	0.441	10.00	10.05	76.81	104.19	178.56		33.84				33.84		PVC DR-35	250.0	1.00	3.50	59.53	1.21	0.05	25.68	43.15%
	S-104	CB05	CBMH111-STMH112						0.133	0.333	0.333	10.00	10.06	76.81	104.19	178.56		25.56				25.56		PVC DR-35	250.0	1.00	4.05	59.53	1.21	0.06	33.97	57.07%
		CBMH111	STMH112							0.000	1.822	10.11	10.87	76.38	103.61	177.54		139.14				139.14		CONC 100-D	450.0	0.40	51.85	180.50	1.13	0.76	41.36	22.91%
		STMH112	STMH113							0.000	3.905	12.30	12.45	68.97	93.43	159.95		269.37				269.37		CONC 100-D	675.0	0.45	14.40	564.45	1.58	0.15	295.08	52.28%
		STMH113	CBMH114							0.000	3.905	12.45	12.85	68.52	92.80	158.86		267.58				267.58		CONC 100-D	675.0	0.45	37.35	564.45	1.58	0.40	296.87	52.59%
		CBMH114	CBMH115							0.000	3.905	12.85	13.25	67.36	91.22	156.13		263.08				263.08		CONC 100-D	675.0	0.45	38.45	564.45	1.58	0.41	301.37	53.39%
		CBMH115	OUTLET							0.000	3.905	13.25	13.33	66.22	89.66	153.42		258.62				258.62		CONC 100-D	675.0	0.45	7.40	564.45	1.58	0.08	305.84	54.18%

Definition:
Q=2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall Intensity in millimeters per hour (mm/hr)
i = 732.951/(TC+6.199)^0.810 — 2 Year
i = 1174.184/(TC+6.014)^0.816 — 5 Year
i = 1735.688/(TC+6.014)^0.820 — 100 Year

Notes:
1. Mannings coefficient (n) = 0.013

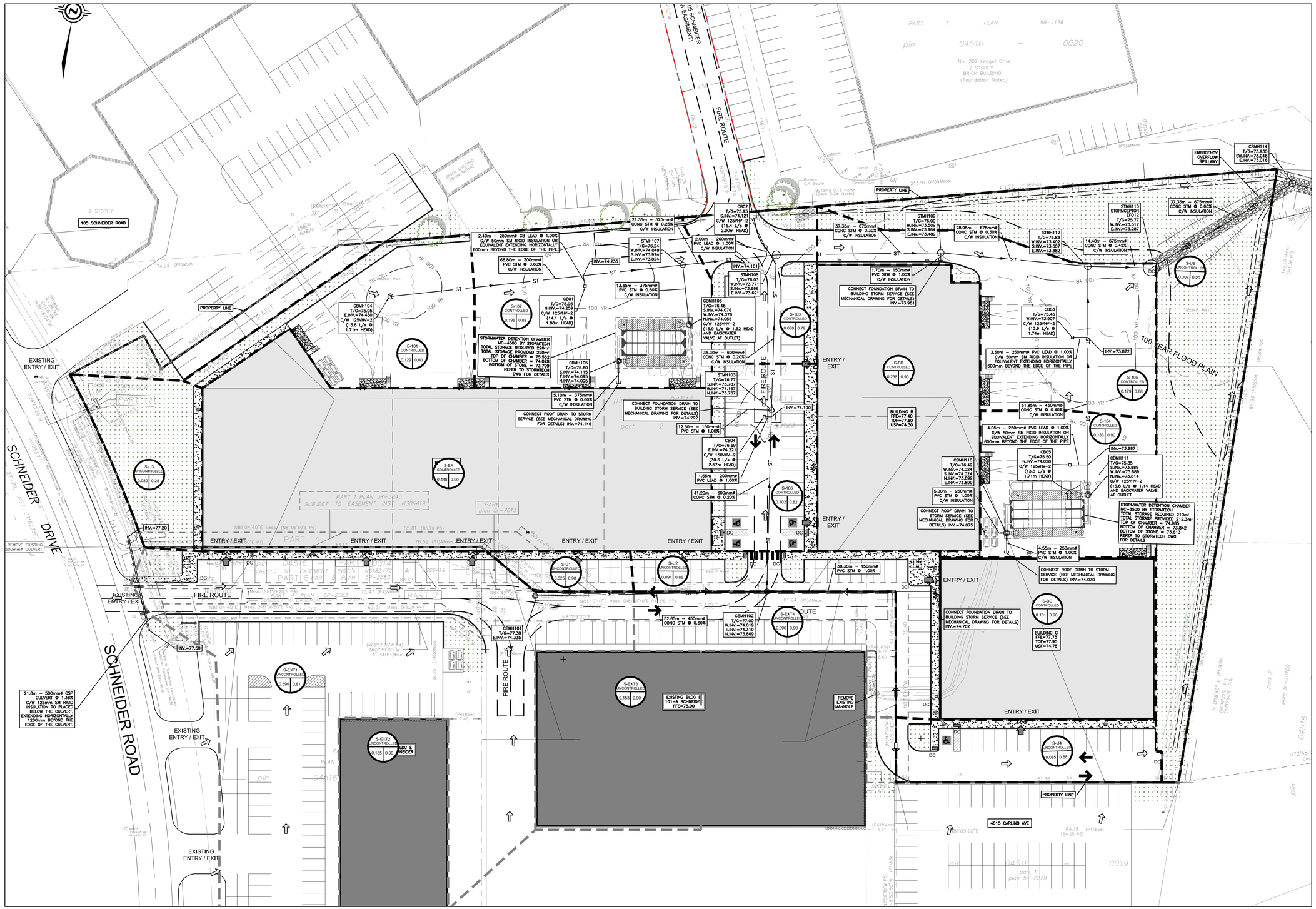
Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)
Runoff Coef.C = 0.00 Impervious

No.	L (m)	S %	Tc (min)
N/A	0	0.00	#DIV/0!

Designed: D.Y.
Checked: D.Y./I.J.
Dwg. Reference: C05

No.	Revision	Date
1.	City Submission No. 1	2021-04-06
2.	City Submission No. 2	2021-06-23
3.	City Submission No. 3	2021-09-21
4.	City Submission No. 4	2021-11-23

File Reference: 211-01794-00
Date: 2021-11-23
Sheet No: 1 of 1



wsp
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OTTAWA, ONTARIO
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WWW.WSP.COM

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rla/architecture
roderick lahey architect inc.
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SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2021-11-23
PROVINCE OF ONTARIO

NORTH

CLIENT:
RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:
103 SCHNEIDER ROAD

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
4		2021-11-23	REVISED AS PER CITY COMMENTS
3		2021-09-21	REVISED AS PER CITY COMMENTS
2		2021-06-23	REVISED AS PER CITY COMMENTS
1		2021-04-06	ISSUED FOR SPA

PROJECT NO: 211-01794-00
DATE: NOVEMBER 2021
ORIGINAL SCALE: 1:400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: D.Y.
DRAWN BY: D.Y.
CHECKED BY: D.Y./I.J.
25mm

DISCIPLINE: CIVIL

TITLE: DRAINAGE AREA PLAN

SHEET NUMBER: C05
SHEET #: 5 OF 7

ISSUE: REVISED AS PER CITY COMMENTS
DATE OF: 2021-11-23
REV #: 0

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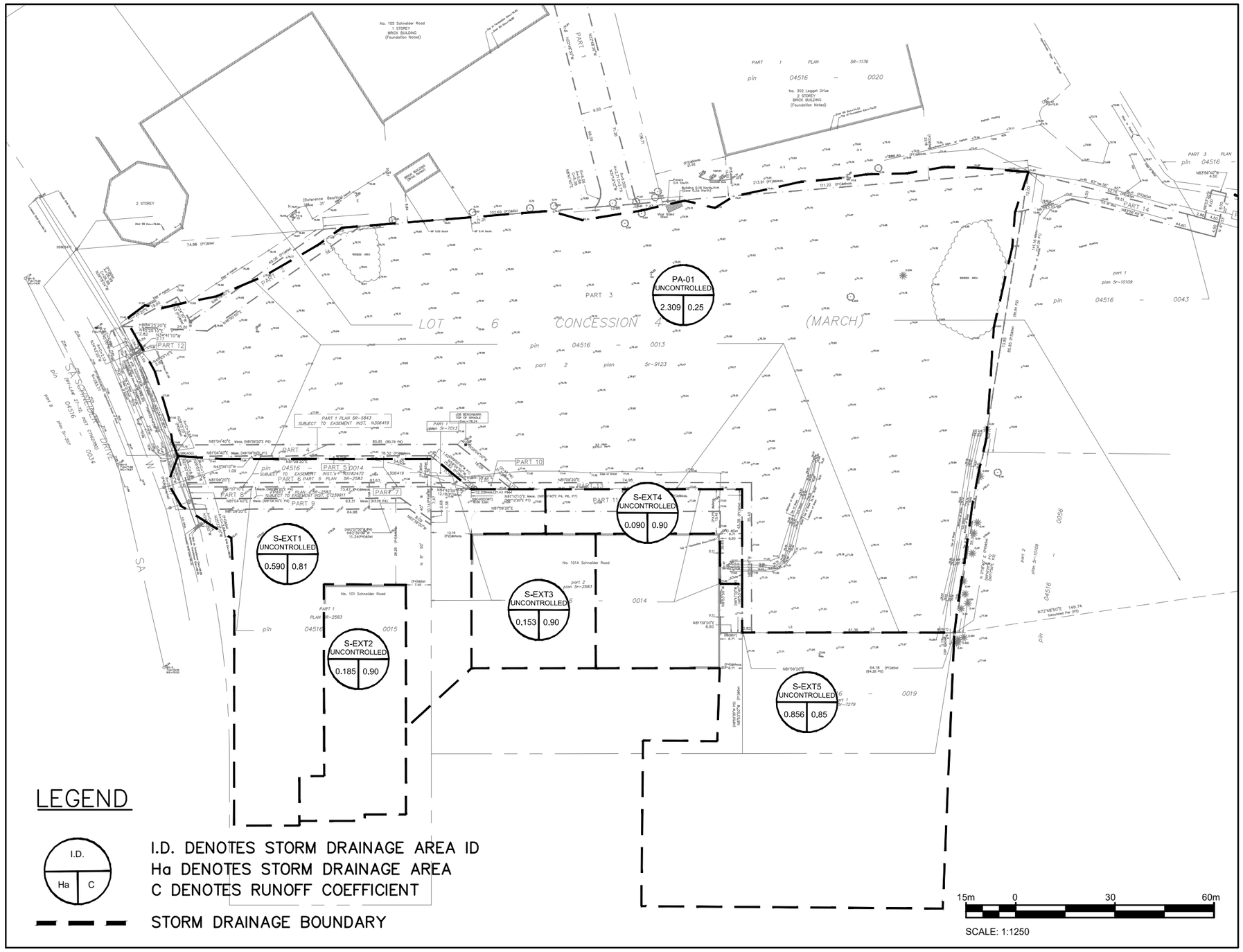
D07-12-21-0044

#18430



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CLIENT:

RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:

105A SCHNEIDER ROAD

NORTH

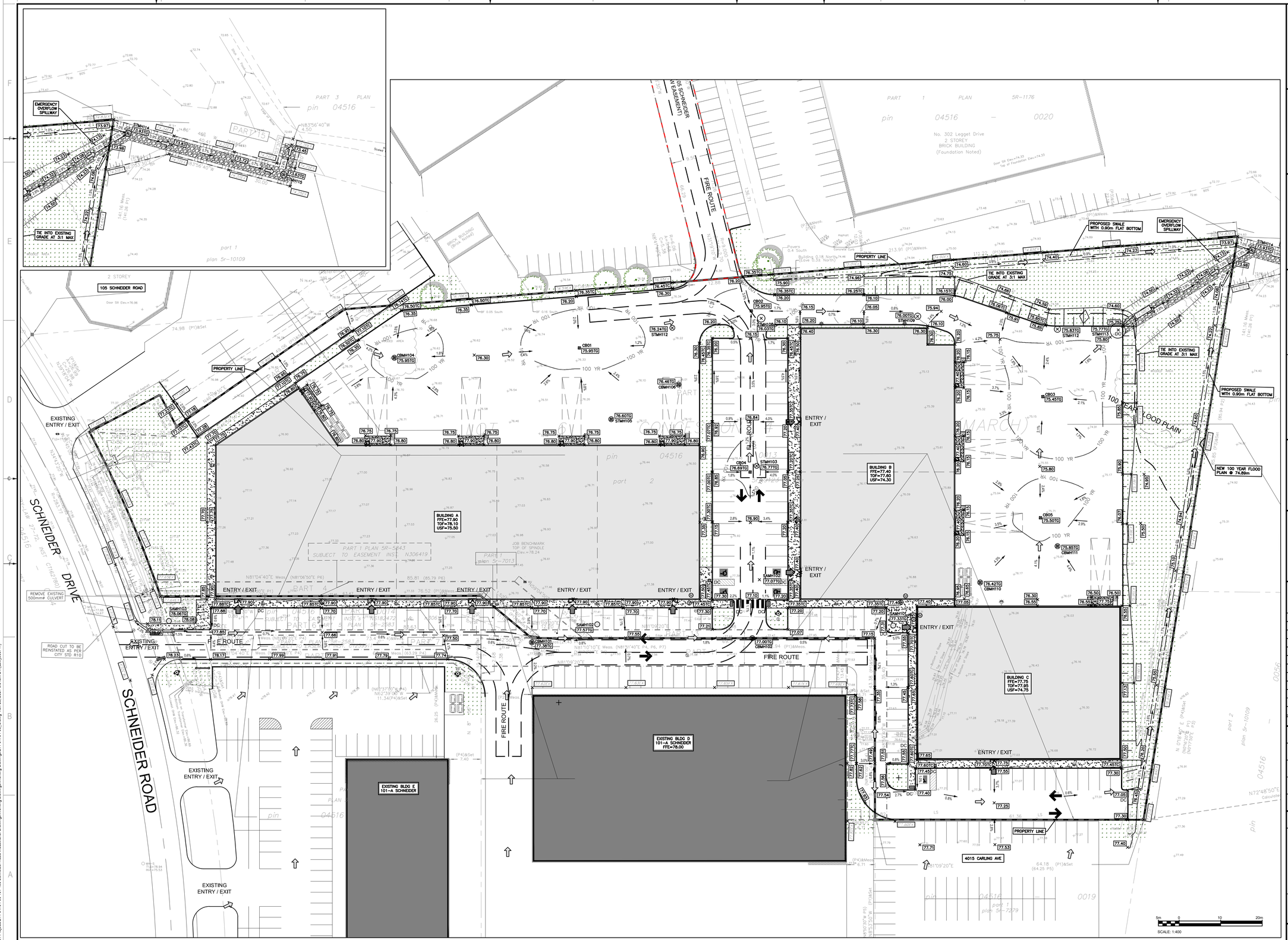
PROJECT NO: 211-01794-00	DATE: JUNE 2021
ORIGINAL SCALE: 1:1250	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: D.Y.	
DRAWN BY: D.Y.	
CHECKED BY: D.Y./I.J.	25mm

TITLE:

EXISTING DRAINAGE AREA PLAN

SHEET NUMBER:

FIG 2



wsp
2011 QUEENSVIEW DR.
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ARCHITECT:
rla/architecture
roderick lahey architect inc.
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SEAL:

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2021–11–23
PROVINCE OF ONTARIO

NORTH

CLIENT:

RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:

103 SCHNEIDER ROAD

KEY PLAN:

ISSUED FOR - REVISION:

	IS	RE	DATE	DESCRIPTION
4			2021-11-23	REVISED AS PER CITY COMMENTS
3			2021-09-21	REVISED AS PER CITY COMMENTS
2			2021-06-23	REVISED AS PER CITY COMMENTS
1			2021-04-06	ISSUED FOR SPA

PROJECT NO: 211-01794-00
DATE: NOVEMBER 2021
ORIGINAL SCALE: 1:400
DESIGNED BY: D.Y.
DRAWN BY: D.Y.
CHECKED BY: D.Y./I.J.

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: CIVIL

TITLE: GRADING PLAN

SHEET NUMBER: C03
SHEET #: 3 OF 7

ISSUE: REVISED AS PER CITY COMMENTS
REV #: 0
DATE OF: 2021-11-23

V:\10-13 ME 2021 Projects\211-01794-00\ 101-103 Schneider Road Industrial\3. Drawings\Working drawings\211-01794-00_C.dwg Nov 23, 2021-9:31am BY (czavi)(69741)

D07-12-21-0044

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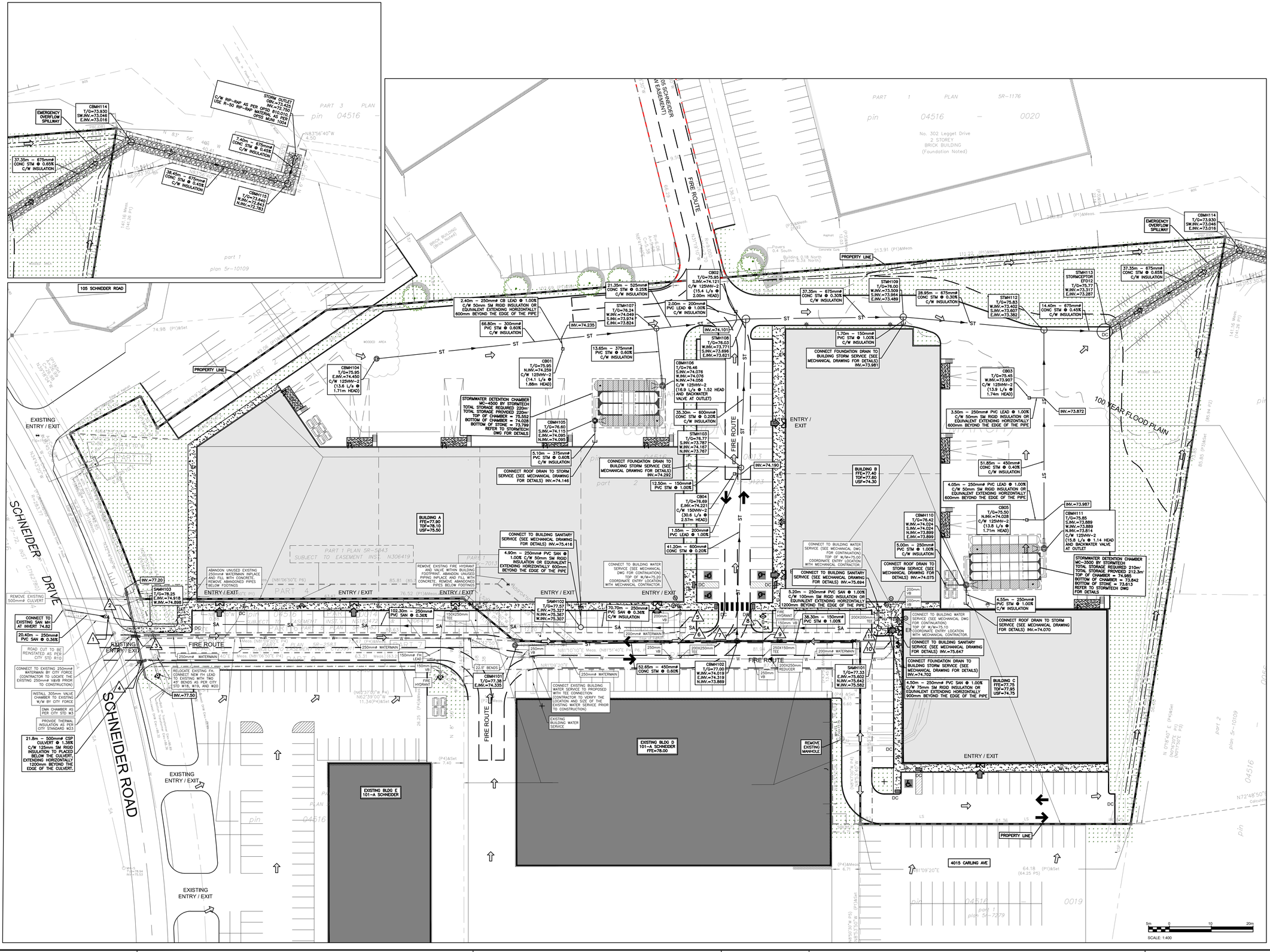

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SEAL:
LICENSED PROFESSIONAL ENGINEER
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100230568
2021–11–23
PROVINCE OF ONTARIO

NORTH

CLIENT:
RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:
103 SCHNEIDER ROAD

KEY PLAN:


ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
4		2021-11-23	REVISED AS PER CITY COMMENTS
3		2021-09-21	REVISED AS PER CITY COMMENTS
2		2021-06-23	REVISED AS PER CITY COMMENTS
1		2021-04-06	ISSUED FOR SPA

PROJECT NO: 211-01794-00
DATE: NOVEMBER 2021
ORIGINAL SCALE: 1:400
DESIGNED BY: D.Y.
DRAWN BY: D.Y.
CHECKED BY: D.Y./I.J.
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: CIVIL

TITLE: SERVICING PLAN

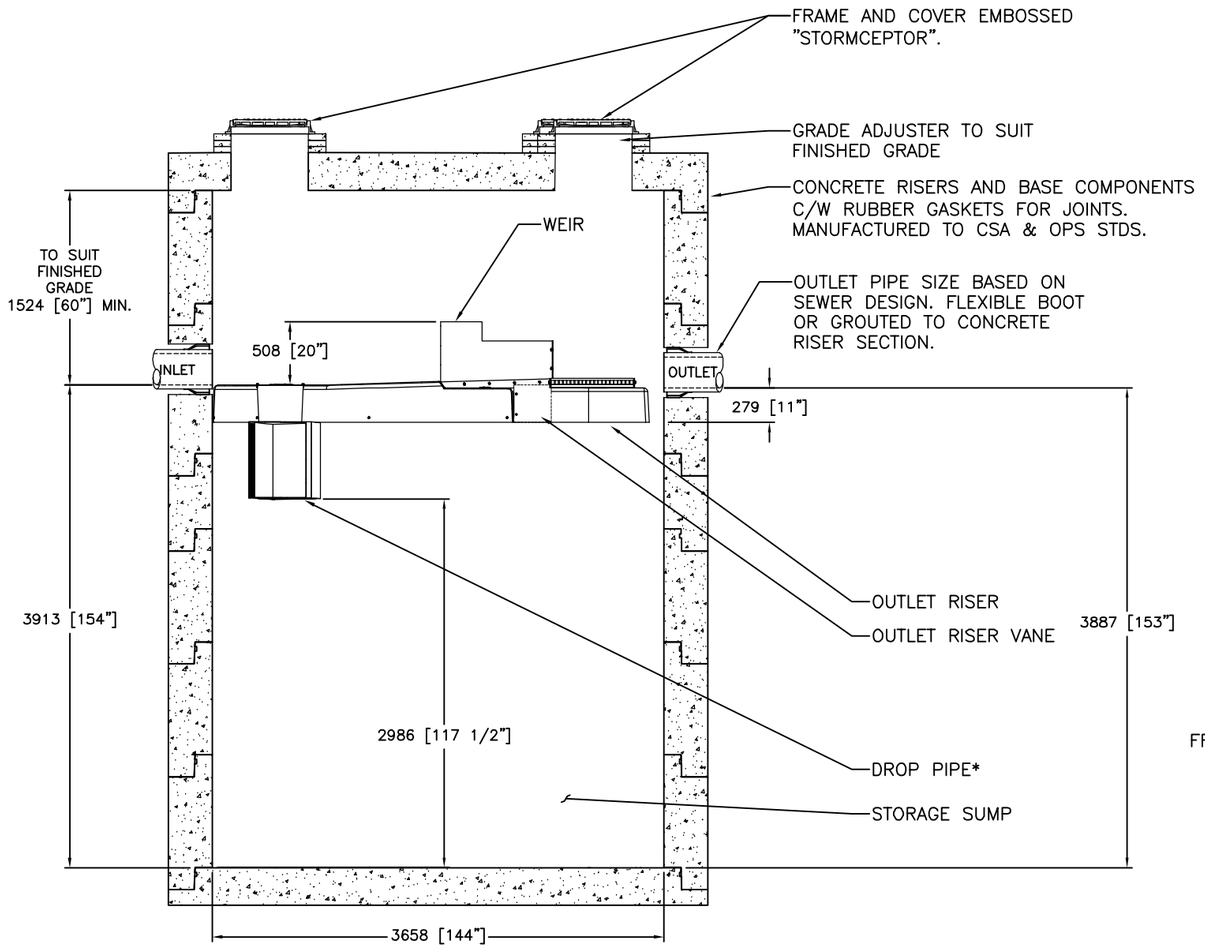
SHEET NUMBER: C04
SHEET #: 4 OF 7

ISSUE: REVISED AS PER CITY COMMENTS
REV #: 0
DATE OF: 2021-11-23

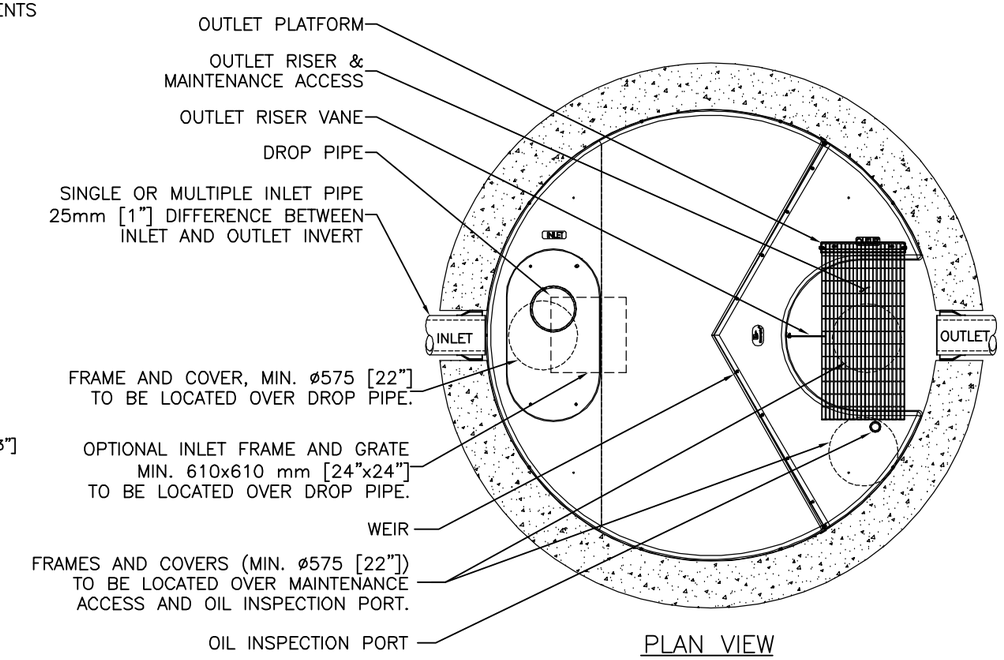
D07-12-21-0044

#18430

DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF12 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO12 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO12
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	OUTLET PLATFORM	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-4801 CA 416-665-8900 INTL +1-416-665-8900

DATE:	10/24/2017
DESIGNED:	JSK
DRAWN:	JSK
CHECKED:	BSF
APPROVED:	SP
PROJECT No.:	EFO12
SEQUENCE No.:	*
SHEET:	1 OF 1

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Stormceptor® EF and EFO Oil-Grit Separators

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

Registration: GPS-ETV_VR2020-11-15_Imbrium-SC

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 15, 2020
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Stormceptor® EF and EFO are treatment devices designed to remove oil, sediment, trash, debris, and pollutants attached to particulates from Stormwater and snowmelt runoff. The device takes the place of a conventional manhole within a storm drain system and offers design flexibility that works with various site constraints. The EFO is designed with a shorter bypass weir height, which accepts lower surface loading rate into the sump, thereby reducing re-entrainment of captured free floating light liquids.

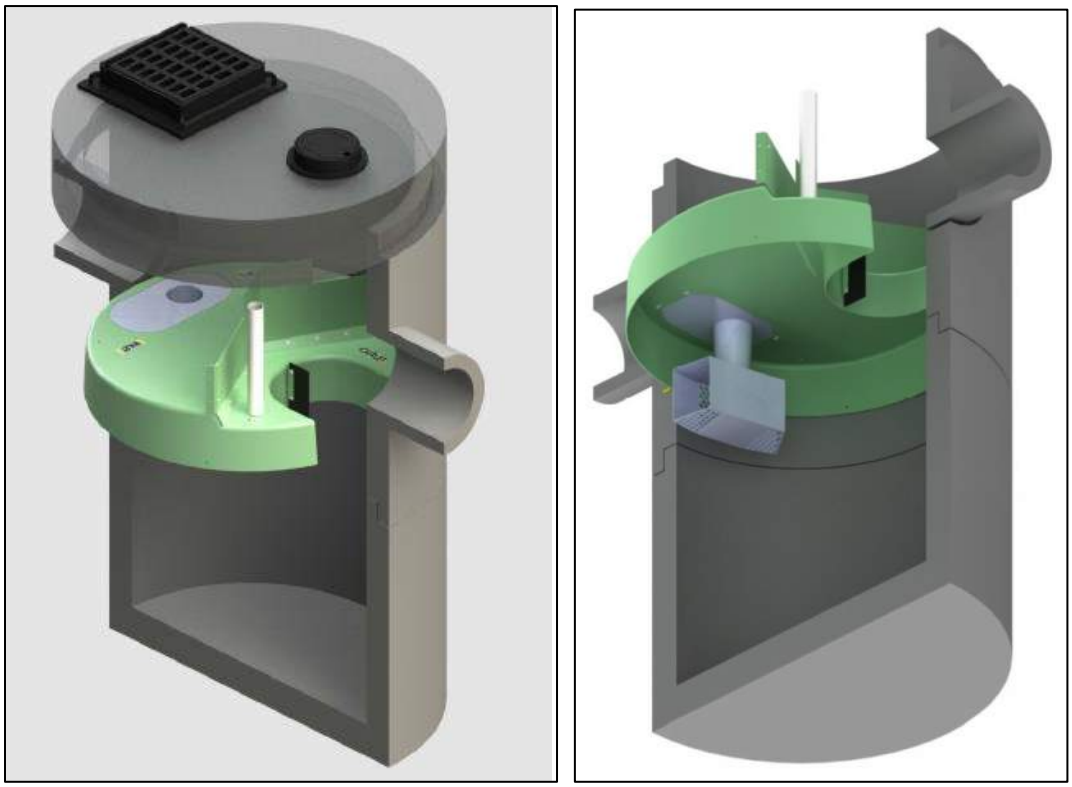


Figure 1. Graphic of typical inline Stormceptor® unit and core components.

Stormwater and snowmelt runoff enters the Stormceptor® EF/EFO's upper chamber through the inlet pipe(s) or a surface inlet grate. An insert divides the unit into lower and upper chambers and incorporates a weir to reduce influent velocity and separate influent (untreated) from effluent (treated) flows. Influent water ponds upstream of the insert's weir providing driving head for the water flowing downwards into the drop pipe where a vortex pulls the water into the lower chamber. The water diffuses at lower velocities in multiple directions through the drop pipe outlet openings. Oil and other floatables rise up and are trapped beneath the insert, while sediments undergo gravitational settling to the sump's bottom. Water from the sump can exit by flowing upward to the outlet riser onto the top side of the insert and downstream of the weir, where it discharges through the outlet pipe.

Maximum flow rate into the lower chamber is a function of weir height and drop pipe orifice diameter. The Stormceptor® EF and EFO are designed to allow a surface loading rate of 1135 L/min/m^2 (27.9 gal/min/ft^2) and 535 L/min/m^2 (13.1 gal/min/ft^2) into the lower chamber, respectively. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of

additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor® EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. Inspection of Stormceptor® EF and EFO devices is performed from grade by inserting a sediment probe through the outlet riser and an oil dipstick through the oil inspection pipe. The unit can be maintained by using a vacuum hose through the outlet riser.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from the testing program conducted on the Imbrium Systems Inc.'s Stormceptor® EF4 and EFO4 Oil-Grit Separators, in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014). The Procedure was prepared by the Toronto and Region Conservation Authority (TRCA) for Environment Canada's Environmental Technology Verification (ETV) Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test[a]:

During the capture test, the Stormceptor® EF4 OGS device, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 46, 44, and 49 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Stormceptor® EFO4, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 42, 40, and 34 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test[a]:

During the scour test, the Stormceptor® EF4 and Stormceptor® EFO4 OGS devices, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, generate corrected effluent concentrations of 4.6, 0.7, 0, 0.2, and 0.4 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

Light liquid re-entrainment test[a]:

During the light liquid re-entrainment test, the Stormceptor® EFO4 OGS device with surrogate low-density polyethylene beads preloaded within the lower chamber oil collection zone, representing a floating light liquid volume equal to a depth of 50.8 mm over the sedimentation area, retained 100, 99.5, 99.8, 99.8, and 99.9 percent of loaded beads by mass during the 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2.

[a] The claim can be applied to other units smaller or larger than the tested unit as long as the untested units meet the scaling rule specified in the Procedure for Laboratory of Testing of Oil Grit Separators (Version 3.0, June 2014)

Performance results

The test sediment consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the three sample average of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%. The comparison of the average test sediment PSD to the CETV specified PSD in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition.

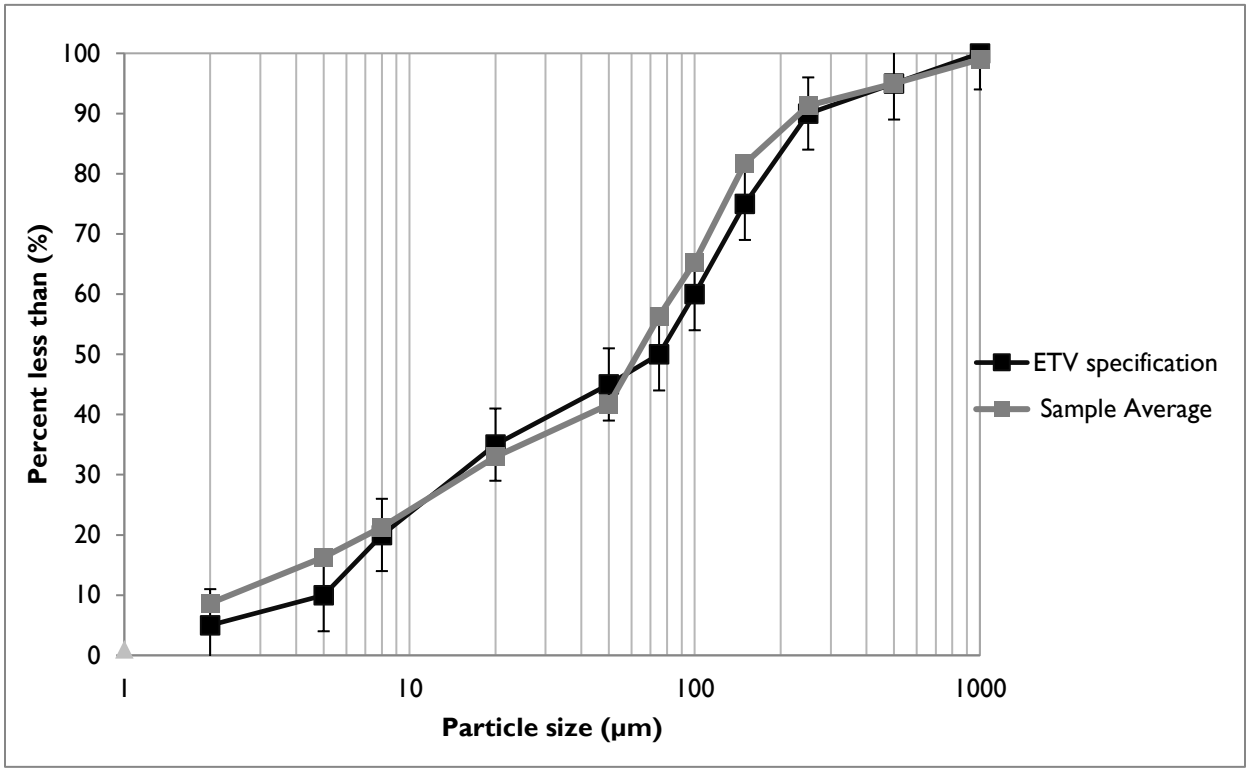


Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

The capacity of the device to retain sediment was determined at seven surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor simulating the technology filled to 50% of the manufacturer's recommended maximum sediment storage depth. The test was carried out with clean water that maintained a sediment concentration below 20 mg/L. Based on these conditions, removal efficiencies for individual particle size classes and for the test sediment as a whole were determined for each of the tested surface loading rates (Table 1). Since the EF and EFO models are identical except for the weir height, which bypasses flows from the EFO model at a surface loading rate of 535 L/min/m^2 (13.1 gpm/ft^2), sediment capture tests at surface loading rates from 40 to 400 L/min/m^2 were only performed on the EF unit. Surface loading rates of 600, 1000, and 1400 L/min/m^2 were tested on both units separately. Results for the EFO model at these higher flow rates are presented in Table 2.

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and may be attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory

analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "all particle sizes by mass balance" (see Table 1 and 2) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

Table 1. Removal efficiencies (%) of the EF4 at specified surface loading rates

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**						
	40	80	200	400	600	1000	1400
>500	90	58	58	100*	86	72	100*
250 - 500	100*	100*	100	100*	100*	100*	100*
150 - 250	90	82	26	100*	100*	67	90
105 - 150	100*	100*	100*	100*	100*	100*	100
75 - 105	100*	92	74	82	77	68	76
53 - 75	Undefined [a]	56	100*	72	69	50	80
20 - 53	54	100*	54	33	36	40	31
8 - 20	67	52	25	21	17	20	20
5 – 8	33	29	11	12	9	7	19
<5	13	0	0	0	0	0	4
All particle sizes by mass balance	**70.4**	**63.8**	**53.9**	**47.5**	**46.0**	**43.7**	**49.0**

[a] An outlier in the feed sample sieve data resulted in a negative removal efficiency for this size fraction.
* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 171% (average 128%). See text and Bulletin # CETV 2016-11-0001 for more information.

Table 2. Removal efficiencies (%) of the EFO4 at surface loading rates above the bypass rate of 535 L/min/m²

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**		
	600	1000	1400
>500	89	83	100*
250 - 500	90	100*	92
150 - 250	90	67	100*
105 - 150	85	92	77
75 - 105	80	71	65
53 - 75	60	31	36
20 - 53	33	43	23
8 - 20	17	23	15
5 – 8	10	3	3
<5	0	0	0
All particle sizes by mass balance	**41.7**	**39.7**	**34.2**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 103 and 111% (average 107%). See text and Bulletin # CETV 2016-11-0001 for more information.

Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the EF4 at each of the tested surface loading rates. Figure 4 shows the same graph for the EFO4 unit at surface loading rates above the bypass rate of 535 L/min/m².

As expected, the capture efficiency for fine particles in both units was generally found to decrease as surface loading rates increased.

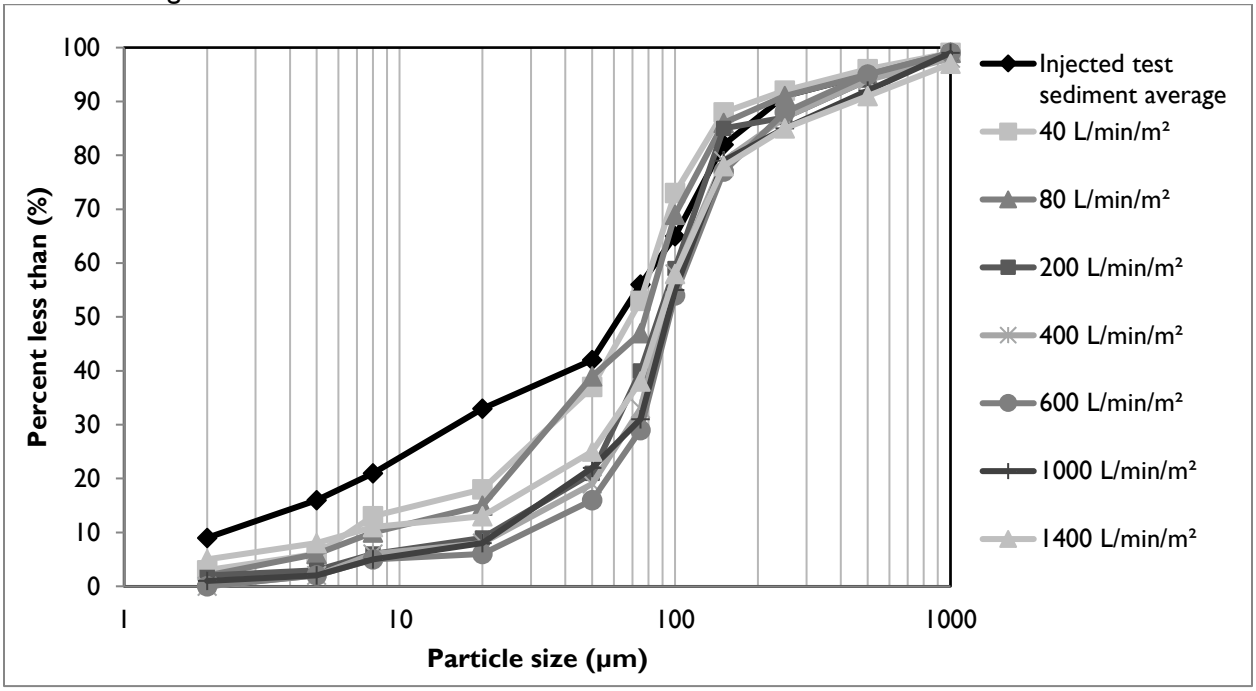


Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

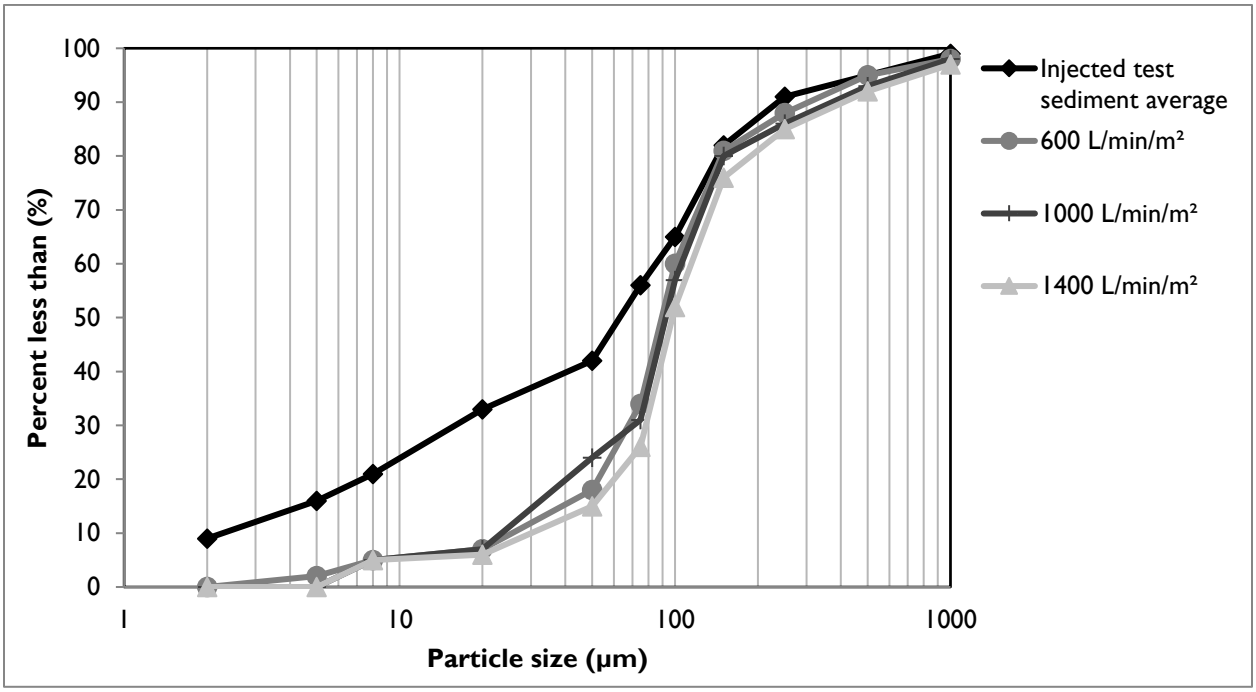


Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

Table 4 shows the results of the sediment scour and re-suspension test for the EF4 unit. The EFO4 was not tested as it was reasonably assumed that scour rates would be lower given that flow bypass occurs at a lower surface loading rate. The scour test involved preloading 10.2 cm of fresh test sediment into

the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. Typically, the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test is also used to adjust the concentration, as per the method described in Bulletin # CETV 2016-09-0001. However, since the composites of effluent concentrations were below the Reporting Detection Limit of the Laser Diffraction PSD methodology, this adjustment was not made. Results showed average adjusted effluent sediment concentrations below 5 mg/L at all tested surface loading rates.

It should be noted that the EF4 starts to internally bypass water at 1135 L/min/m^2, potentially resulting in the dilution of effluent concentrations, which would not normally occur under typical field conditions because the field influent concentration would contain a much higher sediment concentration than during the lab test. Recalculation of effluent concentrations to account for dilution at surface loading rates above the bypass rate showed sediment effluent concentrations to be below 1.6 mg/L.

Table 4. Scour test adjusted effluent sediment concentration.

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Adjusted effluent suspended sediment concentration (mg/L) [a]	Average (mg/L)
1	200	1:00	<RDL	11.9	4.6
		2:00		7.0	
		3:00		4.4	
		4:00		2.2	
		5:00		1.0	
		6:00		1.2	
2	800	7:00	<RDL	1.1	0.7
		8:00		0.9	
		9:00		0.6	
		10:00		1.4	
		11:00		0.1	
		12:00		0	
3	1400	13:00	<RDL	0	0
		14:00		0.1	
		15:00		0	
		16:00		0	
		17:00		0	
		18:00		0	
4	2000	19:00	1.2	0.2	0.2
		20:00		0	
		21:00		0	
		22:00		0.7	
		23:00		0	
		24:00		0.4	

5	2600	25:00	1.6	0.3	0.4
		26:00		0.4	
		27:00		0.7	
		28:00		0.4	
		29:00		0.2	
		30:00		0.4	

[a] The adjusted effluent suspended sediment concentration represents the actual measured effluent concentration minus the background concentration. For more information see Bulletin # CETV 2016-09-0001.

The results of the light liquid re-entrainment test used to evaluate the unit's capacity to prevent re-entrainment of light liquids are reported in Table 5. The test involved preloading 58.3 L (corresponding to a 5 cm depth over the collection sump area of 1.17m^2) of surrogate low-density polyethylene beads within the oil collection skirt and running clean water through the device continuously at five surface loading rates (200, 800, 1400, 2000, and 2600 L/min/m^2). Each flow rate was maintained for 5 minutes with approximately 1 minute transition time between flow rates. The effluent flow was screened to capture all re-entrained pellets throughout the test.

Table 5. Light liquid re-entrainment test results for the EFO4.

Surface Loading Rate (L/min/m2)	Time Stamp	Amount of Beads Re-entrained			
		Mass (g)	Volume (L)[a]	% of Pre-loaded Mass Re-entrained	% of Pre-loaded Mass Retained
200	62	0	0	0.00	100
800	247	168.45	0.3	0.52	99.48
1400	432	51.88	0.09	0.16	99.83
2000	617	55.54	0.1	0.17	99.84
2600	802	19.73	0.035	0.06	99.94
Total Re-entrained		295.60	0.525	0.91	--
Total Retained		32403	57.78	--	99.09
Total Loaded		32699	58.3	--	--

[a] Determined from bead bulk density of 0.56074 g/cm^3

Variances from testing Procedure

The following minor deviations from the *Procedure for Laboratory Testing of Oil-Grit Separators* (Version 3.0, June 2014) have been noted:

1. During the capture test, the 40 L/min/m^2 and 80 L/min/m^2 surface loading rates were evaluated over 3 and 2 days respectively due to the long duration needed to feed the required minimum of 11.3 kg of test sediment into the unit at these lower flow rates. Pumps were shut down at the end of each intermediate day, and turned on again the following morning. The target flow rate was re-established within 30 seconds of switching on the pump. This procedure may have allowed sediments to be captured that otherwise may have exited the unit if the test was continuous. On the basis of practical considerations, this variance was approved by the verifier prior to testing.

2. During the scour test, the coefficient of variation (COV) for the lowest flow rate tested (200 L/min/m^2) was 0.07, which exceeded the specified limit of 0.04 target specified in the OGS Procedure. A pump capable of attaining the highest flow rate of 3036 L/min had difficulty maintaining the lowest flow of 234 L/min but still remained within +/- 10% of the target flow and is viewed as having very little impact on the observed results. Similarly, for the light liquid re-entrainment test the COV for the flow rate of the 200 L/min/m^2 run was 0.049, exceeding the limit of 0.04, but is believed to introduce negligible bias.

3. Due to pressure build up in the filters, the runs at 1000 L/min/m^2 for the Stormceptor® EF4 and 1000 and 1400 L/min/m^2 for the Stormceptor® EFO4 were slightly shorter than the target. The run times were 54, 59 and 43 minutes respectively, versus targets of 60 and 50 minutes. The final feed samples were timed to coincide with the end of the run. Since >25 lbs of sediment was fed, the shortened time did not invalidate the runs.

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems Inc. to support the performance claim included the following: Performance test report prepared by Good Harbour Laboratories, and dated September 8, 2017; the report is based on testing completed in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014).

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Stormceptor® EF and EFO OGS please contact:

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V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

Stormceptor EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

04/05/2021

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id:	6000
Years of Rainfall Data:	37

Site Name:	105A Schneider Road
Drainage Area (ha):	2.849
Runoff Coefficient 'c':	0.87
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	89.58
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	614.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	105A Schneider Road
Project Number:	211-01794-00
Designer Name:	Ding Bang Yang
Designer Company:	WSP Canada Inc
Designer Email:	winston.yang@wsp.com
Designer Phone:	613-690-0538
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	50
EFO6	65
EFO8	73
EFO10	79
EFO12	84

Recommended Stormceptor EFO Model: EFO12

Estimated Net Annual Sediment (TSS) Load Reduction (%): 84

Water Quality Runoff Volume Capture (%): > 90

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 waterwavs.

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.

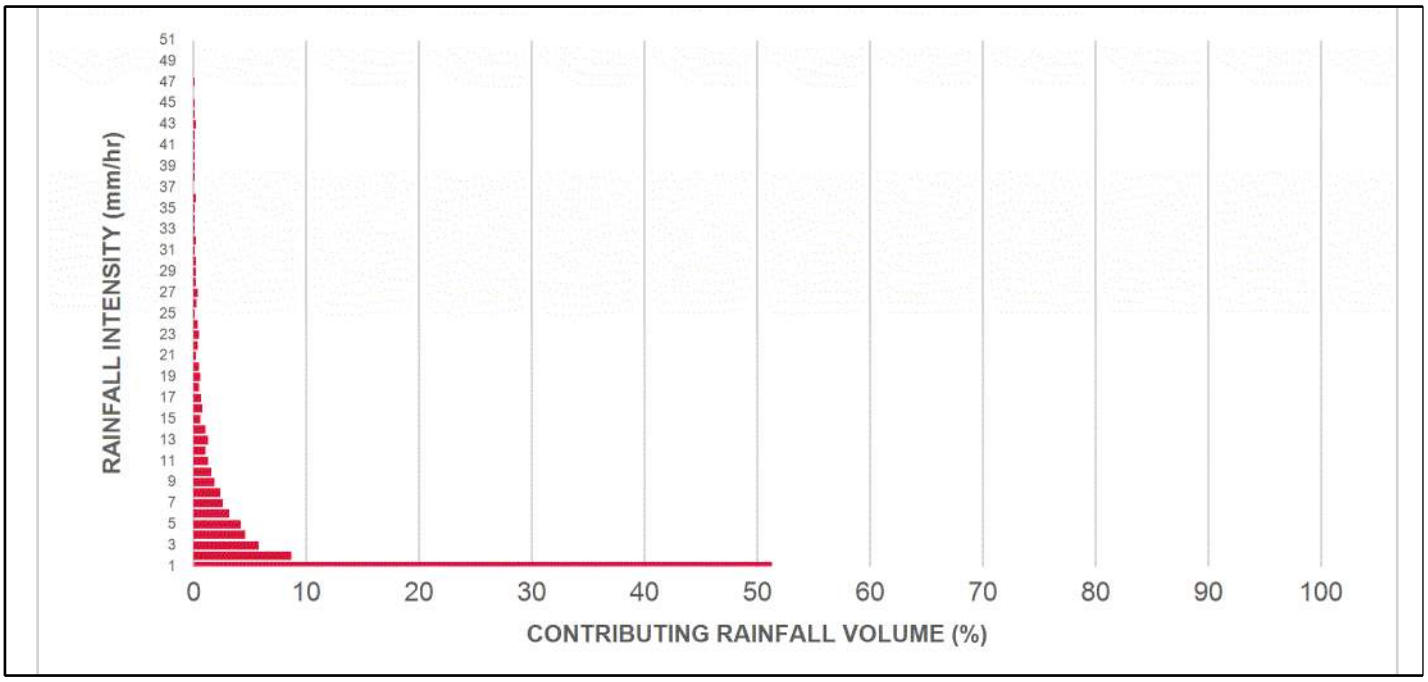
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

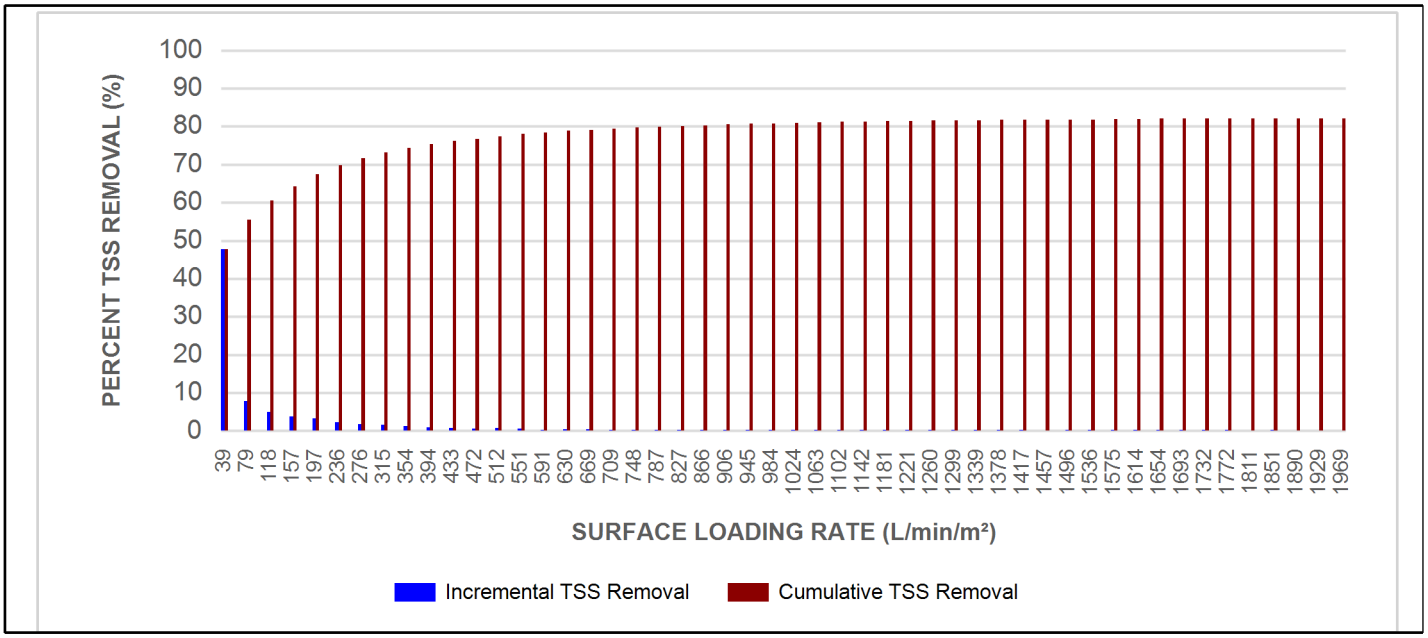
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	51.3	51.3	6.89	413.0	33.0	93	47.7	47.7
2	8.7	60.0	13.78	827.0	66.0	91	7.9	55.6
3	5.8	65.8	20.67	1240.0	99.0	87	5.0	60.7
4	4.6	70.4	27.56	1654.0	132.0	84	3.8	64.5
5	4.2	74.6	34.45	2067.0	165.0	80	3.4	67.9
6	3.2	77.8	41.34	2481.0	198.0	77	2.5	70.3
7	2.6	80.4	48.23	2894.0	232.0	73	1.9	72.3
8	2.4	82.8	55.12	3307.0	265.0	71	1.7	73.9
9	1.9	84.7	62.02	3721.0	298.0	68	1.3	75.2
10	1.6	86.3	68.91	4134.0	331.0	64	1.0	76.3
11	1.3	87.6	75.80	4548.0	364.0	62	0.8	77.1
12	1.1	88.7	82.69	4961.0	397.0	59	0.6	77.7
13	1.3	90.0	89.58	5375.0	430.0	57	0.7	78.5
14	1.1	91.1	96.47	5788.0	463.0	56	0.6	79.1
15	0.6	91.7	103.36	6202.0	496.0	55	0.3	79.4
16	0.8	92.5	110.25	6615.0	529.0	54	0.4	79.8
17	0.7	93.2	117.14	7028.0	562.0	53	0.4	80.2
18	0.5	93.7	124.03	7442.0	595.0	52	0.3	80.5
19	0.6	94.3	130.92	7855.0	628.0	52	0.3	80.8
20	0.5	94.8	137.81	8269.0	661.0	52	0.3	81.0
21	0.2	95.0	144.70	8682.0	695.0	52	0.1	81.1
22	0.4	95.4	151.59	9096.0	728.0	51	0.2	81.4
23	0.5	95.9	158.48	9509.0	761.0	51	0.3	81.6
24	0.4	96.3	165.37	9922.0	794.0	51	0.2	81.8
25	0.1	96.4	172.26	10336.0	827.0	51	0.1	81.9

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 (%)
26	0.3	96.7	179.16	10749.0	860.0	51	0.2	82.0
27	0.4	97.1	186.05	11163.0	893.0	51	0.2	82.2
28	0.2	97.3	192.94	11576.0	926.0	50	0.1	82.3
29	0.2	97.5	199.83	11990.0	959.0	50	0.1	82.4
30	0.2	97.7	206.72	12403.0	992.0	50	0.1	82.5
31	0.1	97.8	213.61	12817.0	1025.0	50	0.1	82.6
32	0.2	98.0	220.50	13230.0	1058.0	50	0.1	82.7
33	0.1	98.1	227.39	13643.0	1091.0	49	0.0	82.7
34	0.1	98.2	234.28	14057.0	1125.0	49	0.0	82.8
35	0.1	98.3	241.17	14470.0	1158.0	49	0.0	82.8
36	0.2	98.5	248.06	14884.0	1191.0	48	0.1	82.9
37	1.5	100.0	254.95	15297.0	1224.0	48	0.7	83.6
38	0.1	100.1	261.84	15711.0	1257.0	48	0.0	83.7
39	0.1	100.2	268.73	16124.0	1290.0	47	0.0	83.7
40	0.1	100.3	275.62	16537.0	1323.0	47	0.0	83.8
41	0.1	100.4	282.51	16951.0	1356.0	47	0.0	83.8
42	0.1	100.5	289.40	17364.0	1389.0	46	0.0	83.9
43	0.2	100.7	296.30	17778.0	1422.0	45	0.1	84.0
44	0.1	100.8	303.19	18191.0	1455.0	44	0.0	84.0
45	0.1	100.9	310.08	18605.0	1488.0	44	0.0	84.0
46	-0.9	100.0	316.97	19018.0	1521.0	42	N/A	83.7
47	0.1	100.1	323.86	19431.0	1555.0	42	0.0	83.7
48	-0.1	100.0	330.75	19845.0	1588.0	41	N/A	83.7
49	0.0	100.0	337.64	20258.0	1621.0	40	0.0	83.7
50	0.0	100.0	344.53	20672.0	1654.0	39	0.0	83.7
							Estimated Net Annual Sediment (TSS) Load Reduction =	**84 %**

RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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

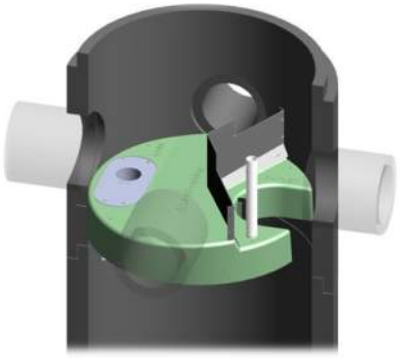
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

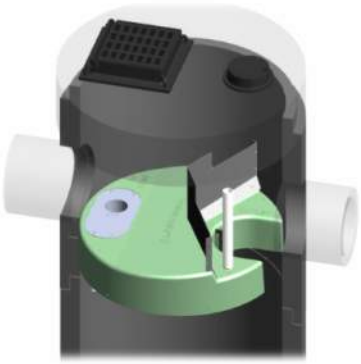
DESIGN FLEXIBILITY

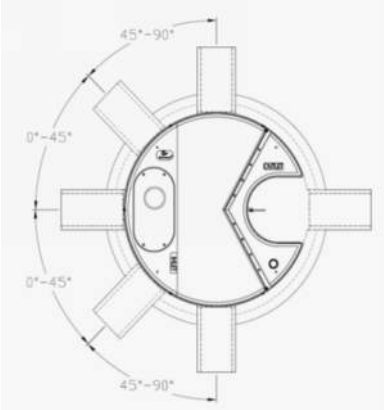
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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







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)	(ft^3)	(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/ft^3)

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

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** S**eparators**

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

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 shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. 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 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/m^2.

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.

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADS-PIPE.COM
ADS SALES REP:	MICHAEL REID 613-882-4186 MICHAEL.REID@ADS-PIPE.COM
PROJECT NO:	S245240
ADS SITE COORDINATOR:	MATTHEW BEGHIN 519-710-3687 MATTHEW.BEGHIN@ADS-PIPE.COM

Advanced Drainage Systems, Inc.

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103 SCHNEIDER ROAD

KANATA, ON.

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm)..
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT - EAST SYSTEM

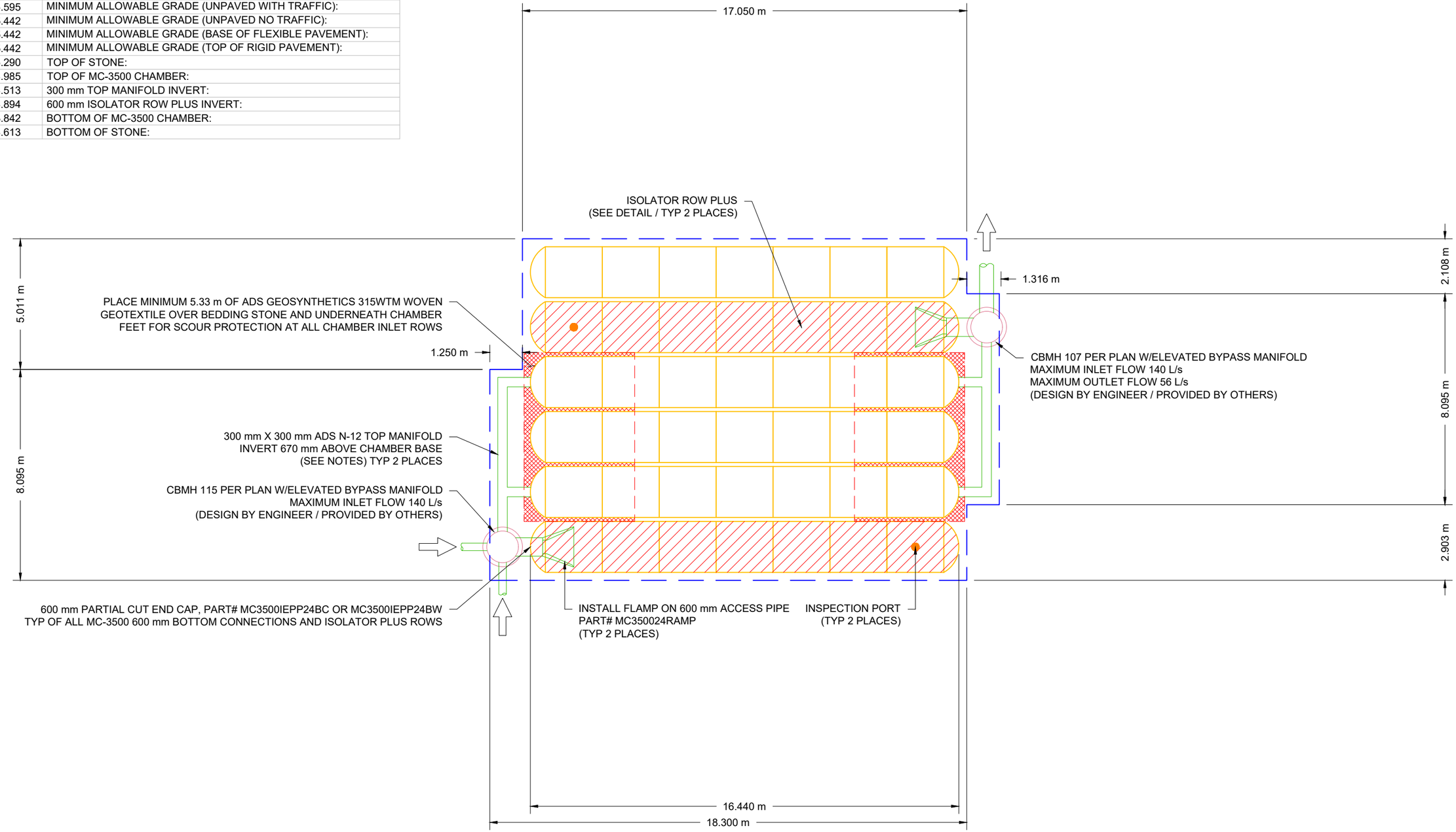
42	STORMTECH MC-3500 CHAMBERS
12	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
212.3	**INSTALLED SYSTEM VOLUME (m^3) ABOVE ELEVATION 73.894 (PERIMETER STONE INCLUDED)**
243.6	SYSTEM AREA (m^2)
65.3	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - EAST SYSTEM

77.423	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
75.595	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
75.442	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
75.442	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
75.442	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
75.290	TOP OF STONE:
74.985	TOP OF MC-3500 CHAMBER:
74.513	300 mm TOP MANIFOLD INVERT:
73.894	600 mm ISOLATOR ROW PLUS INVERT:
73.842	BOTTOM OF MC-3500 CHAMBER:
73.613	BOTTOM OF STONE:

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



103 SCHNEIDER ROAD
KANATA, ON.

DATE: 06/21/21 | DRAWN: RCT | CHECKED: RCT
PROJECT #: S245240

DATE	DESCRIPTION	DRWN	CHKD

StormTech
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ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SCALE = 1 : 150

PROPOSED LAYOUT - WEST SYSTEM

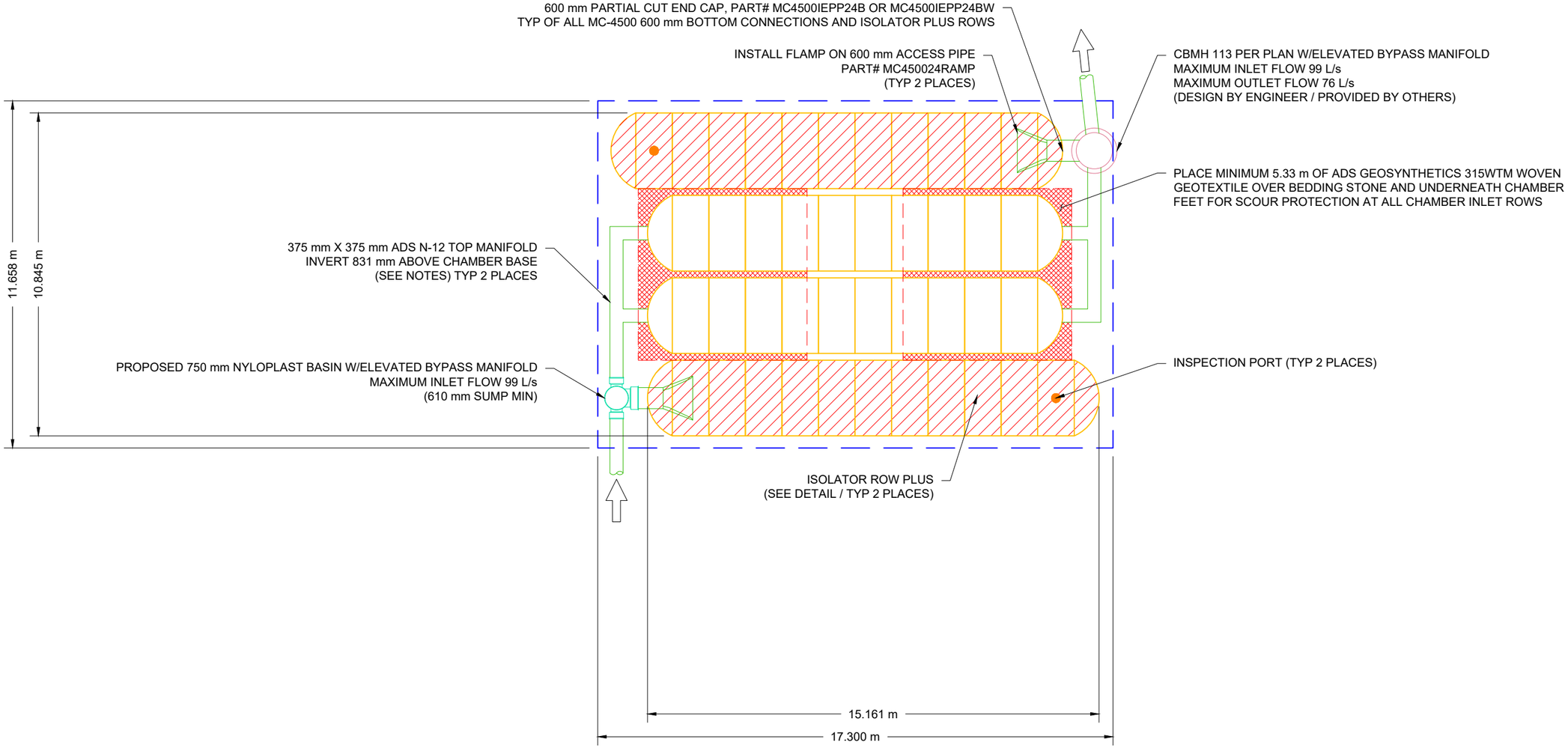
42	STORMTECH MC-4500 CHAMBERS
8	STORMTECH MC-4500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
220.0	**INSTALLED SYSTEM VOLUME (m^3) ABOVE ELEVATION 74.085 (PERIMETER STONE INCLUDED)**
201.6	SYSTEM AREA (m^2)
57.9	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - WEST SYSTEM

77.686	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
76.314	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
76.162	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
76.162	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
76.162	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
75.857	TOP OF STONE:
75.552	TOP OF MC-4500 CHAMBER:
74.860	375 mm TOP MANIFOLD INVERT:
74.086	600 mm ISOLATOR ROW PLUS INVERT:
74.028	BOTTOM OF MC-4500 CHAMBER:
73.799	BOTTOM OF STONE:

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



103 SCHNEIDER ROAD
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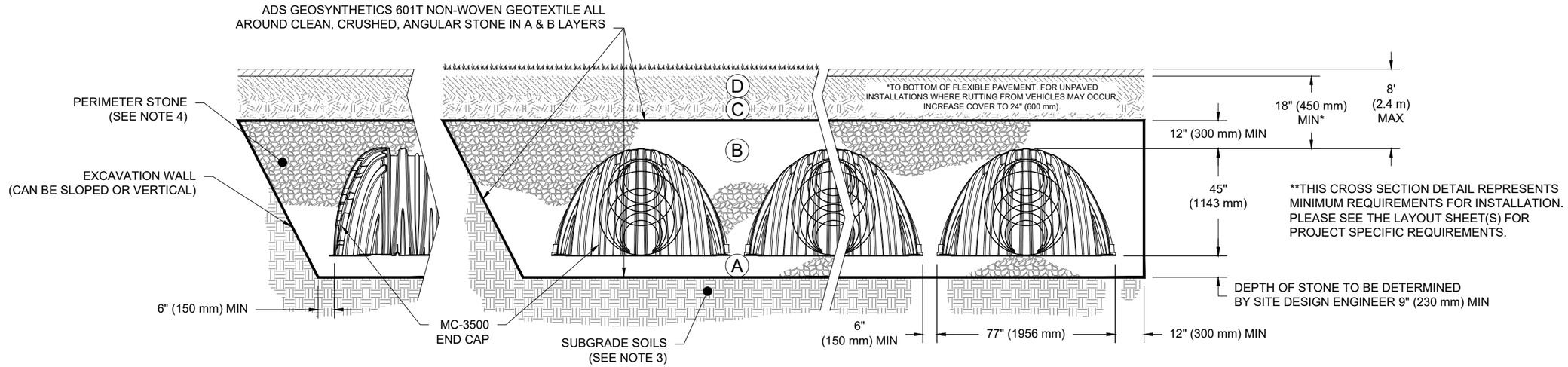
HILLIARD, OH 43026

SCALE = 1 : 150

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

103 SCHNEIDER ROAD
KANATA, ON.

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HILLIARD, OH 43026

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
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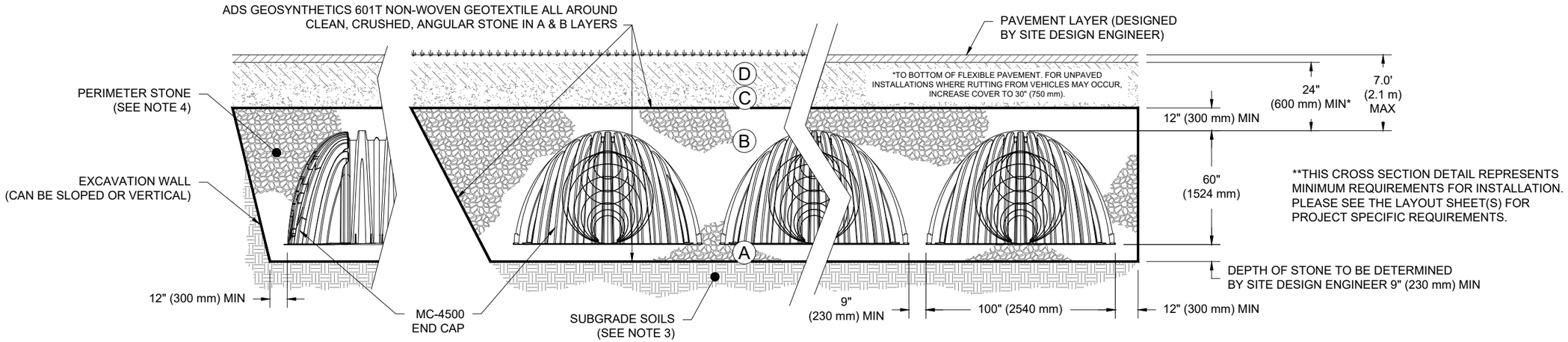

NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
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103 SCHNEIDER ROAD
KANATA, ON.
DATE: 06/21/21 | DRAWN: RCT | CHECKED: RCT
PROJECT #: S245240

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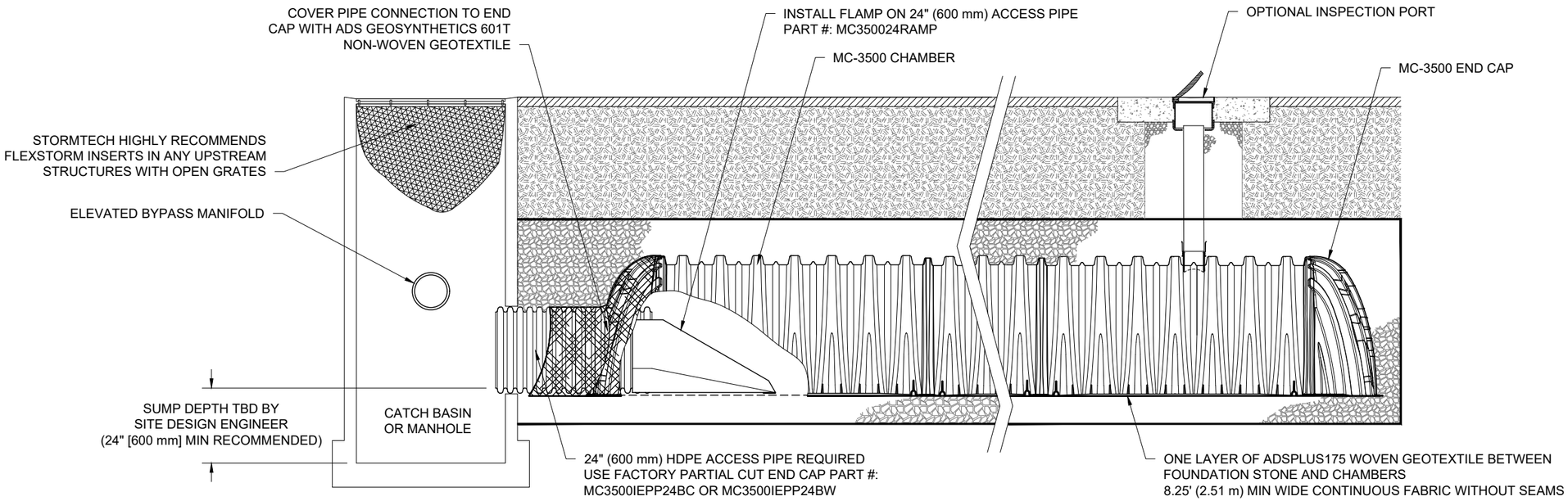


MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

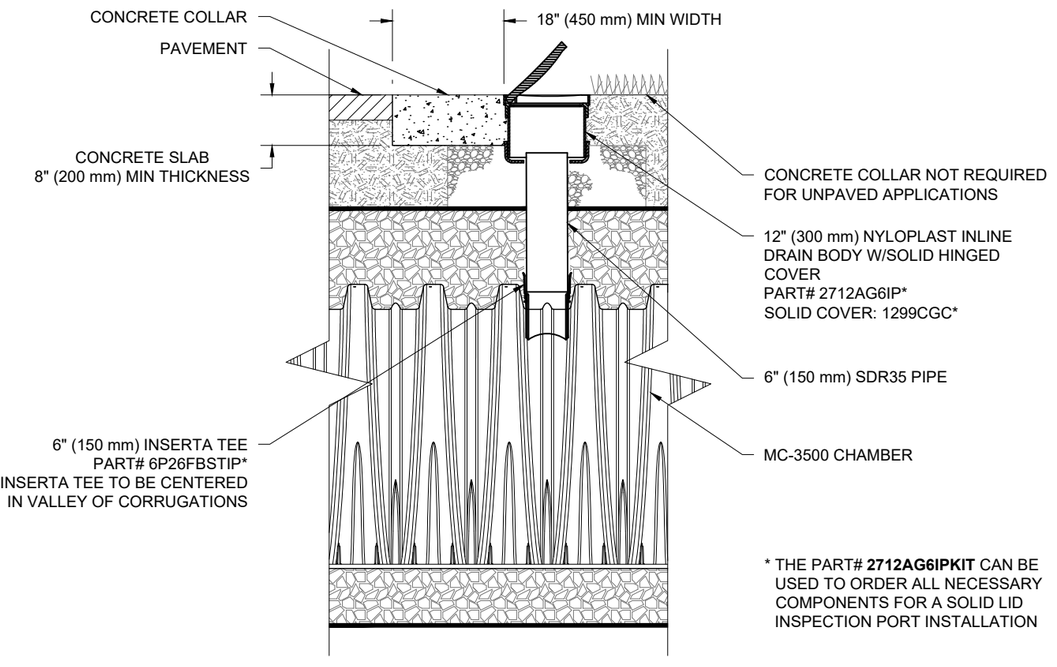
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" (150 mm) INSPECTION PORT DETAIL
NTS

103 SCHNEIDER ROAD
KANATA, ON.

DATE: 06/21/21 | DRAWN: RCT | CHECKED: RCT
PROJECT #: S245240

DATE	DRWN	CHKD	DESCRIPTION

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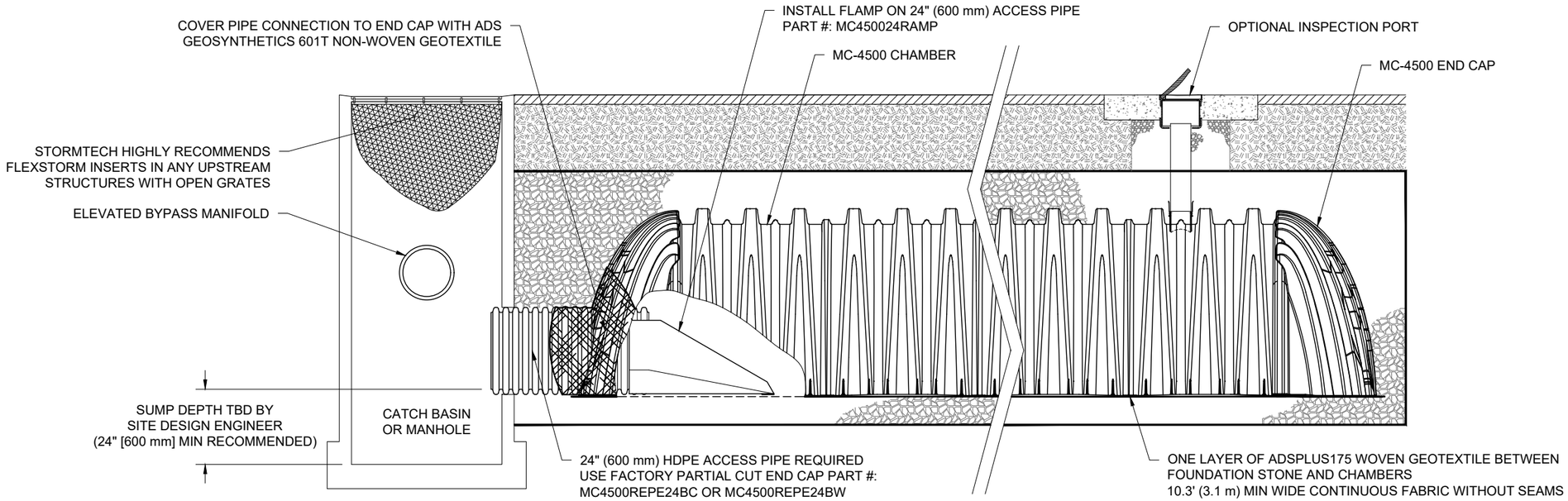


MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

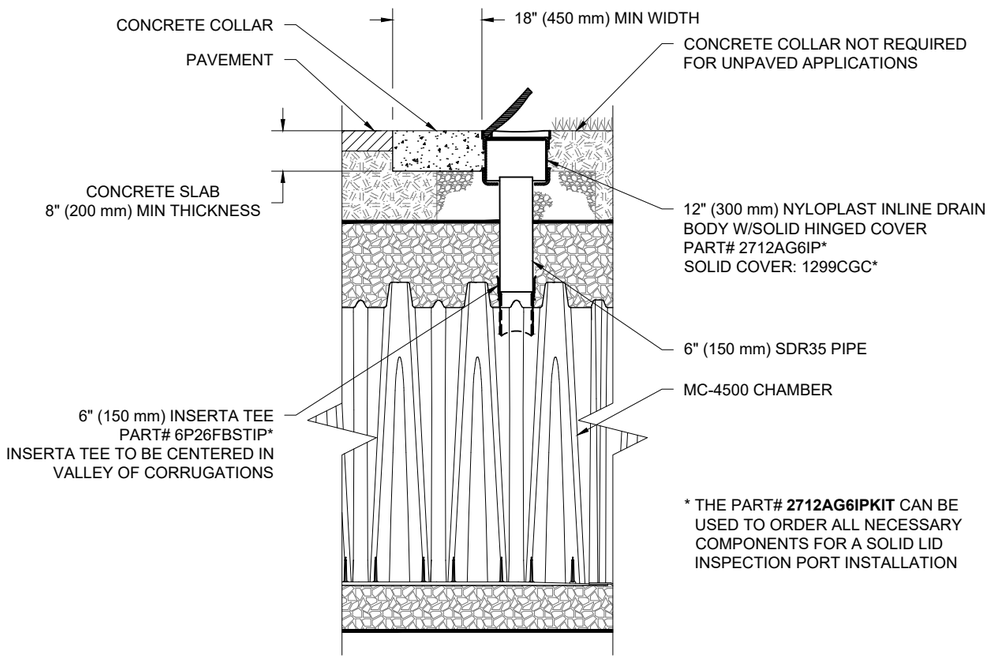
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-4500 6" (150 mm) INSPECTION PORT DETAIL
NTS

103 SCHNEIDER ROAD
KANATA, ON.

DATE: 06/21/21 | DRAWN: RCT | CHECKED: RCT
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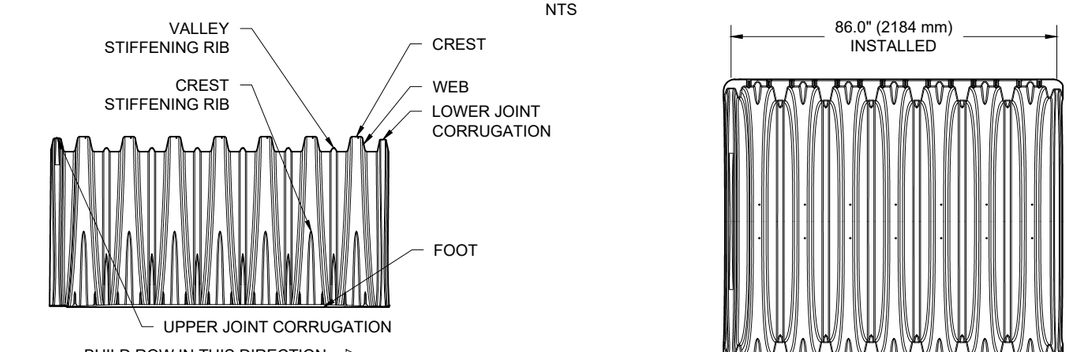
MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

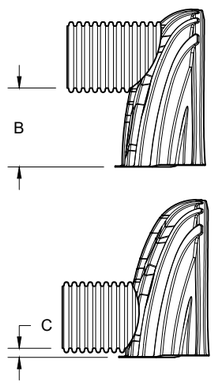
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

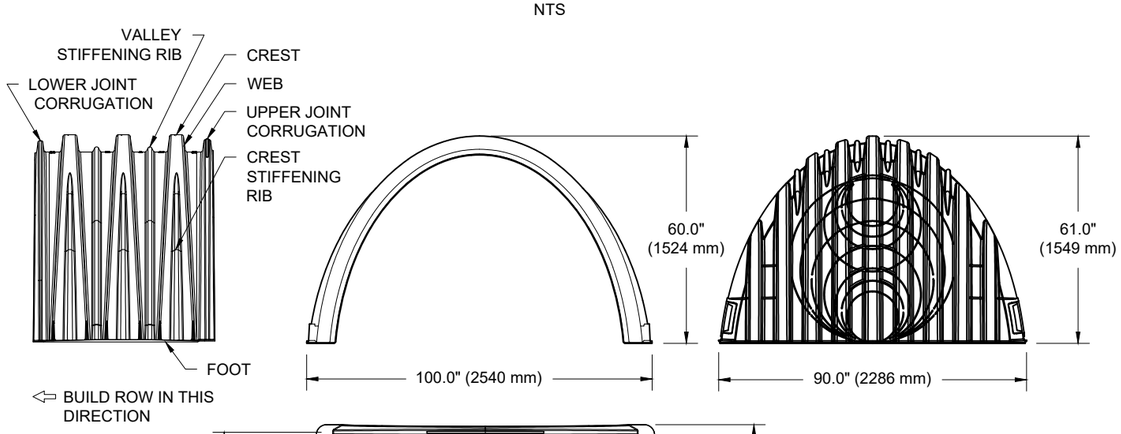
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

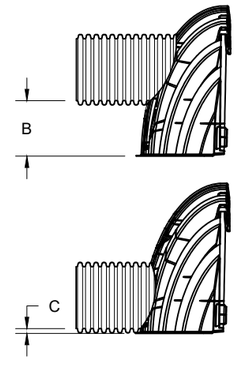
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

103 SCHNEIDER ROAD
KANATA, ON.

DATE: 06/21/21 | DRAWN: RCT | CHECKED: RCT | PROJECT #: S245240

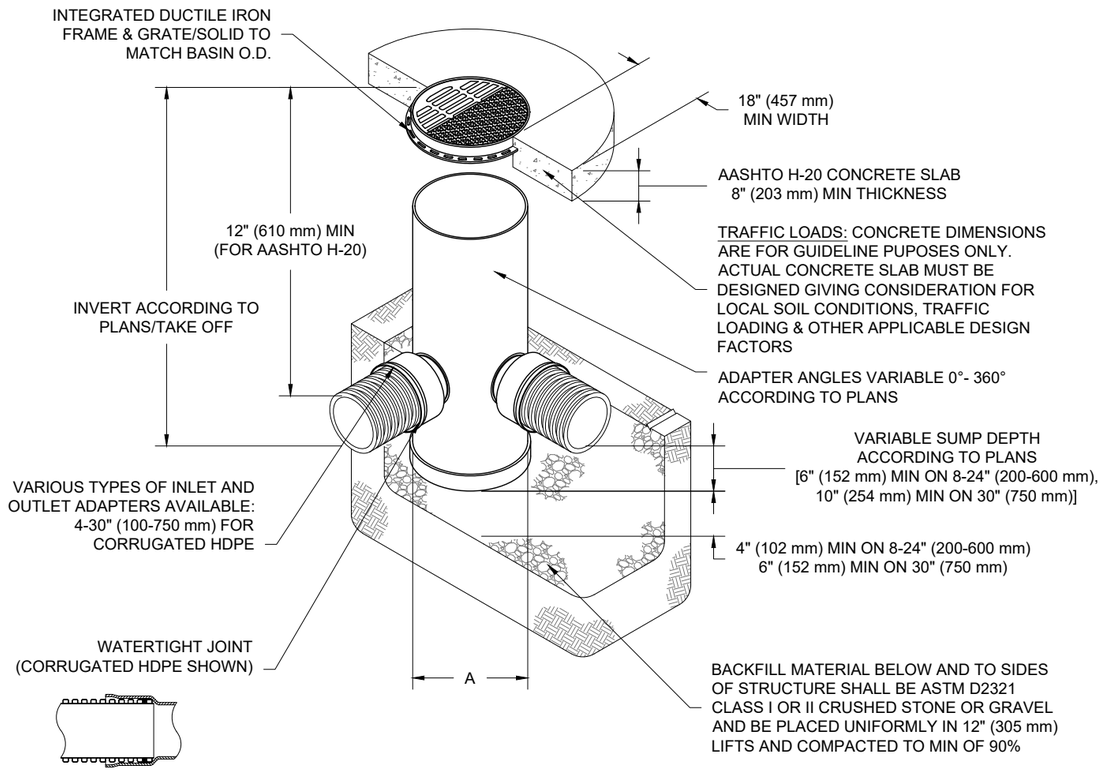
DATE	DRWN	CHKD	DESCRIPTION

StormTech
Detention • Retention • Water Quality
520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

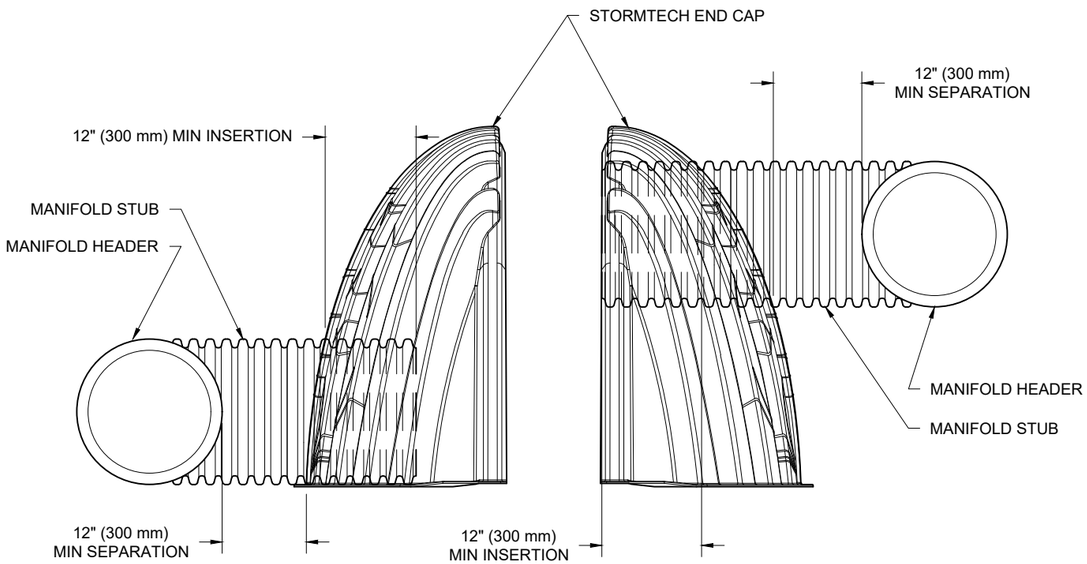
NYLOPLAST DRAIN BASIN

NTS



MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

103 SCHNEIDER ROAD
KANATA, ON.

DATE: 06/21/21 | DRAWN: RCT
PROJECT #: S245240 | CHECKED: RCT

DATE	DRWN	CHKD	DESCRIPTION

3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

Nyloplast

4640 TRUEMAN BLVD
HILLIARD, OH 43026

ADS

21.35m – 525mmø
CONC STM @ 0.25%
C/W INSULATION

STMH112
T/G=76.24
W.INV.=74.049
S.INV.=73.974
E.INV.=73.824

2.00m – 200mmø
PVC LEAD @ 1.00%
C/W INSULATION

66.80m – 300mmø
PVC STM @ 0.60%
C/W INSULATION

INV.=74.235

ST

2.40m – 250mmø
CB LEAD @ 1.00%
C/W INSULATION

13.65m – 375mmø
PVC STM @ 0.60%
C/W INSULATION

CB01
T/G=75.95
N.INV.=74.259
C/W 75mm ICD
(14.0 L/s @
1.44m HEAD)

CBMH113
T/G=76.24
S.INV.=74.076
N.INV.=74.036

STORMWATER DETENTION CHAMBER
MC–XXXX BY STORMTECH
TOTAL STORAGE REQUIRED 220m³
TOTAL STORAGE PROVIDED XXXm³
BOTTOM OF CHAMBER = XX.XX
BOTTOM OF STONE = XX.XX
TO STORMTECH DWG FOR DETAILS

1.55m – 375mmø
PVC STM @ 0.6%
C/W INSULATION

INV.=74.085

WEST BED

1.60m – 375mmø
PVC STM @ 0.60%
C/W INSULATION

CBMH114
T/G=76.73
S.INV.=74.115
N.INV.=74.095

35.30m – 600mm
CONC STM @ 0.
C/W INSULA

STMH110
T/G=76.7
S.INV.=73.78
E.INV.=74.16
N.INV.=73.76

STMH102
T/G=77.21
E.INV.=74.481
W.INV.=74.451

1.05m – 375mmø
PVC STM @ 0.60%
C/W INSULATION

CONNECT ROOF DRAIN TO STORM
SERVICE (SEE MECHANICAL DRAWING
FOR DETAILS) INV.=74.121

CONNECT FOUNDATION DRAIN TO
BUILDING STORM SERVICE (SEE
MECHANICAL DRAWING FOR DETAILS)
INV.=74.292

12.50m – 200mmø
PVC STM @ 1.00%

SLOPED ROOF

CB0
T/G=76.6
E.INV.=74.22
C/W 100mm IC
(30.6 L/s @
2.20m HEAD

1.55m – 200mm
PVC LEAD @ 1.00

36.70m – 600mm
CONC STM @ 0.20%

21.90m – 200m
PVC SAN @ 0.3
C/W INSULATI

CONNECT TO BUILDING WATER
SERVICE (SEE MECHANICAL
DWG FOR CONTINUATION)
TOP OF W/M=75.40
COORDINATE ENTRY LOCATION
WITH MECHANICAL CONTRACTOR.

CONNECT TO BUILDING SANITARY
SERVICE (SEE MECHANICAL DRAWING
FOR DETAILS) INV.=75.416

4.90m – 200mmø
PVC SAN @ 1.00%

38.40m – 200mmø
PVC SAN @ 0.36%

ENTRY / EXIT

EIDER

TING FIRE HYDRANT
VE WITHIN BUILDING
ABANDON UNUSED
ACE AND FILL WITH
EMOVE ABANDONED
S BELOW FOOTINGS

PVC LEAD @ 1.00%
C/W INSULATION

51.85m – 450mmø
CONC STM @ 0.40%
C/W INSULATION

ST

4.05m – 250mmø
PVC LEAD @ 1.00%
C/W INSULATION

LOADING ZONE

CB05
T/G=75.50
N.INV.=74.028
C/W 75mm ICD
(13.8 L/s @
1.42m HEAD)

INV.=73.987

1.25m – 375mmø
PVC STM @ 0.40%
C/W INSULATION

CBMH115
T/G=76.48
W.INV.=74.024
S.INV.=74.024
E.INV.=73.899

CBMH107
T/G=75.85
S.INV.=73.889
N.INV.=73.814

1.35m – 375mmø
PVC STM @ 0.40%
C/W INSULATION

.00m – 250mmø
PVC STM @ 1.00%
C/W INSULATION

DRAIN TO STORM
CHANICAL DRAWING
AILS) INV.=74.064

INV.=73.894

STORMWATER DETENTION CHAMBER
MC–XXXX BY STORMTECH
TOTAL STORAGE REQUIRED 210m³
TOTAL STORAGE PROVIDED XXXm³
BOTTOM OF CHAMBER = XX.XX
BOTTOM OF STONE = XX.XX
REFER TO STORMTECH DWG FOR DETAILS

3.45m – 250mmø
PVC STM @ 1.00%
C/W INSULATION

CONNECT ROOF DRAIN TO STORM
SERVICE (SEE MECHANICAL DRAWING
FOR DETAILS) INV.=74.059

EAST BED

8.20m – 200mmø
PVC STM @ 1.00%

CONNECT FOUNDATION DRAIN TO
BUILDING STORM SERVICE (SEE
MECHANICAL DRAWING FOR DETAILS)
INV.=74.563

WATER
METER

CONNECT TO BUILDING SANITARY
SERVICE (SEE MECHANICAL DRAWING
FOR DETAILS) INV.=75.702

CONNECT TO BUILDING WATER
SERVICE (SEE MECHANICAL DWG
FOR CONTINUATION)
TOP OF W/M=75.12
COORDINATE ENTRY LOCATION
WITH MECHANICAL CONTRACTOR.

BUILDING C
FFE=77.75
USF=74.75

Project: **103 Schneider Road - East Bed**

Chamber Model -	MC-3500		
Units -	**Metric**	Click Here for Imperial	
Number of Chambers -	42		
Number of End Caps -	12		
Voids in the stone (porosity) -	40	%	
Base of Stone Elevation -	73.61	m	☑ Include Perimeter Stone in Calculations
Amount of Stone Above Chambers -	305	mm	
Amount of Stone Below Chambers -	229	mm	
Amount of Stone Between Chambers -	152	mm	
	243.6	sq.meters	Min. Area - 211.475 sq.meters

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Chamber, End Cap and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.00	0.00	0.00	0.00	2.474	2.47	244.77	75.29
1651	0.00	0.00	0.00	0.00	2.474	2.47	242.30	75.26
1626	0.00	0.00	0.00	0.00	2.474	2.47	239.83	75.24
1600	0.00	0.00	0.00	0.00	2.474	2.47	237.35	75.21
1575	0.00	0.00	0.00	0.00	2.474	2.47	234.88	75.19
1549	0.00	0.00	0.00	0.00	2.474	2.47	232.40	75.16
1524	0.00	0.00	0.00	0.00	2.474	2.47	229.93	75.14
1499	0.00	0.00	0.00	0.00	2.474	2.47	227.46	75.11
1473	0.00	0.00	0.00	0.00	2.474	2.47	224.98	75.09
1448	0.00	0.00	0.00	0.00	2.474	2.47	222.51	75.06
1422	0.00	0.00	0.00	0.00	2.474	2.47	220.04	75.04
1397	0.00	0.00	0.00	0.00	2.474	2.47	217.56	75.01
1372	0.00	0.00	0.07	0.00	2.446	2.52	215.09	74.98
1346	0.01	0.00	0.23	0.01	2.378	2.62	212.57	74.96
1321	0.01	0.00	0.35	0.01	2.329	2.69	209.96	74.93
1295	0.01	0.00	0.48	0.02	2.275	2.77	207.26	74.91
1270	0.02	0.00	0.82	0.02	2.138	2.98	204.49	74.88
1245	0.03	0.00	1.22	0.03	1.973	3.23	201.51	74.86
1219	0.04	0.00	1.49	0.04	1.865	3.39	198.29	74.83
1194	0.04	0.00	1.69	0.04	1.780	3.51	194.90	74.81
1168	0.04	0.00	1.87	0.05	1.706	3.63	191.39	74.78
1143	0.05	0.00	2.03	0.06	1.639	3.73	187.76	74.76
1118	0.05	0.01	2.17	0.06	1.579	3.82	184.04	74.73
1092	0.05	0.01	2.30	0.07	1.525	3.90	180.22	74.71
1067	0.06	0.01	2.43	0.07	1.473	3.97	176.32	74.68
1041	0.06	0.01	2.54	0.08	1.426	4.04	172.35	74.65
1016	0.06	0.01	2.65	0.09	1.382	4.11	168.30	74.63
991	0.07	0.01	2.74	0.09	1.340	4.17	164.19	74.60
965	0.07	0.01	2.84	0.10	1.301	4.23	160.02	74.58
940	0.07	0.01	2.92	0.10	1.264	4.29	155.79	74.55
914	0.07	0.01	3.01	0.10	1.229	4.34	151.50	74.53
889	0.07	0.01	3.08	0.11	1.196	4.39	147.16	74.50
864	0.08	0.01	3.16	0.11	1.165	4.44	142.77	74.48
838	0.08	0.01	3.23	0.12	1.135	4.48	138.33	74.45
813	0.08	0.01	3.30	0.12	1.106	4.52	133.85	74.43
787	0.08	0.01	3.36	0.13	1.079	4.57	129.32	74.40
762	0.08	0.01	3.42	0.13	1.054	4.60	124.76	74.38
737	0.08	0.01	3.48	0.13	1.029	4.64	120.15	74.35
711	0.08	0.01	3.53	0.14	1.005	4.68	115.51	74.32
686	0.09	0.01	3.58	0.14	0.984	4.71	110.84	74.30
660	0.09	0.01	3.63	0.15	0.963	4.74	106.13	74.27
635	0.09	0.01	3.68	0.15	0.942	4.77	101.39	74.25
610	0.09	0.01	3.72	0.15	0.923	4.80	96.62	74.22
584	0.09	0.01	3.76	0.16	0.905	4.83	91.82	74.20
559	0.09	0.01	3.81	0.16	0.888	4.85	86.99	74.17
533	0.09	0.01	3.84	0.16	0.871	4.88	82.14	74.15
508	0.09	0.01	3.88	0.17	0.856	4.90	77.26	74.12
483	0.09	0.01	3.91	0.17	0.841	4.92	72.36	74.10
457	0.09	0.01	3.95	0.17	0.826	4.94	67.44	74.07
432	0.09	0.01	3.98	0.17	0.813	4.96	62.49	74.04
406	0.10	0.01	4.01	0.18	0.800	4.98	57.53	74.02
381	0.10	0.01	4.03	0.18	0.788	5.00	52.54	73.99
356	0.10	0.02	4.06	0.18	0.776	5.02	47.54	73.97
330	0.10	0.02	4.09	0.18	0.765	5.04	42.52	73.94
305	0.10	0.02	4.11	0.19	0.754	5.05	37.48	73.92
279	0.10	0.02	4.14	0.19	0.743	5.07	32.43	73.89
254	0.10	0.02	4.17	0.20	0.725	5.10	27.36	73.87
229	0.00	0.00	0.00	0.00	2.474	2.47	22.26	73.84
203	0.00	0.00	0.00	0.00	2.474	2.47	19.79	73.82
178	0.00	0.00	0.00	0.00	2.474	2.47	17.32	73.79
152	0.00	0.00	0.00	0.00	2.474	2.47	14.84	73.77
127	0.00	0.00	0.00	0.00	2.474	2.47	12.37	73.74
102	0.00	0.00	0.00	0.00	2.474	2.47	9.89	73.71
76	0.00	0.00	0.00	0.00	2.474	2.47	7.42	73.69
51	0.00	0.00	0.00	0.00	2.474	2.47	4.95	73.66
25	0.00	0.00	0.00	0.00	2.474	2.47	2.47	73.64

Project: **103 Schneider Road - West Bed**

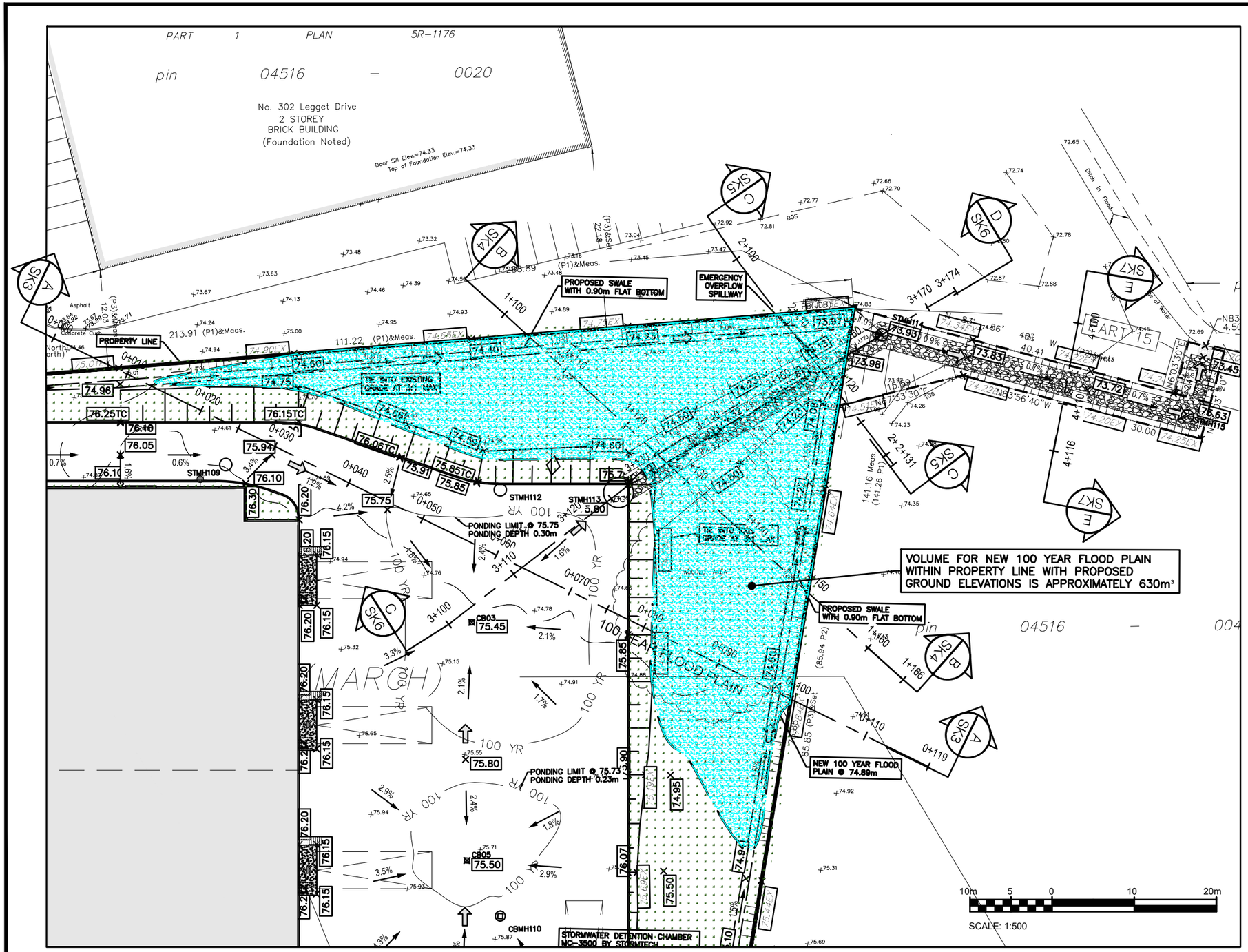
Chamber Model -	MC-4500	
Units -	**Metric**	Click Here for Imperial
Number of Chambers -	42	
Number of End Caps -	8	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	73.80	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

☑ Include Perimeter Stone in Calculations

201.6 sq.meters Min. Area - 167.907 sq.meters

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Chamber, End Cap and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
2057	0.00	0.00	0.00	0.00	2.047	2.05	247.20	75.86
2032	0.00	0.00	0.00	0.00	2.047	2.05	245.16	75.83
2007	0.00	0.00	0.00	0.00	2.047	2.05	243.11	75.81
1981	0.00	0.00	0.00	0.00	2.047	2.05	241.06	75.78
1956	0.00	0.00	0.00	0.00	2.047	2.05	239.01	75.75
1930	0.00	0.00	0.00	0.00	2.047	2.05	236.97	75.73
1905	0.00	0.00	0.00	0.00	2.047	2.05	234.92	75.70
1880	0.00	0.00	0.00	0.00	2.047	2.05	232.87	75.68
1854	0.00	0.00	0.00	0.00	2.047	2.05	230.82	75.65
1829	0.00	0.00	0.00	0.00	2.047	2.05	228.78	75.63
1803	0.00	0.00	0.00	0.00	2.047	2.05	226.73	75.60
1778	0.00	0.00	0.00	0.00	2.047	2.05	224.68	75.58
1753	0.00	0.00	0.05	0.00	2.027	2.08	222.64	75.55
1727	0.00	0.00	0.14	0.01	1.989	2.13	220.56	75.53
1702	0.00	0.00	0.20	0.01	1.964	2.17	218.42	75.50
1676	0.01	0.00	0.25	0.01	1.942	2.21	216.25	75.48
1651	0.01	0.00	0.32	0.02	1.912	2.25	214.05	75.45
1626	0.01	0.00	0.54	0.02	1.822	2.38	211.80	75.42
1600	0.02	0.00	0.79	0.03	1.719	2.54	209.41	75.40
1575	0.02	0.00	0.95	0.04	1.653	2.64	206.87	75.37
1549	0.03	0.01	1.08	0.04	1.598	2.72	204.23	75.35
1524	0.03	0.01	1.19	0.05	1.550	2.79	201.51	75.32
1499	0.03	0.01	1.29	0.06	1.508	2.86	198.72	75.30
1473	0.03	0.01	1.38	0.06	1.469	2.91	195.86	75.27
1448	0.03	0.01	1.47	0.07	1.433	2.97	192.95	75.25
1422	0.04	0.01	1.55	0.07	1.399	3.02	189.98	75.22
1397	0.04	0.01	1.62	0.08	1.368	3.07	186.96	75.20
1372	0.04	0.01	1.69	0.09	1.338	3.11	183.89	75.17
1346	0.04	0.01	1.75	0.09	1.309	3.15	180.78	75.15
1321	0.04	0.01	1.81	0.10	1.282	3.20	177.63	75.12
1295	0.04	0.01	1.87	0.11	1.256	3.23	174.43	75.09
1270	0.05	0.01	1.93	0.11	1.231	3.27	171.20	75.07
1245	0.05	0.01	1.98	0.12	1.207	3.31	167.92	75.04
1219	0.05	0.02	2.03	0.12	1.185	3.34	164.62	75.02
1194	0.05	0.02	2.08	0.13	1.163	3.37	161.28	74.99
1168	0.05	0.02	2.13	0.13	1.143	3.40	157.90	74.97
1143	0.05	0.02	2.17	0.14	1.123	3.43	154.50	74.94
1118	0.05	0.02	2.22	0.14	1.103	3.46	151.07	74.92
1092	0.05	0.02	2.26	0.15	1.086	3.49	147.60	74.89
1067	0.05	0.02	2.30	0.15	1.067	3.52	144.11	74.87
1041	0.06	0.02	2.34	0.16	1.049	3.54	140.60	74.84
1016	0.06	0.02	2.37	0.16	1.033	3.57	137.05	74.82
991	0.06	0.02	2.41	0.17	1.016	3.59	133.48	74.79
965	0.06	0.02	2.44	0.17	1.001	3.62	129.89	74.76
940	0.06	0.02	2.48	0.18	0.986	3.64	126.27	74.74
914	0.06	0.02	2.51	0.18	0.972	3.66	122.63	74.71
889	0.06	0.02	2.54	0.19	0.958	3.68	118.97	74.69
864	0.06	0.02	2.57	0.19	0.944	3.70	115.29	74.66
838	0.06	0.02	2.60	0.19	0.932	3.72	111.59	74.64
813	0.06	0.02	2.62	0.19	0.920	3.74	107.87	74.61
787	0.06	0.03	2.65	0.20	0.907	3.76	104.13	74.59
762	0.06	0.03	2.67	0.20	0.895	3.77	100.37	74.56
737	0.06	0.03	2.70	0.21	0.885	3.79	96.60	74.54
711	0.06	0.03	2.72	0.21	0.875	3.81	92.81	74.51
686	0.07	0.03	2.74	0.21	0.864	3.82	89.00	74.48
660	0.07	0.03	2.77	0.22	0.854	3.84	85.18	74.46
635	0.07	0.03	2.79	0.22	0.845	3.85	81.34	74.43
610	0.07	0.03	2.81	0.22	0.836	3.86	77.49	74.41
584	0.07	0.03	2.83	0.22	0.829	3.87	73.63	74.38
559	0.07	0.03	2.84	0.23	0.819	3.89	69.75	74.36
533	0.07	0.03	2.86	0.23	0.811	3.90	65.86	74.33
508	0.07	0.03	2.88	0.23	0.804	3.91	61.96	74.31
483	0.07	0.03	2.89	0.23	0.797	3.92	58.05	74.28
457	0.07	0.03	2.91	0.24	0.790	3.93	54.13	74.26
432	0.07	0.03	2.92	0.24	0.784	3.94	50.19	74.23
406	0.07	0.03	2.93	0.24	0.778	3.95	46.25	74.21
381	0.07	0.03	2.95	0.24	0.773	3.96	42.30	74.18
356	0.07	0.03	2.96	0.24	0.768	3.97	38.34	74.15
330	0.07	0.03	2.97	0.24	0.762	3.98	34.37	74.13
305	0.07	0.03	2.98	0.25	0.757	3.98	30.40	74.10
279	0.07	0.03	2.99	0.25	0.752	3.99	26.42	74.08
254	0.07	0.03	3.01	0.25	0.745	4.00	22.43	74.05
229	0.00	0.00	0.00	0.00	2.047	2.05	18.43	74.03
203	0.00	0.00	0.00	0.00	2.047	2.05	16.38	74.00
178	0.00	0.00	0.00	0.00	2.047	2.05	14.33	73.98
152	0.00	0.00	0.00	0.00	2.047	2.05	12.28	73.95
127	0.00	0.00	0.00	0.00	2.047	2.05	10.24	73.93
102	0.00	0.00	0.00	0.00	2.047	2.05	8.19	73.90
76	0.00	0.00	0.00	0.00	2.047	2.05	6.14	73.88
51	0.00	0.00	0.00	0.00	2.047	2.05	4.09	73.85
25	0.00	0.00	0.00	0.00	2.047	2.05	2.05	73.82

27.2m3 @ 74.085



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RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:

103 SCHNEIDER ROAD

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3		2021/11/22	REVISED AS PER COMMENTS
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PROJECT NO: 211-01794-00	DATE: NOVEMBER 2021
ORIGINAL SCALE: 1:500	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: D.Y.	
DRAWN BY: J.T.	
CHECKED BY: D.Y./I.J.	25mm

DISCIPLINE: CIVIL

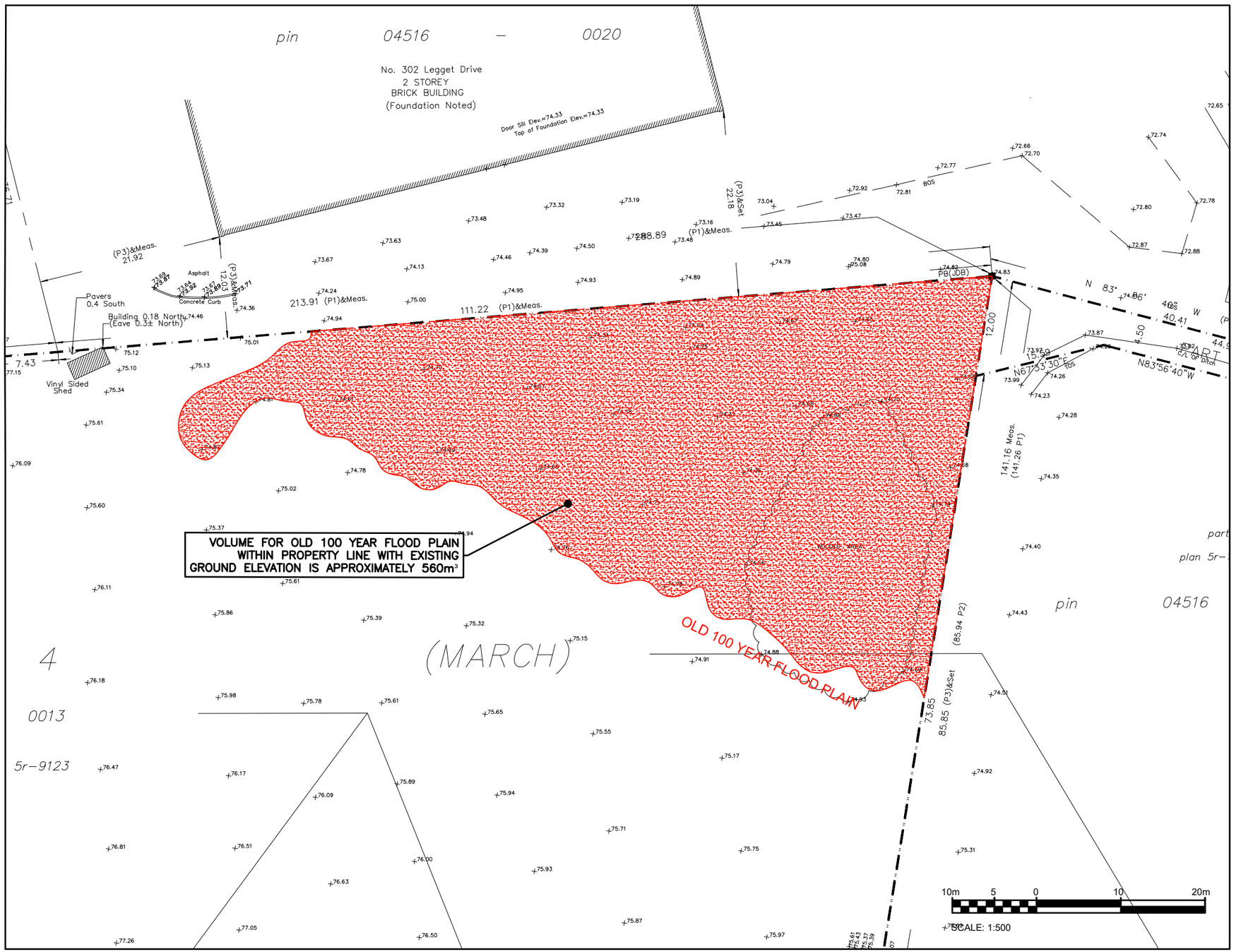
TITLE: NEW 100 YEAR FLOOD PLAIN VOLUME

SHEET NUMBER: SK1

SHEET #: 1 OF 7

ISSUE: REVISED AS PER COMMENTS
DATE OF: 2021/11/22

REV # 0



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CLIENT REF. #:

PROJECT:

103 SCHNEIDER ROAD

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IS	RE	DATE	DESCRIPTION
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1		2021/06/23	ISSUE FOR SPA

PROJECT NO: 211-01794-00

DATE: NOVEMBER 2021

ORIGINAL SCALE: 1:500

DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DISCIPLINE: CIVIL

TITLE:

OLD 100 YEAR FLOOD PLAIN VOLUME

SHEET NUMBER: SK2

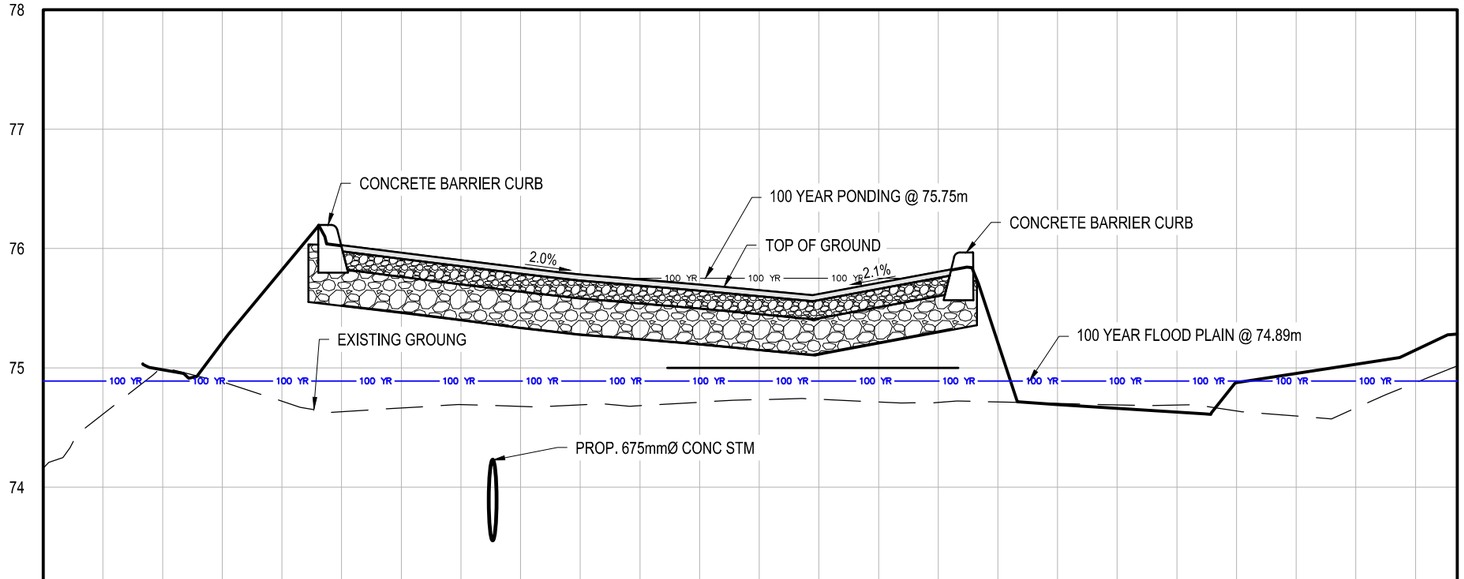
SHEET #: 2 OF 7

ISSUE: REVISED AS PER COMMENTS

DATE OF: 2021/11/22

REV # 0

V:\10-13 ME 2021 Projects\211-01794-00 101-103 Schneider Road Industrial\3. Drawings\Working drawings\211-01794-00_C_S.dwg Nov 23, 2021-9:35am BY:(cawy0697441)



STATION		0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100	0+110	0+119	STATION
CENTERLINE GRADE FINISHED		74.98	75.82	75.96	75.83	75.74	75.65	75.71	75.21	74.66	74.88	75.03	75.28	75.02
CENTERLINE GRADE EXISTING		74.16	75.00	74.72	74.66	74.68	74.68	74.73	74.71	74.71	74.69	74.64	74.66	

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PROJECT:

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PROJECT NO: 211-01794-00

DATE: NOVEMBER 2021

ORIGINAL SCALE: 1:500

DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DISCIPLINE: CIVIL

TITLE: CROSS SECTION A-A

SHEET NUMBER: SK3

SHEET #: 3 OF 7

ISSUE: REVISED AS PER COMMENTS

DATE OF: 2021/11/22

REV # 0

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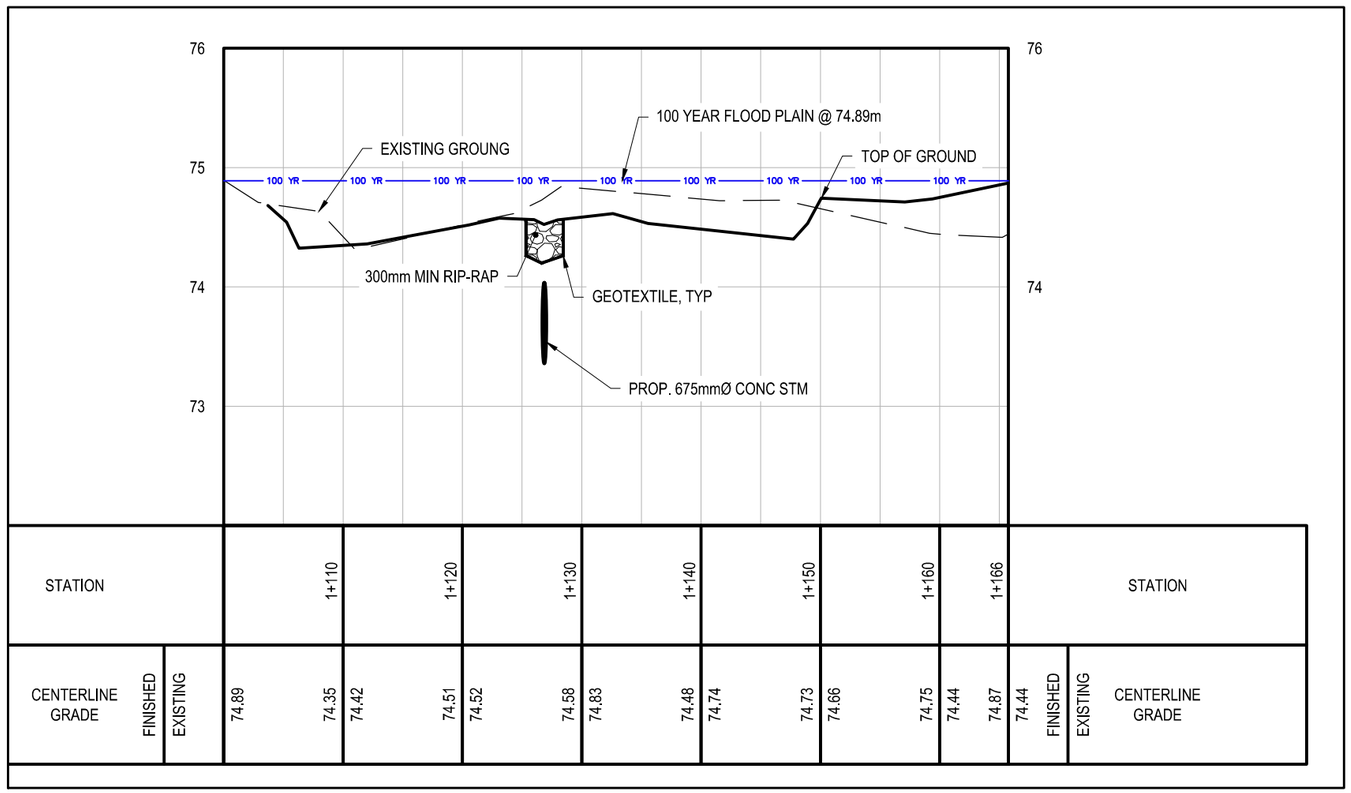

STATION		1+110	1+120	1+130	1+140	1+150	1+160	1+166	STATION
CENTERLINE GRADE FINISHED		74.89	74.42	74.52	74.83	74.74	74.66	74.44	CENTERLINE GRADE FINISHED
CENTERLINE GRADE EXISTING		74.35	74.51	74.58	74.48	74.73	74.75	74.87	CENTERLINE GRADE EXISTING

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1		2021/06/23	ISSUE FOR SPA

PROJECT NO: 211-01794-00

DATE: NOVEMBER 2021

ORIGINAL SCALE: 1:500

DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DISCIPLINE: CIVIL

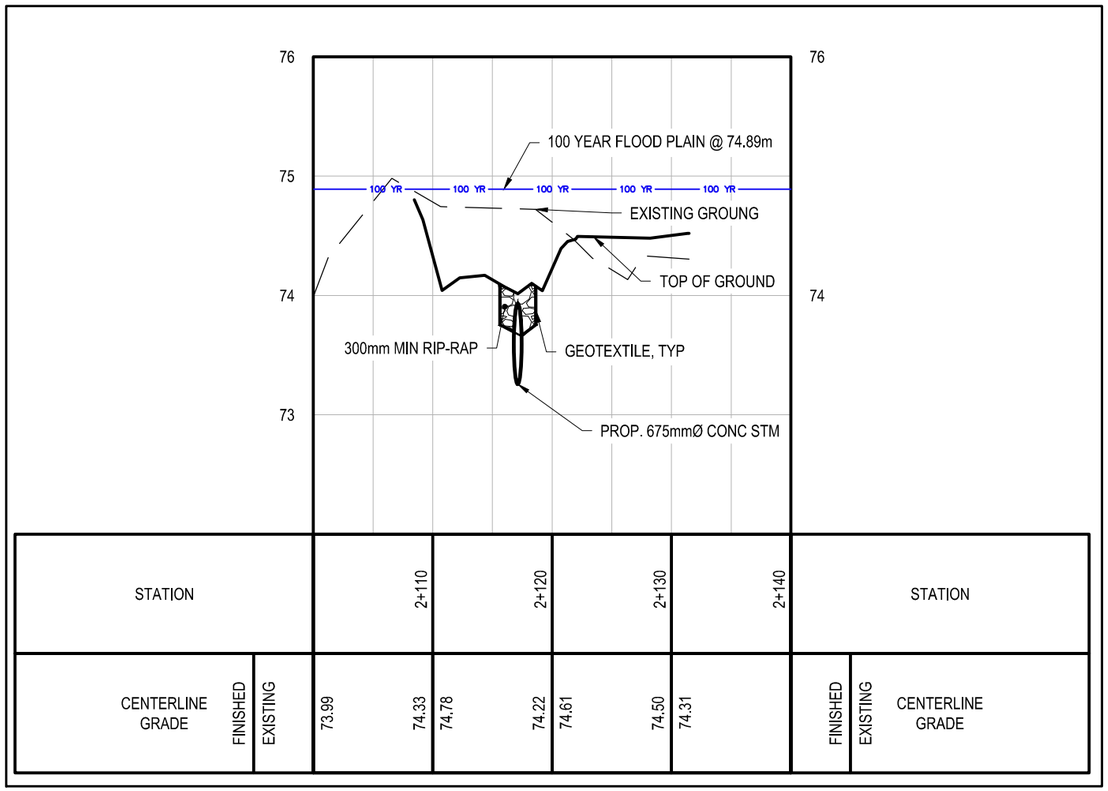
TITLE: CROSS SECTION B-B

SHEET NUMBER: SK4

SHEET #: 4 OF 7

ISSUE: REVISED AS PER COMMENTS
DATE OF: 2021/11/22

REV # 0



STATION		2+110	2+120	2+130	2+140	STATION
CENTERLINE GRADE FINISHED		73.99	74.33	74.78	74.22	74.61	74.50	74.31	FINISHED	CENTERLINE GRADE
	EXISTING								EXISTING	

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PROJECT NO: 211-01794-00

DATE: NOVEMBER 2021

ORIGINAL SCALE: 1:500

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25mm

DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

DISCIPLINE: CIVIL

TITLE: CROSS SECTION C-C

SHEET NUMBER: SK5

SHEET #: 5 OF 7

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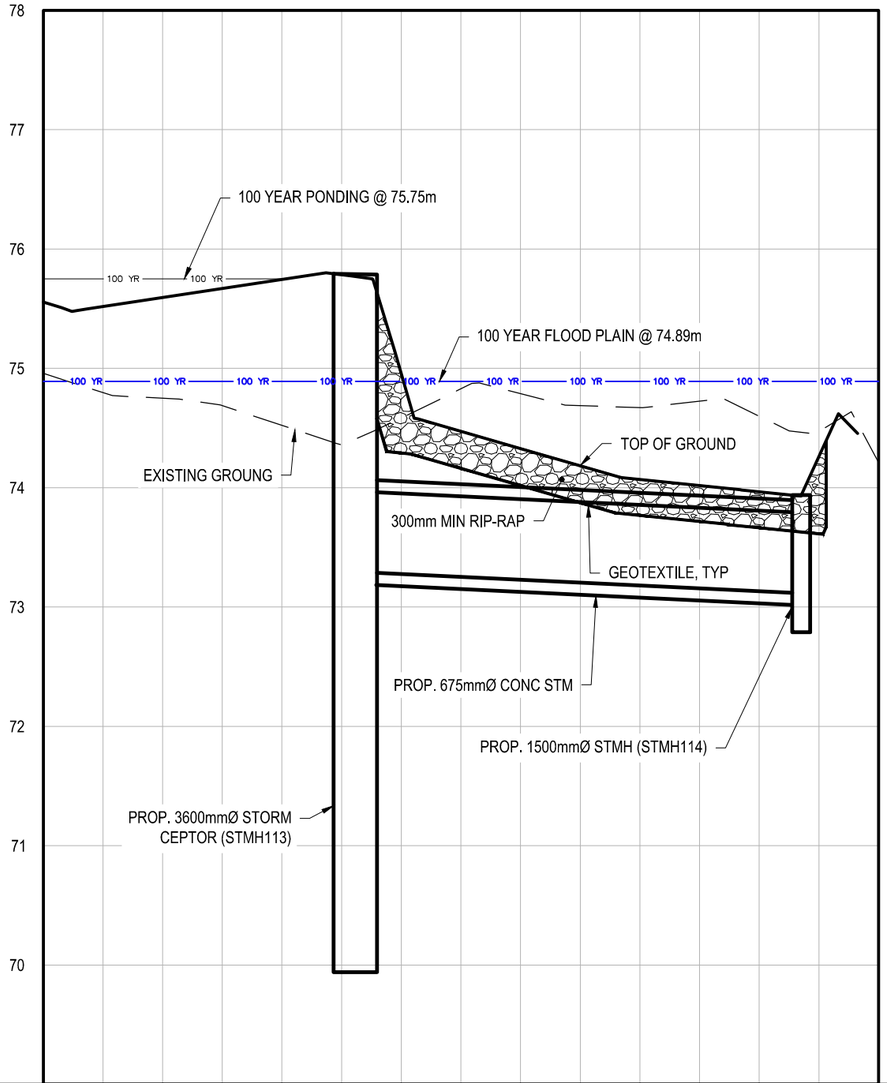

STATION		3+110	3+120	3+130	3+140	3+150	3+160	3+170	STATION
CENTERLINE GRADE FINISHED	75.55	74.96	75.59	74.75	75.74	74.52	74.96	74.58	74.33	74.79	74.07	74.67	73.97	74.60	74.21	FINISHED CENTERLINE GRADE
	EXISTING															EXISTING

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PROJECT NO: 211-01794-00

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ORIGINAL SCALE: 1:500

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

DISCIPLINE: CIVIL

TITLE: CROSS SECTION D-D

SHEET NUMBER: SK6

SHEET #: 6 OF 7

ISSUE: REVISED AS PER COMMENTS

DATE OF: 2021/11/22

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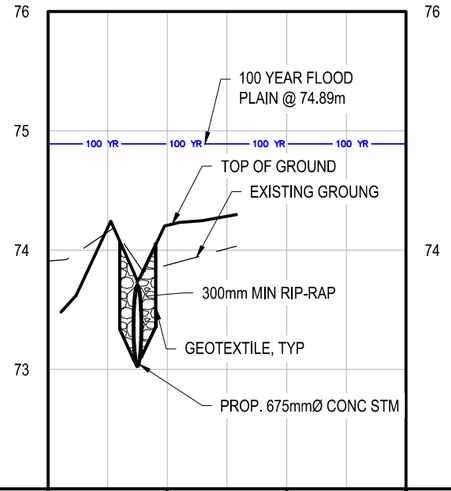

STATION		4+110	4+120	4+130	STATION		
CENTERLINE GRADE	FINISHED	73.91	73.88		FINISHED	EXISTING	CENTERLINE GRADE
	EXISTING	74.21					

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DESIGNED BY: D.Y.

DRAWN BY: J.T.

CHECKED BY: D.Y./I.J.

DISCIPLINE: CIVIL

TITLE: CROSS SECTION E-E

SHEET NUMBER: SK7

SHEET #: 7 OF 7

ISSUE: REVISED AS PER COMMENTS

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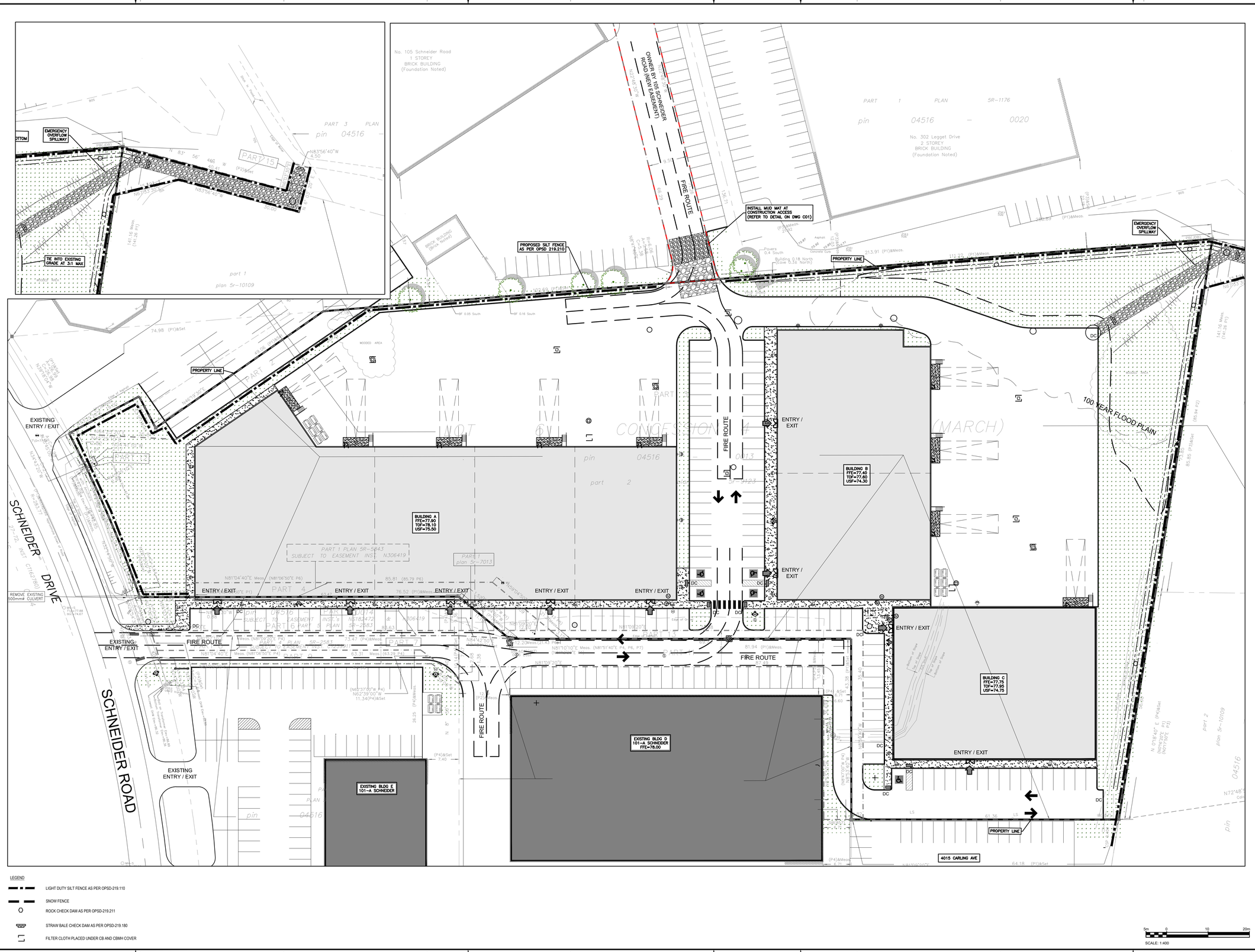
REV # 0

APPENDIX

APPENDIX

E

- EROSION AND SEDIMENTATION CONTROL PLAN C07



LEGEND

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- O ROCK CHECK DAM AS PER OPSD-219.211
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- FILTER CLOTH PLACED UNDER CB AND CBMH COVER

5m 0 10 20m

SCALE: 1:400

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ARCHITECT:
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SEAL:

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2021-11-23
PROVINCE OF ONTARIO

NORTH

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PROJECT:

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KEY PLAN:

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IS	RE	DATE	DESCRIPTION

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DATE: NOVEMBER 2021
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DESIGNED BY: D.Y.
DRAWN BY: D.Y.
CHECKED BY: D.Y./I.J.
25mm

DISCIPLINE: CIVIL

TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN

SHEET NUMBER: C07
SHEET #: 7 OF 7

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REV #: 0

D07-12-21-0044

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