October 6, 2025
VH Project No. 31489-22

Brad Wesley Holdings Ltd.
5359 8th Line
Erin, Ontario, N0B 1T0

Re: Servicing and Stormwater Management Report
Proposed Self Storage Complex
Part of Lot 237 Concession 2, 752065 Ida Street, Dundalk, Ontario

1.0 Introduction

Van Harten Surveying Inc. (Van Harten) was retained to prepare a Servicing and Stormwater Management Report in support of the Site Plan Application for the construction of a proposed self storage complex located at the above address.

The purpose of this Servicing and Stormwater Management Report is to outline proposed water servicing, sanitary servicing, and stormwater servicing for the proposed development. The following reports and background information were referenced to inform this report and supporting design calculations:

- CMT Engineering Inc. – Geotechnical Investigation (March 27, 2023)
- Riepma Consultants Inc. – Site Plan (September 2025)
- MGM Consulting Inc. – Floodplain Assessment (February 2025)
- Township of Southgate – Municipal Servicing Standards (June 2022)
- Township of Southgate As-Constructed Drawings
- Low Pressure Sanitary Sewage System Design Brief – Triton Engineering Services Ltd. (September 2025)
- Ministry of the Environment - Stormwater Management Planning and Design Manual (March 2003)

This Servicing and Stormwater Management Report and engineering drawings have been updated to address the 1st submission comments received from the reviewing agencies on May 23rd, 2025. Relevant excerpts from the above reports and background information have been provided in Appendix A.

2.0 Existing Site Conditions

The undeveloped site encompasses an area of approximately 2.43 ha and is currently comprised of grassed vacant lands. The property is bounded by commercial land to the east, wastewater treatment ponds to the south, Ida Street to the west and Eco Parkway to the north.

CMT Engineering Inc. advanced twelve (12) boreholes across the site to confirm the subsurface soils and groundwater conditions on March 6th to 7th of 2023. Based on the borehole investigation the on-site soils are comprised of topsoil underlain by a fill layer comprised of sand, silt, and gravel and then layers of silt and sand to silt and sand till. Monitoring wells were installed in boreholes 4 and 9 to measure the static groundwater levels. The water level in borehole 4 was measured at 0.55mbgs and the water level in borehole 9 was measured at 0.28mbgs. It should be noted that infiltration systems are not considered feasible for the site due to the presence of high groundwater levels.

MGM Consulting Inc. completed a Floodplain Assessment to determine the extent of the pre-development regional floodplain. See Appendix A for the Pre-Development Floodplain figure provided by MGM Consulting Inc.

3.0 Proposed Development Conditions

According to the Site Plan prepared by Riepma Consultants Inc. the proposed development will be comprised of the following:

- Seven (7) self-storage buildings.
- Asphalt parking areas and drive aisles with an entrance to Eco Parkway.
- Landscaped areas and a stormwater management facility.

4.0 Water Servicing

4.1 Existing Water Servicing

There is an existing 150mmØ watermain along the north side of Eco Parkway. There are no water services to the site in the existing condition. An existing hydrant exists in the Eco Parkway north boulevard along the northern frontage of the site.

4.2 Water Demand Calculation

The water demand for the proposed development was calculated based on the Ministry of the Environment (MOE) Design Guidelines for Drinking-Water Systems (2008). A summary of the calculated design flows is presented in Table 1 below, with detailed calculations provided in Appendix B.

Table 1: Water Demand Calculations – Proposed Development

Design Guidelines	Average Daily Flow (L/s)	Max. Daily Flow (L/s)	Peak Hour Design Flow (L/s)
MOE	0.98	1.97	3.93

Based on the above results, the maximum daily water demand and peak hour water demand for the proposed development are 1.97 L/s and 3.94 L/s, respectively. It should be noted that these values likely overestimate the actual water demand, as the proposed development is intended for self-storage use.

4.3 Proposed Fire Flow Calculation

The required fire flow for the proposed development was estimated using the Fire Underwriters Survey – Water Supply for Public Fire Protection (2020). A summary of the calculated fire flow requirements is provided in Table 2, with supporting calculations included in Appendix B.

Table 2: Required Fire Flows

Fire Flow Criteria	Fire Flow (L/s)	Duration (hours)
FUS 2020	183	2.5

Based on the FUS methodology, the required fire flow for the proposed development is 183 L/s for a duration of 2.5 hours. It is noted that detailed fire flow calculations and fire suppression design will be reviewed by the project's mechanical engineer and architect to ensure compliance with all applicable building code and fire protection standards.

4.4 Proposed Water Servicing

The proposed development will be serviced by a 150 mm diameter water service connecting to the existing 150 mm watermain along the north side of Eco Parkway via a cut-in tee. At the property line, the service will split into a 150 mm fire service and a 25 mm domestic service to provide water supply for the development. The 150 mm fire service will connect to a proposed on-site fire hydrant. Together, the proposed fire hydrant and the existing hydrant on Eco Parkway will provide fire protection for the development.

It should be noted that hydrant flow testing has not been conducted to confirm the available capacity of the existing 150 mm watermain on Eco Parkway. Based on aerial imagery, an existing warehouse with an approximate floor area of 11,000 m² is present directly across from the site. It is reasonable to assume that the existing warehouse would require higher fire flows than the proposed development. Therefore, it can be assumed that the existing watermain has sufficient capacity to meet the fire flow requirements of the proposed development.

Details of the proposed water servicing are shown on the Site Servicing Plan.

5.0 Sanitary Servicing

5.1 Existing Sanitary Servicing

With reference to Triton Engineering Services Ltd.'s Site Servicing Plan and Details drawing for Blue Mountain Covers on Eco Parkway, there is an existing 38 mm diameter HDPE sanitary forcemain plug on Eco Parkway, located approximately 25 m northeast of the site.

5.2 Proposed Sanitary Servicing

The proposed development will be serviced by a 125 mm diameter gravity sewer, which will convey flows to a Liberty Pump Station within the site. From the pump station, flows will be discharged through a 38 mm forcemain, which will connect to an existing 38 mm forcemain stub located approximately 25 m northeast of the easternmost property boundary within the Eco Parkway right-of-way. Refer to the Low Pressure Sanitary Sewage System Design Brief prepared by Triton Engineering Services Ltd. in Appendix B.

6.0 Stormwater Management

6.1 Stormwater Management Criteria

The Township of Southgate Municipal Servicing Standards (June 2022) and the Ministry of Environment Stormwater Management Planning and Design Manual (March 2003) were referenced to determine the stormwater management criteria for the proposed development. Based on the manuals the following stormwater criteria must be met:

Stormwater Quantity Control – Control of post-development runoff flows to pre-development levels for rainfall events with return periods between the 5 year and 100 year storm event.

Stormwater Quality Control – Provide enhanced protection - 80% total suspended solid (TSS) removal.

6.2 Existing Drainage Patterns

An Existing Drainage Plan has been prepared based on the topographic survey completed by Van Harten. According to the survey, the site slopes from northeast to southwest, with a total relief of approximately 1.75 m. The majority of stormwater runoff drains overland toward the Ida Street roadside ditch, which is a GRCA-regulated watercourse.

Two catchments were identified under pre-development conditions:

- **Catchment 101**: Represents the area draining overland toward the Ida Street roadside ditch.
- **Catchment 102**: Represents the area draining toward the adjacent property to the east, which ultimately discharges to the existing wastewater treatment ponds to the south.

Table 3 summarizes the pre-development drainage areas and hydrologic design parameters. The Pre-Development Drainage Plan is provided in Appendix C.

Table 3: Pre-development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 101[N]	Catchment 102[N]
Catchment Area (ha)	2.240	0.186
Curve Number	60.95	58.00
Initial Abstraction (mm)	6.63	7.00
Slope (%)	1.0	1.0
Time to Peak (hr)	0.29	0.17

N = Nashyd

6.3 Proposed Drainage Patterns

A Proposed Drainage Plan has been prepared based on the Site Grading Plan completed by Van Harten. To remain consistent with the existing drainage conditions, the grading for the proposed development (Catchment 201) was designed to direct the majority of stormwater runoff to the GRCA-regulated watercourse/Ida Street ditch.

- **Catchment 201**: Includes building, landscaped areas, asphalt parking lot, and drive aisle runoff. All runoff from this catchment will be captured and conveyed by the proposed storm sewer network and controlled by the proposed stormwater management facility, ultimately discharging to the GRCA watercourse/Ida Street ditch.
- **Catchment 202**: Includes undeveloped landscaped runoff. All runoff from this catchment will sheet flow to the existing roadside ditch along Ida Street and will remain uncontrolled.
- **Catchment 203**: Includes landscaped runoff. All runoff from this catchment will sheet flow to the adjacent property to the east, which ultimately drains to the wastewater treatment ponds to the southeast.

Table 4 summarizes the post-development drainage areas and hydrologic design parameters. The Post-Development Drainage Plan is provided in Appendix C.

Table 4: Post Development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 201[S]		Catchment 202[N]	Catchment 203[N]
Catchment Area (ha)	1.151		1.124	0.150
Percent Imperv (%) / Curve Number	96%		58.00	61.00
Initial Abstraction | Depression Storage (mm)	5.0	2.0	7.0	5.0
Slope (%) (Perv | Imperv)	2.0	1.0	1.0	0.3
Time to Peak (hr)	-		0.31	0.58

N = Nashyd , S = Stanhyd

6.4 Stormwater Quantity Controls

The stormwater management quantity control criteria for the site are subject to the Township of Southgate Municipal Servicing Standards. The quantity control criterion for the proposed development includes controlling the post-development peak flows to the pre-development peak flow rates for the 5-year through 100-year storm events.

Calculations were prepared using Visual Otthymo and IDF parameters obtained from the MTO Lookup Tool – Dundalk Specific IDF (accessed April 5, 2025) to calculate the return period peak flows under the pre-development and post-development conditions for the 5-year through 100-year return periods (Table 5 & 6). The Visual Otthymo output files are provided in Appendix C.

Table 5: Peak Flow and Storage Requirements Summary (Catchment 201 & 202) – Ida Street Ditch Outlet

Storm Event (yr)	Pre-Development Peak Flow (m^3/s)	Post-Development Controlled Peak Flow (m^3/s)	Required Storage (m^3)	Provided Storage (m^3)
5	0.030	0.029	332	791
10	0.043	0.035	395	
25	0.061	0.044	479	
50	0.077	0.052	545	
100	0.093	0.060	608	

[1] Pre-Development Peak Flows = Catchment 101

[2] Post-Development Controlled Peak Flow = Catchment 201 + Catchment 202

[3] Storage provided includes freeboard (0.20m)

Table 6: Peak Flow and Storage Requirements Summary (Catchment 203) – Neighbouring Property Outlet

Storm Event (yr)	Catchment 102 Peak Flow (m^3/s)	Catchment 203 Peak Flow (m^3/s)	Reduction (L/s)
5	0.003	0.002	1
10	0.004	0.002	2
25	0.006	0.003	3
50	0.008	0.004	4
100	0.009	0.004	5

Quantity controls are required to attenuate post-development peak flows to pre-development levels. For the proposed development, quantity control will be provided by a dry pond equipped with an outlet control structure. The stormwater management facility will provide 791 m^3 of storage to meet the quantity control requirements.

Stormwater will be attenuated to pre-development levels through a control structure featuring a 100 mm diameter circular orifice plate at the outlet of the dry pond, located within the proposed concrete ditch inlet catchbasin (DI1). Additional details of the outlet control structure and stormwater management facility design are provided in Appendix C.

All proposed hard-surfaced areas will have runoff directed toward the stormwater facility. The facility has been designed to capture, convey, and attenuate the 100-year storm event. Storm events exceeding the 100-year design will be safely conveyed to the site outlet via a 4 m wide emergency overland flow weir at an elevation of 585.80 m, directing flows to the GRCA-regulated watercourse/Ida Street ditch.

6.5 Stormwater Quality Controls

Stormwater quality controls for the proposed development will provide an enhanced level of treatment, targeting 80% removal of total suspended solids (TSS). Enhanced TSS removal for Catchment 201 will be achieved through the installation of an oil-grit separator. Using Hydrostorm sizing software, it was determined that a Hydrostorm HS6 unit will provide 81% TSS removal for all storm events captured by the storm sewer network (up to and including the 5-year storm).

The Hydrostorm unit will require regular inspection and maintenance in accordance with the manufacturer's specifications to ensure proper operation. The maintenance manual is provided in Appendix C.

Catchments 202 and 203 consist of "clean runoff" from landscaped areas; therefore, no stormwater quality controls have been provided for these catchments.

6.6 Operation and Maintenance

The future property owners will be required to inspect the stormwater management works on an annual basis to ensure their continued proper functioning:

- All downspouts, splash pads, and roof leaders shall be maintained in good working order at all times.
- All grassed swales should be kept clear of obstructions to ensure proper function. Property owners should routinely inspect for erosion, particularly at outlet locations, and repair any gullies, rills, or bare spots.
- The oil-grit separator should be inspected in accordance with the manufacturer's specifications, and accumulated suspended solids should be removed when sufficient buildup occurs.
- The depression storage outlet should be inspected for obstructions after each major rainfall event, and accumulated suspended solids should be removed as needed.

Maintenance of the stormwater management features on the site is the sole responsibility of the property owner and should be carried out as required.

7.0 Closure

The completed Servicing and Stormwater Management Report is specific to the site based on our knowledge of the proposed development. We trust that this report is suitable to support the Site Plan Application for the proposed development. Please contact our office if you have any questions or require further consultation.

Van Harten Surveying Inc.

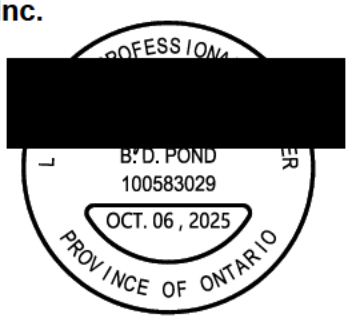
[redacted]

Blair Henderson, C.E.T.
Certified Engineering Technologist

Van Harten Surveying Inc.

[redacted]

Brett Pond, P. Eng
Project Manager

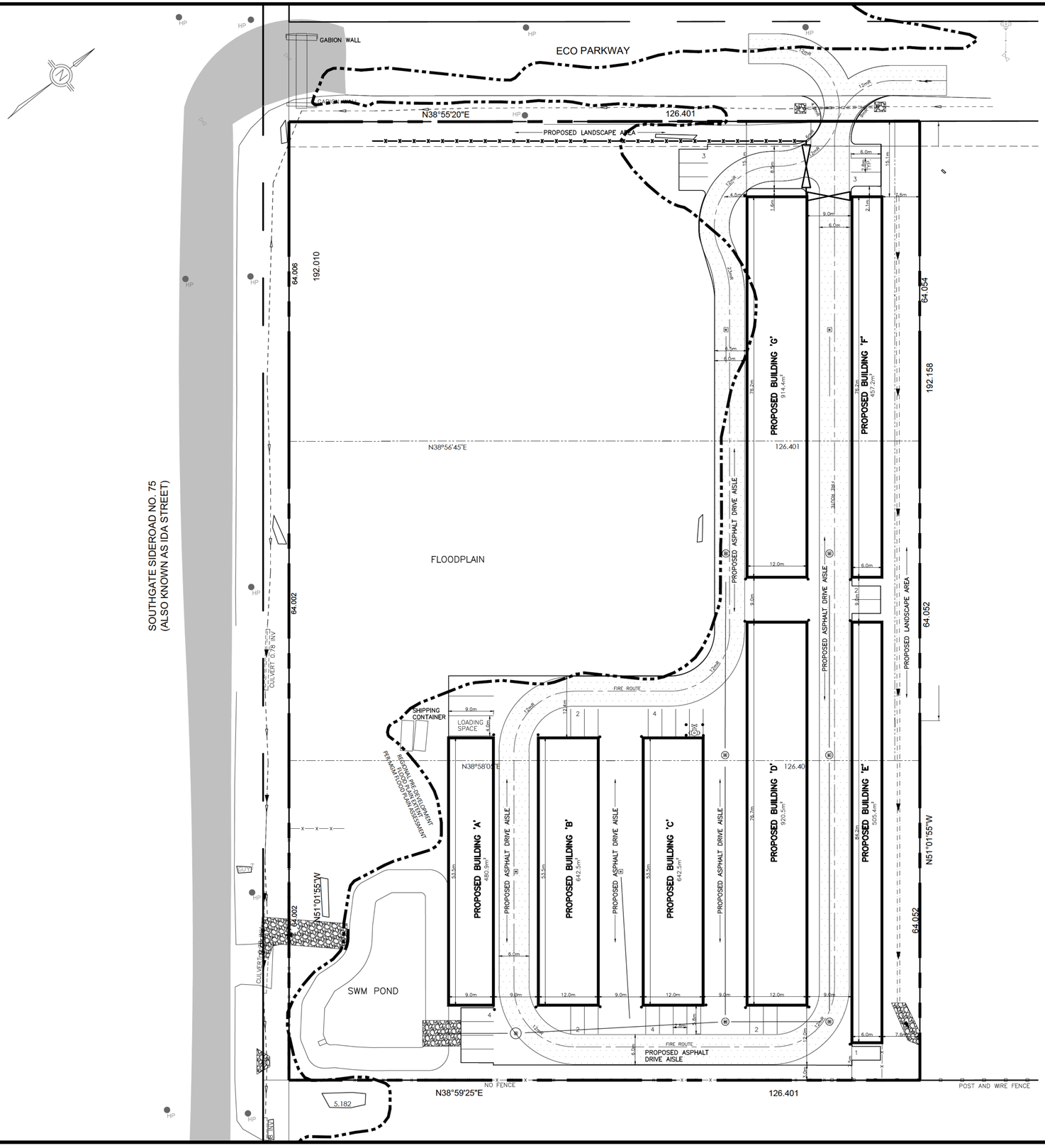


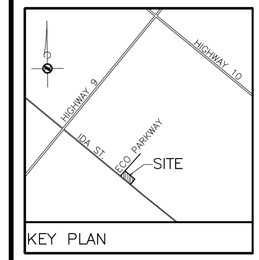
Encl. Appendix A – Background Information
Encl. Appendix B – Water Supply and Sanitary Servicing
Encl. Appendix C – Stormwater Management Calculations

Encl. Drawings
Sheet 1 - Site Grading Plan
Sheet 2 - Site Servicing Plan
Sheet 3 - Notes and Details
Sheet 4 - Pre-Development Drainage Plan
Sheet 5 - Post-Development Drainage Plan

Q:\22-314\31489-22 (Dundalk Eco Park)\Engineering\SWM\(31489-22)_SWMR.docx

APPENDIX A
BACKGROUND INFORMATION





KEY PLAN

LEGEND

- PRE-DEVELOPMENT FLOODPLAIN EXTENT
- CHAIN LINK FENCE
- PROPERTY LINE

LEGAL DESCRIPTION

PART OF LOT 237
CONCESSION 2 SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

SITE STATISTICS

TOTAL SITE AREA	5.999 ac/2.428ha

PROPOSED BUILDING AREAS

BUILDING 'A'	480.9m²
BUILDING 'B'	642.5m²
BUILDING 'C'	642.5m²
BUILDING 'D'	920.5m²
BUILDING 'E'	505.4m²
BUILDING 'F'	457.2m²
BUILDING 'G'	914.4m²
TOTAL BUILDING AREA	4,563.4m²
BUILDING COVERAGE	18.8%
LANDSCAPE AREA	16,789.9m²
LANDSCAPE COVERAGE	69.2%

PARKING

TOTAL PARKING REQUIRED	25 SPACES
TOTAL PARKING PROVIDED	27 SPACES
LOADING	3 SPACES

DATE	DESCRIPTION	CHECKED BY
JULY 10 2025	REVISED AS PER COMMENTS	
MAY 27 2025	REVISED SITE PLAN & ISSUED FOR REVIEW	
SEPT. 12 2024	REVISED SITE PLAN & ISSUED FOR REVIEW	
JUNE 2023	REVISED SITE PLAN & ISSUED FOR REVIEW	
JUNE 2022	ISSUED FOR REVIEW	

REVISIONS

Riepma CONSULTANTS INC.
220 Kempenfelt Drive
Barrie, Ontario
L4M 1C4
416-346-8258
www.riepma.ca
riepma@riepma.ca

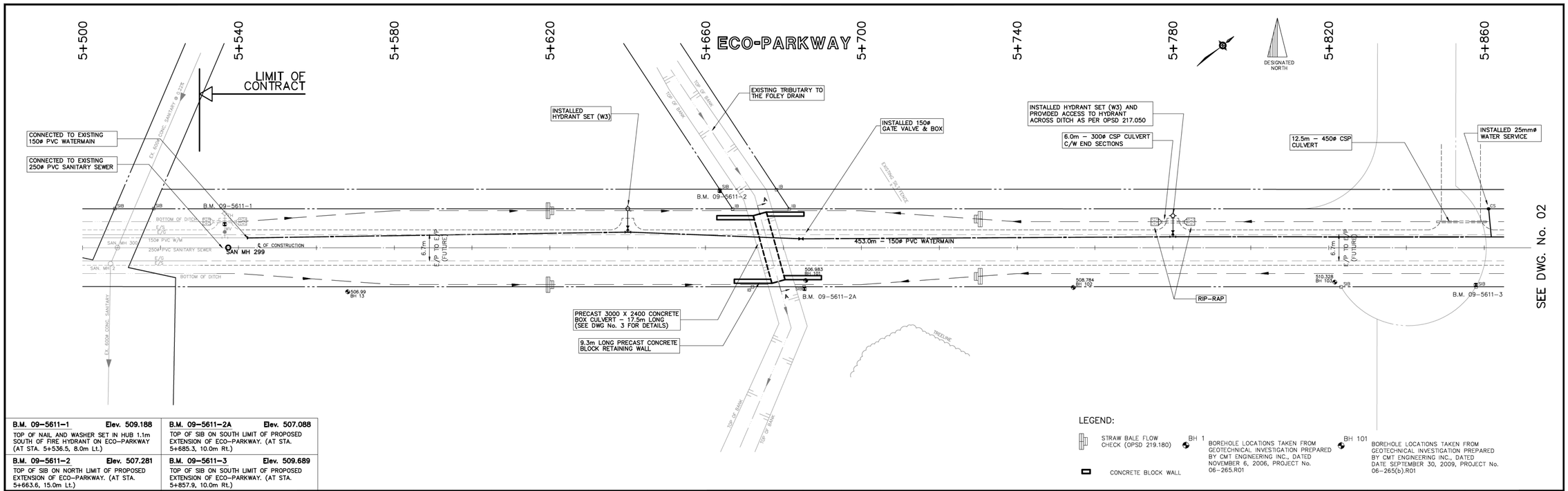
Project Title

PROPOSED SELF STORAGE UNITS
Ida Street
Dundalk, Ontario

Drawing

SITE PLAN
SP14-23

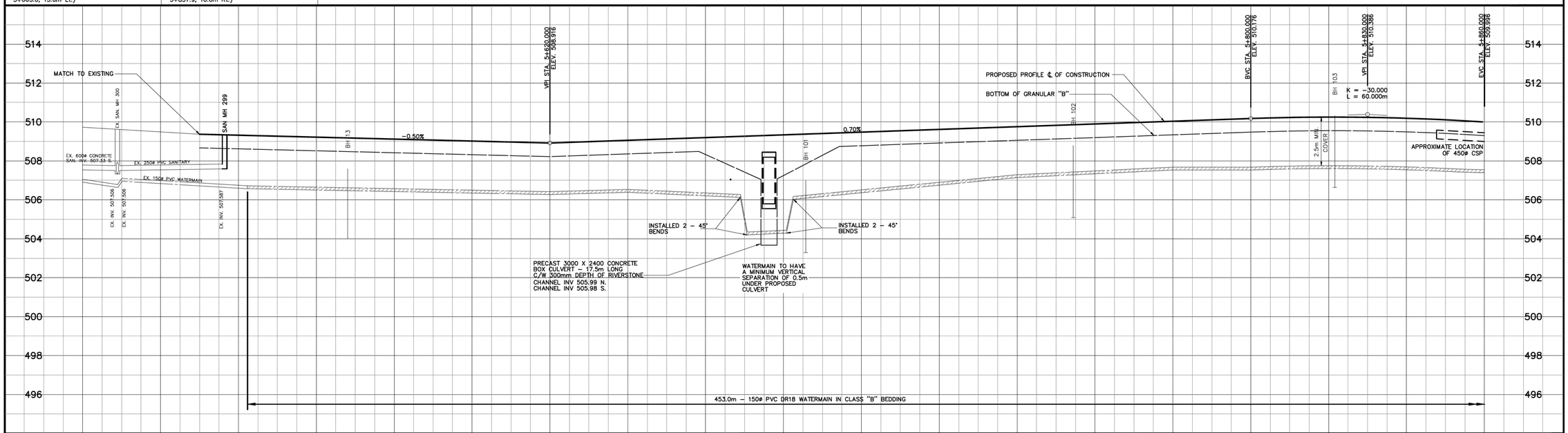
DATE June 2023	ISSUED
JOB NUMBER 22-03	DRAWN BY D.N.
SCALE 1:400	CHECKED BY
SHEET NUMBER	SP.1



B.M. 09–5611–1 **Elev. 509.188** TOP OF NAIL AND WASHER SET IN HUB 1.1m SOUTH OF FIRE HYDRANT ON ECO–PARKWAY (AT STA. 5+536.5, 8.0m Lt.)	**B.M. 09–5611–2A** **Elev. 507.088** TOP OF SIB ON SOUTH LIMIT OF PROPOSED EXTENSION OF ECO–PARKWAY. (AT STA. 5+685.3, 10.0m Rt.)
B.M. 09–5611–2 **Elev. 507.281** TOP OF SIB ON NORTH LIMIT OF PROPOSED EXTENSION OF ECO–PARKWAY. (AT STA. 5+663.6, 15.0m Lt.)	**B.M. 09–5611–3** **Elev. 509.689** TOP OF SIB ON SOUTH LIMIT OF PROPOSED EXTENSION OF ECO–PARKWAY. (AT STA. 5+857.9, 10.0m Rt.)

LEGEND:

- STRAW BALE FLOW CHECK (OPSD 219.180)
- CONCRETE BLOCK WALL
- BH 1 — BOREHOLE LOCATIONS TAKEN FROM GEOTECHNICAL INVESTIGATION PREPARED BY CMT ENGINEERING INC., DATED NOVEMBER 6, 2006, PROJECT No. 06–265.R01
- BH 101 — BOREHOLE LOCATIONS TAKEN FROM GEOTECHNICAL INVESTIGATION PREPARED BY CMT ENGINEERING INC., DATED DATE SEPTEMBER 30, 2009, PROJECT No. 06–265(b).R01



NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No	DATE	REVISION	INITIAL
4.	JAN. 11	RECORD INFORMATION	k.j.b.
3.	OCT. 09	ISSUED FOR CONSTRUCTION	d.g.d.
2.	SEPT. 09	ISSUED FOR M.O.E. APPROVAL	d.g.d.
1.	SEPT. 09	ISSUED FOR G.R.C.A. APPROVAL	d.g.d.

CONSTRUCTION OF

ECO–PARKWAY

(DUNDALK)

TOWNSHIP OF SOUTHGATE
185667 GREY COUNTY ROAD No. 9
R.R.#1 DUNDALK, ONTARIO N0C 1B0

PLAN AND PROFILE
STATION 5+500 TO STATION 5+860

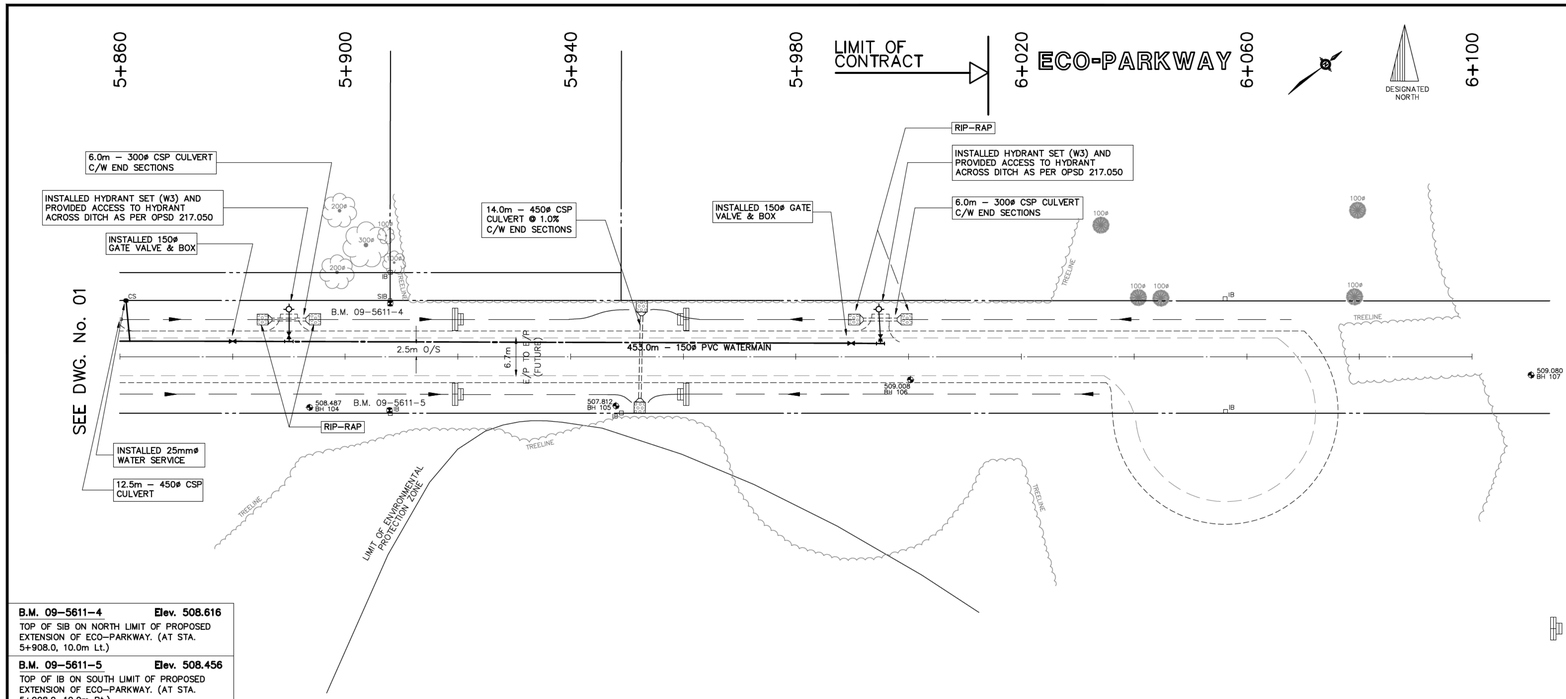
PROJECT No M5611

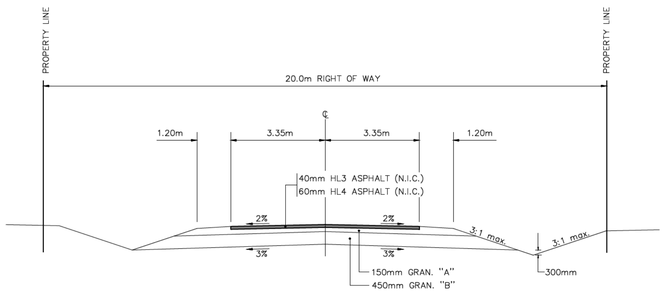
DRAWN BY· D.P.S. (AutoCAD)
CHECKED BY· D.G.D.
APPROVED BY· D.B.M.
DATE· AUGUST, 2009

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES
1:500 HORIZONTAL
1:100 VERTICAL

DRAWING NUMBER **01**





INDUSTRIAL ROAD TYPICAL SECTION
N.T.S.

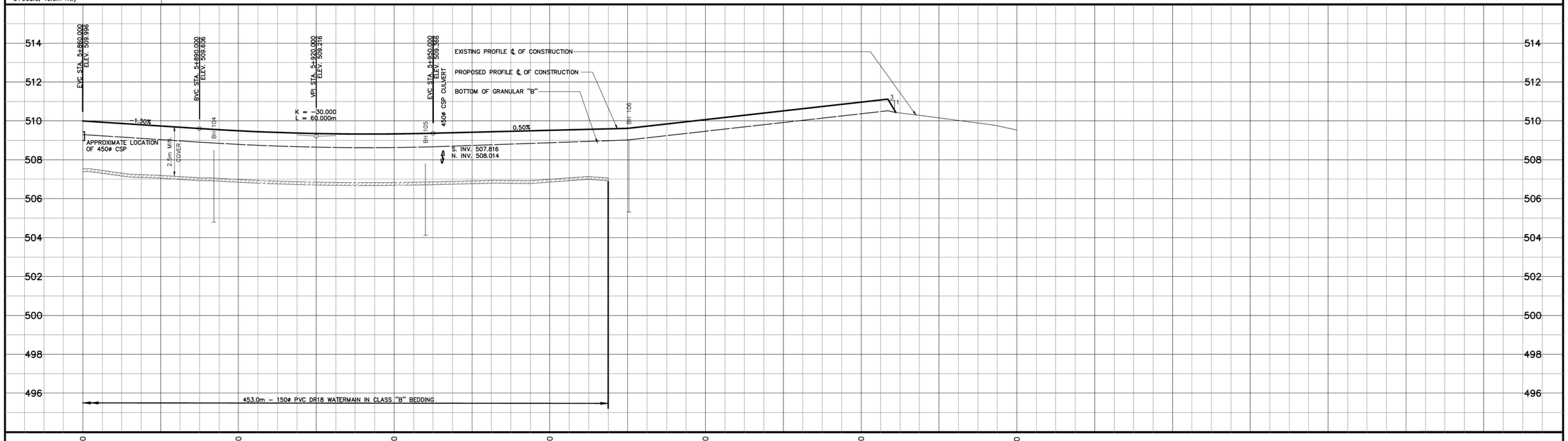
B.M. 09–5611–4 **Elev. 508.616**
TOP OF SIB ON NORTH LIMIT OF PROPOSED EXTENSION OF ECO–PARKWAY. (AT STA. 5+908.0, 10.0m Lt.)

B.M. 09–5611–5 **Elev. 508.456**
TOP OF IB ON SOUTH LIMIT OF PROPOSED EXTENSION OF ECO–PARKWAY. (AT STA. 5+908.0, 10.0m Rt.)

LEGEND:

STRAW BALE FLOW CHECK (OPSD 219.180)

BH 101 BOREHOLE LOCATIONS TAKEN FROM GEOTECHNICAL INVESTIGATION PREPARED BY CMT ENGINEERING INC., DATED DATE SEPTEMBER 30, 2009, PROJECT No. 06–265(b).R01



NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No	DATE	REVISION	INITIAL
3.	JAN. 11	RECORD INFORMATION	k.j.b.
3.	OCT. 09	ISSUED FOR CONSTRUCTION	d.g.d.
2.	SEPT. 09	ISSUED FOR M.O.E. APPROVAL	d.g.d.
1.	SEPT. 09	ISSUED FOR G.R.C.A. APPROVAL	d.g.d.

CONSTRUCTION OF

ECO–PARKWAY

(DUNDALK)

TOWNSHIP OF SOUTHGATE
185667 GREY COUNTY ROAD No. 9
R.R.#1 DUNDALK, ONTARIO N0C 1B0

PLAN AND PROFILE
STATION 5+860 TO STATION 6+100

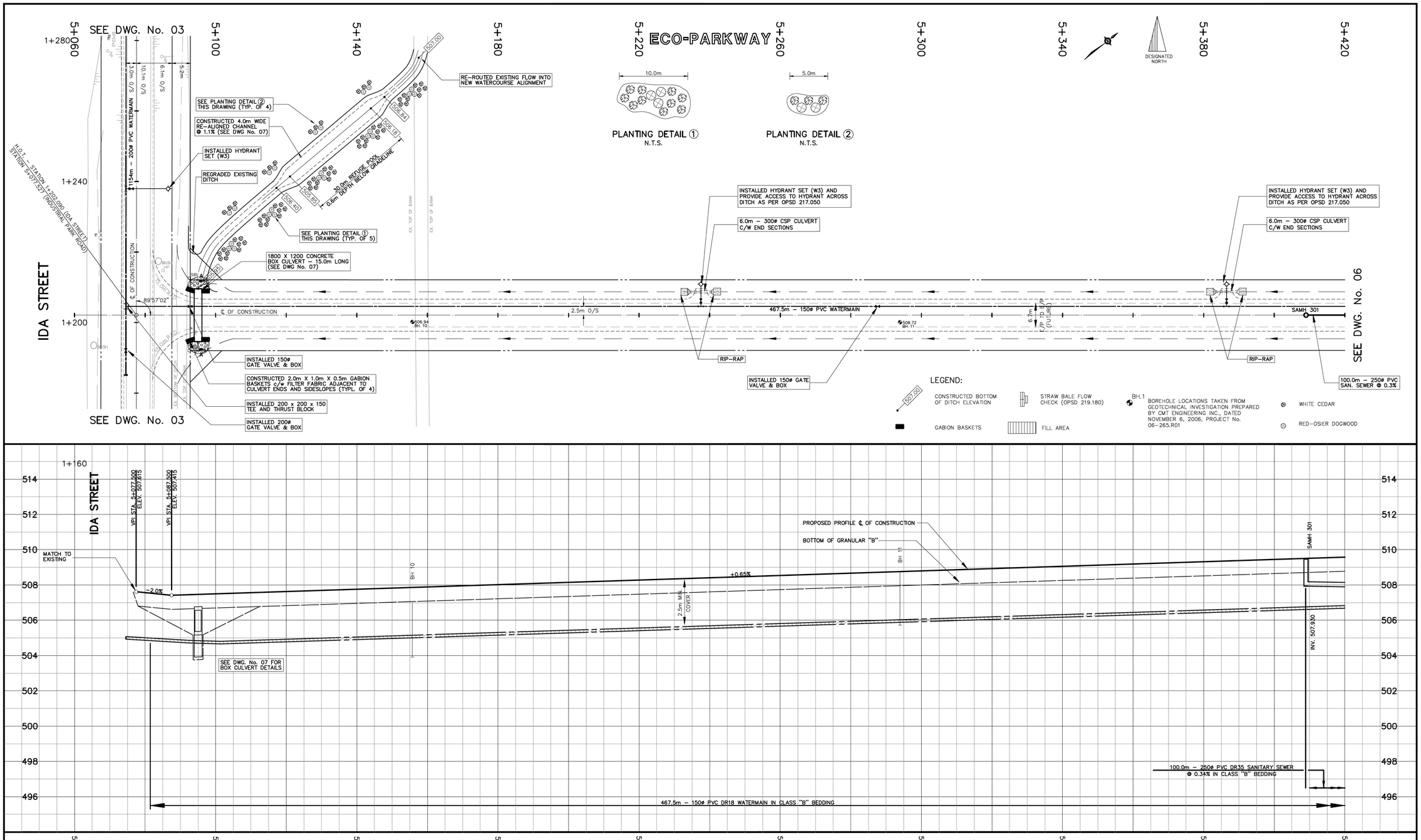
PROJECT No M5611

DRAWN BY: D.P.S. (AutoCAD)
CHECKED BY: D.G.D.
APPROVED BY: D.B.M.
DATE: AUGUST, 2009

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES
HORIZONTAL 1:500 VERTICAL 1:100

DRAWING NUMBER **02**



NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No	DATE	REVISION	INITIAL
4.	JAN. 10	RECORD INFORMATION	d.g.d.
3.	OCT. 07	ISSUED FOR TENDER	d.g.d.
2.	JUNE '07	ISSUED FOR G.R.C.A. APPROVAL	d.g.d.
1.	SEP. 06	ISSUED FOR M.O.E. APPROVAL	d.g.d.

CONSTRUCTION OF

ECO-PARKWAY

(DUNDALK)

TOWNSHIP OF SOUTHGATE

185667 GREY COUNTY ROAD No. 9
R.R.#1 DUNDALK, ONTARIO N0C 1B0

PLAN AND PROFILE

IDA ST. TO STATION 5+420

PROJECT No M5611

DRAWN BY: w.o. j.h. (AutoCAD)

CHECKED BY: D.G.D.

APPROVED BY: D.B.M.

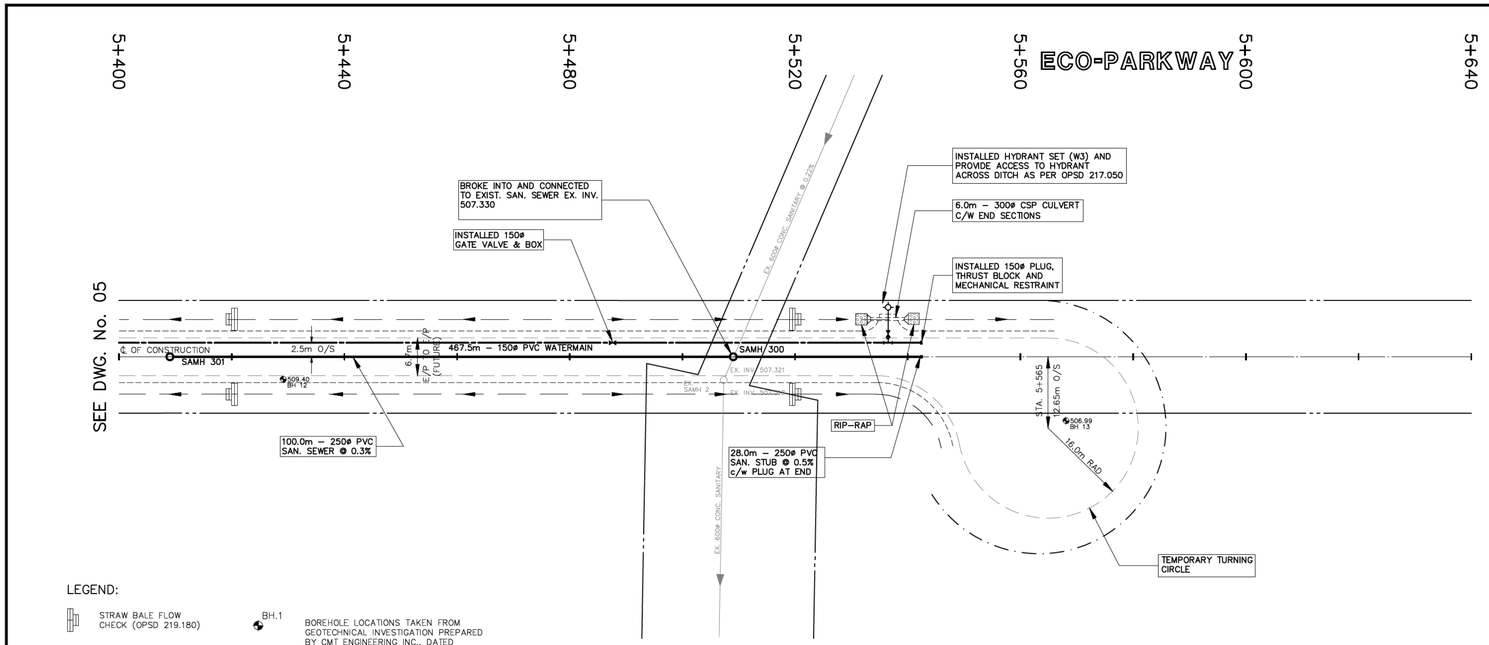
DATE: AUGUST, 2006

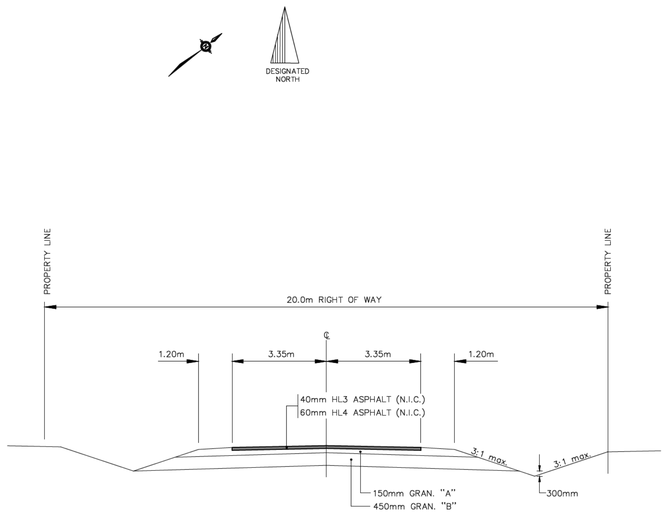
TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES

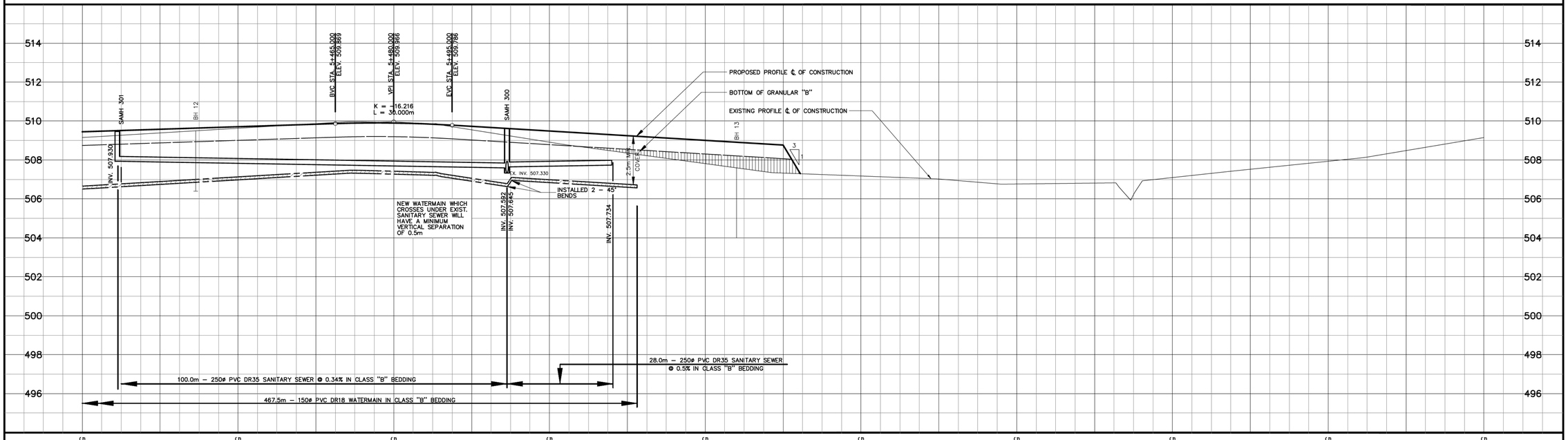
1:500	1:100
HORIZONTAL	VERTICAL

DRAWING NUMBER **05**





ECO-PARKWAY TYPICAL SECTION
N.T.S.



NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No	DATE	REVISION	INITIAL
4.	JAN. 10	RECORD INFORMATION	d.g.d.
3.	OCT. 07	ISSUED FOR TENDER	d.g.d.
2.	JUNE '07	ISSUED FOR G.R.C.A. APPROVAL	d.g.d.
1.	SEP. 06	ISSUED FOR M.O.E. APPROVAL	d.g.d.

CONSTRUCTION OF

ECO-PARKWAY

(DUNDALK)

TOWNSHIP OF SOUTHGATE
185667 GREY COUNTY ROAD No. 9
R.R.#1 DUNDALK, ONTARIO N0C 1B0

PLAN AND PROFILE
STATION 5+400 TO STATION 5+640

PROJECT No M5611
DRAWN BY: w.o. j.h. (AutoCAD)
CHECKED BY: D.G.D.
APPROVED BY: D.B.M.
DATE: AUGUST, 2006

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES
1:500 HORIZONTAL
1:100 VERTICAL

DRAWING NUMBER 06

APPENDIX B
WATER SUPPLY AND SANITARY SERVICING

Project No:	31489-22
Project Name:	Self Storage Complex
Project Location:	752065 Ida Street
Date:	2025-09-18
Update:	2025-09-18

Water Design Flow Calculation

Site Characteristics

Site Area =	2.428	ha	*Per Site Plan

Residential Design Flow

Average Daily Water Flow =	35000	L/ha/day	=MOE Industiral Water Demand for Light Industry
Site Average Daily Flow =	**0.98**	**L/s**	
MOE Max. Day Peak Factor =	2.00		*Per MOE Design Guidelines (2008)
MOE Peak Hour Factor =	4.00		
Peak Max. Day Design Flow =	**1.97**	**L/s**	=Average Daily Flow * Max Day PF
Peak Hour Design Flow =	**3.93**	**L/s**	=Average Daily Flow * Max Hour PF

Notes:

Design Guideline	Average Daily Flow (L/s)	Max. Day Flow (L/s)	Peak Hour Design Flow (L/s)
MOE	**0.98**	**1.97**	**3.93**

*Water design flow calculations complete with referenceto Ministry of Environment Design Guidelines for Drinking-Water Systems (2008)

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

Water Supply for Fire Protection - Fire Underwriters Survey 2020

Required Fire Flow (RFF)

Equation: RFF = 220*C*sqrt(A)

RFF = Required Fire Flow (LPM)
C = Construction Coefficient
A = Effective Floor Area (m^2)

Construction Coefficient =	1.0		*Construction Type III - Ordinary Construction
Total Effective Floor Area =	921	m^2	*Building 'D' to be cosidered Worst-Case Scenario, Per Site Plan
Required Fire Flow =	7,000	LPM	

Occupancy and Contents Adjustment Factor

Description of Major Occupancy =	Low Hazard Industrial (Storage)	
Occupancy and Contents Adjustment Factor =	0%	
Occupancy Reduction/Increase =	0	LPM
Occupancy Adjusted Required Fire Flow =	7,000	LPM

Automatic Sprinkler Protection

Automatic Sprinkler System Design	With Complete Building Coverage	With Partial Building Coverage
Automatic sprinkler protection (NFPA 13)	30%	30% * Percent of Floor Area Sprinklered
Water Supply is Standard	10%	10% * Percent of Floor Area Sprinklered
Fully Supervised	10%	10% * Percent of Floor Area Sprinklered

Sprinkler Adjustment Factor =	0%	
Automatic Sprinkler Reduction =	0	LPM

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

Water Supply for Fire Protection - Fire Underwriters Survey 2020

Exposure Adjustment Charge

Separation Distance (m)	Maximum Exposure Adjustment Charge
0 m to 3 m	25%
3.1 m to 10 m	20%
10.1 m to 20 m	15%
20.1 m to 30 m	10%
> 30 m	0%

Exposure Direction	Structure	Exposure Distance (m)	Exposure Adjustment Charge
North	Self-Storage Building 'G'	9.0	20%
East	Self-Storage Building 'E'	9.0	20%
South	-	0.0	0%
West	Self-Storage Building 'C'	9.0	20%

Exposure Adjustment Charge =	60%	
Exposure Adjustment Charge =	4,200	LPM

Fire Flow Summary

Required Fire Flow =	7,000	LPM
Occupancy Adjusted Fire Flow =	7,000	LPM
Automatic Sprinkler Reduction =	0	LPM
Exposure Adjustment Charge =	4,200	LPM
Calculated Fire Flow =	**11,000**	**LPM**
Required Duration =	**2.5**	**hr**

183 LPS

752065 Ida Street

Self-Storage Units

Low-Pressure Sanitary Sewage System

Design Brief

October 2025

A4206E

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

Table of Contents

1.0 General

As requested by Van Harten Surveying, Triton Engineering has prepared the following Low-Pressure Sanitary Sewage System (LPS System) Design Brief as required to serve the Riepma Consultants Inc. proposed self-storage unit development at the southeast corner of Ida Street and Eco Parkway (Subject Lot). To support this development, it is proposed to extend the existing LPS System forcemain within the Eco Parkway road allowance (ROW). This forcemain extension is required to service two washrooms that are proposed in “Building F” of the development to be constructed. A service stub and a grinder sewage pump station (SPS) will be located near the property line, with a gravity sewer service line provided between the SPS and Building F. The forcemain within the Municipal ROW will connect to the existing 38mm HDPE forcemain plug near the shut-off valve at Blue Mountain Covers (120 Eco Parkway) as shown on Figure 1 below and Appendix C, attached. The existing forcemain discharges into the existing gravity sewer system on Eco Parkway.

Figure 1:

2.0 Expected Sanitary Flow

The LPS System has been designed to accommodate an average day sanitary flow (ADF) of approximately 1,000L/day (0.69L/min) based on the information provided by the proponent, which equates to approximately one residential unit. This ADF is then peaked by a factor of 3 as the proposed business will operate for an 8-hour day. This results in a peak flow rate of 2.1L/min.

3.0 Low Pressure System Design

The design of the collection system will consider servicing of not only the Subject Lot, but the neighbouring existing industrial site (Blue Mountain Covers) that is also tributary to the forcemain. This neighbouring Lot is expected to also contribute approximately 1,000L/day.

Based on the design sheet in Appendix A, a 38mm (1.5inch) forcemain is expected to be satisfactory for this application. The maximum total dynamic head (TDH) the grinder pumps will be operating against is estimated to be 28.95m (95 ft).

The elevation of the lowest and most westerly portion of the service area has been conservatively estimated assuming the grinder pump will be installed 3m below the existing elevation at property line.

The LPS has been designed based on the following criteria.

Design Flow per Lot	1,000 L/day
Design Flow Per Pump	53.0 L/min
Lateral/Services to Lots	38 mm diameter
Main Collection Piping	38mm diameter
Lateral/Service & Main Pipe Material	HDPE AWWA C901 PE-4710
Lateral Isolation Valves	One ball type “curb stop” per service connection
Cover Depth	Min. 2.4 m to obvert
Air Release	Collection system is to be sloped upwards toward the outlet; therefore, air release is not required.

4.0 Grinder Sewage Pump Station

Appendix B provides the pump specifications for the LSGX200-Series (Single-Stage) Grinder Pump by Liberty Pump, which has been selected based on its ability to meet the required minimum standards for the Dundalk Industrial Park proposed sewage collection system, as follows:

- Centrifugal type sewage grinder pump
- Integral check valve and isolation valve
- Minimum 225 L (60 US gal) HDPE tank recommended by the manufacturer
- Rated pump capacity of 53L/min (14 GPM) at 28.95 m (95ft.) TDH
- Automatic pump controls complete with failure and equivalent high liquid level alarm
- 38 mm diameter discharge piping (SCH 40) to connect to the low-pressure collection system as recommended by manufacturer

Additionally, the pump is to be placed within a pump chamber that is suitable for outdoor applications. A 24" x 48" Zoeller Simplex Fiberglass Basin complete with Anti-Floatation Ring and 4" tank venting, or approved equivalent has been proposed.

Refer to Appendix B for additional details.

5.0 Conclusion

Providing a gravity sanitary sewer system was not considered feasible for this development area due to limitations of the topography of the existing sewage system and the proposed industrial lots. Therefore, the existing low-pressure sanitary sewage system (LPS) on Eco Parkway can be extended to service this development area. A grinder pump station will be constructed on the Subject Site to convey sewage to the extended LPS. A pump was selected to satisfy the expected flow rates and TDH requirements of the system.

[redacted]

Sandeep Shrestha, E.I.T

Dustin Lyttle, P.Eng

Appendix A: Low-Pressure Sanitary Sewer Design Sheet

TRITON ENGINEERING SERVICES LTD	*PRELIMINARY LOW PRESSURE SEWER SYSTEM*	*Pipe Material:*	HDPE	*Rev.No.*
CONSULTING ENGINEERS	*PIPE SCHEDULE AND BRANCH ANALYSIS*	*Hazen Williams C:*	130	*Design By: SS + DCL*
105 QUEEN STREET W, FERGUS ON, N1M 1S6				

Eco Parkway – West

No. of Pumps	MAX No. "ON"	Max Flow Per Pump	Max Flow	Pipe Size	Cross Sectional Area	Max Velocity	Length	Friction Loss	Friction Loss Total	Friction Loss from Check Valve	Friction Loss from Check Valve	Friction Loss Total	Max Main Elevation	Min Pump Elevation	Elevation Difference	Total Head
		L/min	L/sec	mm	mm^2	m/sec	m	m/100m	m	m	m	m	m	m	m	m
2.00	2.00	53.00	1.77	38.00	1133.54	1.56	200.30	8.64	17.31	0.27	0.04	17.62	507.93	506.00	1.93	19.55

Formulas

Max Velocity Equation:

$$V = \frac{Q}{A}$$

Where;
V = Maximum Velocity (m/sec)
Q = Maximum Flow (m^3/sec)
A = Cross-Sectional Flow Area (m^2)

Friction Loss Total:

Friction Head Loss in m/100m of Pipe:

$$H_F = 0.2164\left[\left(\frac{100}{C}\right)^{1.852} \times \left(\frac{Q^{1.852}}{d^{4.8655}}\right)\right]$$

Where;
H_F = Head Loss (m/100m of Pipe)
C = Hazen-William Coefficient (unitless)
Q = Maximum Flow (m^3/sec)
d = Internal Diameter of Pipe (m)

Friction Head Loss from Check Valve:

$$H_m = k_L \frac{V^2}{2g}$$

Where;
H_M = Head Loss (m/100m of Pipe)
k_L = Loss Coefficient for Check valve = 2.2 (unitless)
V = Maximum Velocity (m/sec)
g = gravitational acceleration (m^2/sec)

Friction Head Loss from 90° Elbow:

$$H_m = k_L \frac{V^2}{2g}$$

Where;
H_M = Head Loss (m/100m of Pipe)
k_L = Loss Coefficient for 90° Elbow = 0.3 (unitless)
V = Maximum Velocity (m/sec)
g = gravitational acceleration (m^2/sec)

Appendix B: Specifications

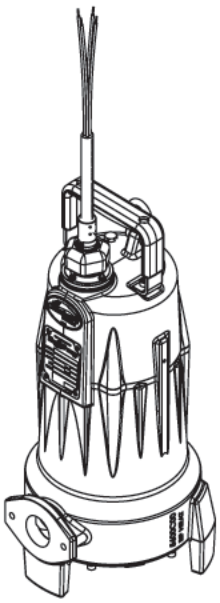
Liberty Pumps®
A Family and Employee Owned Company

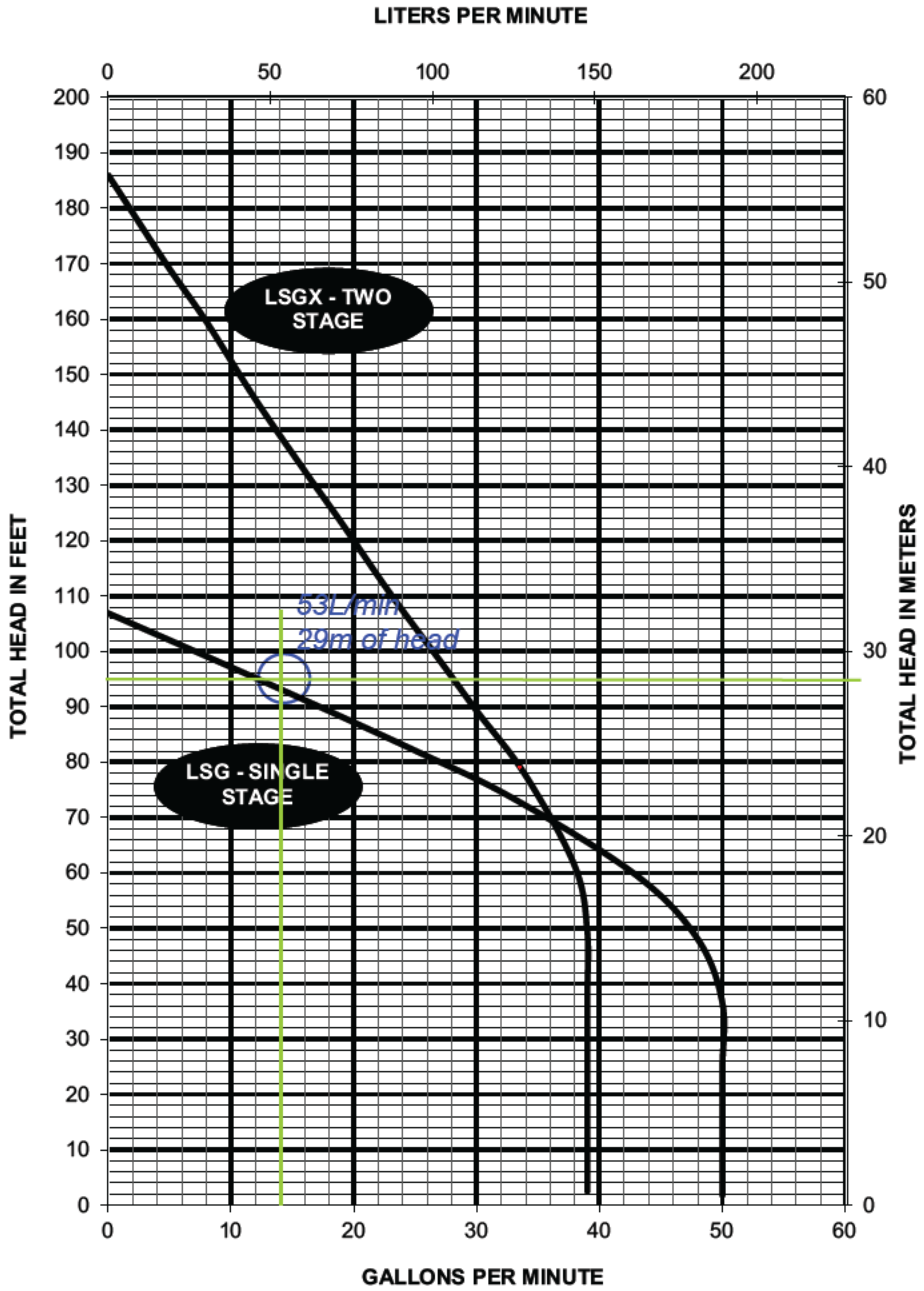
Omnivore® Grinders | Omnivore X2® 2-Stage Grinders By Liberty Pumps

Pump Specification

LSG200-Series (Single-Stage)
LSGX200-Series (2-Stage)

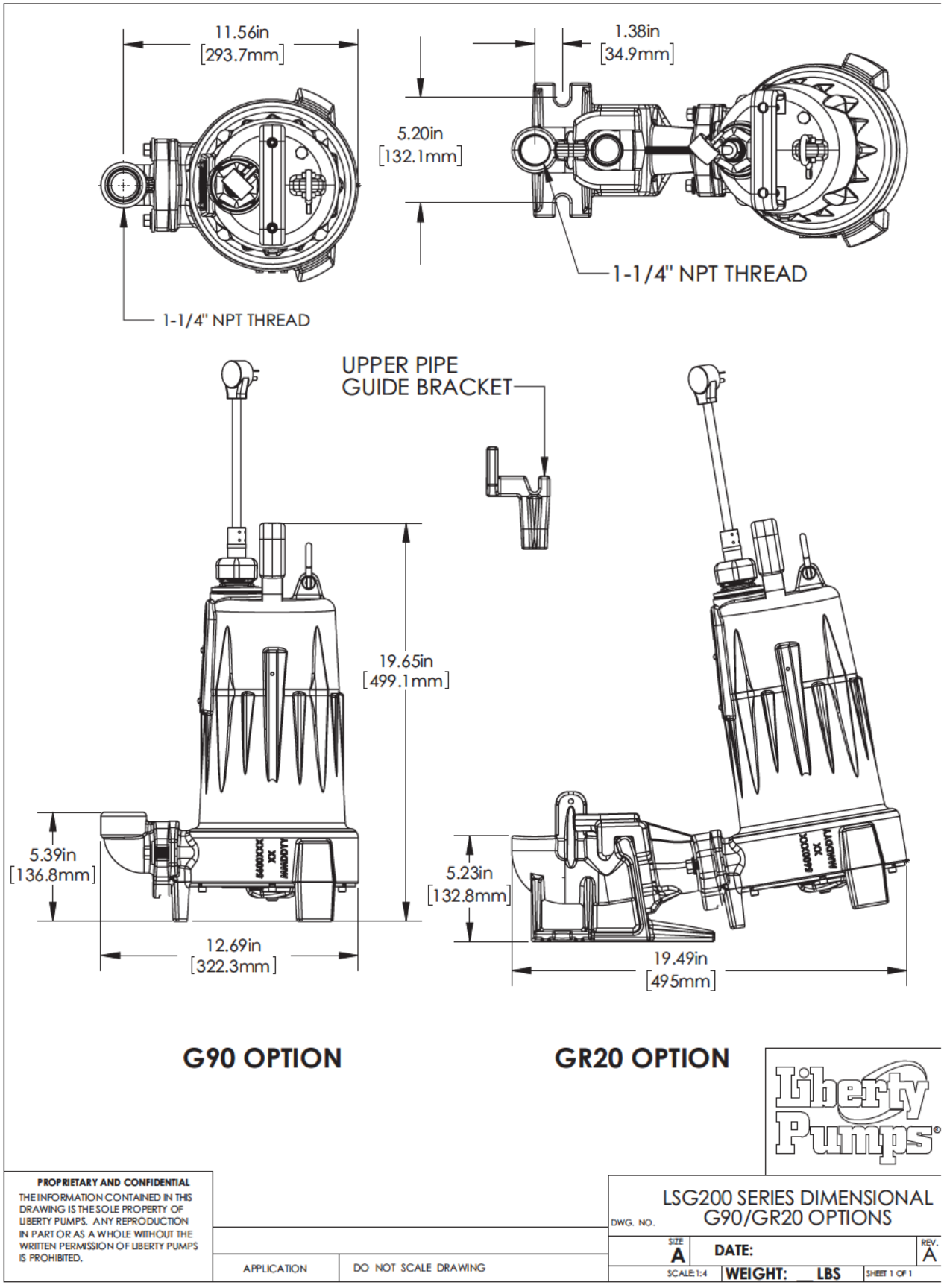
Omnivore® 2 HP Submersible Grinder Pumps





LSG200_P1 R7/17/2019

7000 Apple Tree Avenue Bergen NY 14416 ■ Phone 800-543-2550 ■ Fax 585-494-1839 ■ Email Liberty@LibertyPumps.com ■ Web www.LibertyPumps.com



APPLICATION | DO NOT SCALE DRAWING

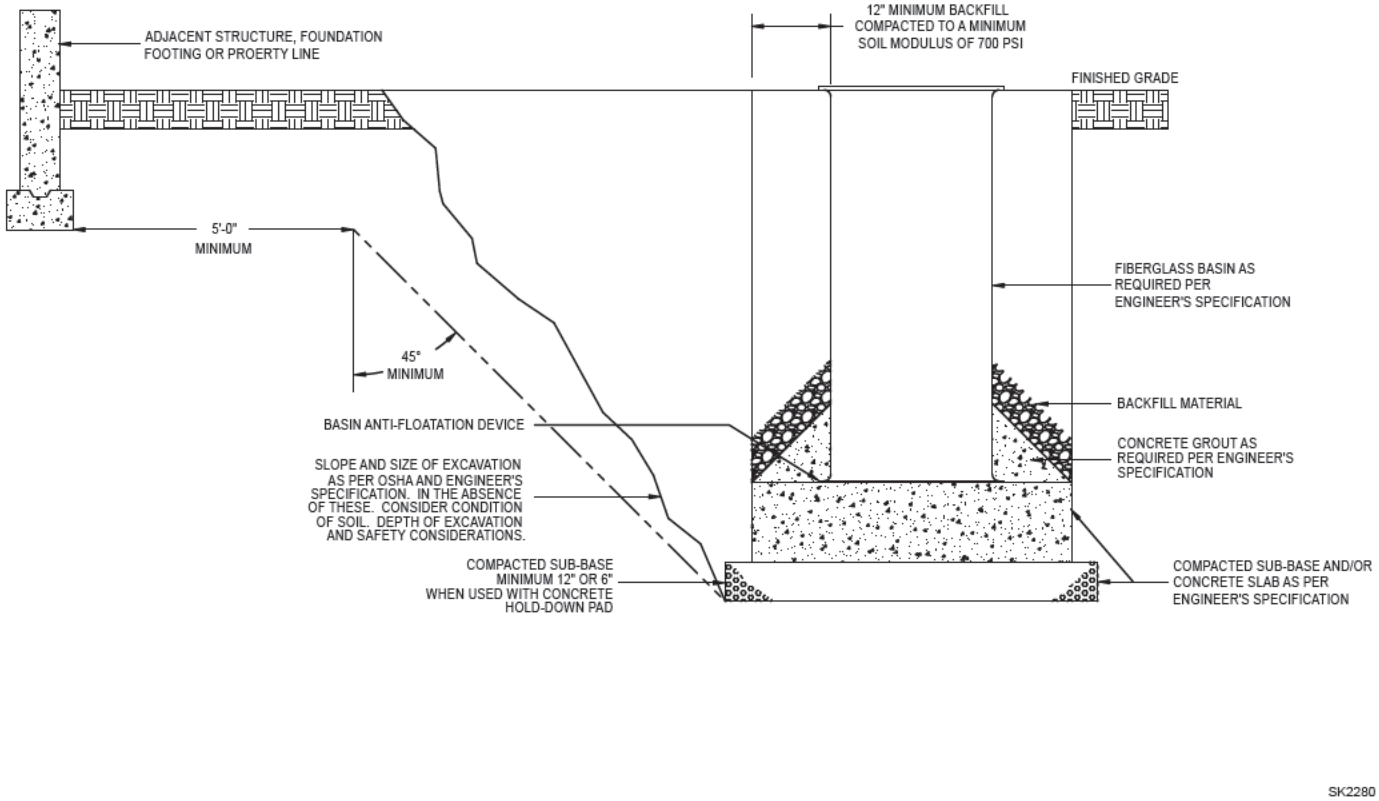
DWG. NO. LSG200 SERIES DIMENSIONAL G90/GR20 OPTIONS

SIZE A | DATE: | REV. A

SCALE: 1:4 | WEIGHT: __ LBS | SHEET 1 OF 1

FIBERGLASS "OUTDOOR" APPLICATION

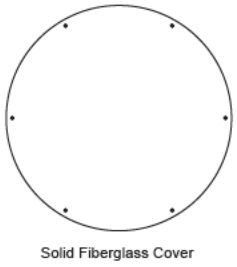
1. **Inspect your basin assembly.** If the unit has been damaged in shipment or if parts are missing, contact your distributor before installing.
2. **Carefully read all literature** to familiarize yourself with details regarding installation and use. Retain materials for future reference.
3. All installations must comply with all applicable electrical and plumbing codes, including but not limited to the National Electrical Code, local, regional and/or state plumbing codes, etc.
4. Dig a hole for the basin. The hole should be at least 24" larger in diameter than the basin diameter to provide 12" of backfill all around and deep enough to provide either 12" of compacted backfill or 6" when a concrete pad is required. Ensure the removable cover extends above the finished grade line and the grade slopes away from the unit. Backfill and subbase should be 1/8" –3/4" pea gravel or 1/8" –1/2" crushed stone.
5. **Note: Care must be taken when excavating in order to avoid underground utilities and disturbance of existing structure foundations. The hole should be located at least ten feet from adjacent structures. Additional distance may be required to sufficiently locate the basin outside of the loading area of the adjacent structures.**
6. Determine the location of the inlet based upon your inlet pipe arrangement. The inlet must be used with 4" pipe. It should be installed on the side of the basin opposite the float switches. To install a 4" cast iron inlet hub, use a 4" holesaw to drill into the side of the basin at the correct elevation. Center the hub inner diameter with the hole in the basin. Attach the hub to the side of the basin using the sealant and hardware provided. To install a pipe seal, use a 5" holesaw to drill into the side of the basin at the correct elevation. Insert the pipe seal from the outside of the basin.
7. The bottom of the excavation can now be back filled and compacted. Set the basin in the hole and connect the 4" inlet pipe. If using a cast iron hub, seal the pipe to the flange with approved caulk or gasket. If using a pipe seal, use liquid soap as a lubricant if necessary.
8. The cover bolts should be installed into their threaded inserts to prevent damage to the threads during the final stages of installation.
9. Pouring a concrete anchor around system can now be completed. Basin should be filled with water when pouring concrete to minimize movement of the system. Backfill around basin with specified media. Care should be used to avoid damaging components or leaving voids when back filling.
10. **Note: Venting can be installed on basin cover as necessary according to all applicable national, state, and local plumbing codes.**
11. Clean any debris out of the basin.



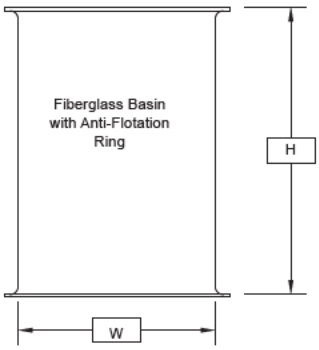
OUTDOOR BASINS AND ACCESSORIES

OUTDOOR BASINS - FIBERGLASS ONLY - NO HOLES DRILLED			
Size	**Item No.**	**Simplex / Duplex**	**Description**
24" X 48"	31-0866	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
24" X 60"	31-0946	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
24" X 72"	31-0594	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
30" X 48"	31-1830	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
30" X 60"	31-1831	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
30" X 72"	31-1586	Simplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
36" X 48"	31-1450	Simplex or Duplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
36" X 60"	31-1451	Simplex or Duplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
36" X 72"	31-1452	Simplex or Duplex	Solid Fiberglass Basin with Solid Fiberglass Cover and Anti-Flotation Ring
All basins include 5 field installed adapta-flex seals - (1) 1-1/4", (1) 1-1/2", (2) 2" and (1) 4" grommets.			

Additional basin sizes with options (i.E. Rail studs) are available. Consult factory.

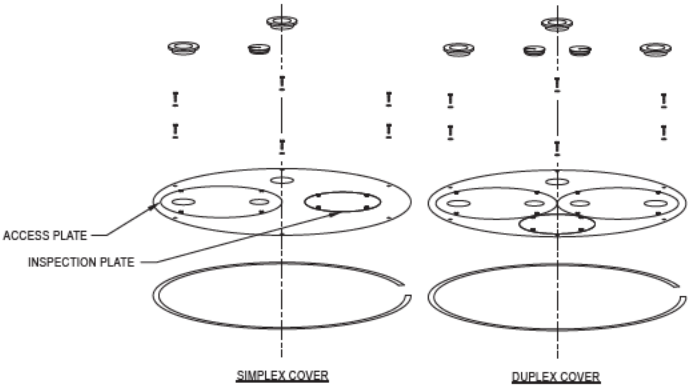


Solid Fiberglass Cover



SK2278

OUTDOOR



SK1866B

INDOOR

OUTDOOR TANK VENTS						
Item No.	Color	Material	Size	Dimension (W x H)	Pipe Area	Screen Area
10-1753	Black	Plastic	2" Female NPT	4.625" X 3.125"	3.1 sq. in.	6.9 sq. in.
10-1461	Green	Metal	2" Female NPT	4.625" X 3.125"	3.1 sq. in.	6.9 sq. in.
10-1462	Green	Metal	3" Female NPT	6.875" X 4.500"	7.1 sq. in.	19.6 sq. in.
10-1463	Green	Metal	4" Female NPT	9.250" X 5.000"	12.6 sq. in.	35.8 sq. in.
10-1464	Green	Metal	6" Female NPT	11.125" X 6.625"	28.3 sq. in.	42.5 sq. in.

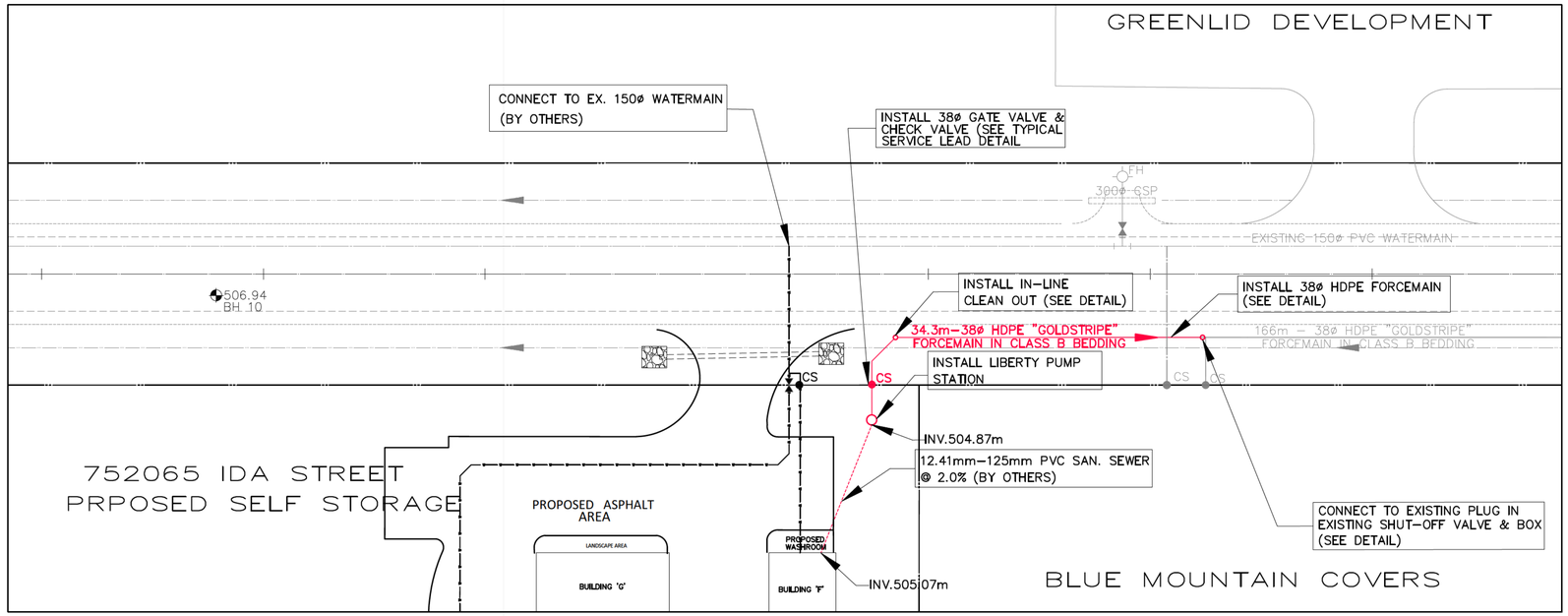
ZOELLER® PUMP COMPANY

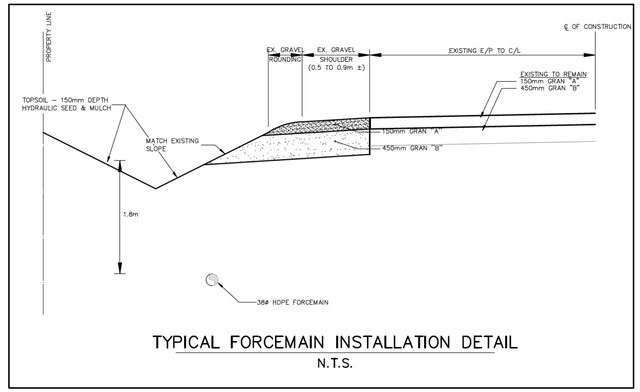
MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
Tel: (502) 778-2731 • 1 (800) 928-PUMP

Trusted. Tested. Tough.®

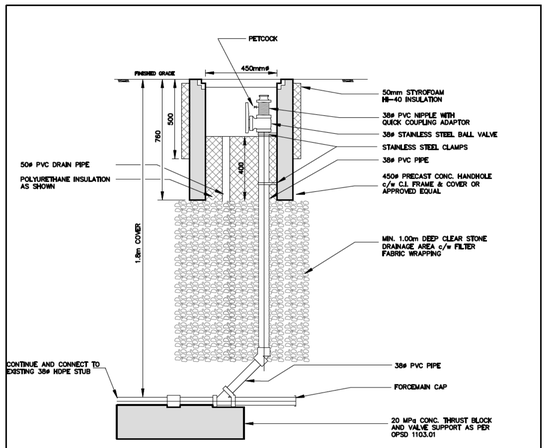
Visit our website:
zoellerpumps.com

Appendix C: Servicing Plan and Details

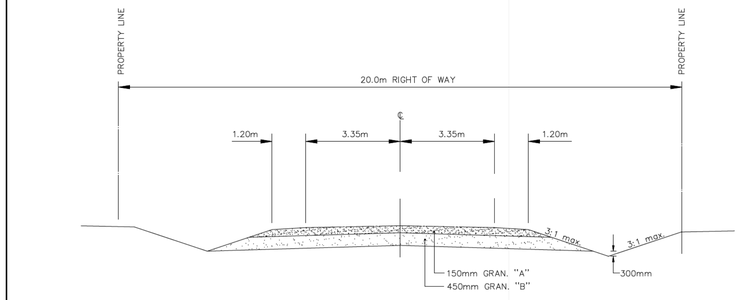




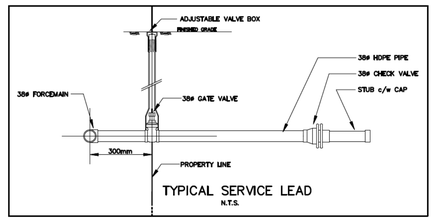
TYPICAL FORCEMAIN INSTALLATION DETAIL
N.T.S.



TYPICAL IN-LINE CLEAN-OUT DETAIL
N.T.S.



ECO-PARKWAY TYPICAL SECTION
N.T.S.



TYPICAL SERVICE LEAD
N.T.S.

GENERAL NOTES

1. ALL WORK TO CONFORM TO THE LATEST TOWNSHIP OF SOUTHGATE MSS AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONTRACTOR AS DEFINED IN THE ACT.
3. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL BOOK 7- TEMPORARY CONDITIONS FIELD EDITION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATES AND ANY DAMAGE OR DISTURBANCE DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL RECTIFY ALL EXISTING DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE TOWNSHIP.
6. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY O.L.S. AT CONTRACTORS EXPENSE IF REMOVED DURING CONSTRUCTION.
7. CONTRACTOR IS TO SUBMIT A LIST OF MATERIAL TO THE TOWNSHIP TO REVIEW FOR APPROVAL WITH A MINIMUM OF 2 WEEKS PRIOR TO THE START OF CONSTRUCTION.

SANITARY FORCEMAIN

1. BOULEVARD RESTORATION FOR NEW FORCEMAIN SHALL BE 150mm TOPSOIL AND HYDRAULIC SEED
2. CONTRACTOR TO MAINTAIN 1.8m COVER ABOVE NEW SANITARY FORCEMAIN. CONTRACTOR TO CONFIRM ELEVATIONS AT TIME OF CONSTRUCTION
3. CONTRACTOR TO OBTAIN TOWNSHIP APPROVAL FOR FITTINGS, VALVES AND CONFIGURATION OF SANITARY CONNECTIONS PRIOR TO PURCHASE AND INSTALLATION.

GRADING ROADS

1. NO ALTERATIONS TO EXISTING BOUNDARY ELEVATIONS OR ADJACENT LANDS SHALL BE UNDERTAKEN UNLESS WRITTEN AGREEMENT WITH THE ADJACENT PROPERTY OWNER IS OBTAINED AND SUBMITTED IN A FORMAT ACCEPTABLE TO THE TOWNSHIP.
2. MUNICIPAL BOULEVARDS ARE 150mm TOPSOIL AND SOD AS PER MSS.
3. ALL BEDDING AND BACKFILL MATERIAL, ROAD SUBGRADE AND BOULEVARD ETC., SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY (SPD) (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300 mm LIFTS.
4. NATIVE MATERIAL SUITABLE FOR BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY, OTHERWISE NOTED. ENGINEERED FILL SHALL BE COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
5. DISTURBED AREAS WITHIN EXISTING MUNICIPAL RIGHT-OF-WAYS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER AS DETERMINED BY THE TOWNSHIP OF SOUTHGATE (MIN 450mm GRANULAR B, 150mm GRANULAR A, 150mm TOPSOIL AND SOD). ALL OTHER DISTURBED AREAS TO BE TOPSOILED AND SEEDED.

NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No.	DATE	REVISION	INITIAL
2	OCT 2025	ISSUED FOR SITE PLAN	D.C.L
1	SEPT 2025	ISSUED FOR REVIEW	D.C.L

LICENSED PROFESSIONAL ENGINEER
D. C. LYTTLE
100212003
PROVINCE OF ONTARIO

CONSTRUCTION OF MUNICIPAL SERVICES
IDA STREET SELF STORAGE
ECO PARKWAY
(DUNDALK)

TOWNSHIP OF SOUTHGATE
185667 GREY COUNTY ROAD #9
RR#1 DUNDALK, ONTARIO N0C 1B0

SITE SERVICING PLAN & DETAILS

PROJECT No A4206E
DRAWN BY: S.S (AutoCAD)
CHECKED BY: D.C.L
APPROVED BY:
DATE: SEPT 2025

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES
1:250 HORIZONTAL
N/A VERTICAL

DRAWING NUMBER 01
REV. 0

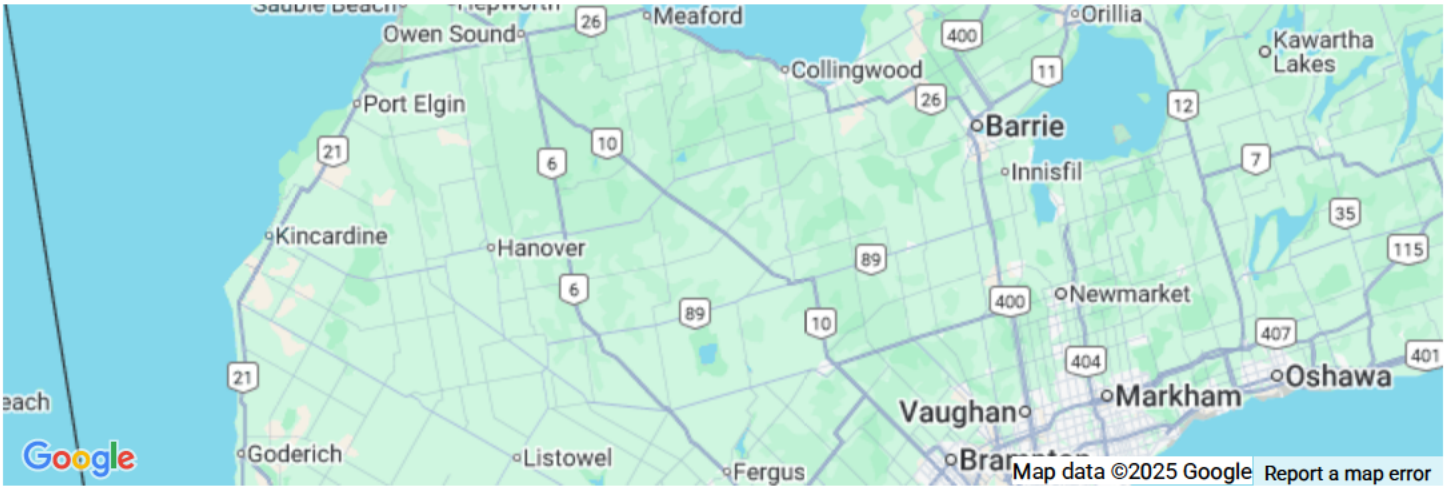
APPENDIX C
STORMWATER MANAGEMENT CALCULATIONS

Ontario [redacted]

Active coordinate

44° 9' 15" N, 80° 23' 15" W (44.154167,-80.387500)

Retrieved: Tue, 24 Jun 2025 13:11:33 GMT



Location summary

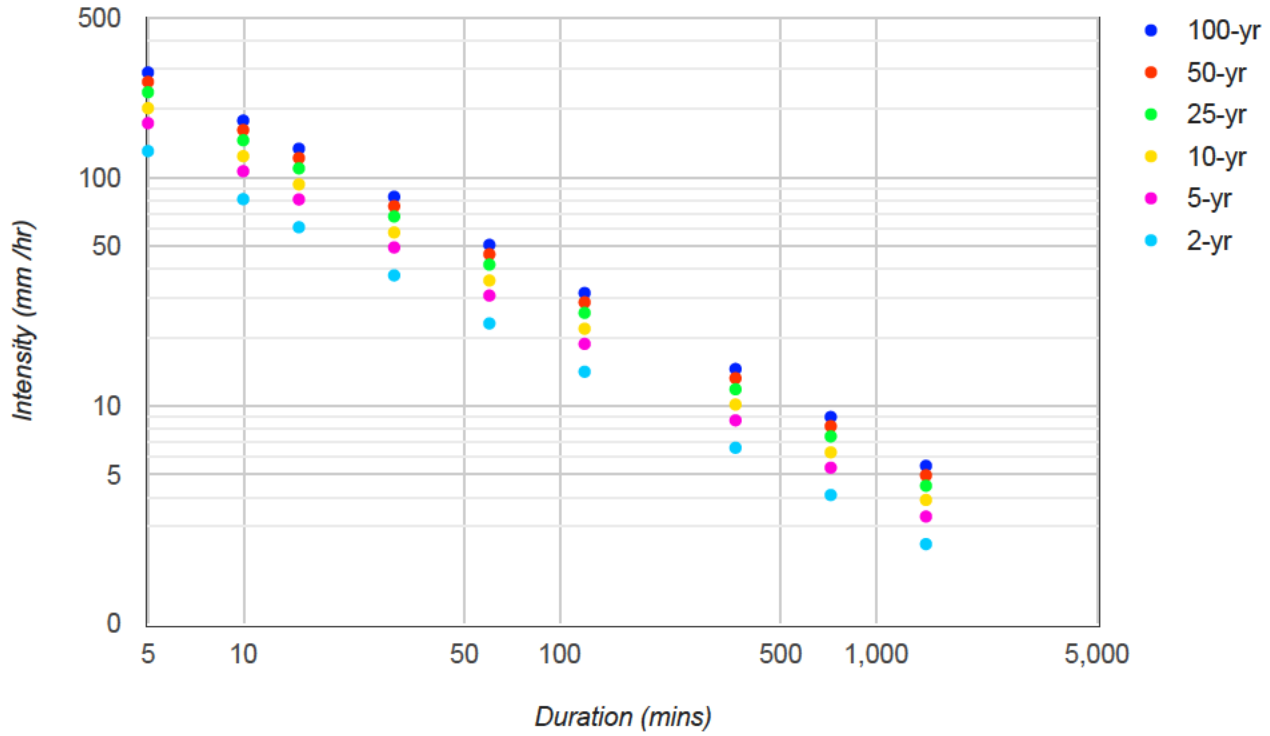
These are the locations in the selection.

IDF Curve: 44° 9' 15" N, 80° 23' 15" W (44.154167,-80.387500)

Results

An IDF curve was found.

Coordinate: 44.154167, -80.387500
IDF curve year: 2010



Coefficient summary

IDF Curve: 44° 9' 15" N, 80° 23' 15" W (44.154167,-80.387500)

Retrieved: Tue, 24 Jun 2025 13:11:33 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.1	30.6	35.6	41.8	46.4	51.0
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	131.2	80.8	60.9	37.5	23.1	14.2	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	202.2	124.6	93.8	57.8	35.6	21.9	10.2	6.3	3.9
25-yr	237.4	146.3	110.2	67.9	41.8	25.7	11.9	7.4	4.5
50-yr	263.6	162.3	122.3	75.3	46.4	28.6	13.3	8.2	5.0
100-yr	289.7	178.4	134.4	82.8	51.0	31.4	14.6	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.5	15.2	18.8	23.1	28.5	39.6	48.8	60.1
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.9	20.8	23.5	28.9	35.6	43.9	61.0	75.2	92.7
25-yr	19.8	24.4	27.5	33.9	41.8	51.5	71.7	88.3	108.8
50-yr	22.0	27.1	30.6	37.7	46.4	57.2	79.6	98.0	120.8
100-yr	24.1	29.7	33.6	41.4	51.0	62.8	87.5	107.7	132.7

Terms of Use

You agree to the Terms of Use of this site by reviewing, using, or interpreting these data.

Ontario Ministry of Transportation | Terms and Conditions | About
Last Modified: September 2016

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

NASHYD Hydraulic Parameter Sheet
Pre-Development Catchment 101

Catchment Area: 2.240 ha

On-site Soils:

Type	Classification
Listowel Silt Loam	B

*Per Ontario Soil Mapping and CMT Geotech Investigation

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
		0.165	98					0.165	98.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Meadow		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
				2.075	58			2.075	58.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0
Woodland	10	0
Meadow	7	2.07
Wetland	16	0
Impervious	2	0.17
Catchment Weighted	6.63	2.24

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn		0
Woodland		0
Meadow	0.25	2.07
Wetland		0
Impervious	0.90	0.17
Catchment Weighted	0.30	2.24

Composite Curve Number:	60.95
Composite Initial Abstraction (mm):	6.63
Composite Runoff Coefficient:	0.30
Flow Length (m):	100
Slope (%):	1.0
Time to Concentration (hr):	0.44
Time to Peak (hr):	0.29

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

NASHYD Hydraulic Parameter Sheet
Pre-Development Catchment 102

Catchment Area: 0.186 ha

On-site Soils:

Type	Classification
Listowel Silt Loam	B

*Per Ontario Soil Mapping and CMT Geotech Investigation

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
								0.00	0.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Meadow		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
				0.186	58			0.186	58.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0
Woodland	10	0
Meadow	7	0.186
Wetland	16	0
Impervious	2	0
Catchment Weighted	7.00	0.186

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn		0
Woodland		0
Meadow	0.25	0.186
Wetland		0
Impervious		0
Catchment Weighted	0.25	0.186

Composite Curve Number:	58.00
Composite Initial Abstraction (mm):	7.00
Composite Runoff Coefficient:	0.25
Flow Length (m):	30
Slope (%):	1.0
Time to Concentration (hr):	0.25
Time to Peak (hr):	0.17

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

Van Harten
LAND SURVEYORS - ENGINEERS

STANHYD Hydraulic Parameter Sheet
Post-Development Catchment 201

Catchment Area: 1.151 ha

On-site Soils:

Type	Classification
Listowel Silt Loam	B

*Per Ontario Soil Mapping and CMT Geotech Investigation

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.553	98			0.457	98	0.095	50	1.105	93.87

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	1.0
Flow Length (m from model):	87.6
Total Indirectly Connected Impervious Area (ha):	1.105
Total Directly Connected Impervious Area (ha):	1.105
T IMP:	0.96
X IMP:	0.96

Pervious Land Use:

Lawn		Woodland		Meadow		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.046	61							0.046	61.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	61.0
Initial Abstraction (mm):	5.00
Slope (%):	2.0
Flow Length (m):	20

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.046
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.046

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

NASHYD Hydraulic Parameter Sheet
Post-Development Catchment 202

Catchment Area: 1.124 ha

On-site Soils:

Type	Classification
Listowel Silt Loam	B

*Per Ontario Soil Mapping and CMT Geotech Investigation

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
								0.00	0.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Meadow		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
				1.124	58			1.124	58.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0
Woodland	10	0
Meadow	7	1.124
Wetland	16	0
Impervious	2	0
Catchment Weighted	7.00	1.124

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn		0
Woodland		0
Meadow	0.25	1.124
Wetland		0
Impervious		0
Catchment Weighted	0.25	1.124

Composite Curve Number:	58.00
Composite Initial Abstraction (mm):	7.00
Composite Runoff Coefficient:	0.25
Flow Length (m):	100
Slope (%):	1.0
Time to Concentration (hr):	0.46
Time to Peak (hr):	0.31

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

NASHYD Hydraulic Parameter Sheet
Post-Development Catchment 203

Catchment Area: 0.150 ha

On-site Soils:

Type	Classification
Listowel Silt Loam	B

*Per Ontario Soil Mapping and CMT Geotech Investigation

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
								0.00	0.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Meadow		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.150	61							0.150	61.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.150
Woodland	10	0
Meadow	7	0
Wetland	16	0
Impervious	2	0
Catchment Weighted	5.00	0.150

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn	0.25	0.150
Woodland		0
Meadow		0
Wetland		0
Impervious		0
Catchment Weighted	0.25	0.150

Composite Curve Number:	61.00
Composite Initial Abstraction (mm):	5.00
Composite Runoff Coefficient:	0.25
Flow Length (m):	160
Slope (%):	0.30
Time to Concentration (hr):	0.87
Time to Peak (hr):	0.58

Project No: 31489-22
Project Name: Self Storage Complex
Project Location: 752065 Ida Street
Date: 2025-03-19
Update: 2025-09-18

Storage and Control Structure Calculations

Circular Orifice (Low Flow):

$$Q = C_d A \sqrt{2 g H}$$

Diameter = 0.100 m
Invert Elevation = 504.80 m
Orifice Coefficient = 0.62

Elev. (m)	Storage Volume (m^3)	Circular Orifice Discharge (m^3/s)	Total Discharge (m^3/s)	Storage (ha.m)
504.85	47	0.000	0.000	0.005
504.95	58	0.007	0.007	0.006
505.05	98	0.010	0.010	0.010
505.15	152	0.012	0.012	0.015
505.25	211	0.014	0.014	0.021
505.35	274	0.015	0.015	0.027
505.45	341	0.017	0.017	0.034
505.55	413	0.018	0.018	0.041
505.65	489	0.019	0.019	0.049
505.75	569	0.020	0.020	0.057
505.85	655	0.022	0.022	0.065
505.95	745	0.023	0.023	0.074
506.00	791	0.023	0.023	0.079

- 5 year storm elevation = 505.44 (approx.)
- 100 year storm elevation = 505.80 (approx.)

Project No:	31489-22
Project Name:	Self Storage Complex
Project Location:	752065 Ida Street
Date:	2025-03-19
Update:	2025-09-18

100-Year Storm Drawdown Calculation (Dry Pond)

100-Year Storage Volume =	608	m^3
100-Year Ponding Elevation =	505.80	
Orifice Diameter =	100	mm
Orifice Invert Elevation=	504.80	
Orifice Area =	0.007854	m^2
Orifice Discharge Coefficient =	0.62	
Average Head 100-year Event =	0.50	m
Drawdown Time =	**20**	**hr**

Project No:	31489-22
Project Name:	Self Storage Complex
Project Location:	752065 Ida Street
Date:	2025-03-19
Update:	2025-09-18

Erosion Controls - Riprap Sizing Calculation at Dry Pond Sewer Outlet

Riprap Rock Size Calculation:

Equation: $D_{50} = V^2 / 2*g*C^2(S-1)$

D_{50} =	0.15	Median diameter of riprap (m)
V =	1.06	Water velocity (m/s)
g =	9.81	Gravity (m/s)
C =	1.2	Isbash Const. (C=0.86 high to 1.2 low turb)
S =	2.65	Specific Gravity of Stone

D^{50}_{Design} =	0.024	m	
D^{50}_{Design} =	**24.10**	mm	(min riprap size)
$D^{50}_{Provided}$ =	150	mm	

Notes:
- Water velocity per flowmaster calculations at 21 L/s outflow = 100-year storm
- 1.2 used for Isbash Constant to provide safety factor into design.

Project No:	31489-22
Project Name:	Self Storage Complex
Project Location:	752065 Ida Street
Date:	2025-03-19
Update:	2025-09-18

Erosion Controls - Riprap Sizing Calculation at Dry Pond Sewer Outlet

Riprap Rock Size Calculation:

Equation: $\mathbf{D_{50} = V^2 / 2*g*C^2(S-1)}$

D_{50} =	0.15	Median diameter of riprap (m)
V =	0.48	Water velocity (m/s)
g =	9.81	Gravity (m/s)
C =	1.2	Isbash Const. (C=0.86 high to 1.2 low turb)
S =	2.65	Specific Gravity of Stone

D^{50}_{Design} =	0.005	m	
D^{50}_{Design} =	**4.94**	mm	(min riprap size)
$D^{50}_{Provided}$ =	150	mm	

Notes:
- Water velocity per flowmaster calculations at 169 L/s outflow = Regional Storm Event
- 1.2 used for Isbash Constant to provide safety factor into design.

Project No:	31489-22
Project Name:	Self Storage Complex
Project Location:	752065 Ida Street
Date:	2025-03-19
Update:	2025-09-18

Erosion Controls - Riprap Sizing Calculation at Swale Outlet (Catchment 203)

Riprap Rock Size Calculation:

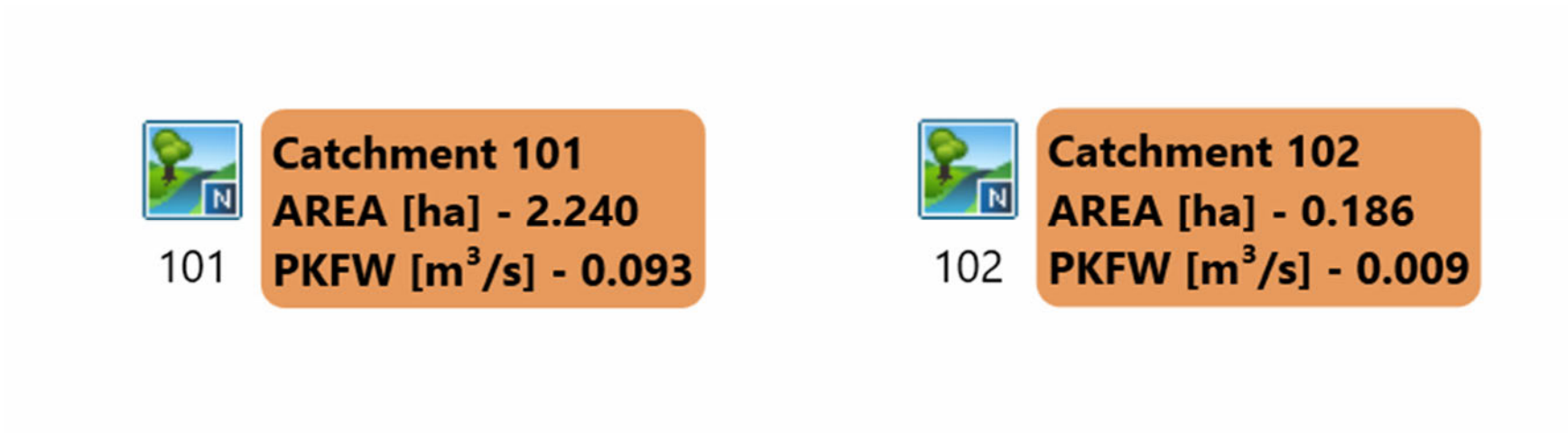
Equation: $D_{50} = V^2 / 2*g*C^2(S-1)$

D_{50} =	0.15	Median diameter of riprap (m)
V =	0.05	Water velocity (m/s)
g =	9.81	Gravity (m/s)
C =	1.2	Isbash Const. (C=0.86 high to 1.2 low turb)
S =	2.65	Specific Gravity of Stone

D^{50}_{Design} =	0.00005	m	
D^{50}_{Design} =	**0.05**	mm	(min riprap size)
$D^{50}_{Provided}$ =	150	mm	

Notes:
- Water velocity per flowmaster calculations at 21 L/s outflow = 100-year storm
- 1.2 used for Isbash Constant to provide safety factor into design.

Pre-Development 100-Year Storm Event Uncontrolled Schematic



```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8
c82fca4-29e4-4cbc-9642-e4b72463101e\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8
c82fca4-29e4-4cbc-9642-e4b72463101e\s


DATE: 09-16-2025                          TIME: 01:11:01

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : 100yr 3hr 10min Chicago       **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 892.273
| Ptotal= 70.94 mm |                          B=   0.000
--------------------                          C=   0.699
```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	8.30	0.83	178.44	1.67	12.86	2.50	8.00
0.17	9.77	1.00	37.79	1.83	11.36	2.67	7.50
0.33	12.10	1.17	23.83	2.00	10.23	2.83	7.06
0.50	16.55	1.33	18.17	2.17	9.33		
0.67	30.79	1.50	14.97	2.33	8.61		

CALIB NASHYD (0101)	Area (ha)= 2.24	Curve Number (CN)= 61.0
ID= 1 DT=10.0 min	Ia (mm)= 6.63	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.29	

Unit Hyd Qpeak (cms)= 0.295

PEAK FLOW (cms)= 0.093 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 18.096
TOTAL RAINFALL (mm)= 70.941
RUNOFF COEFFICIENT = 0.255

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0102)	Area (ha)= 0.19	Curve Number (CN)= 58.0
ID= 1 DT=10.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.17	

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 15.734
TOTAL RAINFALL (mm)= 70.941
RUNOFF COEFFICIENT = 0.222

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\0
16faf0b-e5f9-4d26-955a-22d402c26388\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\0
16faf0b-e5f9-4d26-955a-22d402c26388\s


DATE: 09-16-2025                          TIME: 01:11:01

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : 10yr 3hr 10min Chicago        **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 622.842
| Ptotal= 49.52 mm |                          B=   0.000
--------------------                          C=   0.699
```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.79	0.83	124.56	1.67	8.98	2.50	5.59
0.17	6.82	1.00	26.38	1.83	7.93	2.67	5.23
0.33	8.45	1.17	16.63	2.00	7.14	2.83	4.93
0.50	11.56	1.33	12.68	2.17	6.51		
0.67	21.49	1.50	10.45	2.33	6.01		

CALIB NASHYD (0101)	Area (ha)= 2.24	Curve Number (CN)= 61.0
ID= 1 DT=10.0 min	Ia (mm)= 6.63	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.29	

Unit Hyd Qpeak (cms)= 0.295

PEAK FLOW (cms)= 0.043 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 8.887
TOTAL RAINFALL (mm)= 49.520
RUNOFF COEFFICIENT = 0.179

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0102)	Area (ha)= 0.19	Curve Number (CN)= 58.0
ID= 1 DT=10.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.17	

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 7.614
TOTAL RAINFALL (mm)= 49.520
RUNOFF COEFFICIENT = 0.154

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\e
90f71dc-eeb0-4982-9673-86d75d42a803\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\e
90f71dc-eeb0-4982-9673-86d75d42a803\s


DATE: 09-16-2025                          TIME: 01:11:01

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : 25yr 3hr 10min Chicago        **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 731.314
| Ptotal= 58.14 mm |                          B=   0.000
--------------------                          C=   0.699
```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.80	0.83	146.25	1.67	10.54	2.50	6.56
0.17	8.01	1.00	30.97	1.83	9.31	2.67	6.14
0.33	9.92	1.17	19.53	2.00	8.38	2.83	5.79
0.50	13.57	1.33	14.89	2.17	7.65		
0.67	25.24	1.50	12.27	2.33	7.05		

CALIB NASHYD (0101)	Area (ha)= 2.24	Curve Number (CN)= 61.0
ID= 1 DT=10.0 min	Ia (mm)= 6.63	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.29	

Unit Hyd Qpeak (cms)= 0.295

PEAK FLOW (cms)= 0.061 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 12.304
TOTAL RAINFALL (mm)= 58.144
RUNOFF COEFFICIENT = 0.212

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0102)	Area (ha)= 0.19	Curve Number (CN)= 58.0
ID= 1 DT=10.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.17	

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.006 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 10.612
TOTAL RAINFALL (mm)= 58.144
RUNOFF COEFFICIENT = 0.183

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

```
================================================================================
========================

================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\a
a2bacc3-c0ec-4ff4-a97a-56bee11d5680\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\a
a2bacc3-c0ec-4ff4-a97a-56bee11d5680\s


DATE: 09-16-2025                          TIME: 01:11:01

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : 50yr 3hr 10min Chicago        **
  ********************************************
```

```
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 813.543
| Ptotal= 64.68 mm |                          B=   0.000
--------------------                          C=   0.699
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    7.56 |  0.83  162.70 |  1.67   11.73 |  2.50    7.30
                0.17    8.91 |  1.00   34.45 |  1.83   10.36 |  2.67    6.83
                0.33   11.03 |  1.17   21.72 |  2.00    9.32 |  2.83    6.44
                0.50   15.09 |  1.33   16.57 |  2.17    8.51 |
                0.67   28.07 |  1.50   13.65 |  2.33    7.85 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   2.24   Curve Number   (CN)= 61.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   6.63   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.295

     PEAK FLOW       (cms)=   0.077 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  15.163
     TOTAL RAINFALL   (mm)=  64.681
     RUNOFF COEFFICIENT   =   0.234

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   0.19   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.17

     Unit Hyd Qpeak  (cms)=   0.042

     PEAK FLOW       (cms)=   0.008 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=  13.133
     TOTAL RAINFALL   (mm)=  64.681
```

RUNOFF COEFFICIENT = 0.203

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

==========
==========

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\c423593b-1342-474d-9035-e0401063c23c\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\c423593b-1342-474d-9035-e0401063c23c\s

DATE: 09-16-2025 TIME: 01:11:01

USER:

COMMENTS: _____

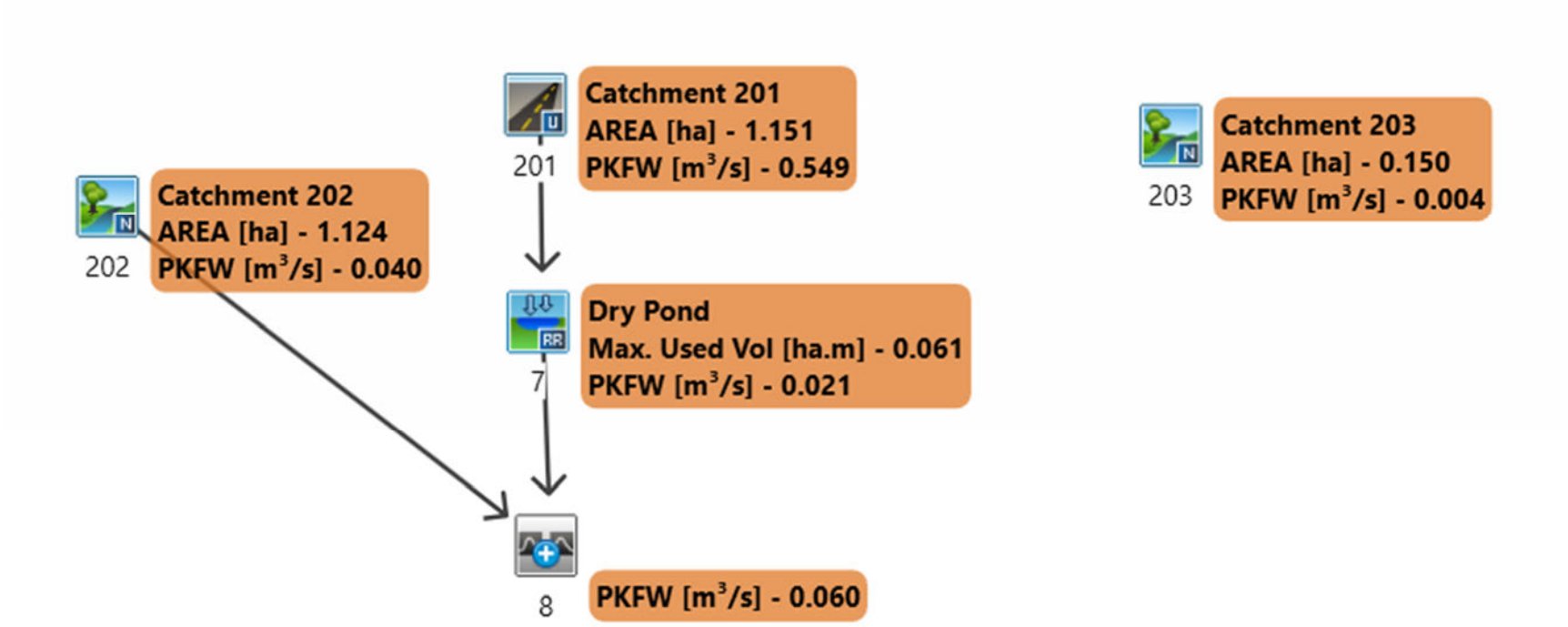
****
** SIMULATION : 5yr 3hr 10min Chicago **
****

```
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 535.364
| Ptotal= 42.56 mm |                          B=   0.000
--------------------                          C=   0.699
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.98 |  0.83  107.07 |  1.67    7.72 |  2.50    4.80
                0.17    5.86 |  1.00   22.67 |  1.83    6.82 |  2.67    4.50
                0.33    7.26 |  1.17   14.30 |  2.00    6.14 |  2.83    4.24
                0.50    9.93 |  1.33   10.90 |  2.17    5.60 |
                0.67   18.47 |  1.50    8.98 |  2.33    5.16 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   2.24   Curve Number   (CN)= 61.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   6.63   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.295

     PEAK FLOW       (cms)=   0.030 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   6.457
     TOTAL RAINFALL   (mm)=  42.565
     RUNOFF COEFFICIENT   =   0.152

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   0.19   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.17

     Unit Hyd Qpeak  (cms)=   0.042

     PEAK FLOW       (cms)=   0.003 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=   5.495
     TOTAL RAINFALL   (mm)=  42.565
```

RUNOFF COEFFICIENT = 0.129

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Post-Development 100-Year Storm Event Controlled Schematic



```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\9
1d939d1-24b7-4724-adba-667f95453b41\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\9
1d939d1-24b7-4724-adba-667f95453b41\s


DATE: 09-16-2025                          TIME: 01:17:46

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  **********************************************
  ** SIMULATION : 005yr 3hr 10min Chicago       **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 535.364
| Ptotal= 42.56 mm |                          B=   0.000
--------------------                          C=   0.699
```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	4.98	0.83	107.07	1.67	7.72	2.50	4.80
0.17	5.86	1.00	22.67	1.83	6.82	2.67	4.50
0.33	7.26	1.17	14.30	2.00	6.14	2.83	4.24
0.50	9.93	1.33	10.90	2.17	5.60		
0.67	18.47	1.50	8.98	2.33	5.16		

CALIB NASHYD (0203) ID= 1 DT=10.0 min	Area (ha)= 0.15	Curve Number (CN)= 61.0
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.58	

Unit Hyd Qpeak (cms)= 0.010

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 7.045
TOTAL RAINFALL (mm)= 42.565
RUNOFF COEFFICIENT = 0.166

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0202) ID= 1 DT=10.0 min	Area (ha)= 1.12	Curve Number (CN)= 58.0
	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.31	

Unit Hyd Qpeak (cms)= 0.138

PEAK FLOW (cms)= 0.013 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 5.732
TOTAL RAINFALL (mm)= 42.565
RUNOFF COEFFICIENT = 0.135

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.15
|ID= 1 DT=10.0 min |   Total Imp(%)=  96.00   Dir. Conn.(%)=  96.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.10         0.05
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.60        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     107.07         9.41
               over (min)        10.00        20.00
     Storage Coeff.  (min)=       2.30 (ii)   14.28 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.17         0.07
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.33         0.00          0.325 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      40.56         7.06          39.22
     TOTAL RAINFALL   (mm)=      42.56        42.56          42.56
     RUNOFF COEFFICIENT   =       0.95         0.17           0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0007)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0047   |    0.0180      0.0413
                          0.0068      0.0058   |    0.0193      0.0489
                          0.0096      0.0098   |    0.0205      0.0569
                          0.0118      0.0152   |    0.0216      0.0655
                          0.0136      0.0211   |    0.0226      0.0745
                          0.0153      0.0274   |    0.0231      0.0791
                          0.0167      0.0341   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     1.151      0.325      1.00      39.22
   OUTFLOW: ID= 1 (  0007)     1.151      0.017      2.50      35.12
```

```
                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.07
                    TIME SHIFT OF PEAK FLOW         (min)= 90.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0332

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.013     1.33     5.73
      + ID2= 2 (  0007):     1.15   0.017     2.50    35.12
        ====================================================
        ID = 3 (  0008):     2.27   0.029     1.33    20.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                    *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\3
13592db-7816-4d68-af00-38806fee1072\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\3
13592db-7816-4d68-af00-38806fee1072\s


DATE: 09-16-2025                          TIME: 01:17:46
```

USER:

COMMENTS: _____

****
** SIMULATION : 010yr 3hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 49.52 mm

IDF curve parameters: A= 622.842
B= 0.000
C= 0.699
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.79	0.83	124.56	1.67	8.98	2.50	5.59
0.17	6.82	1.00	26.38	1.83	7.93	2.67	5.23
0.33	8.45	1.17	16.63	2.00	7.14	2.83	4.93
0.50	11.56	1.33	12.68	2.17	6.51		
0.67	21.49	1.50	10.45	2.33	6.01		

CALIB NASHYD (0203) | ID= 1 DT=10.0 min	Area (ha)= 0.15	Curve Number (CN)= 61.0
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.58	

Unit Hyd Qpeak (cms)= 0.010

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 9.564
TOTAL RAINFALL (mm)= 49.520
RUNOFF COEFFICIENT = 0.193

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.12   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.138

     PEAK FLOW       (cms)=   0.019 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   7.943
     TOTAL RAINFALL   (mm)=  49.520
     RUNOFF COEFFICIENT   =   0.160

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.15
|ID= 1 DT=10.0 min |   Total Imp(%)=  96.00   Dir. Conn.(%)=  96.00
--------------------

                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.10         0.05
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.60        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     124.56        19.10
               over (min)       10.00        20.00
     Storage Coeff.  (min)=       2.16 (ii)   11.19 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.17         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.38         0.00         0.380 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17          1.00
     RUNOFF VOLUME    (mm)=      47.52         9.58         45.99
     TOTAL RAINFALL   (mm)=      49.52        49.52         49.52
     RUNOFF COEFFICIENT   =       0.96         0.19          0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0007)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000      0.0047    |    0.0180      0.0413
                          0.0068      0.0058    |    0.0193      0.0489
                          0.0096      0.0098    |    0.0205      0.0569
                          0.0118      0.0152    |    0.0216      0.0655
                          0.0136      0.0211    |    0.0226      0.0745
                          0.0153      0.0274    |    0.0231      0.0791
                          0.0167      0.0341    |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)      1.151      0.380      1.00      45.99
   OUTFLOW: ID= 1 (  0007)      1.151      0.018      2.67      41.89

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.66
                  TIME SHIFT OF PEAK FLOW         (min)=100.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0395

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.019     1.33     7.94
      + ID2= 2 (  0007):     1.15   0.018     2.67    41.89
        ================================================
        ID = 3 (  0008):     2.27   0.035     1.33    25.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\bdb03331-de37-4432-87f9-f917e2f16a15\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\bdb03331-de37-4432-87f9-f917e2f16a15\s

DATE: 09-16-2025 TIME: 01:17:46

USER:

COMMENTS: _____

** SIMULATION : 025yr 3hr 10min Chicago **

| CHICAGO STORM |
| Ptotal= 58.14 mm |

IDF curve parameters: A= 731.314
B= 0.000
C= 0.699
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.80	0.83	146.25	1.67	10.54	2.50	6.56
0.17	8.01	1.00	30.97	1.83	9.31	2.67	6.14
0.33	9.92	1.17	19.53	2.00	8.38	2.83	5.79
0.50	13.57	1.33	14.89	2.17	7.65		
0.67	25.24	1.50	12.27	2.33	7.05		

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.15   Curve Number   (CN)= 61.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.58

     Unit Hyd Qpeak  (cms)=   0.010

     PEAK FLOW       (cms)=   0.003 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  13.088
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.225

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.12   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.138

     PEAK FLOW       (cms)=   0.026 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  11.070
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.190

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.15
|ID= 1 DT=10.0 min |   Total Imp(%)=  96.00   Dir. Conn.(%)=  96.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.10         0.05
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.60        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     146.25        26.89
               over (min)       10.00        10.00
```

```
     Storage Coeff.  (min)=       2.03 (ii)    9.90 (ii)
     Unit Hyd. Tpeak (min)=      10.00        10.00
     Unit Hyd. peak  (cms)=       0.17         0.11
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.45         0.00          0.448 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00           1.00
     RUNOFF VOLUME    (mm)=      56.14        13.10          54.42
     TOTAL RAINFALL   (mm)=      58.14        58.14          58.14
     RUNOFF COEFFICIENT   =       0.97         0.23           0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0007)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000      0.0047   |    0.0180      0.0413
                           0.0068      0.0058   |    0.0193      0.0489
                           0.0096      0.0098   |    0.0205      0.0569
                           0.0118      0.0152   |    0.0216      0.0655
                           0.0136      0.0211   |    0.0226      0.0745
                           0.0153      0.0274   |    0.0231      0.0791
                           0.0167      0.0341   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)      1.151      0.448      1.00      54.42
   OUTFLOW: ID= 1 (  0007)      1.151      0.019      2.83      50.32

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.27
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0479

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.026     1.33    11.07
      + ID2= 2 (  0007):     1.15   0.019     2.83    50.32
        ================================================
```

```
        ID = 3 (  0008):     2.27   0.044     1.33    30.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------

 FINISH
================================================================================
========================

================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\9
8ee1e4f-501c-46d6-95ea-1bb6fed9eb5c\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\9
8ee1e4f-501c-46d6-95ea-1bb6fed9eb5c\s


DATE: 09-16-2025                          TIME: 01:17:46

USER:



COMMENTS: _____________________________________________________________

------------------------------------------------------------------------------
```

```
------------------------
  ********************************************
  ** SIMULATION : 050yr 3hr 10min Chicago       **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 813.543
| Ptotal= 64.68 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    7.56 |  0.83  162.70 |  1.67   11.73 |  2.50    7.30
                0.17    8.91 |  1.00   34.45 |  1.83   10.36 |  2.67    6.83
                0.33   11.03 |  1.17   21.72 |  2.00    9.32 |  2.83    6.44
                0.50   15.09 |  1.33   16.57 |  2.17    8.51 |
                0.67   28.07 |  1.50   13.65 |  2.33    7.85 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.15   Curve Number   (CN)= 61.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.58

     Unit Hyd Qpeak  (cms)=   0.010

     PEAK FLOW       (cms)=   0.004 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  16.021
     TOTAL RAINFALL   (mm)=  64.681
     RUNOFF COEFFICIENT   =   0.248

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.12   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.138
```

```
     PEAK FLOW       (cms)=   0.033 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  13.700
     TOTAL RAINFALL   (mm)=  64.681
     RUNOFF COEFFICIENT   =   0.212

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.15
|ID= 1 DT=10.0 min |   Total Imp(%)=  96.00   Dir. Conn.(%)=  96.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.10         0.05
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.60        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     162.70        33.49
               over (min)       10.00        10.00
     Storage Coeff.  (min)=       1.94 (ii)    9.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        10.00
     Unit Hyd. peak  (cms)=       0.17         0.11
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.50         0.00          0.500 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00           1.00
     RUNOFF VOLUME    (mm)=      62.68        16.04          60.81
     TOTAL RAINFALL   (mm)=      64.68        64.68          64.68
     RUNOFF COEFFICIENT   =       0.97         0.25           0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0007)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0047   |    0.0180      0.0413
                          0.0068      0.0058   |    0.0193      0.0489
                          0.0096      0.0098   |    0.0205      0.0569
```

```
                          0.0118      0.0152   |    0.0216      0.0655
                          0.0136      0.0211   |    0.0226      0.0745
                          0.0153      0.0274   |    0.0231      0.0791
                          0.0167      0.0341   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     1.151      0.500      1.00      60.81
   OUTFLOW: ID= 1 (  0007)     1.151      0.020      3.00      56.71

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.03
                  TIME SHIFT OF PEAK FLOW         (min)=120.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0545

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.033     1.33    13.70
      + ID2= 2 (  0007):     1.15   0.020     3.00    56.71
        ================================================
        ID = 3 (  0008):     2.27   0.052     1.33    35.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
```

Output filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\5496dc1a-2469-4b0c-9f12-fd5c53ae6d3d\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\5496dc1a-2469-4b0c-9f12-fd5c53ae6d3d\s

DATE: 09-16-2025 TIME: 01:17:46

USER:

COMMENTS: _____

****
** SIMULATION : 100yr 3hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 70.94 mm

IDF curve parameters: A= 892.273
B= 0.000
C= 0.699
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	8.30	0.83	178.44	1.67	12.86	2.50	8.00
0.17	9.77	1.00	37.79	1.83	11.36	2.67	7.50
0.33	12.10	1.17	23.83	2.00	10.23	2.83	7.06
0.50	16.55	1.33	18.17	2.17	9.33		
0.67	30.79	1.50	14.97	2.33	8.61		

CALIB NASHYD (0203) | ID= 1 DT=10.0 min

Area (ha)= 0.15 Curve Number (CN)= 61.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.58

Unit Hyd Qpeak (cms)= 0.010

```
     PEAK FLOW       (cms)=   0.004 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  19.027
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.268

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.12   Curve Number   (CN)= 58.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.138

     PEAK FLOW       (cms)=   0.040 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  16.409
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.231

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.15
|ID= 1 DT=10.0 min |   Total Imp(%)=  96.00   Dir. Conn.(%)=  96.00
--------------------

                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.10         0.05
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.60        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     178.44        40.33
               over (min)        10.00        10.00
     Storage Coeff.  (min)=       1.87 (ii)    8.57 (ii)
     Unit Hyd. Tpeak (min)=      10.00        10.00
     Unit Hyd. peak  (cms)=       0.17         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.55         0.00         0.549 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00          1.00
     RUNOFF VOLUME    (mm)=      68.94        19.04         66.94
     TOTAL RAINFALL   (mm)=      70.94        70.94         70.94
     RUNOFF COEFFICIENT   =       0.97         0.27          0.94
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(0007)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 10.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0047	0.0180	0.0413
0.0068	0.0058	0.0193	0.0489
0.0096	0.0098	0.0205	0.0569
0.0118	0.0152	0.0216	0.0655
0.0136	0.0211	0.0226	0.0745
0.0153	0.0274	0.0231	0.0791
0.0167	0.0341	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	1.151	0.549	1.00	66.94
OUTFLOW: ID= 1 (0007)	1.151	0.021	3.00	62.84

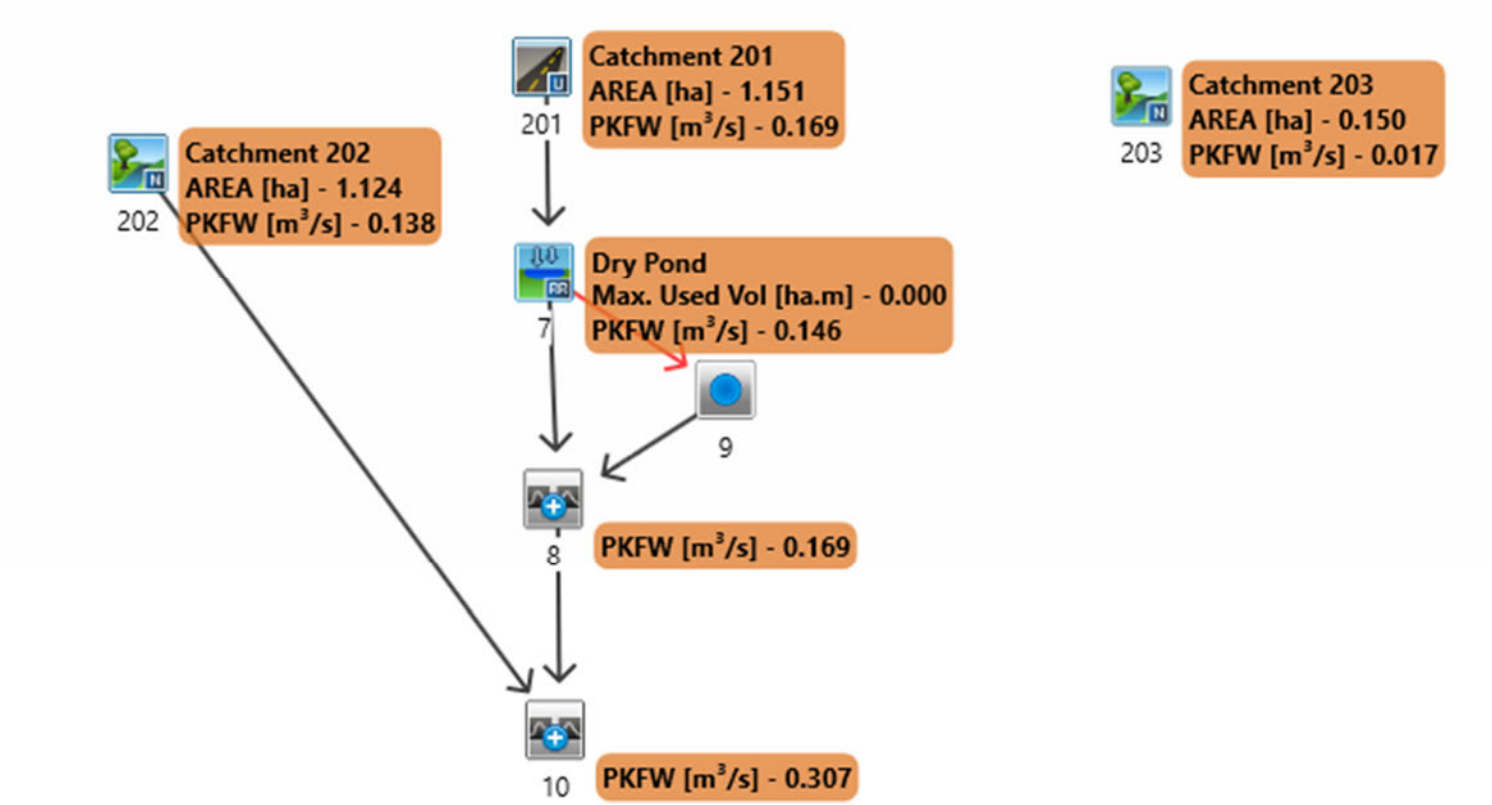
PEAK FLOW REDUCTION [Qout/Qin](%)= 3.82
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 0.0608

| ADD HYD (0008)|
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0202):	1.12	0.040	1.33	16.41
+ ID2= 2 (0007):	1.15	0.021	3.00	62.84
ID = 3 (0008):	2.27	0.060	1.33	39.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Post-Development Regional Storm Event Schematic



```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2017)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\6
3237b70-26c2-40f3-94cc-8a07274e1536\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\6
3237b70-26c2-40f3-94cc-8a07274e1536\s


DATE: 09-16-2025                          TIME: 02:48:32

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  **********************************************
  ** SIMULATION : Hazel                        **
  **********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\brett.pond\AppD
|                  |              ata\Local\Temp\
```

| | 8c770a06-e970-4180-a67e-3696b3a9e0c9\4dae20af
| Ptotal=212.00 mm | Comments: Hazel

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB					
NASHYD (0203)	Area (ha)=	0.15	Curve Number (CN)=	79.0	
ID= 1 DT=10.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.58			

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.010

PEAK FLOW (cms)= 0.017 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 156.007
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.736

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0202)	Area (ha)= 1.12	Curve Number (CN)= 76.0	
ID= 1 DT=10.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.31		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.138

PEAK FLOW (cms)= 0.138 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 146.597
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.691

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0201)	Area (ha)= 1.15		
ID= 1 DT=10.0 min	Total Imp(%)= 96.00	Dir. Conn.(%)= 96.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.10	0.05
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	87.60	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=		53.00	47.96	
over (min)		10.00	10.00	
Storage Coeff. (min)=		3.04 (ii)	9.29 (ii)	
Unit Hyd. Tpeak (min)=		10.00	10.00	
Unit Hyd. peak (cms)=		0.16	0.11	
				TOTALS
PEAK FLOW	(cms)=	0.16	0.01	0.169 (iii)
TIME TO PEAK	(hrs)=	9.83	10.00	10.00
RUNOFF VOLUME	(mm)=	210.00	156.09	207.84
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	0.99	0.74	0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 79.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0007)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                           0.0000      0.0047   |    0.0180      0.0413
                           0.0068      0.0058   |    0.0193      0.0489
                           0.0096      0.0098   |    0.0205      0.0569
                           0.0118      0.0152   |    0.0216      0.0655
                           0.0136      0.0211   |    0.0226      0.0745
                           0.0153      0.0274   |    0.0231      0.0791
                           0.0167      0.0341   |    0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)      1.151      0.169     10.00     207.84
   OUTFLOW: ID= 1 (  0007)      0.704      0.023      9.17     203.62
   OVERFLOW:ID= 3 (  0003)      0.447      0.146     10.00     203.62

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =    18
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  3.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) = 11.32

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.69
                  TIME SHIFT OF PEAK FLOW         (min)=-50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0791

--------------------------------------------------------------------------------

  --------------------------
  | Junction Command(0009) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 3(  0007)    0.45      0.15   10.00   203.62
  OUTFLOW: ID= 2(  0009)    0.45      0.15   10.00   203.62

  --------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0007):     0.70   0.023     9.17   203.62
      + ID2= 2 (  0009):     0.45   0.146    10.00   203.62
        ================================================
```

```
        ID = 3 (  0008):     1.15   0.169    10.00   203.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.138    10.00   146.60
      + ID2= 2 (  0008):     1.15   0.169    10.00   203.62
        ================================================
        ID = 3 (  0010):     2.27   0.307    10.00   175.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------

 FINISH
================================================================================
========================
```

5-YR STORM SEWER DESIGN SHEET

Location			Drainage Area				Runoff				Pipe						
Catchment ID	From MH	To MH	A *ha*	C	AC	Cuml AC	Tc *min*	Cumul Tc *min*	I *mm/hr*	Q *L/S*	Length *m*	Pipe Dia *mm*	Pipe Slope *%*	Full Capacity *LPS*	V *m/s*	Time of Flow *min*	% full
	CB7.1	CBMH7	0.132	0.90	0.118	0.118	10.0	10.0	107.07	35.22	44.8	250	0.50%	42.05	0.86	0.87	83.8%
	CBMH7	CBMH6	0.047	0.90	0.042	0.161	10.0	10.9	100.99	45.09	40.4	300	0.50%	68.38	0.97	0.70	65.9%
	CBMH6	CBMH5	0.128	0.90	0.115	0.276	10.0	11.6	96.70	74.04	53.4	375	0.50%	123.98	1.12	0.79	59.7%
	CBMH5	CBMH2	0.066	0.90	0.060	0.335	10.0	12.4	92.32	86.02	20.8	375	0.50%	123.98	1.12	0.31	69.4%
	CB4.1	CBMH4	0.087	0.90	0.078	0.078	10.0	10.0	107.07	23.34	44.8	250	0.50%	42.05	0.86	0.87	55.5%
	CBMH4	CBMH3	0.029	0.90	0.026	0.104	10.0	10.9	100.99	29.24	40.4	300	0.50%	68.38	0.97	0.70	42.8%
	CBMH3	CBMH2	0.119	0.90	0.107	0.211	10.0	11.6	96.70	56.76	53.4	375	0.50%	123.98	1.12	0.79	45.8%
	CB1.2	MH1	0.128	0.90	0.115	0.115	10.0	10.0	107.07	34.26	31.2	250	0.50%	42.05	0.86	0.61	81.5%
	CBMH2	MH1	0.098	0.90	0.088	0.750	10.0	12.7	90.75	189.02	42.0	450	0.50%	201.60	1.27	0.55	93.8%
	CB1.1	MH1	0.145	0.90	0.130	0.130	10.0	10.0	107.07	38.73	32.4	250	0.50%	42.05	0.86	0.63	92.1%
	MH1	Outlet	0.046	0.90	0.041	0.921	10.0	13.2	88.08	225.34	16.5	525	0.50%	304.10	1.40	0.20	74.1%

Notes:
Cumulative Tc for each manhole stretch.

Dundalk IDF

Return Period	5-Year
A	535.364
B	0
C	0.699
Manning's N	0.013
Runoff Coefficient Multiplier	1

Van Harten
LAND SURVEYORS - ENGINEERS

Van Harten File No.	31489-22
Property Address:	752065 Ida Street
Date:	18-Sep-25

Hydroworks Sizing Summary

Dundalk Self Storage

09-18-2025

Recommended Size: HydroStorm HS 6

Hydroworks Sizing Program Version 5.8.5

A HydroStorm HS 6 is recommended to provide 80 % annual TSS removal based on a drainage area of 1.023 (ha) with an imperviousness of 100 % and Kitchener / Waterloo, Ontario rainfall for the 20 um to 2000 um particle size distribution.

The recommended HydroStorm HS 6 treats 99 % of the annual runoff and provides 81 % annual TSS removal for the Kitchener / Waterloo rainfall records and 20 um to 2000 um particle size distribution.

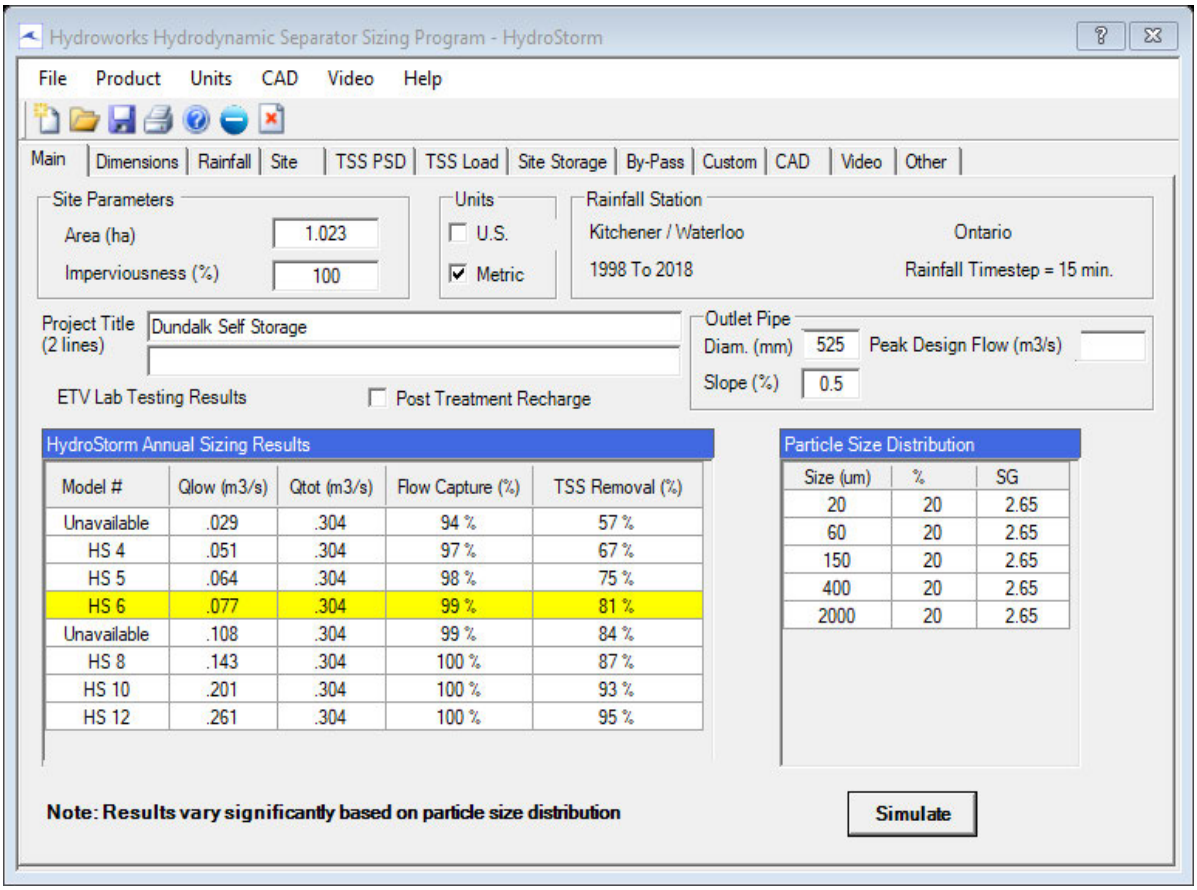
The HydroStorm has a headloss coefficient (K) of 1.04. Since a peak flow was not specified, headloss was calculated using the full pipe flow of .3 (m3/s) for the given 525 (mm) pipe diameter at .5% slope. The headloss was calculated to be 105 (mm) based on a flow depth of 525 (mm) (full pipe flow).

This summary report provides the main parameters that were used for sizing. These parameters are shown on the summary tables and graphs provided in this report.

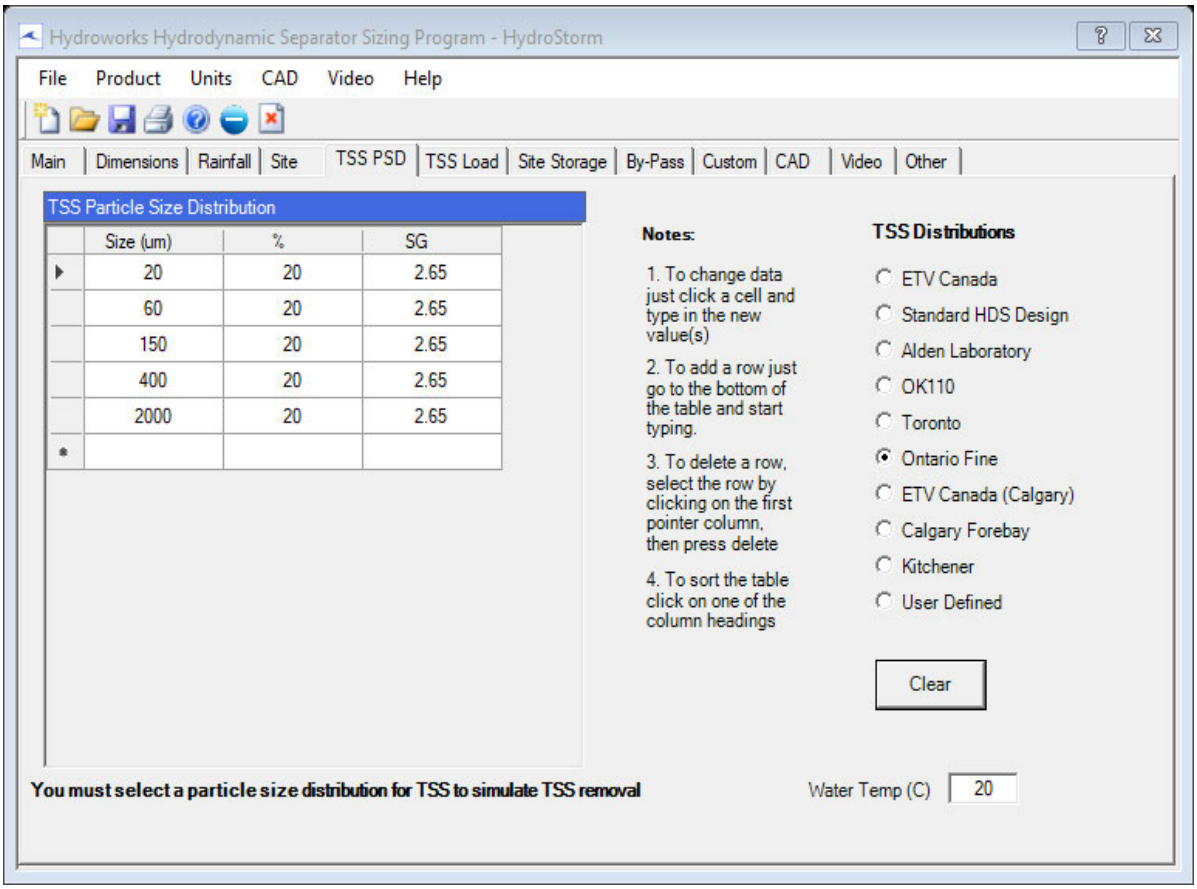
If you have any questions regarding this sizing summary please do not hesitate to contact Hydroworks at 888-290-7900 or email us at support@hydroworks.com.

The sizing program is for sizing purposes only and does not address any site specific parameters such as hydraulic gradeline, tailwater submergence, groundwater, soils bearing capacity, etc. Headloss calculations are not a hydraulic gradeline calculation since this requires a starting water level and an analysis of the entire system downstream of the HydroStorm .

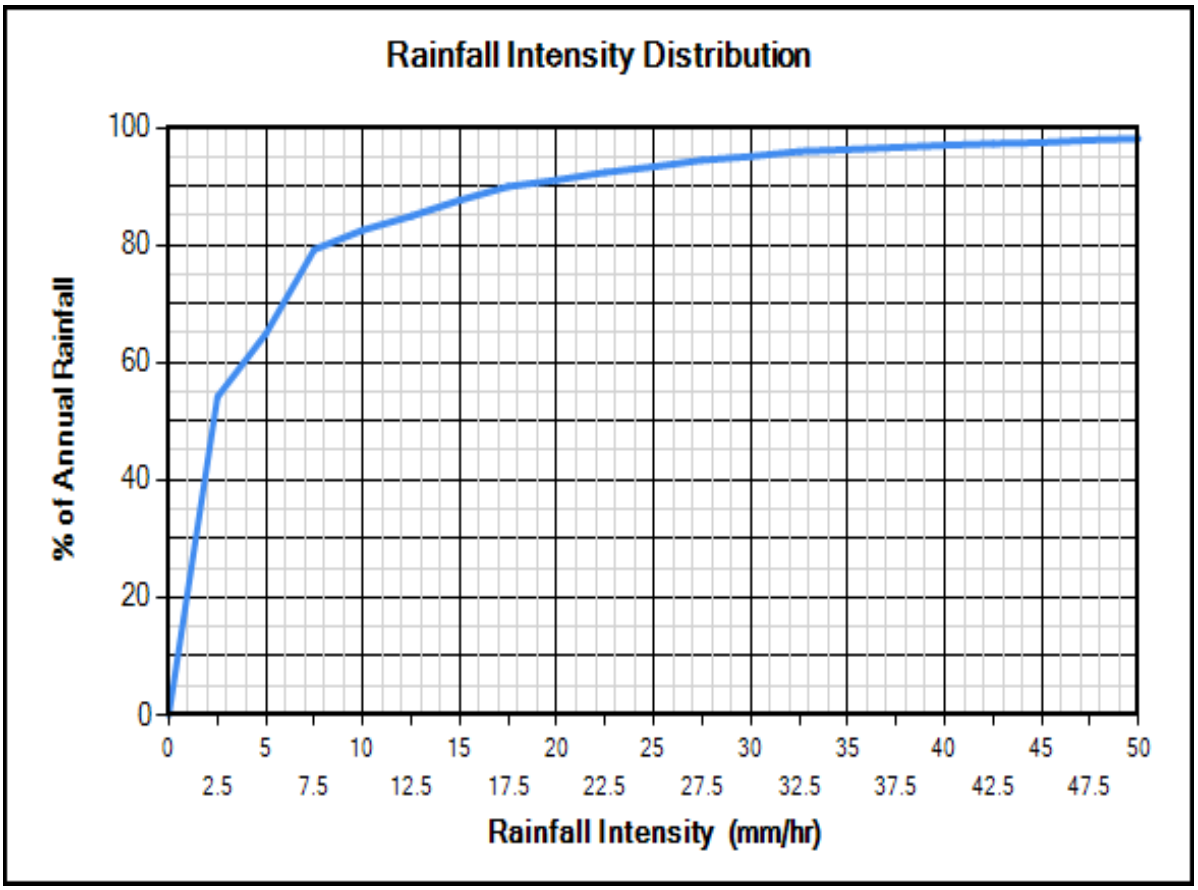
TSS Removal Sizing Summary



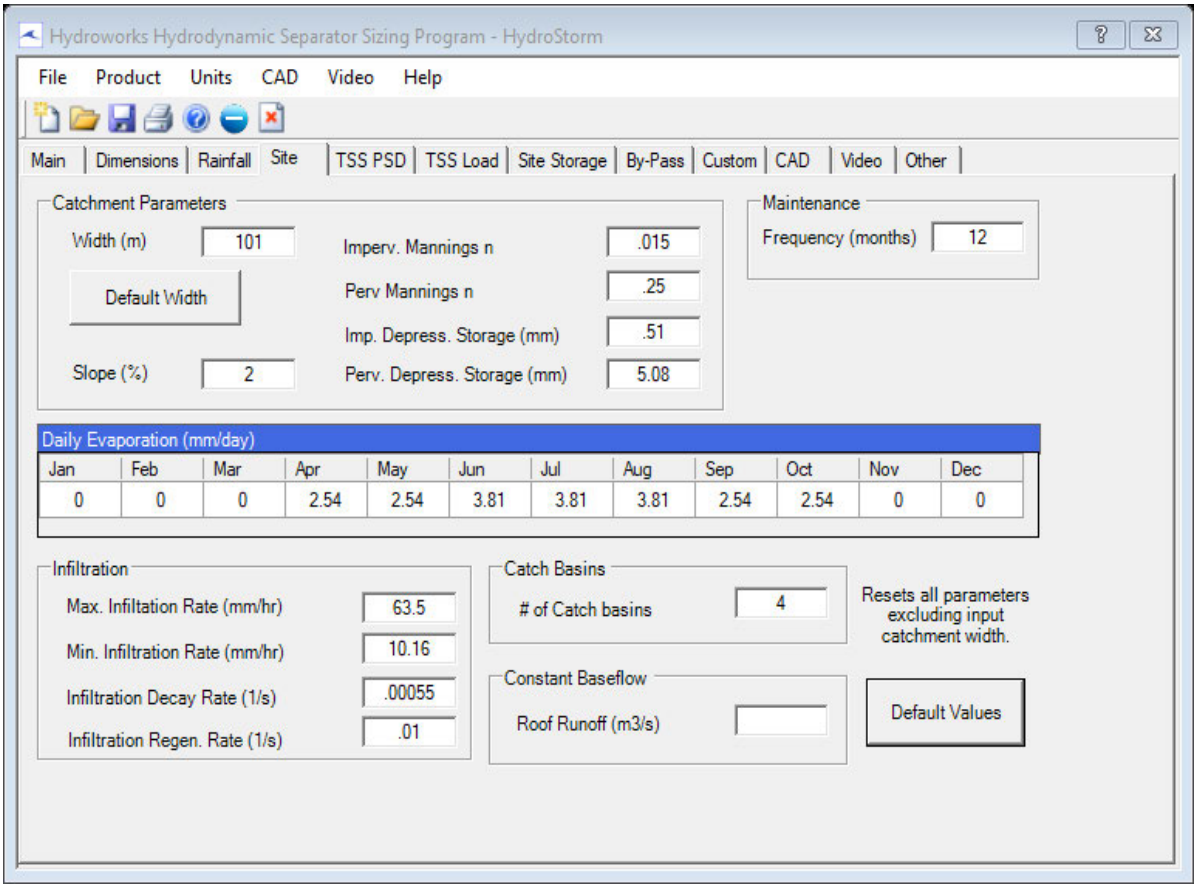
TSS Particle Size Distribution



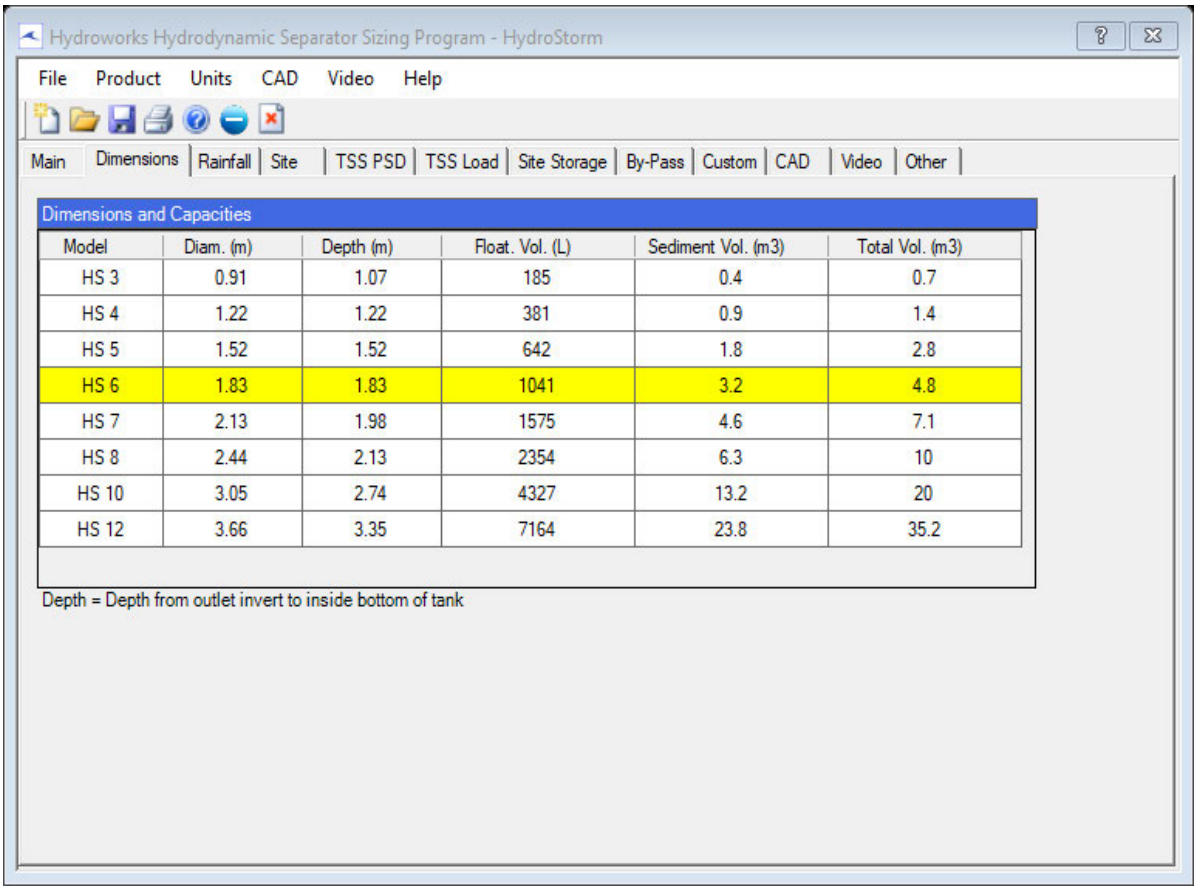
Rainfall Station - Kitchener / Waterloo, Ontario(1998 To 2018)



Site Physical Characteristics



Dimensions And Capacities

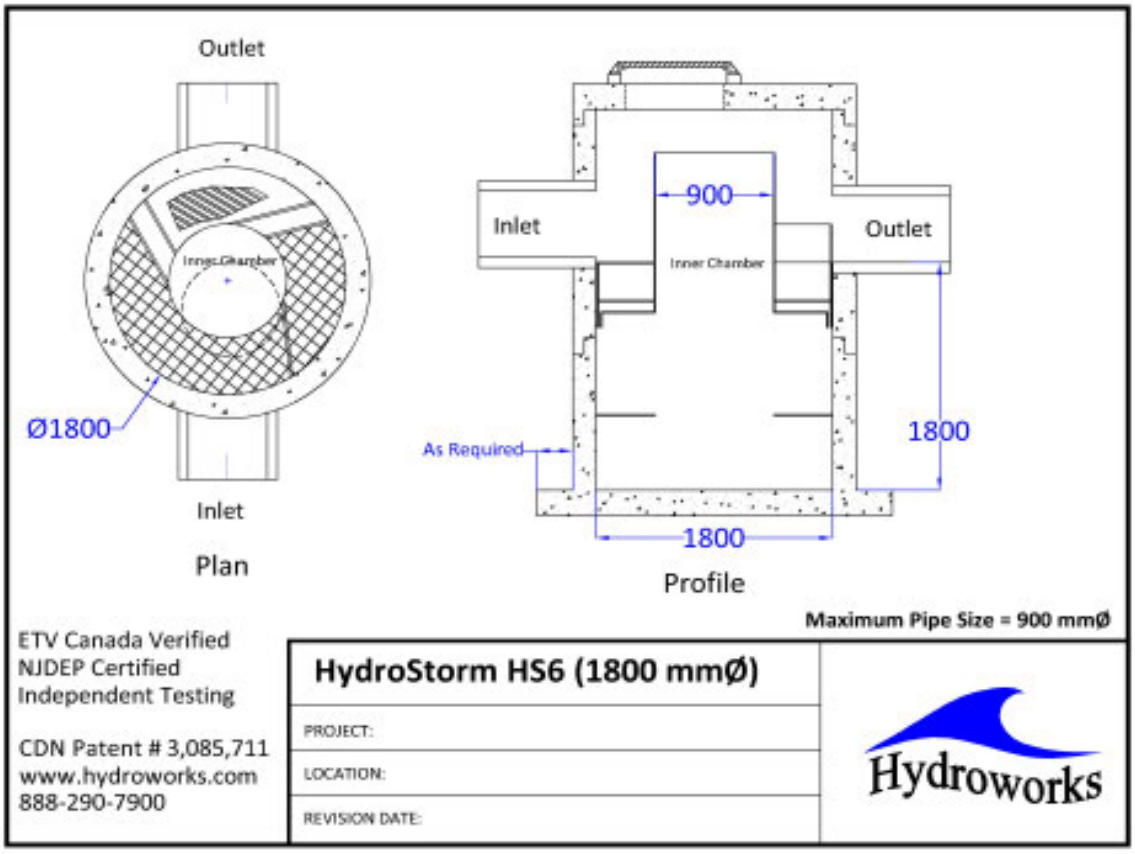


Dimensions and Capacities

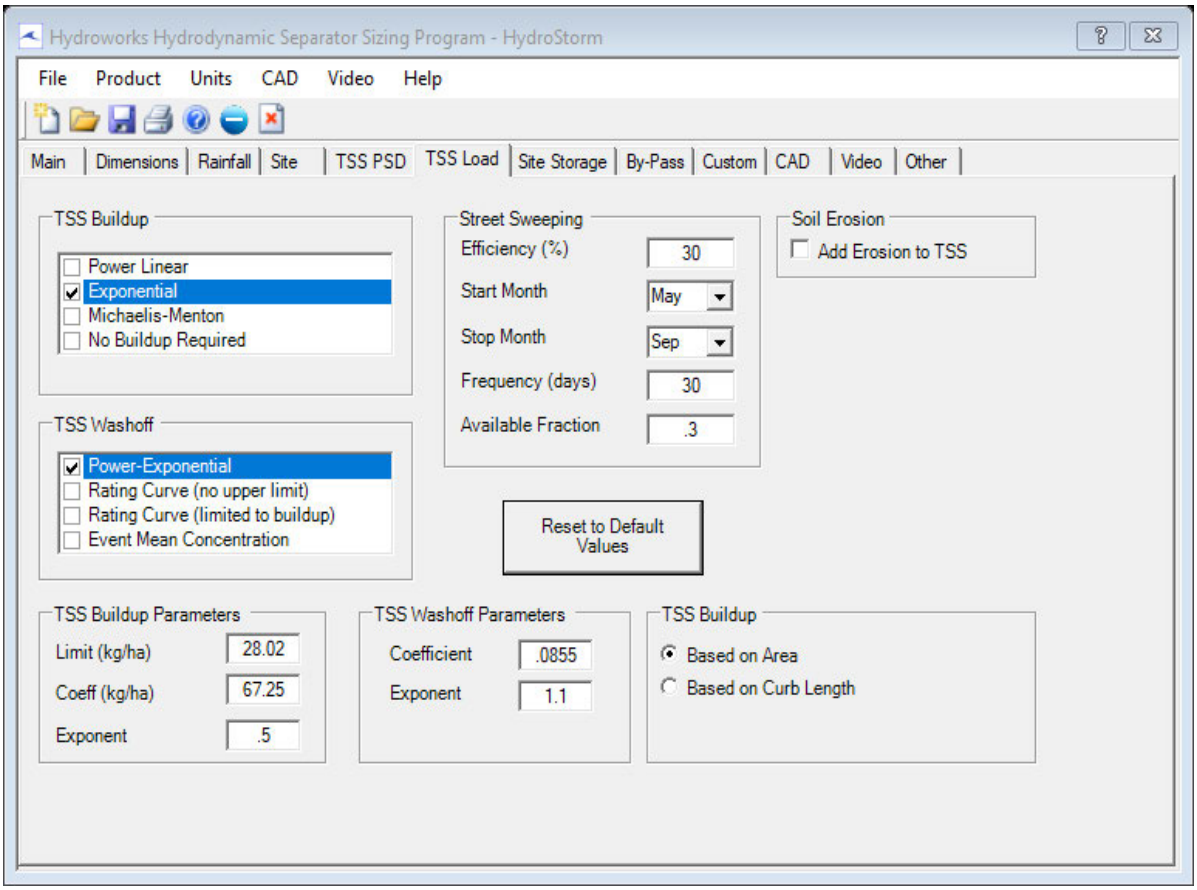
Model	Diam. (m)	Depth (m)	Float. Vol. (L)	Sediment Vol. (m3)	Total Vol. (m3)
HS 3	0.91	1.07	185	0.4	0.7
HS 4	1.22	1.22	381	0.9	1.4
HS 5	1.52	1.52	642	1.8	2.8
HS 6	1.83	1.83	1041	3.2	4.8
HS 7	2.13	1.98	1575	4.6	7.1
HS 8	2.44	2.13	2354	6.3	10
HS 10	3.05	2.74	4327	13.2	20
HS 12	3.66	3.35	7164	23.8	35.2

Depth = Depth from outlet invert to inside bottom of tank

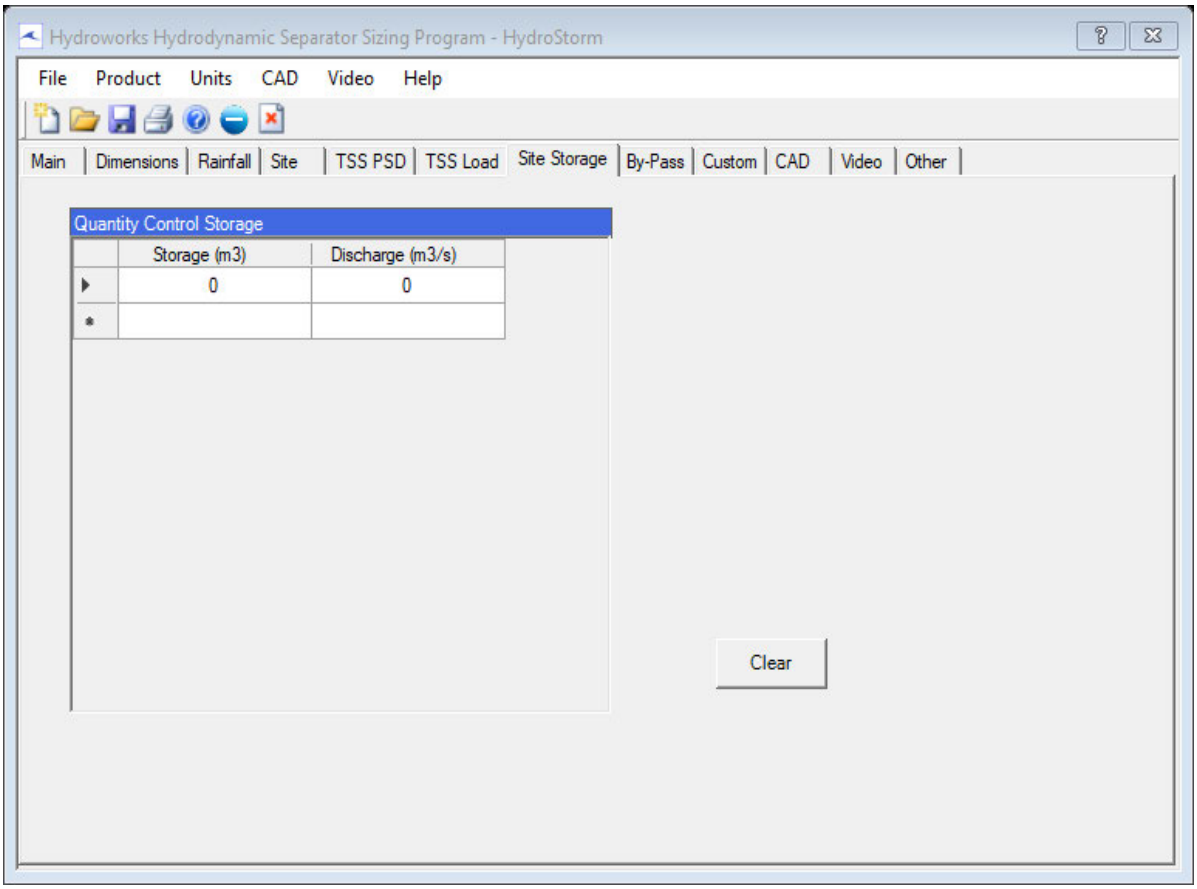
Generic HS 6 CAD Drawing



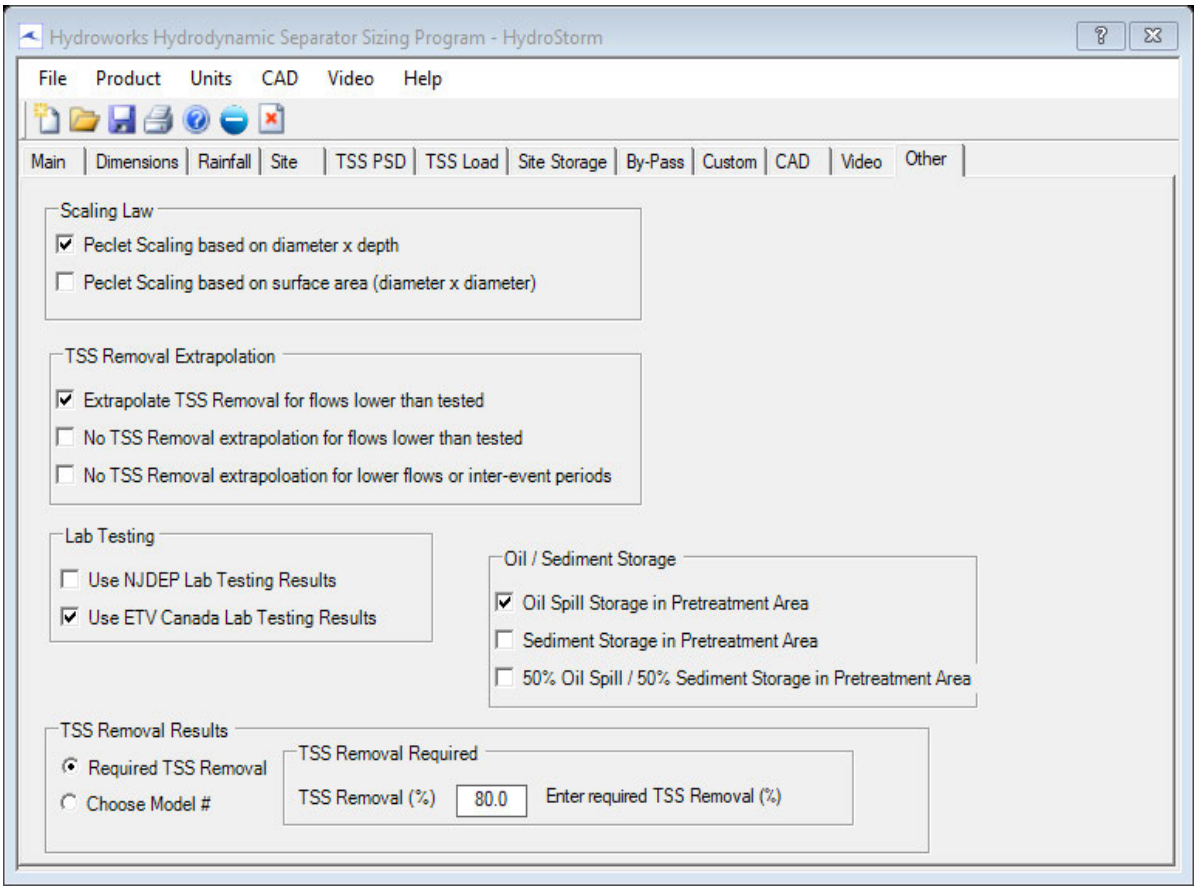
TSS Buildup And Washoff



Upstream Quantity Storage



Other Parameters



Flagged Issues

None

Hydroworks Sizing Program - Version 5.8.5
Copyright Hydroworks, LLC, 2024
1-800-290-7900
www.hydroworks.com

Hydroworks® HydroStorm

Operations & Maintenance Manual

Version 1.2

Please call Hydroworks at 888-290-7900 or email us at support@hydroworks.com if you have any questions regarding the Inspection Checklist. Please email a copy of the completed checklist to Hydroworks at for our records.

Introduction

The HydroStorm is a state-of-the-art hydrodynamic separator. Hydrodynamic separators remove solids, debris and lighter than water (oil, trash, floating debris) pollutants from stormwater. Hydrodynamic separators and other water quality measures are mandated by regulatory agencies (Town/City, State, Federal Government) to protect storm water quality from pollution generated by urban development (traffic, people) as part of new development permitting requirements.

As storm water treatment structures fill up with pollutants they become less and less effective in removing new pollution. Therefore, it is important that storm water treatment structures be maintained on a regular basis to ensure that they are operating at optimum performance. The HydroStorm is no different in this regard and this manual has been assembled to provide the owner/operator with the necessary information to inspect and coordinate maintenance of their HydroStorm.

Hydroworks® HydroStorm Operation

The Hydroworks HydroStorm (HS) separator is a unique hydrodynamic by-pass separator. It incorporates a protected submerged pretreatment zone to collect larger solids, a treatment tank to remove finer solids, and a dual set of weirs to create a high flow bypass. High flows are conveyed directly to the outlet and do not enter the treatment area, however, the submerged pretreatment area still allows removal of coarse solids during high flows.

Under normal or low flows, water enters an inlet area with a horizontal grate. The area underneath the grate is submerged with openings to the main treatment area of the separator. Coarse solids fall through the grate and are either trapped in the pretreatment area or conveyed into the main treatment area depending on the flow rate. Fines are transported into the main treatment area. Openings and weirs in the pretreatment area allow entry of water and solids into the main treatment area and cause water to rotate in the main treatment area creating a vortex motion. Water in the main treatment area is forced to rise along the walls of the separator to discharge from the treatment area to the downstream pipe.

The vortex motion forces solids and floatables to the middle of the inner chamber. Floatables are trapped since the inlet to the treatment area is submerged. The design maximizes the retention of settled solids since solids are forced to the center of the inner chamber by the vortex motion of water while water must flow up the walls of the separator to discharge into the downstream pipe.

A set of high flow weirs near the outlet pipe create a high flow bypass over both the pretreatment area and main treatment chamber. The rate of flow into the treatment area is regulated by the number and size of openings into the treatment chamber and the height of by-pass weirs. High flows flow over the weirs directly to the outlet pipe preventing the scour and resuspension of any fines collected in the treatment chamber.

A central access tube is located in the structure to provide access for cleaning. The arrangement of the inlet area and bypass weirs near the outlet pipe facilitate the use of multiple inlet pipes.

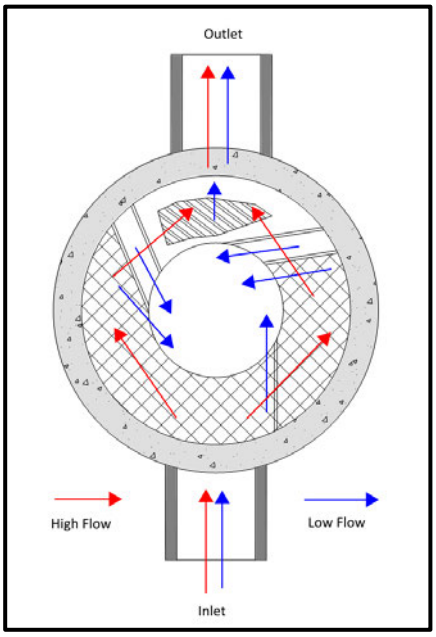


Figure 1. Hydroworks HydroStorm Operation – Plan View

Figure 2 is a profile view of the HydroStorm separator showing the flow patterns for low and high flows.

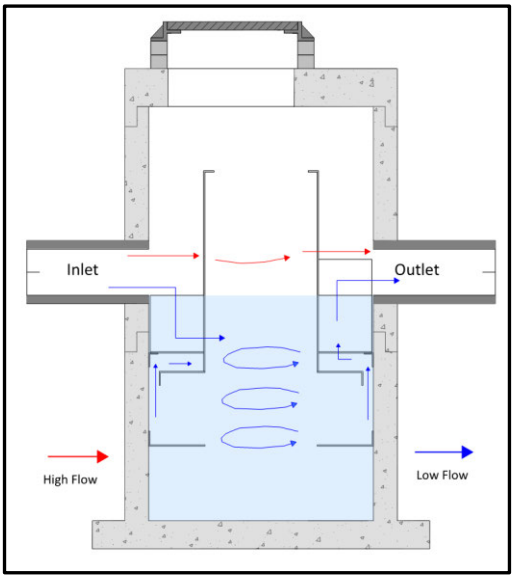


Figure 2. Hydroworks HydroStorm Operation – Profile View

Hydroworks

The HS 4i is an inlet version of the HS 4 separator. There is a catch-basin grate on top of the HS 4i. A funnel sits sits underneath the grate on the frame and directs the water to the inlet side of the separator to ensure all lows flows are properly treated. The whole funnel is removed for inspection and cleaning.

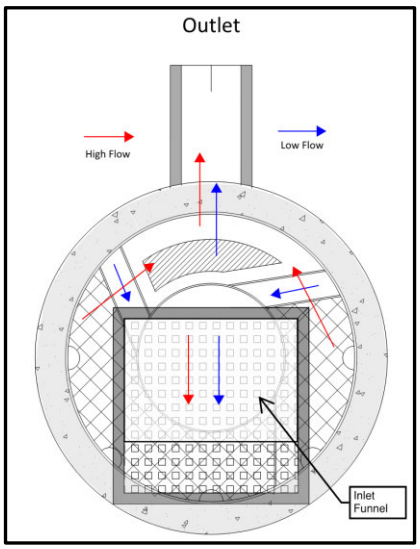


Figure 3. Hydroworks HS 4i Funnel

Construction Materials

The inner chamber and outlet baffle are made out of a copolymer plastic. The shell of the structure is pre-cast concrete. Pre-cast concrete is readily accepted by all municipalities since it has the following advantages:

- long service life
- ease of installation (less dependent on backfill (contractor proficiency) for structural integrity)
- concrete structures are designed for both anti-buoyancy and traffic loading without any field requirements (such as structural loading slabs in traffic areas and anti-buoyancy slabs to prevent groundwater uplift).
- low maintenance requirements

Hydroworks HS Separator Dimensions and Capacities

The HS separator is manufactured in a variety of sizes from 4 ft inside diameter to 12 ft inside diameter as shown in Table 1. Larger sizes may not be available in all areas. Please check with Hydroworks to ensure availability of the larger model sizes.

Table 1. Hydroworks HS Separator Dimensions*					
Model	Structure Inside Diam. (SID) (mm)	Structure Depth (mm)*	Sediment/ Sinking Trash Volume (L)	Oil/Floating Trash Volume (L)	Permanent Pool Wet Volume (L)
HS 3	900	1050	420	150	700
HS 4	1200	1200	845	355	1420
HS 5	1500	1500	1695	620	2775
HS 6	1800	1800	3110	1020	4800
HS 7	2100	1950	4530	1550	7080
HS 8	2400	2100	6225	2325	9960
HS 9	2700	2400	9200	3195	14410
HS 10	3000	2700	13025	4275	20015
HS 12	3600	3000	20525	7095	30535

*Dimensions vary with project requirements

The volumes provided in Table 1 for oil and sediment are to full capacity and not indicative of recommended depths/volumes for maintenance.

Headloss

Any water quality system implemented in a storm drain network will create headloss in the system. In general, depending on the configuration of the by-pass, systems designed to treat high flows or all of the flow will have a higher headloss impact on the storm drain network than systems that by-pass high flows.

The headloss created by the HS separator was measured in an independent laboratory (Alden Research Laboratory) for a full-scale HS 4. The K value ($h = K\ v^2/(2g)$) for headloss calculations was determined to be 1.04 as shown in Figure 3.

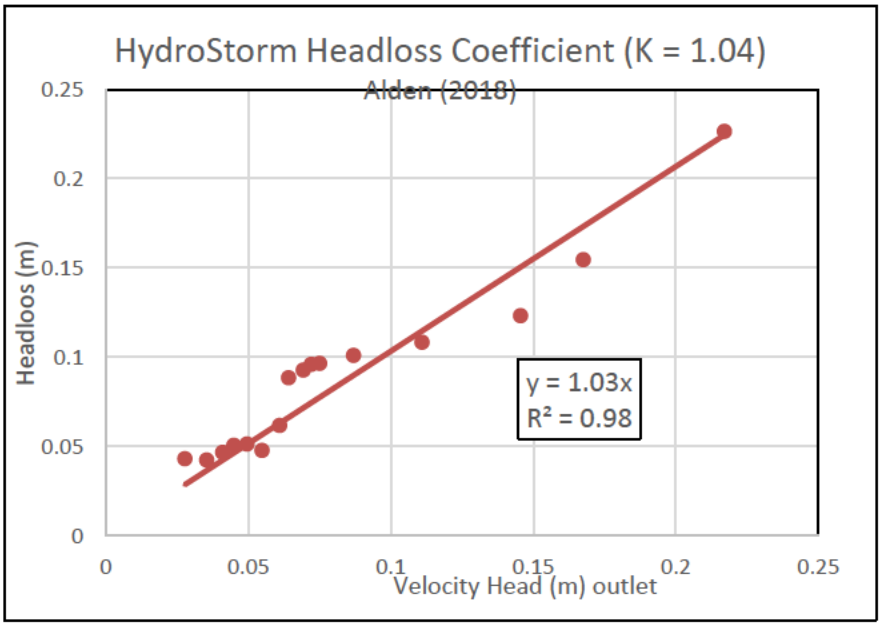


Figure 3. HydroStorm Headloss K Factor (1.04)

Hydroworks

Inspection

Procedure

Floatables

A visual inspection can be conducted for floatables by removing the covers and looking down into the center access tube of the separator. Separators with an inlet grate (HS 4i or custom separator) will have a plastic funnel located under the grate that must be removed from the frame prior to inspection or maintenance. If you are missing a funnel please contact Hydroworks at the numbers provided at the end of this document.

TSS/Sediment

Inspection for TSS build-up can be conducted using a Sludge Judge®, Core Pro®, AccuSludge® or equivalent sampling device that allows the measurement of the depth of TSS/sediment in the unit. These devices typically have a ball valve at the bottom of the tube that allows water and TSS to flow into the tube when lowering the tube into the unit. Once the unit touches the bottom of the device, it is quickly pulled upward such that the water and TSS in the tube forces the ball valve closed allowing the user to see a full core of water/TSS in the unit. The unit should be inspected for TSS through each of the access covers. Several readings (2 or 3) should be made at each access cover to ensure that an accurate TSS depth measurement is recorded.

Frequency

Construction Period

The HydroStorm separator should be inspected every four weeks and after every large storm (over 0.5” (12.5 mm) of rain) during the construction period.

Post-Construction Period

The Hydroworks HydroStorm separator should be inspected during the first year of operation for normal stabilized sites (grassed or paved areas). If the unit is subject to oil spills or runoff from unstabilized (storage piles, exposed soils) areas the HydroStorm separator should be inspected more frequently (4 times per year). The initial annual inspection will indicate the required future frequency of inspection and maintenance if the unit was maintained after the construction period.

Reporting

Reports should be prepared as part of each inspection and include the following information:

1. Date of inspection
2. GPS coordinates of Hydroworks unit
3. Time since last rainfall
4. Date of last inspection
5. Installation deficiencies (missing parts, incorrect installation of parts)
6. Structural deficiencies (concrete cracks, broken parts)
7. Operational deficiencies (leaks, blockages)
8. Presence of oil sheen or depth of oil layer
9. Estimate of depth/volume of floatables (trash, leaves) captured
10. Sediment depth measured
11. Recommendations for any repairs and/or maintenance for the unit
12. Estimation of time before maintenance is required if not required at time of inspection

A sample inspection checklist is provided at the end of this manual.

Maintenance

Procedure

The Hydroworks HydroStorm unit is typically maintained using a vacuum truck. There are numerous companies that can maintain the HydroStorm separator. Maintenance with a vacuum truck involves removing all of the water and sediment together. The water is then separated from the sediment on the truck or at the disposal facility.

A central access opening (24” (600 mm) or greater) is provided to the gain access to the lower treatment tank of the unit. This is the primary location to maintain by vacuum truck. The pretreatment area can also be vacuumed and/or flushed into the lower treatment tank of the separator for cleaning via the central access once the water level is lowered below the pretreatment floor.

In instances where a vacuum truck is not available other maintenance methods (i.e. clamshell bucket) can be used, but they will be less effective. If a clamshell bucket is used the water must be decanted prior to cleaning since the sediment is under water and typically fine in nature.

The local municipality should be consulted for the allowable disposal options for both water and sediments prior to any maintenance operation. Once the water is decanted the sediment can be removed with the clamshell bucket.

Disposal of the contents of the separator depend on local requirements. Maintenance of a Hydroworks HydroStorm unit will typically take 1 to 2 hours based on a vacuum truck and longer for other cleaning methods (i.e. clamshell bucket).

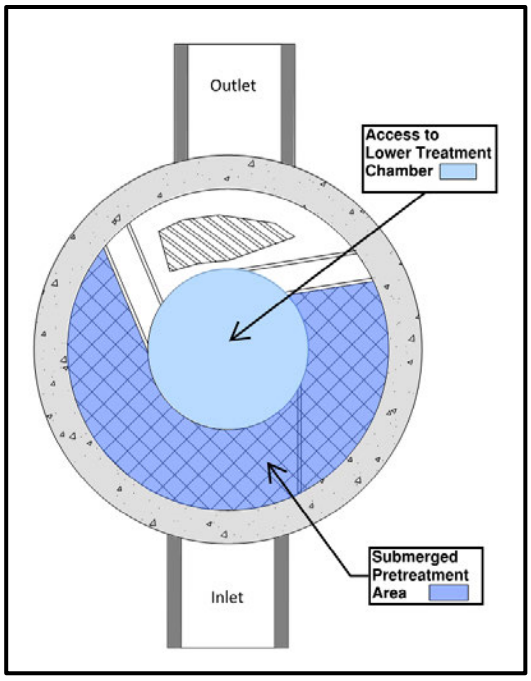


Figure 3. Maintenance Access

Frequency

Construction Period

A HydroStorm separator can fill with construction sediment quickly during the construction period. The HydroStorm must be maintained during the construction period when the depth of TSS/sediment reaches 24" (600 mm). It must also be maintained during the construction period if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 50% of the area of the separator

The HydroStorm separator should be maintained at the end of the construction period, prior to operation for the post-construction period.

Post-Construction Period

The HydroStorm was independently tested by Alden Research Laboratory in 2017. A HydroStorm HS 4 was tested for scour with a 50% sediment depth of 0.5 ft.(150 mm). The sump depths given in Table 1 are scaled larger than required based on standard scaling requirements (NJDEP, ETV Canada). Accordingly maintenance depths for units larger than the HS 4 will be larger than 300 mm.

There will be designs with increased sediment storage based on specifications or site-specific criteria. A measurement of the total depth in the separator through the central access tube should be taken and compared to sump depth given in Table 1.

The standard sump depth from Table 1 should be subtracted from the measured depth and the resulting extra depth should be added to the values given in Table 2 to determine the site-specific sediment maintenance depth for that separator.

For example, if the measured sump depth in the HS-7 is 7.5 feet, then the sediment maintenance depth for that HS-7 is 2.25 ft (= 0.5 + 1.75) and the separator does not need to be cleaned for sediment accumulation until the measure sediment depth is 2.25 ft.

The HydroStorm separator must also be maintained if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 50% of the water surface of the separator.

Table 2 Standard Maintenance Depths for HydroStorm Models

Model	Diameter ft (mm)	Sediment Maintenance Depth for Total Water Depth ft (mm)*
HS-3	3 (900)	1 (300)
HS-4	4 (1200)	1 (300)
HS-5	5 (1500)	1.75 (530)
HS-6	6 (1800)	2 (610)
HS-7	7 (2100)	1.75 (535)
HS-8	8 (2400)	1.5 (465)
HS-9	9 (2700)	1.75 (540)
HS-10	10 (3000)	2 (615)
HS-12	12 (3600)	1.5 (470)

*based on standard sump depths in Table 1

HYDROSTORM INSPECTION SHEET

Date _____
Date of Last Inspection _____

Site _____
City _____
State _____
Owner _____

GPS Coordinates _____

Date of last rainfall _____

Site Characteristics	**Yes**	**No**
Soil erosion evident	☐	☐
Exposed material storage on site	☐	☐
Large exposure to leaf litter (lots of trees)	☐	☐
High traffic (vehicle) area	☐	☐

HydroStorm	**Yes**	**No**
Obstructions in the inlet or outlet	☐ *	☐
Missing internal components	☐ **	☐
Improperly installed inlet or outlet pipes	☐ ***	☐
Internal component damage (cracked, broken, loose pieces)	☐ **	☐
Floating debris in the separator (oil, leaves, trash)	☐	☐
Large debris visible in the separator	☐ *	☐
Concrete cracks/deficiencies	☐ ***	☐
Exposed rebar	☐ **	☐
Water seepage (water level not at outlet pipe invert)	☐ ***	☐

Water level depth below outlet pipe invert _____“

Routine Measurements

Floating debris depth	**< 0.5” (13mm)**	☐	**>0.5” 13mm)**	☐ *
Floating debris coverage	**< 50% of surface area**	☐	**> 50% surface area**	☐ *
Sludge depth	**< 12” (300mm)**	☐	**> 12” (300mm)**	☐ ****

* Maintenance required
** Repairs required
*** Further investigation is required

Hydroworks

Other Comments:

Hydroworks

Hydroworks® HydroStorm

One Year Limited Warranty

Hydroworks, LLC warrants, to the purchaser and subsequent owner(s) during the warranty period subject to the terms and conditions hereof, the Hydroworks HydroStorm to be free from defects in material and workmanship under normal use and service, when properly installed, used, inspected and maintained in accordance with Hydroworks written instructions, for the period of the warranty. The standard warranty period is 1 year.

The warranty period begins once the separator has been manufactured and is available for delivery. Any components determined to be defective, either by failure or by inspection, in material and workmanship will be repaired, replaced or remanufactured at Hydroworks' option provided, however, that by doing so Hydroworks, LLC will not be obligated to replace an entire insert or concrete section, or the complete unit. This warranty does not cover shipping charges, damages, labor, any costs incurred to obtain access to the unit, any costs to repair/replace any surface treatment/cover after repair/replacement, or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to any material that has been disassembled or modified without prior approval of Hydroworks, LLC, that has been subjected to misuse, misapplication, neglect, alteration, accident or act of God, or that has not been installed, inspected, operated or maintained in accordance with Hydroworks, LLC instructions and is in lieu of all other warranties expressed or implied. Hydroworks, LLC does not authorize any representative or other person to expand or otherwise modify this limited warranty.

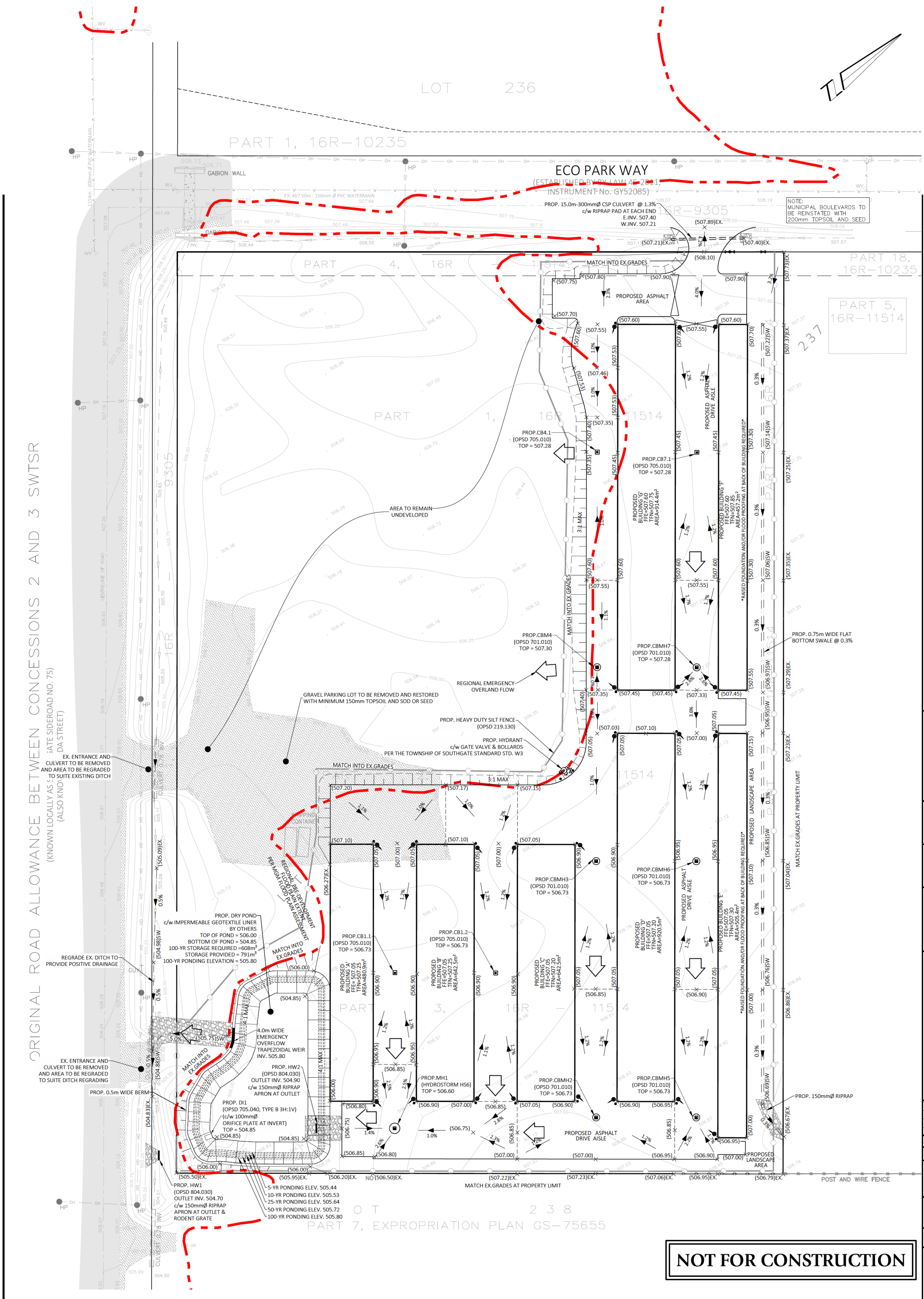
The owner shall provide Hydroworks, LLC with written notice of any alleged defect in material or workmanship including a detailed description of the alleged defect upon discovery of the defect. Hydroworks, LLC should be contacted at 136 Central Ave., Clark, NJ 07066 or any other address as supplied by Hydroworks, LLC. (888-290-7900).

This limited warranty is exclusive. There are no other warranties, express or implied, or merchantability or fitness for a particular purpose and none shall be created whether under the uniform commercial code, custom or usage in the industry or the course of dealings between the parties. Hydroworks, LLC will replace any goods that are defective under this warranty as the sole and exclusive remedy for breach of this warranty.

Subject to the foregoing, all conditions, warranties, terms, undertakings or liabilities (including liability as to negligence), expressed or implied, and howsoever arising, as to the condition, suitability, fitness, safety, or title to the Hydroworks HydroStorm are hereby negated and excluded and Hydroworks, LLC gives and makes no such representation, warranty or undertaking except as expressly set forth herein. Under no circumstances shall Hydroworks, LLC be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the HydroStorm, or the cost of other goods or services related to the purchase and installation of the HydroStorm. For this Limited Warranty to apply, the HydroStorm must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Hydroworks' written installation instructions.

Hydroworks, LLC expressly disclaims liability for special, consequential or incidental damages (even if it has been advised of the possibility of the same) or breach of expressed or implied warranty. Hydroworks, LLC shall not be liable for penalties or liquidated damages, including loss of production and profits; labor and materials; overhead costs; or other loss or expense incurred by the purchaser or any third party. Specifically excluded from limited warranty coverage are damages to the HydroStorm arising from ordinary wear and tear; alteration, accident, misuse, abuse or neglect; improper maintenance, failure of the product due to improper installation of the concrete sections or improper sizing; or any other event not caused by Hydroworks, LLC. This limited warranty represents Hydroworks' sole liability to the purchaser for claims related to the HydroStorm, whether the claim is based upon contract, tort, or other legal basis.

DRAWINGS


LOT 236
PART 1, 16R-10235
ECO PARK WAY
(ESTABLISHED BY BY-LAW 45-2011, INSTRUMENT No. GY52085)
GABION WALL
EX. 467.50m - 150mm Ø PVC WATERMAIN
1154m - 200mm Ø PVC WATERMAIN
PROP. 15.0m-300mmØ CSP CULVERT @ 1.3%
c/w RIPRAP PAD AT EACH END
E.INV. 507.40
W.INV. 507.21
NOTE:
MUNICIPAL BOULEVARDS TO BE REINSTATED WITH 200mm TOPSOIL AND SEED
PART 4, 16R-11514
PART 18, 16R-10235
PART 5, 16R-11514
237
MATCH INTO EX.GRADES
PROPOSED ASPHALT AREA
PART 1, 16R-11514
PROP.CB4.1
(OPSD 705.010)
TOP = 507.28
PROP.CB7.1
(OPSD 705.010)
TOP = 507.28
PROPOSED BUILDING 'G'
FFE=507.60
TFN=507.75
AREA=914.4m²
PROPOSED BUILDING 'F'
FFE=507.60
TFN=507.85
AREA=457.2m²
RAISED FOUNDATION AND/OR FLOOD PROOFING AT BACK OF BUILDING REQUIRED
PROPOSED ASPHALT DRIVE AISLE
AREA TO REMAIN UNDEVELOPED
3:1 MAX
MATCH INTO EX.GRADES
PROP.CBM4
(OPSD 701.010)
TOP = 507.30
PROP.CBMH7
(OPSD 701.010)
TOP = 507.28
PROP. 0.75m WIDE FLAT BOTTOM SWALE @ 0.3%
REGIONAL EMERGENCY OVERLAND FLOW
GRAVEL PARKING LOT TO BE REMOVED AND RESTORED WITH MINIMUM 150mm TOPSOIL AND SOD OR SEED
PROP. HEAVY DUTY SILT FENCE
(OPSD 219.130)
PROP. HYDRANT
c/w GATE VALVE & BOLLARDS
PER THE TOWNSHIP OF SOUTHGATE STANDARD STD. W3
EX. ENTRANCE AND CULVERT TO BE REMOVED AND AREA TO BE REGRADED TO SUITE EXISTING DITCH
ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 2 AND 3 SWTSR
(KNOWN LOCALLY AS SOUTHGATE SIDEROAD NO. 75)
(ALSO KNOWN AS IDA STREET)
CENTRELINE OF ROAD
PROPOSED LANDSCAPE AREA
MATCH EX.GRADES AT PROPERTY LIMIT
REGIONAL PRE-DEVELOPMENT FLOOD PLAIN EXTENT PER MGM FLOOD PLAIN ASSESSMENT
PROP. DRY POND
c/w IMPERMEABLE GEOTEXTILE LINER BY OTHERS
TOP OF POND = 506.00
BOTTOM OF POND = 504.85
100-YR STORAGE REQUIRED =608m³
STORAGE PROVIDED = 791m³
100-YR PONDING ELEVATION = 505.80
REGRADE EX. DITCH TO PROVIDE POSITIVE DRAINAGE
PROP.CB1.1
(OPSD 705.010)
TOP = 506.73
PROP.CB1.2
(OPSD 705.010)
TOP = 506.73
PROP.CBMH3
(OPSD 701.010)
TOP = 506.73
PROP.CBMH6
(OPSD 701.010)
TOP = 506.73
PROPOSED BUILDING 'A'
FFE= 507.05
TFN=507.25
AREA=480.9m²
PROPOSED BUILDING 'B'
FFE=507.05
TFN=507.25
AREA=642.5m²
PROPOSED BUILDING 'C'
FFE=507.05
TFN=507.20
AREA=642.5m²
PROPOSED BUILDING 'D'
FFE=507.05
TFN=507.20
AREA=920.5m²
PROPOSED BUILDING 'E'
FFE=507.05
TFN=507.30
AREA=505.4m²
PART 3, 16R-11514
4.0m WIDE EMERGENCY OVERFLOW TRAPEZOIDAL WEIR INV. 505.80
PROP. HW2
(OPSD 804.030)
OUTLET INV. 504.90
c/w 150mmØ RIPRAP APRON AT OUTLET
PROP. DI1
(OPSD 705.040, TYPE B 3H:1V)
(c/w 100mmØ ORIFICE PLATE AT INVERT)
TOP = 504.85
PROP.MH1
(HYDROSTORM HS6)
TOP = 506.60
PROP.CBMH2
(OPSD 701.010)
TOP = 506.73
PROP.CBMH5
(OPSD 701.010)
TOP = 506.73
PROP. 150mmØ RIPRAP
PROP. 0.5m WIDE BERM
PROP. HW1
(OPSD 804.030)
OUTLET INV. 504.70
c/w 150mmØ RIPRAP APRON AT OUTLET & RODENT GRATE
5-YR PONDING ELEV. 505.44
10-YR PONDING ELEV. 505.53
25-YR PONDING ELEV. 505.64
50-YR PONDING ELEV. 505.72
100-YR PONDING ELEV. 505.80
POST AND WIRE FENCE
LOT 238
PART 7, EXPROPRIATION PLAN GS-75655

PROP. BOLLARD

PROP. DRAINAGE SPLIT

REGIONAL PRE-DEVELOPMENT FLOODPLAIN EXTENT

EMERGENCY OVERLAND FLOW

CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.999560

METRIC:

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

TOPOGRAPHIC SURVEY DATE:

THIS TOPOGRAPHIC SURVEY WAS COMPLETED ON THE 7th DAY OF SEPTEMBER, 2022

BENCHMARK:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTV2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE PLAN FOR:

PROPOSED SELF STORAGE COMPLEX
752065 IDA STREET
PART OF LOT 237, CONCESSION 2
SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

NO.	REVISION	BY	DATE
1	REISSUED FOR 2ND SUBMISSION (SPA)	BP	10/06/25
0	ISSUE FOR 1ST SUBMISSION (SPA)	BP	04/28/25

DRAWING REVISION SCHEDULE

PROJECT No. 31489-22

DRAWING SCALE: 1:400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

NOT FOR CONSTRUCTION

SITE GRADING PLAN

SHEET 1 OF 5

PROFESSIONAL ENGINEER [redacted] B. D. POND 100583029 OCT. 06, 2025 LICENSED PROVINCE OF ONTARIO

PREPARED FOR:

BRAD WESLEY HOLDINGS LTD.

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

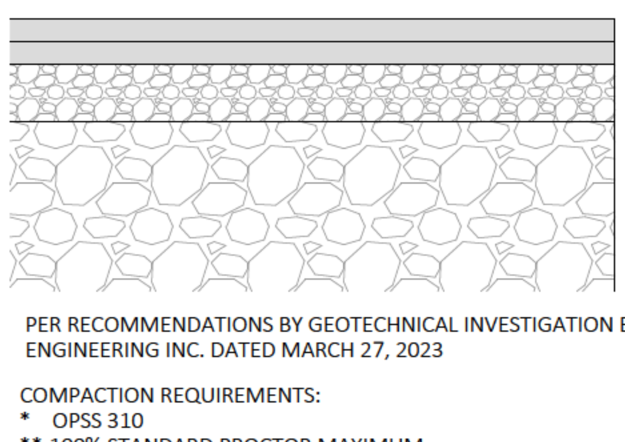
Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: BH | DESIGN BY: BH/BP | CHECKED BY: BP

L:\Proton\Con 2 SWTSR\ACAD\SP.LT.237.BRADWESLEY (31489-22)UTM-2010.dwg

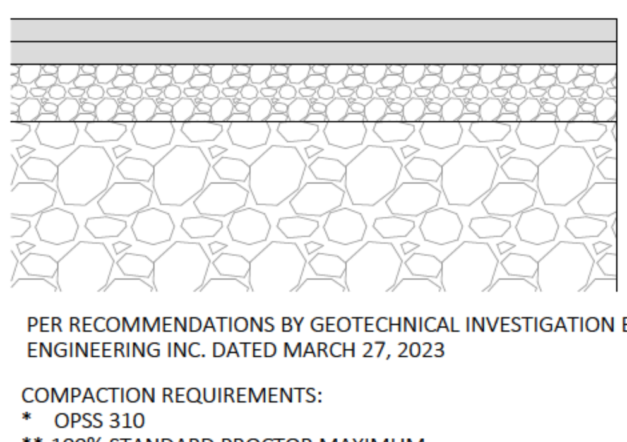
LIGHT TRAFFIC PAVEMENT DETAIL (MIN.)
(N.T.S.)



PER RECOMMENDATIONS BY GEOTECHNICAL INVESTIGATION BY CMT ENGINEERING INC. DATED MARCH 27, 2023

COMPACTION REQUIREMENTS:
* OPSS 310
** 100% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM-D698)

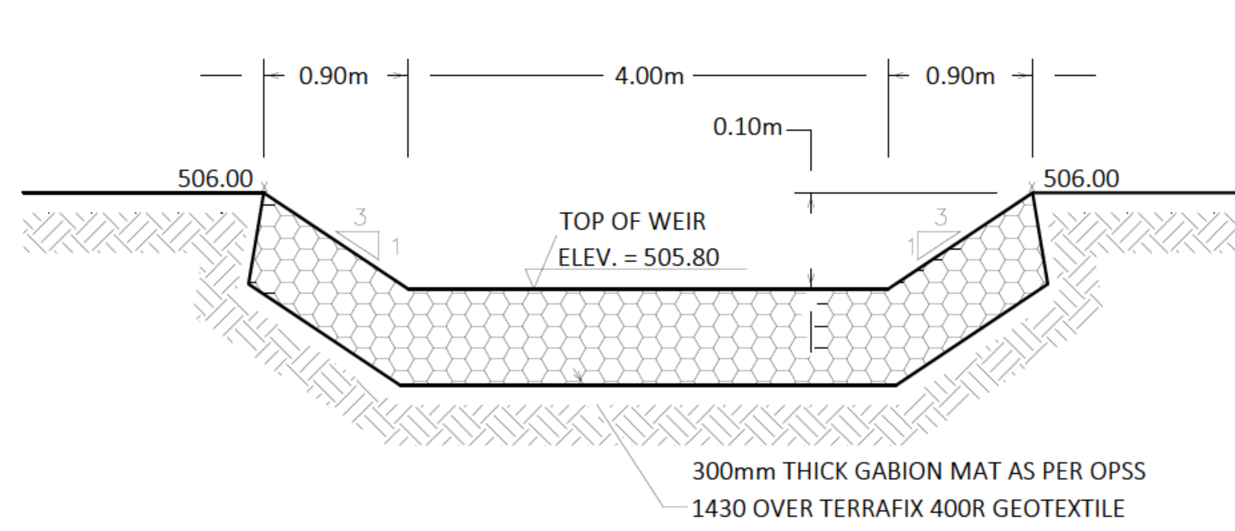
HEAVY TRAFFIC PAVEMENT DETAIL (MIN.)
(N.T.S.)

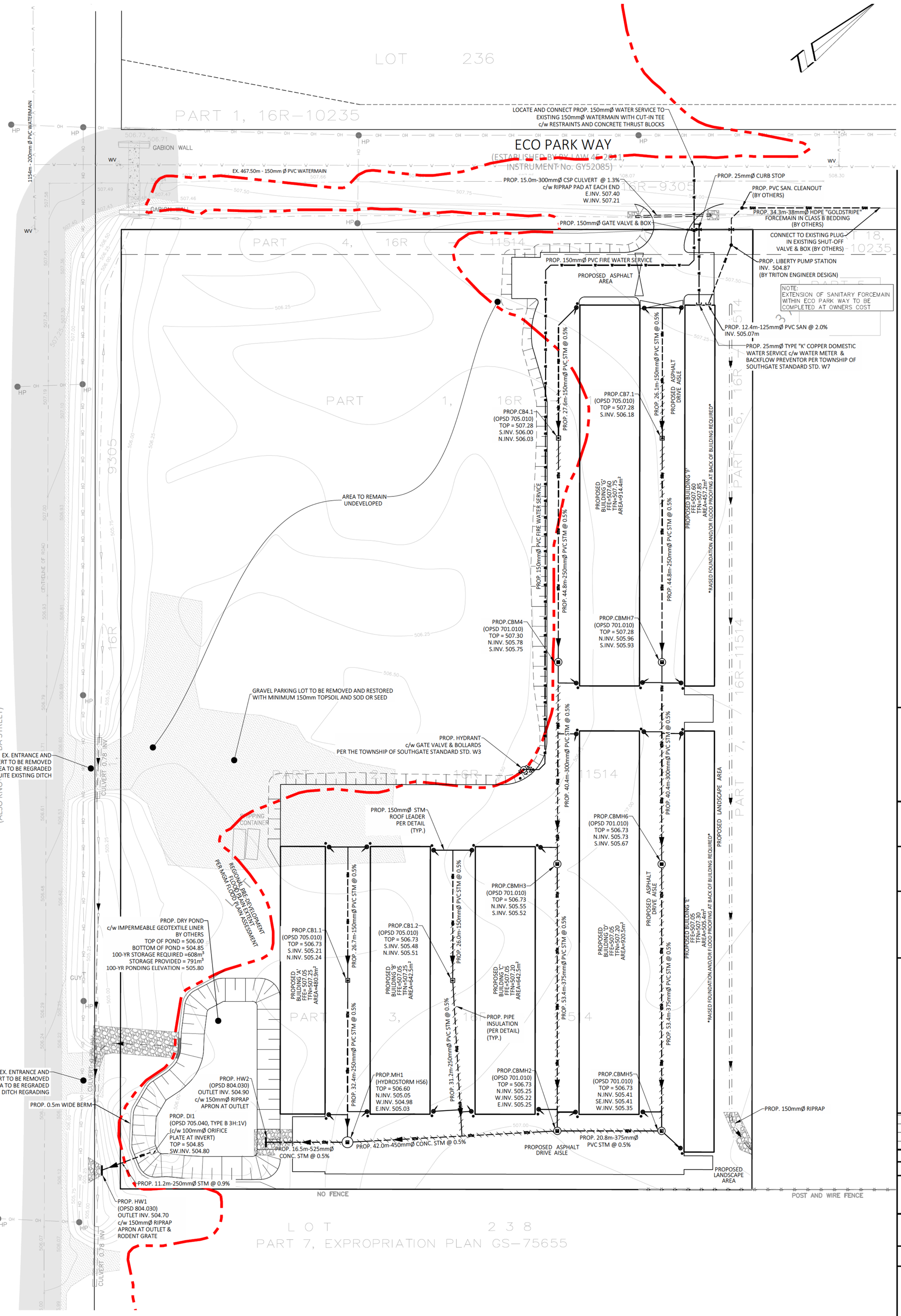


PER RECOMMENDATIONS BY GEOTECHNICAL INVESTIGATION BY CMT ENGINEERING INC. DATED MARCH 27, 2023

COMPACTION REQUIREMENTS:
* OPSS 310
** 100% STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM-D698)

EMERGENCY OVERFLOW WEIR DETAIL
(N.T.S.)





CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.999560

METRIC:

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

TOPOGRAPHIC SURVEY DATE:

THIS TOPOGRAPHIC SURVEY WAS COMPLETED ON THE 7th DAY OF SEPTEMBER, 2022

BENCHMARK:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTV2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE PLAN FOR:

PROPOSED SELF STORAGE COMPLEX
752065 IDA STREET
PART OF LOT 237, CONCESSION 2
SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

NO.	REVISION	BY	DATE
1	REISSUED FOR 2ND SUBMISSION (SPA)	BP	10/06/25
0	ISSUE FOR 1ST SUBMISSION (SPA)	BP	04/28/25

DRAWING REVISION SCHEDULE

PROJECT No. 31489-22

DRAWING SCALE: 1:400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

SITE SERVICING PLAN

SHEET 2 OF 5

LICENSED [redacted] 100583029 OCT. 06, 2025 PROVINCE OF ONTARIO

PREPARED FOR:

BRAD WESLEY HOLDINGS LTD.

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

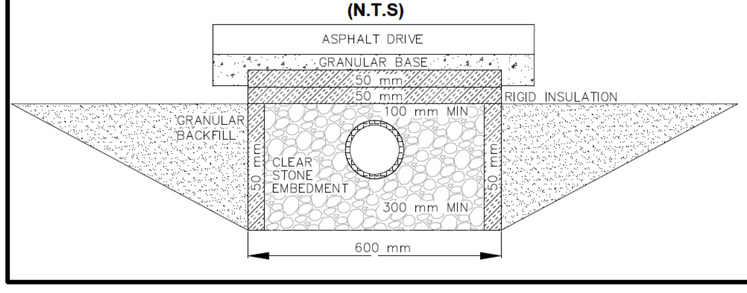
www.vanharten.com info@vanharten.com

DRAWN BY: BH | DESIGN BY: BH/BP | CHECKED BY: BP

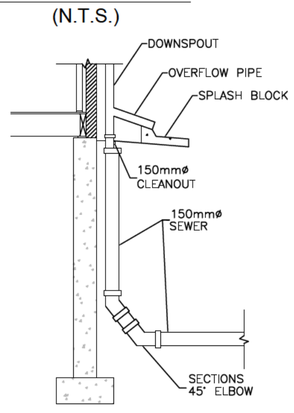
L:\Proton\Con 2 SWTSR\ACAD\SP.LT.237.BRADWESLEY (31489-22)UTM-2010.dwg

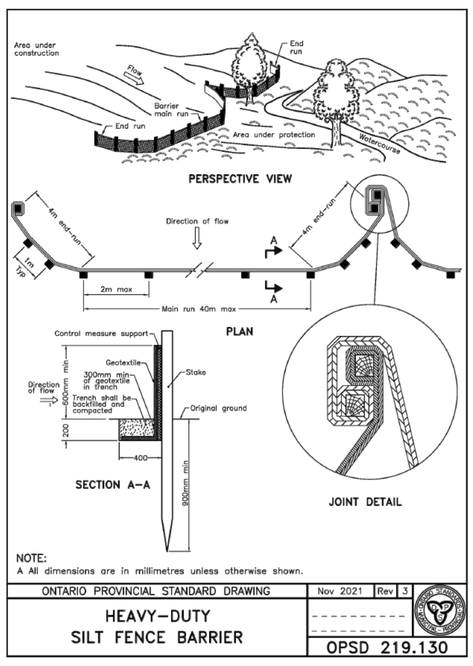
NOT FOR CONSTRUCTION

SHALLOW STORM SEWER INSULATION DETAIL
(N.T.S)



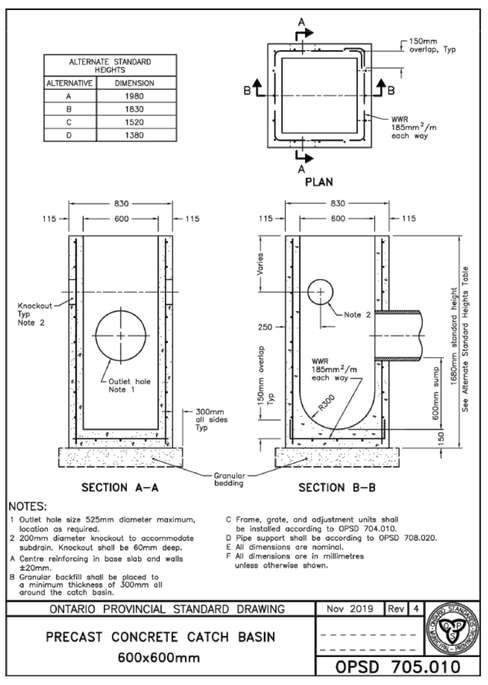
ROOF LEADER DETAIL
(N.T.S.)





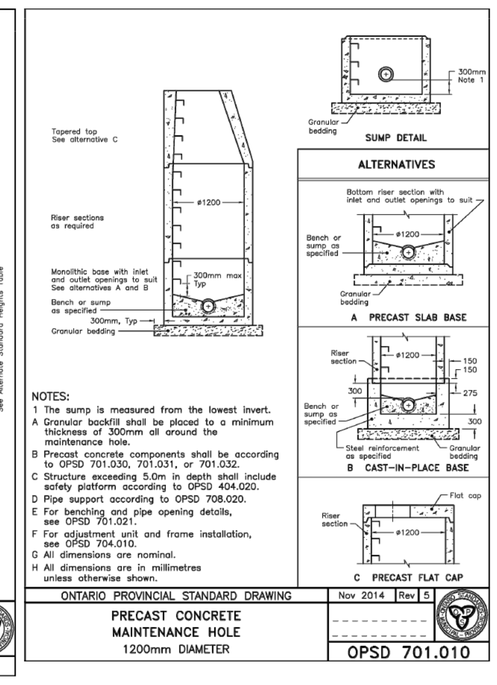
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
HEAVY–DUTY SILT FENCE BARRIER		OPSD 219.130



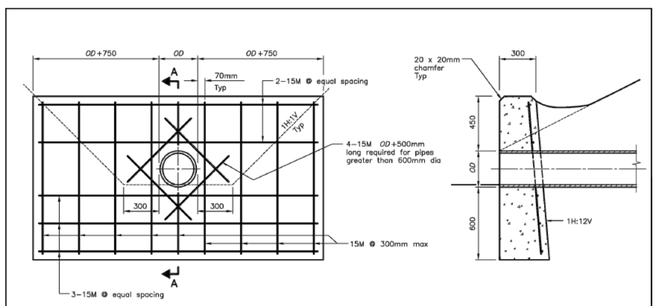
NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010



NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

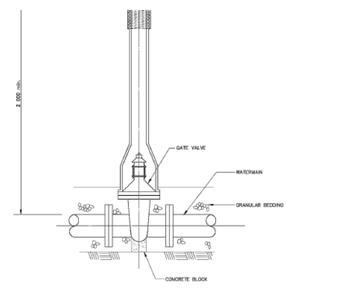
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010



LEGEND:
OD – Outside diameter of pipe

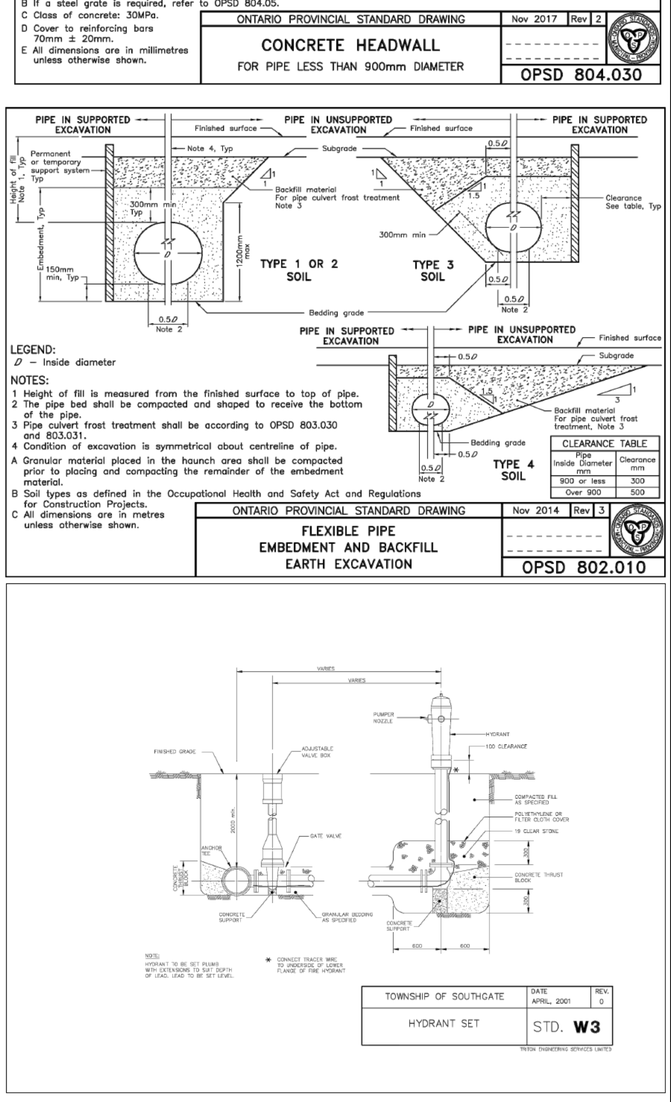
NOTES:
A This OPSD to be read in conjunction with OPSD 3940.150.
B If a steel grate is required, refer to OPSD 804.05.
C Class of concrete: 30MPa.
D Cover to reinforcing bars 70mm ± 20mm.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 2
CONCRETE HEADWALL FOR PIPE LESS THAN 900mm DIAMETER		OPSD 804.030



TOWNSHIP OF SOUTHGATE	DATE APRIL, 2001	REV. 0
VALVE AND VALVE BOX	STD. W2	

TRITON ENGINEERING SERVICES LIMITED



LEGEND:
D – Inside diameter

NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010

WORKS WITHIN THE MUNICIPAL RIGHT OF WAY

1. AN ENTRANCE PERMIT IS REQUIRED PRIOR TO CONSTRUCTION OF THE PROPOSED SITE ENTRANCE.
2. A ROAD OCCUPANCY PERMIT IS REQUIRED PRIOR TO ANY CONSTRUCTION WITHIN THE MUNICIPAL RIGHT–OF–WAY.
3. A PUBLIC TREE PERMIT IS REQUIRED TO REMOVE OR INJURE ANY TREE WITHIN THE TOWNSHIP RIGHT–OF–WAY.
4. CONTRACTOR TO CONFORM TO REQUIREMENTS OF ENTRANCE PERMIT AND ROAD OCCUPANCY PERMIT. WHERE THE PERMITS DIFFER FROM THESE NOTES, THE PERMIT CONDITIONS SHALL TAKE PRECEDENCE.
5. ALL WORKS WITHIN THE MUNICIPAL RIGHT–OF–WAY ARE AT THE DEVELOPER'S COST AND ARE TO BE COMPLETED BY A TOWNSHIP APPROVED CONTRACTOR.
6. CONTRACTOR TO BE RESPONSIBLE FOR PROPERLY COMPACTING BACKFILL MATERIAL AND RESTORING SURFACES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE TOWNSHIP.
7. BOULEVARDS TO BE RESTORED WITH MINIMUM 200mm TOPSOIL AND No. 1 NURSERY SOD OR SEED TO THE SATISFACTION OF THE TOWNSHIP.
8. ROAD MUST BE MAINTAINED TO A MINIMUM OF ONE LANE AT ALL TIMES FOR EMERGENCY ACCESS PER OTM GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL, BOOK 7 – TEMPORARY CONDITIONS.

SERVICING NOTES

1. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT TOWNSHIP OF SOUTHGATE STANDARDS AND SPECIFICATIONS AND APPLICABLE OPSS / OPSD.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RELATING TO DAMAGE OF SAME.
3. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES, FOR THE PURPOSES OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.

STORM

1. ALL STORM SEWERS LESS THAN 375mm TO BE PVC DR 35 PIPE AND CONFORM TO OPSS 1820 AND ANY APPLICABLE CSA STANDARDS. 150mm STORM SEWER LEADS TO BE 150mm PVC DR28
2. ALL STORM SEWERS GREATER THAN 375mm TO BE CONCRETE (CSA A257.1)
3. ALL CATCHBASINS TO BE 600mm x 600mm PRECAST CONCRETE PER OPSD 705.010 TYPE A.
4. ALL MANHOLES AND CATCHBASIN MANHOLES TO BE 1200mm DIAMETER PRECAST CONCRETE PER OPSD 701.010, UNLESS OTHERWISE NOTED.

SANITARY

1. REFER TO THE SANITARY LOW PRESSURE SYSTEM DESIGN COMPLETE BY TRITON ENGINEERING (SEPTEMBER 2025).
2. ALL MATERIAL TO CONFORM WITH THE CURRENT TOWNSHIP OF SOUTHGATE STANDARDS.

WATER

1. THE OWNER IS RESPONSIBLE FOR SATISFYING THAT THERE IS ADEQUATE FIRE PROTECTION AVAILABLE FOR THEIR PURPOSES.
2. WATERMAINS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 441.
3. ALL MUNICIPAL OWNED WATER VALES TO BE OPERATED BY THE TOWNSHIP. THE CONTRACTOR IS TO COORDINATE ALL NECESSARY VALVE OPERATIONS WITH THE TOWNSHIP PUBLIC WORKS DEPARTMENT.
4. WATERMAINS AND/OR WATER SERVICES MATERIALS FOR SIZES 100mm AND LARGER TO BE DR18 MANUFACTURED TO AWWA SPEC. C900–16 SPEC COMPLETE WITH TRACER WIRE. SIZE 50mm AND SMALLER MUST BE TYPE 'K' SOFT COPPER PIPE PER ASTM B88–49 SPECIFICATION.
5. THE CONTRACTOR SHALL FURNISH ALL FITTINGS, SPECIALS, BRANCH OUTLETS, CLOSURE PIECES, ETC. REQUIRED FOR THE COMPLETE INSTALLATION OF THE WATERMAIN.
6. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY WATER SUPPLY TO BUILDINGS AT ALL TIMES. THE CONTRACTOR WILL BE RESPONSIBLE FOR QUALITY TESTING OF THE TEMPORARY SUPPLY IN ACCORDANCE WITH TESTING PROCEDURES TO THE SATISFACTION OF THE TOWNSHIP.
7. TRACER WIRE TO BE #12 AWG COPPER CLAD STEEL. HIGH STRENGTH WITH MINIMUM 450 LB. BREAK LOAD AND MINIMUM 30 MIL HDPE INSULATION THICKNESS SUITABLEFOR DIRECT BURIAL AND COLOUR CODED BLUE. REFER TO SECTION E2 OF THE TOWNSHIP OF SOUTHGATE ENGINEERING STANDARDS.
8. TRACER WIRE SHALL NOT BE BROUGHT UP TO THE SURFACE INSIDE VALVE BOXES. TRACER WIRE TO BE BROUGHT UP TO THE OUTSIDE OF THE VALVE BOX INSTALLED THROUGH A GROMMET NEAR THE SURFACE.
9. GATE VALVES TO BE RESILIENT WEDGE CONFORMING TO AWWA C509, F–6100 MECHANICAL JOINT PER TOWNSHIP OF SOUTHGATE STANDARDS WITH FUSIN–BONDED EPOXY COATING AND BRONZE STEM OPENING COUNTER–CLOCKWISE.
10. ALL FITTINGS TO BE MECHANICALLY RESTRAINED INCLUDING A MINIMUM OF 10m ON EITHER SIDE OF THE FITTING.
11. NON–METALLIC WATERMAIN WITH METALLIC VALVES AND FITTINGS AND NON–METALLIC SERVICE LATERALS TO HAVE ONE DZP–24, 10.9 kg ANODE ATTACHED TO EACH METALLIC FITTING WITH A BRASS GROUNDING CLAMP. PETROLATUM TAPE TO BE USED ON ALL METALLIC FITTINGS.
12. PRIOR TO CONNECTION TO THE PUBLIC WATERMAIN, THE CONTRACTOR IS TO PROVIDE THE TOWNSHIP ENGINEER AND PUBLIC WORKS A COMMISSIONING PLAN WHICH IS TO INCLUDE PLANS FOR SWABBING, DISINFECTION, PRESSURE TESTING AND BACTERIOLOGICAL TESTING.
13. ALL FIELD TESTS TO BE CONDUCTED IN THE PRESENCE OF THE TOWNSHIP AND THE CONTRACT ADMINISTRATOR.
14. SWABBING REQUIRED IN ACCORDANCE WITH OPSS 441.07.25.
15. CHLORINE RESIDUAL AND BATERIOLOGICAL TESTING REQUIRED IN ACCORDANCE WITH OPSS 441.07.25. DISINFECTION OF WATERMAIN SHALL BE COMPLETED IN ACCORDANCE WITH MECP WATERMAIN DISINFECTION PROCEDURE AND AWWA 651.
16. HYDROSTATIC PRESSURE TESTING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 441.
17. CONNECTION TO THE MUNICIPAL WATERMAIN TO BE MADE IN ACCORDANCE WITH TOWNSHIP OF SOUTHGATE STANDARDS.
18. ALL PROPOSED WATER PIPING TO BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
19. ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS–CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM.
20. WHERE EXISTING WATERMAINS ARE TAPPED, THE PIPE SURFACE AT THE LOCATION OF THE TAP SHALL BE CLEANED AND DISINFECTED USING A MINIMUM OF 1% SODIUM HYPOCHLORITE SOLUTION. WHERE APPLICABLE, THE DRILL/CUTTING/TAPPING BITS AND ALL SURFACES OF MAINSTOPS, SERVICE SADDLES, TAPPING SLEEVES AND VALVES WHICH WILL COME INTO CONTACT WITH DRINKING WATER SHALL BE LIKEWISE CLEANED AND DISINFECTED USING A MINIMUM 1% SODIUM HYPOCHLORITE SOLUTION IMMEDIATELY PRIOR TO INSTALLATION. IF ANY OF THE DISINFECTED SURFACES COME IN CONTACT WITH SOIL AND/OR WATER IN THE EXCAVATION PRIOR TO USE, THE CLEANING AND DISINFECTION PROCEDURE SHALL BE REPEATED.
21. PERMITTED AT ANY TIME.
17. PRIOR TO SITE DISTURBANCE THE CONTRACTOR / PROPONENT SHOULD ENSURE THAT THE WORKS ARE IN CONFORMANCE WITH MIGRATORY BIRDS CONVENTION ACT. PLEASE NOTE THAT THE GENERAL BREEDING BIRD TIMING WINDOW FOR THIS AREA IS APRIL 1ST TO AUGUST 31ST, HOWEVER, BREEDING ACTIVITIES MIGHT INITIATE PRIOR TO AND CONTINUE PAST THIS PERIOD.
18. TOPSOIL AND TEMPORARY MATERIAL STOCKPILES TO BE ENCLOSED WITH SEDIMENT CONTROL FENCE. SEDIMENT CONTROL FENCE FOR STOCKPILES TO BE TERRAFIX TERRAFENCE OR APPROVED EQUIVALENT.
19. ACCUMULATED SEDIMENT TO BE REMOVED FORM THE SEDIMENT BARRIER ONCE IT REACHES A DEPTH OF MAXIMUM 300mm. ALL ACCUMULATED SEDIMENT IS TO BE REMOVED PRIOR TO REMOVING THE TEMPORARY SEDIMENT CONTROL FENCING.
20. REMOVE TEMPORARY SEDIMENT CONTROLS FOLLOWING COMPLETION OF CONSTRUCTION AND SITE STABILIZATION.
21. AN AFTER HOURS CONTACT LIST IS TO BE VISIBLY POSTED ON–SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE THE NAME AND CONTACT INFORMATION FOR THE PERSON RESPONSIBLE FOR MAINTENANCE OF ESC MEASURES.
22. ANY SEDIMENT OR OTHER SPILL FROM THE SITE IS TO BE REPORTED TO THE MINISTRY OF ENVIRONMENT (SPILL ACTION CENTRE) AT 1–800–268–6060.

NOTES:
1. – REMOVABLE BOLLARD TO BE STAINLESS OR GALV. STEEL AS SUPPLIED BY ONTARIO BOLLARDS, GEORGETOWN, ONTARIO
2. – BOLLARD PLASTIC COVERS AS SUPPLIED BY ONTARIO BOLLARDS, GEORGETOWN, ONTARIO, COLOUR AS SELECTED BY OWNER.

TOWNSHIP OF SOUTHGATE	DATE AUGUST, 2021	REV. 0
PERMANENT & REMOVABLE BOLLARD	STD. L6	

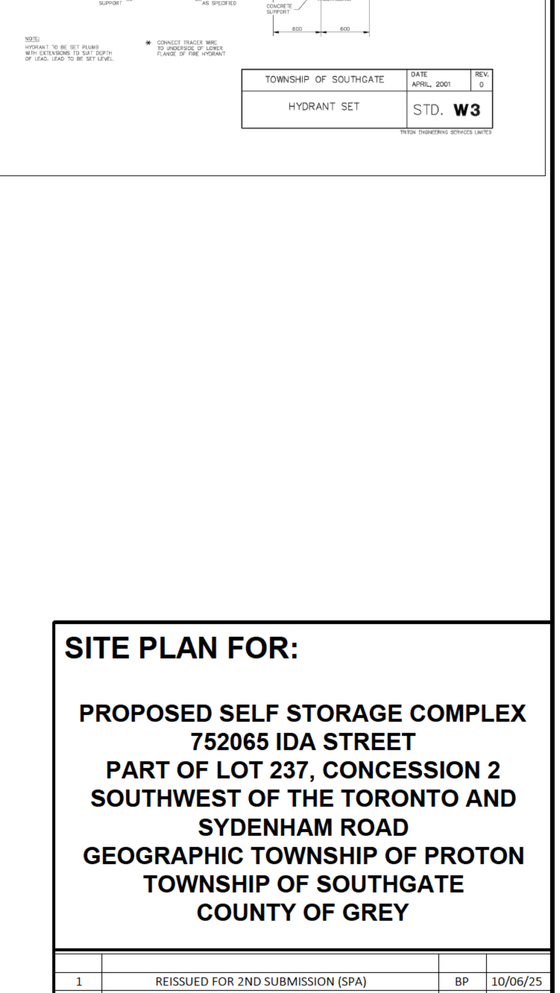
TRITON ENGINEERING SERVICES LIMITED

NOTES:
1. – METER SHALL BE 19mm (3/4") METER. REGISTRATION IN CUBIC METRES. 25mm (1") THREADED CONNECTIONS.
2. – SUPPLY AND INSTALL REMOTE READOUT DEVICE ON OUTSIDE WALL WITHIN 5.0m OF THE FRONT WALL OF THE BUILDING. THE METER AND REMOTE READOUT DEVICE SHALL BE SUITABLE FOR TOUCH READ AUTOMATED READING AND BILLING SYSTEM.
3. – STOP AND DRAIN VALVE TO BE THE SAME SIZE AS INCOMING PIPE.
4. – IF HOT WATER TANK IS RETURN 3.0m OF THE METER, A CHECK VALVE IS REQUIRED BETWEEN THE METER AND THE HOT WATER TANK.
5. – METER SHALL BE INSTALLED USING THREADED CONNECTIONS ONLY.

DRAFT

TOWNSHIP OF SOUTHGATE	DATE MAY 2021	REV. 1
TYPICAL WATER METER INSTALLATION	STD. W7	

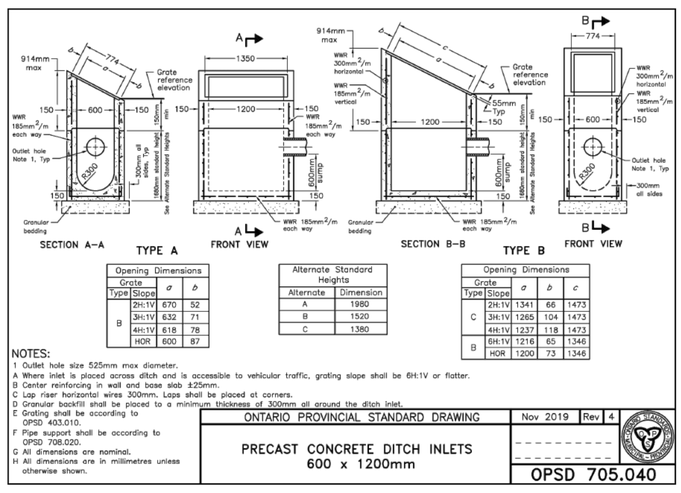
TRITON ENGINEERING SERVICES LIMITED



NOTE:
HYDRANT TO BE SET PLUMB WITH EXTENSIONS TO SUIT DEPTH OF LEAD. LEAD TO BE SET LEVEL.

TOWNSHIP OF SOUTHGATE	DATE APRIL, 2001	REV. 0
HYDRANT SET	STD. W3	

TRITON ENGINEERING SERVICES LIMITED



Opening Dimensions			
Grate Type	Slope	a	b
B	2H:1V	670	52
	3H:1V	632	71
	4H:1V	618	78
	HOR	600	87

Alternate Standard Heights	
Alternate	Dimension
A	1980
B	1520
C	1380

Opening Dimensions				
Grate Type	Slope	a	b	c
C	2H:1V	1341	66	1473
	3H:1V	1265	104	1473
	4H:1V	1237	118	1473
B	6H:1V	1216	65	1346
	HOR	1200	73	1346

NOTES:
1 Outlet hole size 525mm max diameter.
A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope shall be 6H:1V or flatter.
B Center reinforcing in wall and base slab ±25mm.
C Lap riser horizontal wires 300mm. Laps shall be placed at corners.
D Granular backfill shall be placed to a minimum thickness of 300mm all around the ditch inlet.
E Grating shall be according to OPSD 403.010.
F Pipe support shall be according to OPSD 708.020.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE DITCH INLETS 600 x 1200mm		OPSD 705.040

SITE PLAN FOR:

PROPOSED SELF STORAGE COMPLEX
752065 IDA STREET
PART OF LOT 237, CONCESSION 2
SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

NO.	REVISION	BY	DATE
1	REISSUED FOR 2ND SUBMISSION (SPA)	BP	10/06/25
0	ISSUE FOR 1ST SUBMISSION (SPA)	BP	04/28/25

DRAWING REVISION SCHEDULE

PROJECT No. 31489-22

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

DETAILS AND NOTES

SHEET 3 OF 5

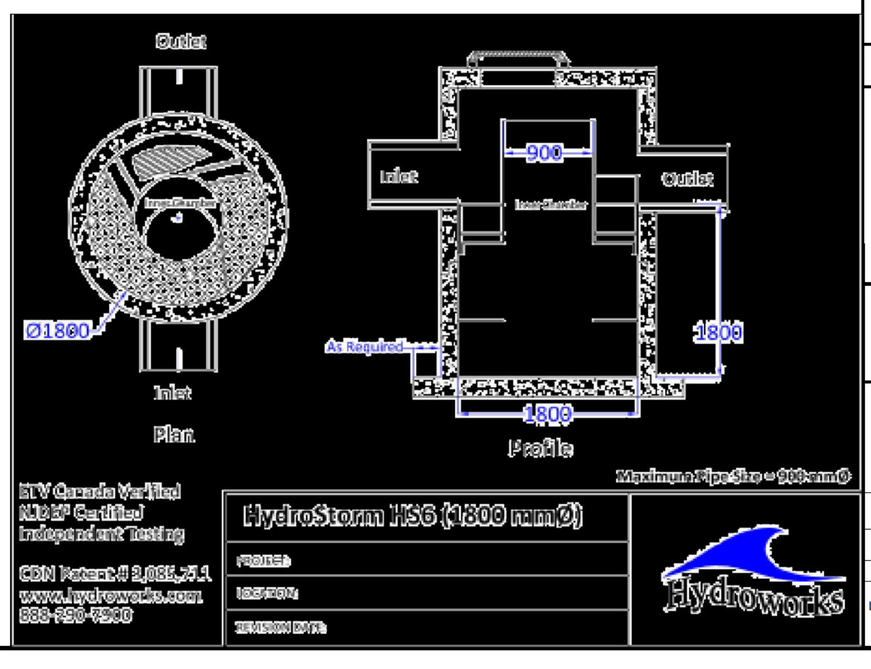
[redacted]
LICENSED
100583029
OCT. 06, 2025
PROVINCE OF ONTARIO

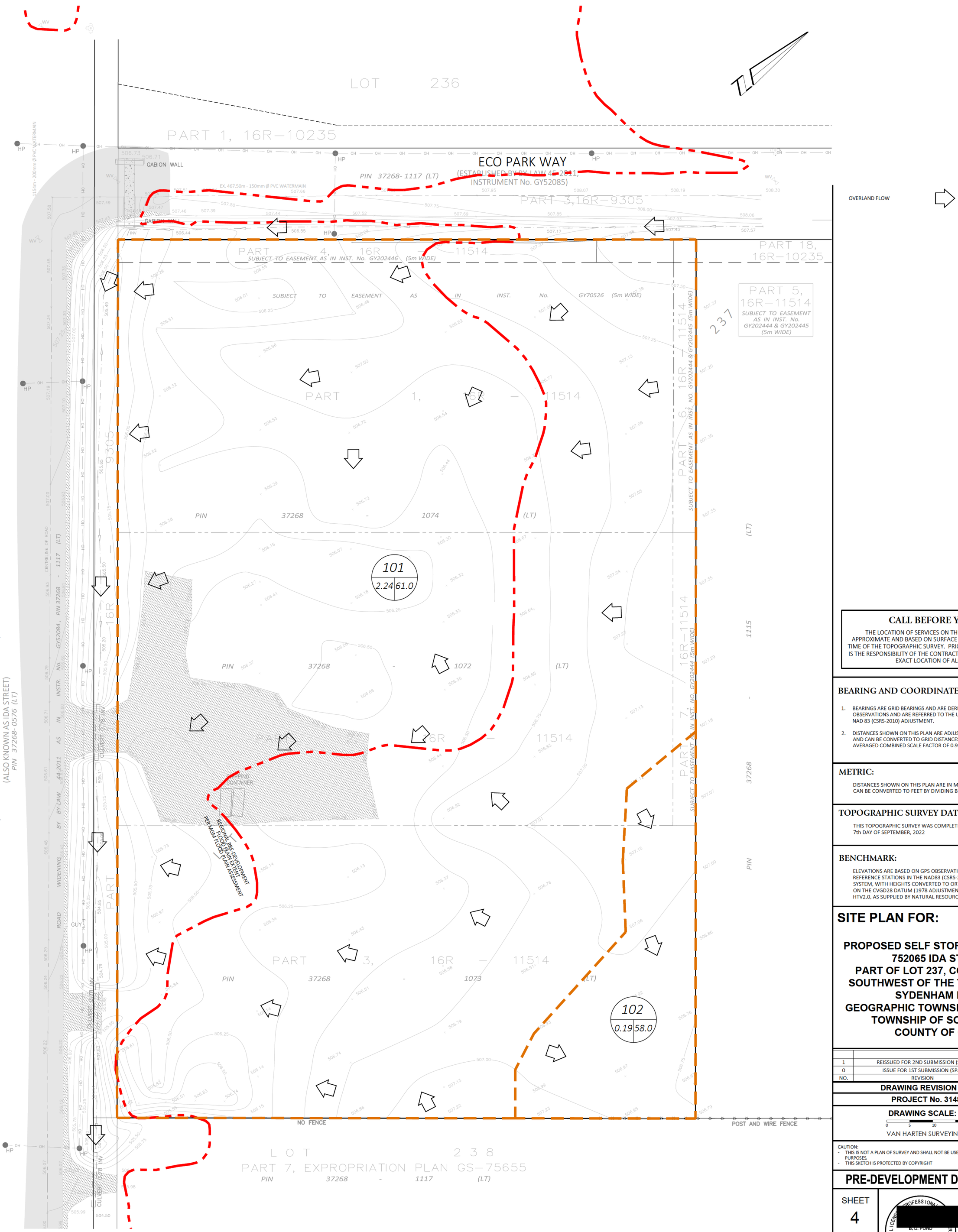
PREPARED FOR:
BRAD WESLEY HOLDINGS LTD.

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS
Kitchener/Waterloo Ph: 519-742-8371
Guelph Ph: 519-821-2763
Orangeville Ph: 519-940-4110
www.vanharten.com info@vanharten.com

DRAWN BY: BH | DESIGN BY: BH/BP | CHECKED BY: BP

L:\Proton\Con 2 SWTSR\ACAD\SP.LT.237.BRADWESLEY (31489-22)UTM-2010.dwg





CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.999560

METRIC:

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

TOPOGRAPHIC SURVEY DATE:

THIS TOPOGRAPHIC SURVEY WAS COMPLETED ON THE 7th DAY OF SEPTEMBER, 2022

BENCHMARK:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTV2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE PLAN FOR:

PROPOSED SELF STORAGE COMPLEX
752065 IDA STREET
PART OF LOT 237, CONCESSION 2
SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

NO.	REVISION	BY	DATE
1	REISSUED FOR 2ND SUBMISSION (SPA)	BP	10/06/25
0	ISSUE FOR 1ST SUBMISSION (SPA)	BP	04/28/25

DRAWING REVISION SCHEDULE

PROJECT No. 31489-22

DRAWING SCALE: 1:400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

PRE-DEVELOPMENT DRAINAGE PLAN

SHEET 4 OF 5

PROFESSIONAL ENGINEER
[redacted]
B. D. POND
100583029
OCT. 06 , 2025
PROVINCE OF ONTARIO

PREPARED FOR:

BRAD WESLEY HOLDINGS LTD.

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

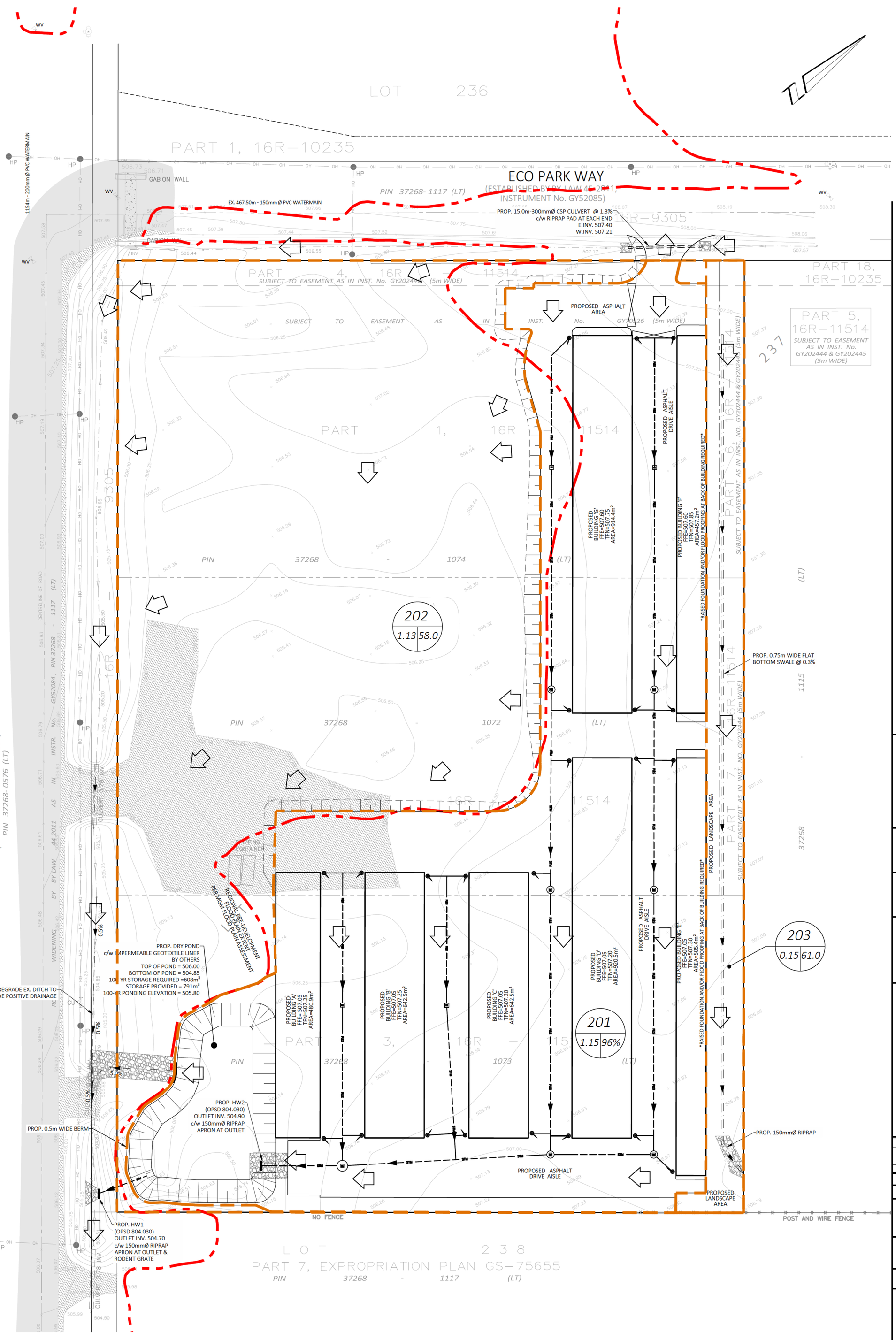
Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY:	DESIGN BY:	CHECKED BY:
BH	BH/BP	BP

L:\Proton\Con 2 SWTSR\ACAD\SP.LT.237.BRADWESLEY (31489-22)UTM-2010.dwg

NOT FOR CONSTRUCTION



201 — CATCHMENT I.D.

1.00 | 50% — AREA (HA) | PERCENT IMPERVIOUS/CURVE NUMBER

REGIONAL PRE-DEVELOPMENT FLOODPLAIN EXTENT

POST-DEVELOPMENT CATCHMENT LIMIT

CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.999560

METRIC:

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

TOPOGRAPHIC SURVEY DATE:

THIS TOPOGRAPHIC SURVEY WAS COMPLETED ON THE 7th DAY OF SEPTEMBER, 2022

BENCHMARK:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTV2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE PLAN FOR:

PROPOSED SELF STORAGE COMPLEX
752065 IDA STREET
PART OF LOT 237, CONCESSION 2
SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

NO.	REVISION	BY	DATE
1	REISSUED FOR 2ND SUBMISSION (SPA)	BP	10/06/25
0	ISSUE FOR 1ST SUBMISSION (SPA)	BP	04/28/25

DRAWING REVISION SCHEDULE

PROJECT No. 31489-22

DRAWING SCALE: 1:400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

POST-DEVELOPMENT DRAINAGE PLAN

SHEET 5 OF 5

LICENSED PROFESSIONAL ENGINEER [redacted] B.D. POND 100583029 OCT. 06, 2025 PROVINCE OF ONTARIO

PREPARED FOR:

BRAD WESLEY HOLDINGS LTD.

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY:	DESIGN BY:	CHECKED BY:
BH	BH/BP	BP

L:\Proton\Con 2 SWTSR\ACAD\SP.LT.237.BRADWESLEY (31489-22)UTM-2010.dwg

NOT FOR CONSTRUCTION