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Hansen Group Inc.

Hewitt's South Subdivision

Preliminary Stormwater Management Report

November 2024

The Jones Consulting Group Ltd.
#1-229 Mapleview Drive East, Barrie ON L4N 0W5

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Report Prepared By:

Kyle Ransom, B. Eng.
Engineering Designer

Report Approved By:

Michael Flis, P. Eng.
Project Manager

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Preliminary Stormwater Management Report
Hewitt's South Subdivision, Hansen Group Inc.

City of Barrie

1. Introduction

1.1. Appointment

The Jones Consulting Group Ltd. (TJCG) was retained by Hansen Group Inc. (Client) to provide engineering services in support of Draft Plan Approval for a proposed residential subdivision development located at 830, 864, 894 and 912 Lockhart Road in the City of Barrie (City). The proposed development is within the Hewitt's Secondary Plan Area and is to be known as Hewitt's South Subdivision.

This *Preliminary Stormwater Management Report* (PSWMR) has been prepared in support of the *Draft Plan of Subdivision* prepared by TJCG, dated November 19, 2024, and demonstrates how the site can be serviced appropriately by the proposed stormwater management infrastructure while not adversely impacting receiving waters in the Hewitt's Creek subwatershed. A *Functional Servicing Report* (FSR) has been submitted in conjunction with this report under separate cover in support of this application.

1.2. Property Description

The site is irregular in shape and comprises of approximately 26.49 hectares of land. The subject property is legally described as part of Lot 19, and Part of Lot 20, Concession 12, Former Township of Innisfil, now in the City of Barrie, County of Simcoe. A copy of the subject lands proposed *Draft Plan of Subdivision* prepared by The Jones Consulting Group (November 19 2024), has been attached in **Appendix C**.

The site is bound to the south by Lockhart Road, to the north by a proposed drainage channel (Special Defined Policy Area 2), and to the west and east by Environmental Protection and Residential areas. The approximate location of the subject property is shown in **Figure 1**.

Figure 1 – Site Location

The site is comprised of mainly cultivated open space utilized for agriculture, with a portion of the property covered in mixed vegetation to the east and west, and four (4) existing residences to the south fronting Lockhart Road. Hewitt's Creek traverses the western portion of the property. An existing drainage channel traverses the property from east to west along the north boundary.

The current Draft Plan proposes the development of 1187 units based on single family residential units, street townhomes, and medium density units. The draft plan also includes a commercial block, open space areas, environmental protection blocks, roadways, reserves, and two stormwater management blocks.

The developable limits of the subject site were established in connection with the *Hewitt's Secondary Plan* and the associated *Secondary Infrastructure Master Plans*, *The Hewitt's Secondary Plan Area Subwatershed Impact Study (SIS)* prepared by R.J. Burnside and Associate (September 2016), as well as Regional Flood Lines and Set Back requirements established by the Lake Simcoe Region Conservation Authority. The Hewitt's SIS has been utilized as a framework for developing a servicing strategy that is outlined in further detail in the *Functional Servicing Report* (under separate cover). As such, many of the assumptions noted in this Preliminary Stormwater

Management Report are based on the findings and recommendations of the Hewitt's Secondary Plan Area SIS.

The site topography ranges in elevation from a maximum elevation of 263.90 meters at the southeast corner of the site to a minimum elevation of 251 meters at the northwest corner of the site. The site generally drains overland to the north with slopes ranging from 2-10%. Overland flow is conveyed to the existing drainage channel along the property's northern limit, as well as the main branch of Hewitt's Creek.

The soils found on the subject site are a combination of Guerin Sandy Loam (Gul), Bondhead Sandy Loam (Bs) and Tioga Loamy Sand (Tis-b). These soils belong predominantly to Group A and B of the SCS Hydrological Soils Group Classification system. Soil Series are determined from the *Soil Map of Simcoe County*, *Report No. 29* of the *Ontario Soil Survey* produced by the Canada Department of Agriculture with the Ontario Department of Agriculture. Soil series, their respective hydrological soils group and their relative percentage of total land area are shown below in **Figure 2** and **Table 1.** Refer to **Appendix C** for a full-size copy of the Soil Map.

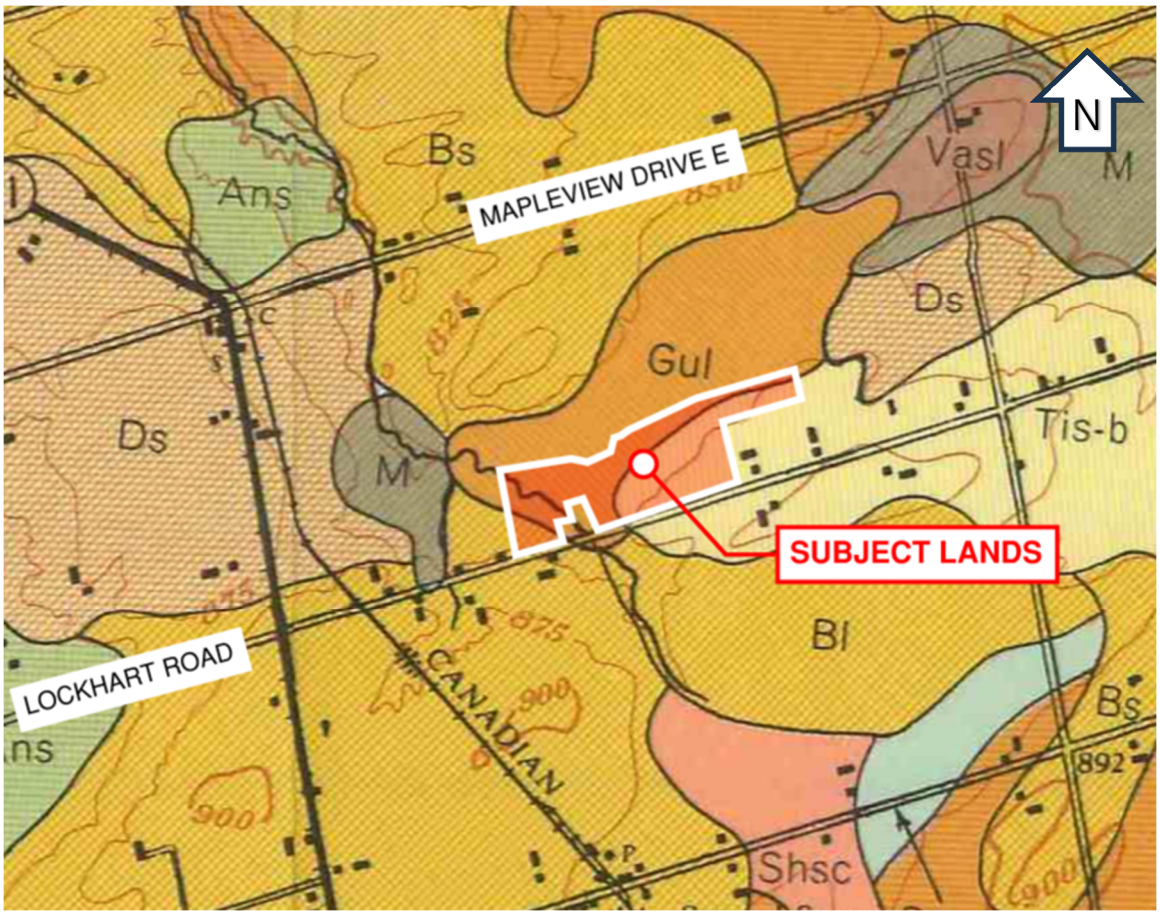


Figure 2 - Site Soils Identification

Table 1 - Soil Type Distribution

Soil Type	Soil Name	SCS Group	Total Area (ha)	Percentage Area (%)
Bs	Bondhead Sandy Loam	Group B	1.74	7
Gul	Guerin Sandy Loam	Group B	11.45	43
Tis-b	Tioga Loamy Sand	Group A	13.30	50

1.3. Existing and Proposed Land Use

The property is currently zoned as Residential with allocations provided for Stormwater Management, Open Space and Environmental Protection. A statistical breakdown of each land use is provided in **Table 2.**

Table 2 - Land Use Statistics

STATISTICS	Area (ha.)	Units
■ 11.0m Singles (LOT 1)	0.05 ha.	1 unit
☼ 10.4m Singles (LOTS 2 & 3, 22 – 25, & 35 – 45)	0.54 ha.	17 units
▼ 9.0m Singles (LOTS 4 – 21, 26 – 34, & 46 – 52)	0.95 ha.	34 units
Street Townhomes (6.0m/unit) (BLOCKS 64, 74 & 75)	0.24 ha.	14 units
Street Townhomes (4.5m/unit) (BLOCKS 53 – 63)	1.03 ha.	81 units
Back to Back Townhomes (6.8m/unit) (BLOCKS 65 – 73)	1.00 ha.	90 units
Medium Density (BLOCKS 76 – 79)	6.84 ha.	950 units
Open Space (BLOCKS 80)	0.50 ha.	
Commercial (BLOCKS 81)	0.14 ha.	
Stormwater Management & Drainage (BLOCKS 82 & 83)	1.56 ha.	
Environmental Protection (BLOCKS 84 – 87)	9.17 ha.	
0.3m Reserves, Private Road, and Widenings (BLOCKS 88 – 94)	0.98 ha.	
Roads 27.0m Major Collector – Street 'A' – Future 'Prince William Way' – Street 'B' – Future 'Terry Fox Drive' 18.0m Local Road – Streets 'C' & 'D' 12.0m Laneway – Laneway 'E' – 'I'	3.49 ha.	
TOTAL	26.49 ha.	1187 units

For further detail, refer to the proposed *Draft Plan of Subdivision* prepared by TJCG, November 19, 2024, which has been included in **Appendix C**.

1.4. Supporting Documents

The following documents have been referenced in the preparation of this report:

- Hewitt's South Draft Plan of Subdivision, Jones Consulting Group Ltd., November 2024;
- Hewitt's Secondary Plan Area Subwatershed Impact Study, Lover's, Hewitt's and Sandy Cove Creeks, R.J. Burnside & Associates Ltd., September 2016;
- Functional Servicing Report, Jones Consulting Group Ltd., November 2024;
- City of Barrie, Stormwater Infrastructure Design Standard, D700, June 2023;
- Lake Simcoe Region Conservation Authority, Technical Guidelines for Stormwater Management Submissions, April 2022;
- Credit Valley Conservation Authority & Toronto Region Conservation Authority, Low Impact Development Stormwater Management Planning and Design Guide, 2010;
- Ministry of the Environment, Lake Simcoe Protection Plan, July 2009;
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003;
- Ministry of Transportation, Drainage Management Manual, February 2008;
- GEI Consultants Ltd., Geotechnical Investigation – Proposed Hewitt's South Residential Subdivision, December 2023;
- GEI Consultants Ltd., Monthly Groundwater Level Monitoring Results – Jan 2024 to Aug 2024 – Rev. 1, Hewitt's Gate South/Phase 3 Residential Subdivision, September 2024;
- GEI Consultants Ltd., Infiltration Testing Letter, Hewitt's Gate South Subdivision – Phase 3, November 2024;
- RJ Burnside & Associates Limited, Hydrogeological Assessment – Hewitt's Gate South Subdivision, November 2024;
- RJ Burnside & Associates Limited, Technical Memorandum, Hewitt's Creek – Subwatershed Impact Study, November 2024

2. Approval Agencies & Design Criteria

The proposed development is subject to the policies and requirements of the City of Barrie (City), the Lake Simcoe Region Conservation Authority (LSRCA), and the Ministry of the Environment (MOE) all with respect to drainage and stormwater management.

2.1. City of Barrie

The stormwater drainage recommendations must conform to the City of Barrie's Stormwater Infrastructure Design Standard (June 2023). The City's document was prepared to reflect current accepted design practices and is intended as a guide to provide a solid engineering basis for storm drainage and stormwater management design, to establish uniform guidelines of minimum standards, and to improve the processing of site plan and plan of subdivision applications for approval in the City. The document provides legal and technical requirements specific to Stormwater Drainage Systems, Stormwater Management Systems, Site Grading, Requirements for Erosion & Sediment Control, Guidelines for Hydrologic and Hydraulic Analysis, and Stormwater Quantity & Quality Control Techniques, among other topics.

2.2. Lake Simcoe Region Conservation Authority (LSRCA)

The subject site is located within the Hewitt's Creek Watershed within the LSRCA's jurisdiction. Portions of the site are located within the LSRCA's Regulated Area subject to Ontario Regulation 41/24, and will require a permit from the LSRCA prior to construction. It is expected that the LSRCA will require the stormwater management plan to adhere to the LSRCA Technical Guidelines for Stormwater Management Submissions (April 2022) as well as conform to the recommendations of the MOE Stormwater Management Planning and Design Manual (March 2003). The goal of Stormwater Management is to mitigate the effects of urbanization on the hydrologic cycle including increased runoff and decreased infiltration, of rain and snowmelt. The LSRCA Technical Guidelines provide a framework for the planning and design of stormwater management infrastructure to address flooding, water quality, erosion, water balance, and natural heritage.

The LSRCA Technical Guidelines no longer follow a traditional approach to the development of stormwater management infrastructure. The Technical Guidelines provide guidance in developing an effective approach to stormwater management which follows Better Site Design Techniques developed by the Minnesota Pollution Control Agency's 'Minnesota Stormwater Manual, 2016'. Better Site Design involves techniques applied early in the planning and design process to preserve natural areas, reduce impervious cover, redistribute runoff and use pervious

areas to more effectively treat stormwater runoff. A major difference between the traditional development process and Better Site Design process is the implementation of Low Impact Development (LID) measures. The focus of design has shifted to treating and utilizing rainfall as soon as it hits the ground, reducing and controlling runoff volume and mimicking natural hydrology rather than simply conveying runoff.

2.3. Ministry of the Environment, Conservation and Parks (MOE)

An Environmental Compliance Approval (ECA) will be required from the MOE for the proposed storm sewers and stormwater management ponds. Once the detailed design for the site has been completed, this report will be updated and submitted to the City and reviewed to be in conformance with their City-wide ECA. Stormwater drainage proposals are to be consistent with the guidelines of the MOE's Stormwater Management Planning and Design Manual (March 2003).

3. Site Physiography

3.1. Existing Drainage Conditions

The subject site consists of approximately 26.49 hectares of land which is primarily used for agriculture and rural residential purposes. The site's topography contains average slopes ranging from 2-10%, generally draining towards the existing drainage channel and the main branch of Hewitt's Creek in a northward direction. The existing channel traverses along the north boundary of the property, flowing from east to west.

There is an external area of approximately 2.0 hectares located immediately east of the site that drains through the subject lands. This area is slated for the future development of a medium density block (by others). The overland flow follows the existing topography northwestwards until it is conveyed by the existing channel to the north, from which it flows westwards until merging with Hewitt's Creek. Next, Hewitt's Creek flows northerly, crossing Mapleview Drive East through a 4250mm (wide) x 1650mm (tall) Concrete Arch Box Culvert, continuing towards Lake Simcoe.

There are no existing stormwater management facilities on the subject site and all flows are released uncontrolled to the existing channel/Hewitt's creek main branch. The Existing Conditions are depicted on **Drawing SWM-1** Stormwater Management Plan Pre-Development Conditions in **Appendix D**.

3.2. Proposed Drainage Conditions

Development of the subject site will consist of single family residential units, street townhomes, medium density units, an internal road network to be built to City of Barrie standards, three Environmentally Protected areas, one parkland area, and two Stormwater Management blocks. One of the Stormwater Management (SWM) Blocks will be located on the west side of Hewitt's Creek and will service the proposed medium density Site Plan Block 79. The other SWM Block will be located on the east side of Hewitt's Creek and will service the remainder of the development.

Individual lots will be developed with buildings, driveways or parking lots, and landscaped areas. The grading of the lots will direct stormwater runoff to the internal road network, which will contain a proposed storm sewer system to convey minor flow (5 Year event) to the proposed stormwater management facility.

The roads are also utilized to convey the major overland flow (>5 Year event) within the right-of-way to the respective stormwater management facilities. The proposed end-of-pipe SWM facility on the east side of Hewitt's Creek is an extended detention wet pond, providing stormwater

quantity and quality control for the site and external drainage areas. Further details regarding the stormwater management plan and control facilities for the Medium Density Site Plan Block 79, west of Hewitt's Creek, to be provided at the Site Plan Approval Stage.

The proposed grading and drainage design includes the construction of a storm sewer system and road right-of-ways to convey flows up to and including the 100-year storm event. The system encompasses almost the totality of the subdivision area and external area to the east. The external area to the east is comprised of 2.0 hectares of future medium density residential lands, owned by others.

The lands east of Hewitt's Creek are to be known as the main development area and are the subject of this Report. These lands have been broken down into nine (9) major catchment areas for stormwater modeling purposes. The major stormwater catchments are illustrated on the Stormwater Management Plan Post-Development Conditions Drainage Area Plan **Drawing SWM-2** included in **Appendix D**.

Catchment 201 represents approximately 12.61ha of internal developable area east of Hewitt's Creek. Proposed site grading has been designed to convey all areas within catchment 201 to the proposed SWMF before discharging to Hewitt's Creek. These areas will drain overland during major events (> 5 year storm), and via the proposed subsurface storm sewer network during minor events (< 5-year storm). Four (4) LID infiltration galleries have been proposed within Catchment 201 to provide upstream pre-treatment to SWMF8 and promote infiltration and groundwater recharge across the development. Corresponding LID catchment areas and proposed locations have been illustrated on **Drawing SWM-3** included in **Appendix D**.

Catchment 202 represents the proposed SWMF8 itself and encompasses approximately 1.31ha of internal lands immediately east of Hewitt's Creek.

Catchments 203, 205 and 206 are comprised of vegetated and rear yard areas which drain uncontrolled due to grading constraints. Catchment 203 drains directly to Hewitt's Creek. Catchments 205 and 206 drain to the existing channel north of the development before being directed to Hewitt's Creek. These catchments are conveyed overland during both major and minor rainfall events.

Catchment 204 is comprised of vegetated and rear yard area along the north boundary of the development. This area is captured by rear yard catchbasins during minor rainfall events and conveyed to SWMF8 via the proposed storm sewer network. Due to grading constraints, this catchment drains overland to the existing channel and ultimately Hewitt's Creek during major rainfall events.

Catchment 301 represents an external drainage area immediately east of the subject lands (2.0ha) which is slated for a future medium density development (by others). Catchment 302 represents an external area of Lockhart Road which fronts the external medium density lands to the east (2.22ha). These areas will drain through the subject lands to proposed SWMF8, overland during major events (> 5-year storm), and via the proposed subsurface storm sewer network during minor events (< 5-year storm).

Catchment 303 represents external area of Lockhart Road which fronts the proposed development. This area will be conveyed to SWMF8 overland during major events (> 5-year storm), and via the proposed subsurface storm sewer network during minor events (< 5-year storm). An Oil Grit Separator (OGS) Unit is proposed to treat runoff pollutants generated by this external area before entering the SWMF.

The proposed stormwater management facility (SWMF8) will be designed to meet the quality and quantity requirements outlined in the *Hewitt's Secondary Plan Area Subwatershed Impact Study* prepared by RJ Burnside (September 2016), along with those of the City of Barrie, LSRCA and MOE, before discharging to the main branch of Hewitt's Creek. Further design details are provided in subsequent sections of this report, as well as the preliminary design drawings provided in **Appendix D**. All design details are outlined within this report, as well as the *Functional Servicing Report* submitted in conjunction with this report under separate cover.

The proposed works will require an Erosion and Sediment Control Plan to provide the appropriate protection of downstream receiving systems during construction. The proposed ESC works are to be outlined as part of the detailed design stage of approvals and should include the construction and staging requirements at various phases of the development.

The Stormwater Management Plan Post-Development Conditions Peak Flow Model Plan, and Low-Impact Development Model Plan (**SWM-2** and **SWM-3**, respectively) are included in **Appendix D** and illustrate the proposed drainage scenario.

3.3. Proposed Drainage Channel (Block 85)

Along the north boundary of the subdivision, there is a proposed 60m wide drainage channel. This channel is the result of an Ontario Municipal Board (OMB) settlement and is known as Special Defined Policy Area 2 Section 9.3.3.2d. Refer to the OMB Minutes of Settlement provided in **Appendix C** for further specifics related to channel geometry, floodplain, ecology, etc. Phasing of the channel construction and/or interim channel works, where necessary, will be resolved at the detailed design phase.

4. Hydrology

4.1. PSCWMM Model

The development was hydrologically modeled using the latest version of the PCSWMM Professional computer program by Computational Hydraulics Int. PCSWMM is a GIS-based hydrologic model capable of performing both event-based and continuous rainfall simulations for SWM Facility & LID design and LID water balance & erosion threshold calculations, respectively. Furthermore, the PCSWMM model utilizes the Green-Ampt Method for determining infiltration losses, which allows for the direct incorporation of field-tested infiltration rates.

The PCSWMM model used for this design is derived from the model provided with the Hewitt's Secondary Plan Area Subwatershed Impact Study (SIS) by R.J. Burnside (September 2016). The model has been truncated to include the lands within SIS Area 8 of the Hewitt's Creek subwatershed, including the subject lands. The model input parameters (e.g. catchment area, flow lengths, proposed imperviousness) have been updated to reflect the proposed subdivision design.

The hydrologic modeling includes only the post-development conditions as the target flow rates (pre-development) are established within the SIS as unitary discharge rates ($m^3/s/ha$).

In addition to the post-development peak flow model, a separate LID Model has been developed using PCSWMM modelling software to analyze the ponding depths and drawdown characteristics of each of the four (4) proposed underground infiltration galleries during the 25mm Water Quality Event.

4.2. Design Storms & Climatology

The rainfall events used for the PCSWMM model simulations are in accordance with City of Barrie SWM Guidelines, including the Chicago 4-hour and the SCS Type II storm distribution for the 6-hour, 12-hour and 24-hour durations. It was found that these storm distributions generated the highest peak flow and greatest volumes. Therefore, the following events were modeled:

- 4-Hour Chicago rainfall distribution for the 2, 5, 10, 25, 50, and 100-year storm events;
- 6-hour SCS Type II rainfall distribution for the 2, 5, 10, 25, 50, and 100-year storm events;
- 12-hour SCS Type II rainfall distribution for the 2, 5, 10, 25, 50, and 100-year storm events;
- 24-hour SCS Type II rainfall distributions for the 2, 5, 10, 25, 50, and 100-year storm events;
- 25 mm 4-hour Chicago rainfall event; and
- Hazel Regional Storm Event.

4.3. Soil Types

The *Soil Survey of Simcoe County Report No. 29* shows that the site is comprised of Bondhead Sandy Loam (7%), Guerin Sandy Loam (43%), and Tioga Sandy Loam (50%). These soil types consist of sandy loam and are part of Groups A & B of the SCS Group categorization. A breakdown of the soil groups and their respective area, and percentage of site coverage is provided in **Table 1** in **Section 1.2**. A copy of the *Soil Map of Simcoe South – Excerpt of Soil Survey No.29* has been attached to this report in **Appendix C**.

A Geotechnical Investigation was carried out by GEI Consultants Ltd in November 2023; which included 29 Boreholes within the subject development boundary, 15 completed with the installation of Groundwater Monitoring Wells. Boreholes were advanced to 6.6m below existing ground level. A 100 to 305mm thick topsoil mantle was found at the surface of all boreholes. Below this mantle, and a localized fill layer, the subsurface stratigraphy is dominated by soils comprising of sand/silty sand, sand/fine sand, glacial till, gravelly sand and sand/silt till, with localized units of silty clay and clayey silt. In general, the soils were loose in the upper 1 to 2 m, becoming compact to very dense below 2 m depth. Moisture contents were typically in the 1 to 45% range, being moist to wet.

A Groundwater Monitoring program was also completed by GEI with monthly readings being reported to better understand the groundwater regime for the subject lands. Findings from the monitoring program indicate a high groundwater level near or at the surface throughout a significant portion of the subject lands. Proposed grading for the site has been designed to maintain minimum separation required from underside of footings or structures, and as a result will require an average fill across the subject lands of approximately 4.0m.

Copies of the Geotechnical Investigation by GEI Consultants Ltd, dated December 2023, and Groundwater Monitoring Results Memo, dated September 2024, are provided under separate cover.

4.4. Discretization

Model discretization for the post-development peak flow model and LID model are summarized herein. PCSWMM modelling includes only the post-development conditions as the allowable target flow rates are established within the SIS as unitary discharge rates ($m^3/s/ha$). The target flow rates are shown on **Table 5** & **6** in **Section 4.5.**

The PCSWMM model derived from the SIS has been updated to reflect the proposed subdivision design. The pre-development and post-development drainage plans, illustrating the limits of each

of the catchment areas described in **Section 3.1** & **3.2** of this Report are illustrated on **Drawings SWM-1** and **SWM-2**, respectively, and provided in **Appendix D**. The PCSWMM model schematic is provided in **Appendix B** along with the model output.

Table 3 below summarizes the hydrologic parameters that were used for the PCSWMM peak flow model.

Table 3 - Summary of Hydrologic Model Input – Post-Development Peak Flow

Catchment Area Parameters						Infiltration Parameters: Green-Ampt Method		
ID	**Area (ha)**	**Flow Length (m)**	**Width (m)**	**Slope (%)**	**Imperv. (%)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
201*	12.61	50	2521	1.5	60	109.98	10.92	0.368
202*	1.31	40	326	2.0	0.0	109.98	10.92	0.368
203	0.34	40	85	1.5	0.0	109.98	10.92	0.368
204**	0.76	70	108	1.5	0.0	109.98	10.92	0.368
205	0.49	20	245	1.5	0.0	109.98	10.92	0.368
206	0.08	30	27	1.5	0.0	109.98	10.92	0.368
301*	2.00	50	400	1.0	60	109.98	10.92	0.368
302*	2.22	100	222	1.0	75	109.98	10.92	0.368
303*	1.36	100	136	1.0	75	109.98	10.92	0.368
Total	**21.17**				**54.1**			

**These catchments drain to the proposed SWMF during major and minor peak flow events.*

***These catchments drain to the proposed SWMF during minor peak flow events.*

Table 4 below summarizes the hydrologic parameters that were used for the PCSWMM LID model. **Drawing SWM-3** in **Appendix D** illustrates the post-development LID Model catchments. Catchment 201 has been broken down into smaller catchments (501, 401 – 404 & RFTP areas) for the purpose of LID modeling.

Table 4 - Summary of Hydrologic Model Input – Post-Development LID Model

Catchment Area Parameters						Infiltration Parameters: Green-Ampt Method		
ID	**Area (ha)**	**Flow Length (m)**	**Width (m)**	**Slope (%)**	**Imperv. (%)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
202*	1.31	40	326	2.0	0.0	109.98	10.92	0.368
203	0.34	40	85	1.5	0.0	109.98	10.92	0.368
204**	0.76	70	108	1.5	0.0	109.98	10.92	0.368
205	0.49	20	245	1.5	0.0	109.98	10.92	0.368
206	0.08	30	27	1.5	0.0	109.98	10.92	0.368
301*	2.00	50	400	1.0	60	109.98	10.92	0.368
302*	2.22	100	222	1.0	75	109.98	10.92	0.368
303*	1.36	100	136	1.0	75	109.98	10.92	0.368
401*	1.30	50	259	1.5	70	109.98	10.92	0.368
402*	0.51	50	101	1.5	70	109.98	10.92	0.368
403*	0.56	50	112	1.5	70	109.98	10.92	0.368
404*	1.15	50	229	1.5	70	109.98	10.92	0.368
501*	7.76	50	1553	1.5	60	109.98	10.92	0.368
RFTPA	0.12	35	34	1.5	100	109.98	10.92	0.368
RFTPB	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPC	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPD	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPE	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPF	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPG	0.11	35	34	1.5	100	109.98	10.92	0.368
RFTPH1	0.13	35	34	1.5	100	109.98	10.92	0.368
RFTPH2	0.13	35	34	1.5	100	109.98	10.92	0.368
RFTPI1	0.13	35	34	1.5	100	109.98	10.92	0.368
RFTPI2	0.13	35	34	1.5	100	109.98	10.92	0.368
Total	**21.17**				**54.1**			

The infiltration parameters used in the model and summarized in **Tables 3 & 4** reflect those values used for Green-Ampt infiltration on PCSWMM Support website https://support.chiwater.com/ under soil characteristics.

Some of the PCSWMM model input parameters (not shown in **Tables 3 & 4** above) are common among all catchment areas, including the following:

Manning's N for impervious / pervious area = 0.013 / 0.15

Depth of depression storage on impervious / pervious area (mm) = 2 / 5

4.5. Hydrologic Peak Flow Model Results

The pre-development condition was not modeled within PCSWMM as the allowable peak flow rates are determined using Unitary Discharge Rates for the Hewitt's Creek watershed as established within the SIS. The Unitary Discharge Rates, provided in units of $m^3/s/ha$, and the resulting allowable peak flow rates for the development area east of Hewitt's Creek are summarized in **Table 5** along with the post-development peak flow rates computed by the PCSWMM Peak Flow model. The PCSWMM model schematics along with the output printout for all simulated storm events are provided in **Appendix B**.

Table 5 - Hydrologic Peak Flow Model Results

Storm Peak Event Flow (m^3/s) – Site Total							
	Area (ha)	**Storm Distribution**					
Return Period (years)		**2**	**5**	**10**	**25**	**50**	**100**
Allowable Flow Rates per the Hewitt's Secondary Plan Area SIS							
Unitary Discharge Rates ($m^3/s/ha$)		0.006	0.011	0.016	0.023	0.029	0.036
25mm 4h CHI Erosion Control Unitary Discharge Rate ($m^3/s/ha$)		0.0006					
Target Flow Rates	21.17	0.127	0.233	0.339	0.487	0.614	0.762
	21.17	0.013					
Post Development Condition – With attenuation							
CHI 4h Storm Distribution	21.17	0.023	0.069	0.149	0.246	0.326	0.414
SCS Type II - 6 hour	21.17	0.027	0.112	0.244	0.369	0.471	0.622
SCS Type II - 12 hour	21.17	0.026	0.102	0.227	0.342	0.443	0.595
SCS Type II - 24 hour	21.17	0.045	0.149	*0.345	0.451	0.559	0.713
CHI 25mm Storm	21.17	0.016					
Hazel Storm	21.17	2.754					

**NOTE: the exceedance of post-development peak flow in the 24-hr SCS 10-year storm of +0.006 m^3/s to be resolved at detailed design.*

The results demonstrate that the proposed stormwater management pond will provide the required quantity control to reduce post-development peak flows to the allowable release rates. The function of the proposed extended detention wet pond is discussed in further detail in **Section 5**.

Site Plan Block 79 will provide standalone quantity control for developable area within the block via a proposed SWMF at its northeast corner. Post-development peak flow rates generated by Block 79 will be controlled to the allowable flow rates per the Hewitts Secondary Plan Area SIS, illustrated in **Table 6** below. Further details regarding SWMF design for Block 79, and peak flow rate comparison to be provided at the Site Plan Approval stage.

Table 6 – Block 79 Allowable Peak Flow Rates

Storm Peak Event Flow (m^3/s) – Site Total							
	Area (ha)	**Storm Distribution**					
Return Period (years)		**2**	**5**	**10**	**25**	**50**	**100**
Allowable Flow Rates per the Hewitt's Secondary Plan Area SIS							
Unitary Discharge Rates ($m^3/s/ha$)		0.006	0.011	0.016	0.023	0.029	0.036
25mm 4h CHI Erosion Control Unitary Discharge Rate ($m^3/s/ha$)		0.0006					
Target Flow Rates	1.82	0.011	0.020	0.029	0.042	0.053	0.066
	1.82	0.001					

5. Stormwater Management Plan

The stormwater management plan is intended to provide an environmentally sound approach to stormwater and drainage issues. The issues can be divided into four categories: stormwater quality control, stormwater quantity control, water balance, and erosion & sediment control.

This PSWMR outlines the proposed design for the Hewitt's South Subdivision stormwater management system to meet the compulsory post-development quantity and quality control requirements of the City, LSRCA, MOE and Hewitt's Area SIS.

To provide the development with the required stormwater quality and quantity control measures, one (1) extended detention wet pond is proposed and complemented by four (4) upstream LID Infiltration Galleries. The main branch of Hewitt's Creek will be the discharge location for the pond's treated stormwater and other stormwater runoff from the site.

The City of Barrie and the LSRCA require Level 1 (Enhanced) quality control for the stormwater runoff generated from this site. The proposed SWM facility (pond) has been sized based on the combination of Level 1 quality control, quantity control of the 2 through 100-year post to pre-development peak flows and the extended detention (24 hour) for the 25mm storm event for erosion control. Sediment and erosion control measures will be investigated and recommended during the detailed design stage, taking into consideration the sensitivity of the downstream receiving watercourse.

Additionally, the subject site proposes to implement a variety of Low Impact Development (LID) measures consisting of underground infiltration galleries, reduced lot grading, rooftop disconnection to pervious surfaces, rain barrels, etc. In addition to the extended detention wet pond, the proposed use of LID measures follows the recommendations of the SIS and will assist in reducing runoff volumes and the subsequent quantity of water to be treated by stormwater management facilities while promoting at-source filtration, infiltration and groundwater recharge. Although reduction in runoff volumes to the SWMF may be experienced through the implementation of at-source LID's, the SWMF has been conservatively designed for quality and quantity without considering upstream LID's.

The pond, SWMF #8, is located on the west end of the site, adjacent to the main branch of Hewitt's Creek. The total area draining into SWMF #8 includes Catchments 201, 202, 204 (during minor events), and 301-303, totaling an area of 20.26 hectares and overall imperviousness equal to 56.5%.

The proposed SWMF #8 is located immediately adjacent to Prince William Way. The facility includes one sediment forebay with a single inlet headwall and one main cell separated from the forebay by a weir. The forebay has been designed to provide the required settling and dispersion lengths per MOE guidelines. Forebay water quality design parameters and calculations are further described in **Section 5.2** of this Report, and outlined in detail in **Appendix A**.

The bottom elevation of the forebay and main cell is 252.20m. The forebay is connected to the main cell through a weir set at 253.70m, which corresponds to the permanent pool elevation, resulting in a permanent pool depth of 1.50m.

The top elevation of SWMF #8 is 256.00m, 0.45m higher than the emergency overflow weir located at the west side of the wet pond at 255.55m elevation. The top of pond elevation provides 0.30m freeboard to the highest ponding elevation during the Regional (Hazel) storm event. Inside sideslopes of 4H:1V are proposed throughout the SWMF except for a 6m wide and 7H:1V sideslopes safety shelf surrounding the permanent pool. Outside sideslopes of 3H:1V are proposed along the surrounding limits of the pond, adjacent to the Environmental Protection Area. 3H:1V slopes are also proposed to slope down from the proposed Prince William Way Right-of-way.

An allowance for a 5.0m wide maintenance access road is provided around the entire perimeter of the pond. More information is provided on the pond plan view and sections **Drawings PND-1** and **PND-2** in **Appendix D**.

5.1. Low Impact Development

As per the recommendations of the *SIS*, the City of Barrie, LSRCA and MOE, a suite of Low Impact Development measures is being proposed throughout the subject lands in an effort to reduce the reliance on end-of-pipe facilities and better mimic the natural hydrologic cycle. The Hewitt's South Subdivision will include both inline and offline practices associated with the stormwater management plan, all designed in accordance with the *Credit Valley Conservation Authority & Toronto and Region Conservation Authority – Low Impact Development Stormwater Management Planning and Design Guide (2010)*.

5.1.1. Lot Level Controls

In accordance with the *SIS,* it is recommended that all catchments should incorporate an increased depth of absorbent topsoil of at least 300mm thick to promote at-source infiltration of pervious surfaces on lots. It is further recommended that any absorbent topsoil be amended with

organic content (compost) as recommended in the *CVC Design Guidelines* while scarifying subsoils and remaining as unconsolidated as reasonably possible to maintain void spaces. A study conducted in BC has asserted reductions in runoff volume and peak flows up to 50% from the placement of 300mm of absorbent landscaping (British Columbia Ministry of Land, Water and Air Protection, May 2002). Another study conducted in Ontario through the *Sustainable Technologies Evaluation Program (STEP)* has confirmed similar findings with a reduction in runoff of up to 27% (STEP, Residential Lot Level SWM Practices, 2013).

Other recommendations include downspout disconnection, where roof leaders are directed away from impervious surfaces. Though not explicitly quantified, sub-area routing can be applied throughout all hydrologic modelling to capture the benefit of re-routing runoff produced from rooftops to pervious surfaces. Additionally, it is recommended to incorporate rain barrels at the lot level where possible, to further reduce runoff volumes to downstream systems.

Although the above lot level controls are recommended, they are not specifically quantified in the design calculations as the provision of these controls cannot be enforced at the lot level.

5.1.2. Infiltration Galleries

Four (4) infiltration galleries are proposed throughout the development in series with the storm sewer network where stormwater runoff is collected from the site's internal roadway, parking and landscaped areas, and building rooftops. The facilities have been designed to have an optimized footprint to capture and infiltrate as much stormwater runoff as possible before overflowing into the next downstream segment of storm pipe, or overland.

Three (3) of the infiltration galleries are located within the subdivision's medium density blocks and will be comprised of Stormtech SC-800 & SC-310 chambers. The fourth infiltration gallery is located within the open space park block and will be comprised of Stormtech SC-800 chambers. These chambers are to be surrounded by a clear stone media to specified depths (void ratio of 0.4) and wrapped in a non-woven filter fabric. All infiltration galleries will feature an ETV verified isolator row at the first run of chambers to provide additional removal of pollutants upon entry to the facilities. The infiltration galleries will have an open bottom to allow the entire footprint area to be utilized for infiltration and have been designed to provide greater than 1m of separation to the recorded high-groundwater level. Inlet and outlet pipes to the systems have been configured to allow for the maximum amount of storage to be achieved in each facility. **LID's 1** through **4** provide maximum storage volumes of **444m^3**, **260m^3**, **206m^3**, and **334m^3**, respectively. This exceeds the volume of rainfall produced by the 25mm Water Quality Event within the upstream drainage area of each LID; 437m^3 (1.75ha x 25mm x 10), 250m^3 (1.00ha x 25mm x 10), 206m^3

(0.825ha x 25mm x 10), and 317m^3 (1.27ha x 25mm x 10). In addition, discrete event modelling of the LID's under the 25mm Water Quality Event simulation conditions determined drawdown periods for LID's **1** through **4** of **31hr**, **17hr**, **8hr**, and **39hr**, respectively. LID's 1 & 4 fall within the desired 24-48hr period as per MOE guidelines. Due to high infiltration rates in receiving soils for LID's 2 & 3, the calculated drawdown period is shorter than 24hr. The LID designs will be further advanced and refined at the detailed design stage. For further details, a detailed cross section of LID-4 is displayed on **Drawing LID-1** in **Appendix D**, and ADS design drawings have been included in **Appendix A**. Additionally, Detailed LID Sizing Design Notes and PCSWMM Model results have been provided in **Appendix A** & **Appendix B**, respectively. Profile **Drawing P-6** in **Appendix D** illustrates a preliminary profile and conceptual LID locations within the MD block.

5.1.3. Oil Grit Separator Unit

An oil grit separator (OGS) unit has been proposed immediately upstream of the SWMF, at it's southeast corner to act as a pre-treatment device for external flows entering the facility from Lockhart Road. An ADS FD-4HC unit has been sized to accept minor event runoff generated by catchment 303. An additional OGS unit has been proposed upstream of LID-4 to act as a pre-treatment device for flows entering the LID. An ADS FD-4HC unit has been sized to accept minor event runoff generated by catchment 120, illustrated on **Drawing STM-1** in **Appendix D**.

ADS detailed OGS sizing reports have been provided in **Appendix A** of this Report. Equivalent OGS units may also be explored.

5.2. Stormwater Quality Control

As per the City and LSRCA requirements, *Enhanced* Level of Protection (Level I) corresponding to 80% long term removal of Total Suspended Solids (TSS) is required for the site. The proposed extended detention wet pond SWMF #8 and LID Underground Infiltration Galleries will provide the required level of SWM quality control, as the calculations provided below will demonstrate. In addition to the typical quality control requirements, the Best Management Practices (BMPs) across the development will provide phosphorus removal benefits to ensure that best efforts are taken to reduce post-development phosphorus loadings to pre-development levels (or a minimum 80% removal of TP from post-development).

A summary of the proposed measures and their corresponding removal efficiencies is provided in **Table 7** below.

Table 7: BMP Concentration Based Removal Efficiency Summary

BMP Measure	TSS Removal Efficiency (%)	TP Removal Efficiency
LID Infiltration Gallery	75	60
Wet Pond	80	63
OGS Unit	60	20

5.2.1. Water Quality Event Volume and Drawdown Detention Time

Based on the MOE requirements (extrapolation of Table 3.2), 193.5m^3/ha of storage is required for Enhanced quality control. This storage corresponds to both the extended detention volume (40 m^3/ha) and the permanent pool volume (153.5 m^3/ha).

The extended detention and permanent pool volumes, as per the MOE guidelines, are calculated as follows:

Enhanced (Level 1) Water Quality Protection

Total area draining to outlet for quality control = 20.26 ha

(56.5% Net Impervious Area), (193.5m^3/ha)

20.26 ha * 153.5 m^3/ha = 3,110 m^3 (permanent pool)

20.26 ha * 40 m^3/ha = 810 m^3 (extended detention)

However, the extended detention volume must be designed to attenuate the erosion volume from the 4-hour 25mm Chicago rainfall event (Water Quality Event). Based on the watershed characteristics and the PCSWMM model, the 25mm storm event produces a runoff volume of 1,620m^3. Therefore, the runoff volume from the 4-hour 25 mm Chicago storm event will govern.

	Required:	Provided:
Permanent Pool	3,110m^3	3,918m^3
Extended Detention	1,620m^3	1,744m^3

The 24-hour extended detention release rate is the maximum target flow rate to ensure that 24-hour settling occurs in the pond, which resulted in an extended detention outlet (primary orifice) of 125 mm in diameter. To calculate the detention and drawdown time for the Water Quality Event volume, the following equation is used:

$$t = \frac{0.66C_2h\sqrt{h} + 2C_3\sqrt{h}}{2.75A_0}$$

Where:

t = drawdown time (seconds)

C_2 = slope coefficient from the area-depth linear regression (2347)

C_3 = intercept from the area-depth linear regression (4618)

A_0 = cross-sectional area of the extended detention orifice (0.0123 m^2)

h = maximum water elevation above the orifice, taken from the extended detention elevation to centroid of orifice (0.288 m)

Given the above information, the calculated extended detention storage time resulted in approximately 42.7 hours, which exceeds MOE minimum criteria. The drawdown time calculation and area-depth curve coefficients are presented on the **Water Quality Calculation Sheet** and included in **Appendix A**.

5.2.2. Forebay Sizing

The forebay is sized to provide sufficient length from the inlet to the forebay weir. It is recommended that the forebay be sized according to the length required for settlement of larger suspended particles. The forebay for the pond was designed according to the following criteria (MOE, 2003):

Forebay Settling Length:

$$Dist = \sqrt{\frac{rQ_p}{V_s}}$$

Where:

Dist = the minimum forebay length (m)

r = the length to width ratio based on the dimensions at the permanent pool elevation 253.70m (3.3:1)

Q_p = the peak flow rate exiting the pond during the 4-hour 25 mm Chicago quality storm event (0.017 m^3/s)

V_s = the settling velocity. It is recommended that a value of 0.0003 m/s be used in most cases.

The required settling length of the forebay is 13.6 meters.

Forebay Dispersion Length:

$$Dist = \frac{8Q}{dV_f}$$

Where:

Dist = the minimum forebay length (m)

Q = the 5-year peak inlet flow rate (4.41 m^3/s)

d = the depth of the permanent pool in the forebay (1.5 m)

V_f = the desired velocity at forebay berm (0.5 m/s)

The required dispersion length of the forebay is 47.0 meters.

The proposed forebay accommodates both the settling and dispersion lengths. The length between the inlet headwall to the forebay weir is approximately 65.0 m.

Supporting calculations and more details are provided on the **Water Quality Calculation Sheet** included in **Appendix A.**

5.2.3. TSS Loading & Removal – Treatment Train Calculations

As mentioned previously, Enhanced Level of Protection (Level I) corresponding to 80% long term removal of Total Suspended Solids (TSS) is required for the site. Thus, Best Management Practices (BMP's) have been adopted for the site, including one (1) Extended Detention Wet Pond and four (4) LID Underground Infiltration Galleries.

The removal efficiency of a series of BMP devices in a treatment train can be expressed as follows:

$$R = A + B - [(A \times B)/100]$$

Where: R = Total Treatment Train Removal Efficiency (%)

A = Removal Efficiency of 1st (Upstream) BMP (%)

B = Removal Efficiency of 2nd (Downstream) BMP (%)

The approach to calculating treatment train removal efficiencies can be extended to include more than two devices.

The predicted water quality performance of the site BMP Measures has been established using a weighted average of the upstream catchment area size and corresponding treatment train removal efficiency. The removal efficiencies of each of the discrete treatment trains and overall catchment performance is summarized below in **Table 8** for the Internal Lands, and **Table 9** for the external Lockhart Road lands.

There are four (4) treatment trains established within the site to service the Internal Lands, as described below:

Table 8 - TSS Concentration Removal Efficiency, Internal Lands

Treatment Train	Catchment Areas	Area (ha)	TSS Removal
Wet Pond	501, 202, 204, 301**	9.96	80.0 %
Underground Infiltration Gallery > Wet Pond	RFTPA – RFTPI2, 401-404	4.71	95.0 %
Untreated	203, 205, 206	0.91	0.0 %
Total		**15.58**	**80.0%**

NOTE: The location of future OGS units to be determined at detailed design. Conservatively, they are not included in the above calculations.

***Catchment 301, representing the external Medium Density Block at 960 Lockhart Road, is considered in the Wet Pond Quality Control calculations, however, the area is excluded from this calculation.*

As per results, the stormwater management plan for the subdivision achieves **80.0%** of overall TSS removal efficiency for internal lands and complies with the Enhanced Level of Protection required by the City, LSRCA, and MOE.

There are two (2) treatment trains established within the site to service the external Lockhart Road Lands, as described below:

Table 9 - TSS Concentration Removal Efficiency, Lockhart Road

Treatment Train	Catchment Areas	Area (ha)	TSS Removal
Wet Pond	302	2.22	80.0 %
Oil Grit Separator > Wet Pond	303	1.36	92.0 %
Total		**3.58**	**84.6%**

As per results, the stormwater management plan achieves **84.6%** of overall TSS removal efficiency for the Lockhart Road lands and complies with the Enhanced Level of Protection required by the City, LSRCA, and MOE.

Site Plan Block 79 will require *Enhanced Level 1 Treatment* to be provided on-site and will be resolved at the Site Plan design stage.

5.2.4. Phosphorus Loading Calculations

A pre to post-development phosphorus calculation has been completed for the site using the Phosphorus Budget Tool to address the LSRCA policy requirements. Hutchinson Environmental Sciences Ltd., Greenland International Consulting Ltd. and Stoneleigh Associates Inc. were retained by the MOE to develop the software. The tool provides standardized methods to estimate and compare pre and post-development phosphorus loadings with the implementation of Best Management Practices (BMP's) and Low Impact Development (LID) techniques. The program uses phosphorus export estimates developed for specific land uses using recent and site-specific estimates.

The land areas used for the analysis are based on the *Draft Plan of Subdivision* and external areas of Lockhart Road draining into SWMF #8, excluding the Environmentally Protected area within the NHS boundaries, resulting in total areas of 15.58 ha & 3.58 ha, respectively.

The site's stormwater management plan includes the underground infiltration galleries, oil grit separator unit (OGS), and extended detention wet pond, aiming to filter and remove suspended solids and phosphorus from site runoff.

The Phosphorus removal rates for BMP's per the values provided in the MOE's *Phosphorus Loading Tool* and *LSRCA SWM Guidelines* are illustrated in **Table 7** of this Report. The removal efficiencies of each of the discrete treatment trains and overall catchment performance is summarized below in **Table 10** for internal lands, and **Table 11** for the external Lockhart Road lands**.**

Table 10 - TP Concentration Removal Efficiency, Internal Lands

Treatment Train	Catchment Areas	Area (ha)	TP Removal
Wet Pond	501, 202, 204 301**	9.96	63.0 %
Underground Infiltration Gallery > Wet Pond	RFTPA – RFTPI2, 401-404	4.71	85.2 %
Untreated	203, 205, 206	0.91	0.0 %
Total		**15.58**	**66.0%**

NOTE: The location of future OGS units to be determined at detailed design. Conservatively, they are not included in the above calculations.

***Catchment 301, representing the external Medium Density Block at 960 Lockhart Road, is considered in the Wet Pond Quality Control calculations, however, the area is excluded from this calculation.*

The TP annual loading rates calculated for the proposed development are summarized as follows:

Pre-Development Loading: 2.96 kg/year

Post-Development Loading: 20.57 kg/year

Post-Development with BMPs: 6.99 kg/year

The calculation shows a 4.03 kg/year, or 136% net increase in the Phosphorus load over pre-development conditions with the implementation of BMPs. The **Phosphorus Loading Tool** printouts are provided in **Appendix A**.

This development will be subject to the Lake Simcoe Phosphorous Offsetting Policy and as such, will pay a phosphorous offsetting fee to the LSRCA. The Phosphorous offsetting Fee, including a 15% administration fee, is calculated as follows:

Offsetting Calculation = 1.15 x (2.5 x P load in kg x $35,770)

The developer is required to pay an estimated **$414,440.17** in offsetting costs. The offsetting calculation will be refined and finalized at the detailed design stage.

The phosphorus removal calculations for the external Lockhart Road lands are demonstrated in **Table 11** below.

Table 11 - TP Concentration Removal Efficiency, Lockhart Road

Treatment Train	Catchment Areas	Area (ha)	TP Removal
Wet Pond	302	2.22	63.0 %
Oil Grit Separator > Wet Pond	303	1.36	68.0 %
Total		**3.58**	**64.9%**

Site Plan Block 79 will require phosphorus removal measures to be provided on-site and will be resolved at the Site Plan design stage.

5.3. Stormwater Quantity Control

To provide stormwater quantity control, the site will utilize an end-of-pipe extended detention wet pond. The combination of the pond's active storage and outlet controls will attenuate post-development stormwater peak runoff to the target flow rates determined via the SIS. Refer to the peak flow results summarized in **Section 4.5**.

In accordance with the SIS, one extended detention wet pond will be utilized as an end-of-pipe stormwater management facility, which is sized to provide the required quantity control for the site

for all design storms up to the 100-year event. In addition, the pond's outlet structure and overflow spill weir have been sized to safely convey the Hurricane Hazel Regional storm event, ensuring a 0.30m freeboard between the top of pond and the Hazel storm event's ponding elevation.

Pond #8 will discharge to a control maintenance hole complete with a 125mm diameter orifice plate bolted to the inside with an invert at the permanent pool elevation. The primary outlet pipe will discharge via a Hickenbottom structure within a plunge pool below the bottom of the pond, ensuring that the water is drawn from the bottom portion of the pond.

A 525mm diameter storm pipe will discharge through a double ditch inlet catchbasin structure located within the pond sideslope to a second control maintenance hole downstream of the first control maintenance hole. The 525mm storm pipe itself acts as a secondary orifice at an invert of 254.80m, above the extended detention elevation.

The second control maintenance hole will discharge via a 750mm diameter storm pipe and outlet via a headwall to Hewitt's Creek.

A 20m wide overflow weir with 10H:1V sideslopes is proposed at an elevation of 255.55m to ensure safe conveyance of peak flows during the Regional (Hazel) storm event. The headwall and overflow weir will discharge to a proposed spillway comprised of Flexamat Erosion Control Mat. The pond outflow will be dissipated via the Flexamat and allowed to flow overland through the Environmental Protection area to Hewitt's Creek.

An abbreviated version of the Pond #8 stage-storage-discharge table is presented in **Table 12** below, including the values for storage and pond outflow resulting from the orifices and overflow weir configuration. The complete SSD table is provided in **Appendix A**.

Table 12 - SWMF #8 Stage-Storage-Discharge Table

Elevation (m)	Total Storage (m^3)	Active Storage (m^3)	Water Depth (m)	Discharge (m^3/s)	Description
252.20	0,000	0,000	0.00	0.000	Bottom of Pond
253.70	3,918	0,000	1.50	0.000	Permanent Pool / Primary Orifice
254.00	5,374	1,456	1.80	0.017	25mm 4hr CHI
254.05	5,662	1,744	1.85	0.018	Extended Detention
254.48	8,281	4,363	2.24	0.028	2yr 24hr SCS
254.80	10,426	6,508	2.60	0.035	Secondary Orifice
254.85	10,805	6,887	2.63	0.040	5yr 24hr SCS
255.01	11,927	8,009	2.81	0.113	10yr 24hr SCS
255.21	13,486	9,568	3.01	0.253	25yr 24hr SCS
255.36	14,648	10,730	3.15	0.368	50yr 24hr SCS
255.51	15,908	11,990	3.31	0.445	100yr 24hr SCS
255.55	16,279	12,361	3.35	0.468	Overflow Weir
255.70	17,548	13,630	3.50	2.571	Regional (Hazel)
256.00	20,330	16,412	3.80	9.476	Top of Pond

5.3.1. Runoff Volume Control

The LSRCA's *Technical Guidelines for Stormwater Management* offers guidance in determining the appropriate volumetric control targets for subject sites as a function of the site characteristics. The overall Hewitt's South Subdivision lands are deemed to be a *Major Development* under the *Lake Simcoe Protection Plan* and are required to provide runoff volume control. Several constraints have been identified within the Hewitt's South Subdivision lands which limit the implementation of LID measures, therefore the targets for the development were established under *Section 3.2.6. Flexible Treatment Alternative for Sites with Restrictions*. The *SIS* as well as various background investigations and studies, identified the following constraints:

Table 13 – Runoff Volume Control Target Factors & Constraints

Factor	Site Specific Constraint
Areas with high chloride concentrations	• Collector and Arterial roadways discouraged (permitted with conditions) per City of Barrie *Infiltration Low Impact Development Screening Process.*
Property/Infrastructure Restrictions	• Blocks available for centralized facility are located at upstream portions of catchment or in locations where limited flow can be routed to. • Limited opportunities within ROW due to servicing constraints (depth vs. groundwater)
Highly vulnerable aquifer	• Part of the subject lands are located within a highly vulnerable aquifer area as shown on City of Barrie Official Plan Map 7
High groundwater	• High groundwater table is a challenge for the overall grading and restricts the effectiveness of LIDs and SWM facility

The factors identified above limit the location and effectiveness of infiltration-based LID practices throughout the subject lands applicable to this report.

The proposed underground infiltration galleries are able to provide a means of capturing and retaining / treating direct runoff volume from 12.5mm of rainfall from all impervious surfaces on site. **Therefore, meeting Alternative #1** under *Section 3.2.6. Flexible Treatment Alternative for Sites with Restrictions*. The following is a summary of calculations used to determine LID performance outlined herein.

Total Developable Area: 15.58 ha

Total Developable Area % imp: 49%

Total Site Impervious Area: 7.56 ha

25mm of Rainfall Across Impervious Surfaces: 7.56 ha x 25mm x 10 = **1,890 m^3**

12.5mm of Rainfall Across Impervious Surfaces: 7.56 ha x 12.5mm x 10 = **945 m^3**

Total Provided LID Storage Volume: **1,244 m^3**

It should be noted that select underground infiltration galleries have been oversized to accommodate increased drawdown periods per MOE standards and all LIDs exceed the volume of storage capacity required to retain 25mm of rainfall across the entirety of their respective catchments, as demonstrated in **Section 5.1.2.** of this Report.

5.3.2. Minor-Major System Conveyance

The Storm Sewer system (minor system) is designed for the 5-year event, with rainfall intensities calculated using the A, B, C parameters listed in Table 3.1 of the *City of Barrie Storm Drainage and Stormwater Management Policies and Design Guidelines.*

All storm sewers throughout the subject lands have been designed to maintain a minimum depth of cover of 1.5m.

There are no crossing conflicts anticipated with the Sanitary Sewers, Watermain, or Utility Ducts. The *Storm Drainage Area Plan*, referenced as **Drawing STM-1** in **Appendix D**, is to be reviewed in conjunction with the *Storm Sewer Design Sheet* in **Appendix A**.

Major System flows (flow > 5-year event) will be conveyed through the internal right-of-ways, which direct runoff to SWMF8.

5.4. Water Balance

The primary objective of the LSRCA's water balance target is to capture and manage annual rainfall on the development site to preserve the pre-development hydrology (water balance) through a combination of infiltration, evapotranspiration, absorbent landscaping, rainwater reuse and/or other LID practices. Various site-specific characteristics contribute to the ability to achieve water balance. They include, but are not limited to: soil permeability, the ability to collect and direct drainage into the ground, groundwater table elevations and seasonal fluctuations. Best efforts will be made via the SWM Plan to maintain groundwater recharge while considering site specific characteristics.

A site-specific water balance in accordance with the SIS recommendations has been completed for the Hewitt's South Subdivision by R.J. Burnside & Associates Ltd. and is detailed in the *Hydrogeological Assessment, Hewitt's Gate South Subdivision,* dated November, 2024. RJB completed a pre- to post-development water balance to estimate the infiltration volume deficit that would need to be mitigated via the proposed SWM Plan. The infiltration and runoff volume as calculated in the RJB Water Balance Assessment are presented in **Table 14** below and **Tables G-3** and **G-4** of the RJB study is provided in **Appendix A.**

Table 14 - Summary of Water Balance Calculations by RJB

Water Balance Runoff & Infiltration Volumes – RJB Table G-4			
	Pre-Development	**Post-Development**	**Difference**
Impervious Area Runoff Volume (m^3/a)	3,707	71,531	+67,824
Pervious Area Runoff Volume (m^3/a)	20,538	8,680	-11,858
Total Runoff Volume (m^3/a)	24,245	80,211	+55,966
Total Infiltration Volume (m^3/a)	30,808	16,121	**-14,687**

The results summarized in the table above indicate that there is an increase in total runoff volume and a deficit in infiltration volume from pre- to post-development without accounting for LID's. The SWM Plan herein is intended to mitigate or reduce the water balance deficit as outlined above. Runoff generated from this development is directed to the proposed Low Impact Development (LID) measures. The LID's and their contributing drainage areas are shown on **Drawing SWM-3** in **Appendix D.**

Upon review of the *Environment Canada Daily Climate Normals* for the *Barrie WPCC* from the years 1979 to 2008, a statistical analysis of rainfall data was completed and it is noted that on an annual average over that time period, this gauge has received **928.1 mm** of total precipitation, comparable to the mean average annual precipitation of 939 mm for Hewitt's Creek, published in the *LSRCA Climate Data Set, April 2017* and comparable to average annual precipitation of 933 mm used by RJB in their water balance calculations.

The daily precipitation recordings were truncated following recommendations provided by the USEPA, removing any precipitation occurring during winter months (December, January and February) as they have been assumed to not directly produce runoff. This leaves a period of nine (9) continuous months in a given calendar year, which are described as *effective precipitation*, or precipitation events expected to produce runoff. In the nine (9) month period, there are on average 112.7 days of rainfall recorded, with 3.9 of those instances having a total depth of precipitation greater than 25 mm. There are, on average, 108.8 instances with a depth of precipitation less than 25mm. This range encapsulates 93.3% of all recorded precipitation events on an annual basis.

The total area draining to the proposed LID infiltration galleries is 4.84ha or 30.9% of the main development area. In following the LSRCA runoff volume target with a best-efforts approach, the LID subcatchment areas have been established to be routed to each system which has been adequately sized to provide a storage volume which captures the entirety of runoff generated

by the 25 mm rainfall event. The following is a summary of calculations which demonstrate how the water balance target has been approached.

Annual Precipitation Volume: (Barrie WPCC 1979 to 2008)	928.1 mm
LID Infiltration Gallery Capture Area:	4.84ha
Percentage of Annual Capture:	28.83%
Estimated LID Annual Infiltration Volume:	**23,125 m^3**

The addition of LID practices has increased the post-development infiltration to **8,439 m^3** annually. In summary, the proposed stormwater management plan has **achieved pre- to post-development water balance targets** for the subject lands. Note that water balance mitigation for Block 79 (future medium density block) will be resolved at the Site Plan design stage.

5.5. Erosion & Sediment Control

During construction, the majority of the development's natural features will be removed and the topsoil stripped within the development area. The exposed surface will be susceptible to erosion, increasing the potential for sediment runoff. To minimize local and downstream impacts from erosion and sedimentation during construction, the following measures have been recommended:

- Excess earth and topsoil is to be stockpiled away from the existing drainage channel limits and/or removed from site. Stockpiles shall be seeded or covered with erosion control if left for periods of greater than 30 days.
- Temporary sediment control fencing should be erected around the perimeter of all grading activities, including double silt fence along the NHS Buffer Boundary.
- Temporary sediment fabric and stone filters should be installed on catch basins until surface cover has been stabilized.
- Temporary rock flow check dams should be installed within drainage cut-off swales.
- A temporary construction access mud mat should be installed at the construction accesses to reduce the amount of materials that may be transported off site.
- Temporary erosion and sediment control basins are to be constructed, complete with a Hickenbottom outlet control structure and overflow weir. The basins' purpose is to detain runoff long enough to allow the majority of soil particles to settle out of suspension.

- Construction during drier months should be monitored for wind-borne transport of sediments. At the direction of the engineer, the contractor may be directed to water down exposed earth areas with an aqueous solution of calcium chloride.
- All disturbed areas not under immediate construction for 30 days, or not intended for building activities within a 3-month time period, should be stabilized with seeding.
- Phased removal of temporary sediment basins during building phase of the development to coincide with upstream stabilization (established vegetation) of catchment areas.
- A weekly monitoring program to ensure all ESC measures are in place and not damaged by vandalism or a significant storm event.

Through proper implementation of these erosion and sediment control measures, off-site impacts are expected to be minimized during the construction phase of the project.

Erosion and Sediment Control Plans will be prepared at the detailed design stage.

6. Conclusions

This *Preliminary Stormwater Management Report* identifies the recommended stormwater management strategies for the proposed Hewitt's South Subdivision. This Report outlines the proposed infrastructure required to service the site with regards to stormwater management quality control, quantity control, water balance, and erosion & sediment control.

This Report has recommended the following:

- The stormwater management plan for the subject site includes the use of one (1) end-of-pipe extended detention wet pond, known as SWMF #8. This facility, as detailed in **Section 5**, addresses both stormwater quality and quantity control for the subject property.
- The stormwater management plan also includes the use of four (4) underground infiltration galleries in the proposed medium density areas and open space park block to capture and infiltrate runoff and increase the overall Total Suspended Solids and Total Phosphorus removal rate for the development.
- Prior to construction, the erosion & sediment control measures outlined in **Section 5.5** should be implemented. These controls are to be maintained throughout the construction period and only removed once exposed areas have been stabilized with vegetative cover.
- The Designs in this report are consistent with the SIS by R.J. Burnside, City of Barrie Guidelines & Policies, LSRCA Technical Guidelines for SWM, and the MOE SWMP Design Guidelines.

In Conclusion, it is recommended that this report be accepted as fulfilling the civil engineering and stormwater management requirements for Draft Plan Approval.

All of which is respectfully submitted,

THE JONES CONSULTING GROUP LTD.

Appendix A

Stormwater Management Calculations

- Storm Sewer Design Sheet
- Detailed Stage-Storage-Discharge Table for Pond #8
- Water Quality Calculation Sheet
- LID Design Notes
- ADS SC-800 & SC-310 Design Drawings
- ADS OGS Sizing Reports
- LSRCA Phosphorus Loading Tool Calculation Sheet
- Water Balance Tables G-3 and G-4 from RJB Hydrogeological Assessment

STORM SEWER DESIGN - 5 YEAR DESIGN STORM - MINOR SYSTEM

Barrie

Design flow in (m³/s)	Q= C·I·A / 360	Pipe capacity (m³/s)	Q	Client:	Hansen Group Inc.
Site specific runoff coefficient	C	Manning roughness value	n=0.013	Project:	Hewitt's South Subdivision
Rainfall intensity (mm/hr)	I = A/(T.C. + B)^C	Cross sectional area of pipe (m²)	A	Address:	-
function of the local intensity-duration data	A= 843.019	Hydraulic Radius (m)	R_h	File No:	PRA-23040
function of the local intensity-duration data	B= 4.582	Sewer pipe slope (m/m)	S	Design:	VBS
function of the local intensity-duration data	C= 0.763	Velocity of flow (m/s)	V	Check:	MF
Max. time of concentration (min)	T.C.= 10			Date:	November 2024
Drainage area (ha)	A			Design sheet:	DS-1

AREAS	Street	MANHOLE		LENGTH	INCREMENT			TOTAL	FLOW TIME (min)		I	TOTAL Q	S	D	Q FULL	V FULL	% FULL
		FROM	TO	(m)	C	A	CA	CA	TO	IN	(mm/h)	(cms)	(%)	(mm)	(cms)	(m/s)	
	Estimated sum of pipe lengths and velocity along Lockhart Rd: 555m @ 0.50% - 1m/s. Flow time in pipe: (555/(60*1))=9.17min + Time to peak (10min)= 19.17																
EXT.1	Lockhart Rd	STM 150	STM 132	42.4	0.75	1.84	1.38	1.38	19.17	0.23	75	0.288	3.00	450	0.494	3.105	*58.4*
101	Terry Fox Dr.	STM STUB	STM 132	19.6	0.75	0.14	0.11	0.11	10.00	0.26	109	0.032	0.50	450	0.202	1.268	*16.0*
102	Terry Fox Dr.				0.65	0.08	0.05										
103	Terry Fox Dr.	STM 132	STM 116	25.2	0.65	0.17	0.11	1.65	19.40	0.14	75	0.343	3.00	450	0.494	3.105	*69.4*
	Estimated sum of pipe lengths and velocity at 960 Lockhart Rd: 170m @ 0.50% - 1m/s. Flow time in pipe: (170/(60*1))=2.83min + Time to peak (10min)= 12.83																
EXT.2	960 Lockhart Rd	STM 117	STM 116	48.4	0.75	2.38	1.79	1.79	12.83	0.49	95	0.473	0.50	675	0.594	1.661	*79.7*
104	MD BLOCK 78	STM 131	STM 116	17.6	0.75	0.83	0.62	0.62	10.00	0.23	109	0.188	0.50	450	0.202	1.268	*93.0*
105	Terry Fox Dr.	STM 116	STM 115	69.9	0.65	0.21	0.14	4.20	19.53	0.46	74	0.867	1.00	750	1.113	2.520	*77.8*
106	Terry Fox Dr.	STM 115	STM 113	14.8	0.65	0.09	0.06	4.26	20.00	0.10	73	0.866	1.00	750	1.113	2.520	*77.8*
107	Terry Fox Dr.	STM DCB	STM 113	14.9	0.65	0.26	0.17	0.17	10.00	0.13	109	0.051	2.00	300	0.137	1.935	*37.2*
108	Terry Fox Dr.	STM 149	STM 114	14.4	0.65	0.26	0.17	0.17	10.00	0.25	109	0.052	0.50	300	0.068	0.967	*75.7*
109	Terry Fox Dr.	STM 114	STM 113	9.3	0.65	0.03	0.02	0.19	10.25	0.16	108	0.058	0.50	300	0.068	0.967	*84.6*
110	Street D	STM 113	STM 112	87.1	0.65	0.45	0.29	4.91	20.09	0.42	73	0.997	1.90	750	1.535	3.474	*64.9*
	Street D	STM 112	STM 111	49.0				4.91	20.51	0.41	72	0.984	0.50	900	1.280	2.012	*76.9*
111	Laneway I	STM 147	STM 111	10.0	0.65	0.33	0.22	0.22	10.00	0.09	109	0.065	2.00	300	0.137	1.935	*47.8*
112	Street D	STM 111	STM 110	40.0	0.65	0.41	0.27	5.40	20.92	0.30	71	1.068	0.50	1,050	1.931	2.230	*55.3*
113	Laneway H	STM 146	STM 110	10.4	0.65	0.29	0.19	0.19	10.00	0.09	109	0.057	2.00	300	0.137	1.935	*41.8*
	Street D	STM 110	STM 109	40.0				5.58	21.22	0.30	71	1.095	0.50	1,050	1.931	2.230	*56.7*
114	Laneway G	STM 145	STM 109	9.9	0.65	0.27	0.17	0.17	10.00	0.09	109	0.053	2.00	300	0.137	1.935	*38.7*
115	Street D	STM 109	STM 108	40.0	0.65	0.41	0.27	6.03	21.51	0.30	70	1.171	0.50	1,050	1.931	2.230	*60.7*
116	Laneway F	STM 144	STM 108	9.8	0.65	0.25	0.16	0.16	10.00	0.08	109	0.049	2.00	300	0.137	1.935	*35.9*
	Street D	STM 108	STM 107	40.0				6.19	21.81	0.30	69	1.192	0.50	1,050	1.931	2.230	*61.8*
117	Laneway E	STM 143	STM 107	10.1	0.65	0.19	0.12	0.12	10.00	0.09	109	0.037	2.00	300	0.137	1.935	*26.8*
118	Street D	STM 107	STM 106	37.0	0.65	0.38	0.25	6.56	22.11	0.28	69	1.253	0.50	1,050	1.931	2.230	*64.9*
119	Block 76	STM 130	STM LID	15.9	0.75	0.40	0.30	0.30	10.00	0.21	109	0.090	0.50	450	0.202	1.268	*44.7*
120	Street C	STM 125	STM 127	32.1	0.65	0.86	0.56	0.56	10.00	0.42	109	0.169	0.50	450	0.202	1.268	*83.7*
	Block 80	STM 127	STM OGS1	8.4				0.56	10.42	0.11	107	0.165	0.50	450	0.202	1.268	*81.9*
	Block 80	STM OGS1	STM 151	3.0				0.56	10.53	0.04	106	0.164	0.50	450	0.202	1.268	*81.5*
INLET	Block 80	STM 151	STM LID	3.0				0.56	10.57	0.04	106	0.164	0.50	450	0.202	1.268	*81.3*
	Street C	STM 127	STM 126	36.8				0.56	10.42	0.48	107	0.165	0.50	450	0.202	1.268	*81.9*
OUTLET	Block 80	STM LID	STM 126	7.4				0.85	10.61	0.09	106	0.251	0.50	525	0.304	1.405	*82.5*
	Street C	STM 126	STM 104	13.2				0.85	10.70	0.08	105	0.250	2.00	525	0.608	2.810	*41.1*
	Street C	STM 104	STM 124	22.4				0.85	10.78	0.13	105	0.249	2.00	525	0.608	2.810	*40.9*

STORM SEWER DESIGN - 5 YEAR DESIGN STORM - MINOR SYSTEM

Design flow in (m³/s)	Q= C·I·A / 360	Pipe capacity (m³/s)	Q	Client:	Hansen Group Inc.
Site specific runoff coefficient	C	Manning roughness value	n=0.013	Project:	Hewitt's South Subdivision
Rainfall intensity (mm/hr)	I = A/(T.C. + B)^C	Cross sectional area of pipe (m²)	A	Address:	-
function of the local intensity-duration data	A= 843.019	Hydraulic Radius (m)	R_h	File No:	PRA-23040
function of the local intensity-duration data	B= 4.582	Sewer pipe slope (m/m)	S	Design:	VBS
function of the local intensity-duration data	C= 0.763	Velocity of flow (m/s)	V	Check:	MF
Max. time of concentration (min)	T.C.= 10			Date:	November 2024
Drainage area (ha)	A			Design sheet:	DS-1

AREAS	Street	MANHOLE		LENGTH	INCREMENT			TOTAL	FLOW TIME (min)		I	TOTAL Q	S	D	Q FULL	V FULL	% FULL
		FROM	TO	(m)	C	A	CA	CA	TO	IN	(mm/h)	(cms)	(%)	(mm)	(cms)	(m/s)	
RLCB.1	Lots 28-29	STM DICB1	STM 124	40.8	0.50	0.09	0.05	0.05	10.00	0.79	109	0.014	0.50	250	0.042	0.857	*32.9*
	Street C	STM 124	STM 135	6.6				0.90	10.91	0.08	104	0.260	0.50	525	0.304	1.405	*85.7*
	Street C	STM 135	STM 123	36.5				0.90	10.99	0.43	104	0.259	0.50	525	0.304	1.405	*85.3*
RLCB.2	Lots 33-34	STM DICB2	STM 123	37.7	0.50	0.11	0.05	0.05	10.00	0.73	109	0.016	0.50	250	0.042	0.857	*38.9*
121	Street C	STM 123	STM 122	65.1	0.65	0.23	0.15	1.10	11.42	0.71	102	0.311	0.50	600	0.434	1.536	*71.7*
RLCB.3	Lots 39-40	STM DICB3	STM 122	35.6	0.50	0.09	0.05	0.05	10.00	0.69	109	0.014	0.50	250	0.042	0.857	*34.2*
122	Street C	STM 122	STM 121	23.4	0.65	0.03	0.02	1.17	12.13	0.25	98	0.319	0.50	600	0.434	1.536	*73.5*
	Street C	STM 121	STM 120	24.6				1.17	12.38	0.27	97	0.315	0.50	600	0.434	1.536	*72.6*
RLCB.4	Lots 44-45	STM DICB4	STM 120	42.9	0.50	0.11	0.06	0.06	10.00	0.83	109	0.017	0.50	250	0.042	0.857	*41.0*
123	Street C	STM 120	STM 119	46.2	0.65	0.18	0.11	1.34	12.65	0.50	96	0.357	0.50	600	0.434	1.536	*82.3*
RLCB.5	Lots 49-50	STM DICB5	STM 119	37.1	0.50	0.10	0.05	0.05	10.00	0.72	109	0.015	0.50	250	0.042	0.857	*36.5*
124	Street C	STM 119	STM 118	21.8	0.65	0.11	0.07	1.46	13.15	0.24	94	0.382	0.50	600	0.434	1.536	*87.9*
125	Street C	STM 118	STM 106	41.7	0.65	0.19	0.12	1.59	13.39	0.45	93	0.410	0.50	600	0.434	1.536	*94.4*
126	STM EASEMENT	STM 140	STM 106	79.5	0.75	2.75	2.06	2.06	10.00	0.74	109	0.625	0.50	750	0.787	1.782	*79.4*
	Street D - ELLIP.	STM 106	STM 105	48.0				10.21	22.39	0.33	68	1.935	0.50	1,200	2.757	2.438	*70.2*
127	MD BLOCK 77	STM 129	STM 105	14.7	0.75	0.47	0.35	0.35	10.00	0.19	109	0.106	0.50	450	0.202	1.268	*52.7*
128	Street D - ELLIP.	STM 105	STM 102	48.6	0.65	0.45	0.29	10.85	22.72	0.33	68	2.039	0.50	1,200	2.757	2.438	*73.9*
129	PWW	STM 103	STM 102	18.0	0.65	0.34	0.22	0.22	10.00	0.27	109	0.066	0.50	375	0.124	1.123	*53.3*
130	PWW - ELLIP.	STM 102	STM 101	58.1	0.65	0.10	0.07	11.14	23.05	0.40	67	2.073	0.50	1,200	2.757	2.438	*75.2*
	PWW - ELLIP.	STM 101	STM 100	27.6				11.14	23.45	0.19	66	2.050	0.50	1,200	2.757	2.438	*74.4*
	SWMF - ELLIP.	STM 100	STM HW-2	12.5				11.14	23.64	0.09	66	2.040	0.50	1,200	2.757	2.438	*74.0*
131	Lockhart Rd				0.75	0.88	0.66										
EXT.3	Lockhart Rd	STM 148	STM OGS2	26.1	0.75	1.36	1.02	1.68	10.00	0.26	109	0.510	0.50	675	0.594	1.661	*85.9*
		STM OGS2	STM HW-3	13.0				1.68	10.26	0.13	108	0.504	0.50	675	0.594	1.661	*84.7*

Lots and TH runoff coefficent: 60% IMP area * 0.95 RC + 40% PERV area * 0.16 RC = **0.65**

MD Block runoff coefficent: 75% IMP area * 0.95 RC + 25% PERV area * 0.16 RC = **0.75**

Refer to **Tables 3.2** and **7.6** from the Stormwater Infrastructure Design Standard

Ellipcal pipe 965x1525mm - Equivalent diameter: 1200mm

ELLIP. = ELLIPTICAL / EQUIVALENT DIAMETER TO CIRCULAR PIPES

Stormwater Management Facility
Stage Storage Discharge Table

CLIENT: Hansen Group Inc.
DATE: Nov 2024
PROJECT: Hewitts South
DESIGN: KR
FILE: PRA-23040
CHECKED: MF

Extended Detention Orifice		
Radius	0.063	m
Outlet Diameter	125	mm
Invert Elevation	253.70	m

Secondary Orifice		
Radius	0.263	m
Outlet Diameter	525	mm
Invert Elevation	254.80	m

Control Weir Details		
Invert Elevation	255.55	m
Length	20.0	m
Sideslope	10	H : 1V
Downstream Length of Weir (m)	8.15	@255.55m

	Minimum		Provided		Elevation	
Total Permanent Pool Volume:	3110	m^3	3918	m^3	253.70	m
Extended Detention Volume:	810	m^3	1744	m^3	254.05	m

Surface Area	Total Storage	Active Storage	Water Depth	Ext. Detention Orifice Flow	Secondary Orifice Flow	Trapezoidal Weir with 10H : 1V Sideslopes		Total Flow	Elevation	Notes
						Depth Above Overflow Weir	Overflow Weir Flow			
m^2	m^3	m^3	m	(m^3/s)	(m^3/s)	(m)	(m^3/s)	(m^3/s)	m	
682	0	0	0.00	0.000	0.000	0.000	0.000	0.000	252.20	
1,589	78	0	0.05	0.000	0.000	0.000	0.000	0.000	252.25	
1,648	159	0	0.10	0.000	0.000	0.000	0.000	0.000	252.30	
1,708	243	0	0.15	0.000	0.000	0.000	0.000	0.000	252.35	
1,768	330	0	0.20	0.000	0.000	0.000	0.000	0.000	252.40	
1,828	420	0	0.25	0.000	0.000	0.000	0.000	0.000	252.45	
1,890	513	0	0.30	0.000	0.000	0.000	0.000	0.000	252.50	
1,951	609	0	0.35	0.000	0.000	0.000	0.000	0.000	252.55	
2,014	708	0	0.40	0.000	0.000	0.000	0.000	0.000	252.60	
2,077	810	0	0.45	0.000	0.000	0.000	0.000	0.000	252.65	
2,140	915	0	0.50	0.000	0.000	0.000	0.000	0.000	252.70	
2,204	1,024	0	0.55	0.000	0.000	0.000	0.000	0.000	252.75	
2,269	1,136	0	0.60	0.000	0.000	0.000	0.000	0.000	252.80	
2,334	1,251	0	0.65	0.000	0.000	0.000	0.000	0.000	252.85	
2,400	1,369	0	0.70	0.000	0.000	0.000	0.000	0.000	252.90	
2,466	1,491	0	0.75	0.000	0.000	0.000	0.000	0.000	252.95	
2,533	1,616	0	0.80	0.000	0.000	0.000	0.000	0.000	253.00	
2,601	1,744	0	0.85	0.000	0.000	0.000	0.000	0.000	253.05	
2,669	1,876	0	0.90	0.000	0.000	0.000	0.000	0.000	253.10	
2,738	2,011	0	0.95	0.000	0.000	0.000	0.000	0.000	253.15	
2,807	2,150	0	1.00	0.000	0.000	0.000	0.000	0.000	253.20	
2,877	2,292	0	1.05	0.000	0.000	0.000	0.000	0.000	253.25	
3,101	2,441	0	1.10	0.000	0.000	0.000	0.000	0.000	253.30	
3,244	2,600	0	1.15	0.000	0.000	0.000	0.000	0.000	253.35	
3,390	2,766	0	1.20	0.000	0.000	0.000	0.000	0.000	253.40	
3,537	2,939	0	1.25	0.000	0.000	0.000	0.000	0.000	253.45	
3,686	3,120	0	1.30	0.000	0.000	0.000	0.000	0.000	253.50	
3,837	3,308	0	1.35	0.000	0.000	0.000	0.000	0.000	253.55	
3,989	3,503	0	1.40	0.000	0.000	0.000	0.000	0.000	253.60	
4,144	3,707	0	1.45	0.000	0.000	0.000	0.000	0.000	253.65	
4,418	3,918	0	1.50	0.000	0.000	0.000	0.000	0.000	253.70	Perm Pool/Primary Orifice
4,587	4,143	225	1.55	0.001	0.000	0.000	0.000	0.001	253.75	
4,744	4,376	459	1.60	0.007	0.000	0.000	0.000	0.007	253.80	
4,902	4,618	700	1.65	0.010	0.000	0.000	0.000	0.010	253.85	
5,061	4,867	949	1.70	0.013	0.000	0.000	0.000	0.013	253.90	
5,220	5,124	1,206	1.75	0.015	0.000	0.000	0.000	0.015	253.95	
5,381	5,389	1,471	1.80	0.017	0.000	0.000	0.000	0.017	254.00	25mm WQE @ 254.00m
5,542	5,662	1,744	1.85	0.018	0.000	0.000	0.000	0.018	254.05	Extended Detention
5,704	5,943	2,025	1.90	0.020	0.000	0.000	0.000	0.020	254.10	
5,839	6,232	2,314	1.95	0.021	0.000	0.000	0.000	0.021	254.15	
5,932	6,526	2,608	2.00	0.023	0.000	0.000	0.000	0.023	254.20	
6,026	6,825	2,907	2.05	0.024	0.000	0.000	0.000	0.024	254.25	
6,120	7,129	3,211	2.10	0.025	0.000	0.000	0.000	0.025	254.30	
6,214	7,437	3,519	2.15	0.026	0.000	0.000	0.000	0.026	254.35	
6,308	7,750	3,832	2.20	0.027	0.000	0.000	0.000	0.027	254.40	
6,403	8,068	4,150	2.25	0.028	0.000	0.000	0.000	0.028	254.45	2-yr 24hr SCS @ 254.48m
6,497	8,390	4,473	2.30	0.029	0.000	0.000	0.000	0.029	254.50	
6,593	8,718	4,800	2.35	0.030	0.000	0.000	0.000	0.030	254.55	
6,688	9,050	5,132	2.40	0.031	0.000	0.000	0.000	0.031	254.60	
6,783	9,386	5,469	2.45	0.032	0.000	0.000	0.000	0.032	254.65	
6,879	9,728	5,810	2.50	0.033	0.000	0.000	0.000	0.033	254.70	
6,975	10,074	6,157	2.55	0.034	0.000	0.000	0.000	0.034	254.75	
7,072	10,426	6,508	2.60	0.035	0.000	0.000	0.000	0.035	254.80	Secondary Orifice
7,168	10,782	6,864	2.65	0.036	0.025	0.000	0.000	0.060	254.85	5-yr 24hr SCS @ 254.85m
7,265	11,142	7,225	2.70	0.037	0.027	0.000	0.000	0.063	254.90	
7,362	11,508	7,590	2.75	0.037	0.031	0.000	0.000	0.069	254.95	
7,459	11,879	7,961	2.80	0.038	0.041	0.000	0.000	0.079	255.00	10-yr 24hr SCS @ 255.01m
7,557	12,254	8,336	2.85	0.039	0.054	0.000	0.000	0.093	255.05	
7,655	12,634	8,717	2.90	0.040	0.117	0.000	0.000	0.157	255.10	
7,753	13,020	9,102	2.95	0.040	0.179	0.000	0.000	0.219	255.15	
7,851	13,410	9,492	3.00	0.041	0.224	0.000	0.000	0.265	255.20	25-yr 24hr SCS @ 255.21m
7,950	13,805	9,887	3.05	0.042	0.262	0.000	0.000	0.303	255.25	
8,049	14,205	10,287	3.10	0.042	0.294	0.000	0.000	0.337	255.30	
8,148	14,610	10,692	3.15	0.043	0.324	0.000	0.000	0.367	255.35	50-yr 24hr SCS @ 255.36m
8,247	15,019	11,102	3.20	0.044	0.351	0.000	0.000	0.395	255.40	
8,347	15,434	11,516	3.25	0.044	0.376	0.000	0.000	0.421	255.45	
8,447	15,854	11,936	3.30	0.045	0.400	0.000	0.000	0.445	255.50	100-yr 24hr SCS @ 255.51m
8,547	16,279	12,361	3.35	0.046	0.422	0.000	0.000	0.468	255.55	Emergency Overflow Weir
8,647	16,709	12,791	3.40	0.046	0.443	0.050	0.184	0.673	255.60	
8,748	17,144	13,226	3.45	0.047	0.463	0.100	0.788	1.298	255.65	
8,848	17,583	13,666	3.50	0.048	0.482	0.150	1.633	2.163	255.70	HAZEL @255.70m
8,950	18,028	14,111	3.55	0.048	0.501	0.200	2.687	3.236	255.75	
9,051	18,478	14,561	3.60	0.049	0.519	0.250	3.930	4.498	255.80	
9,153	18,934	15,016	3.65	0.049	0.536	0.300	5.356	5.942	255.85	
9,254	19,394	15,476	3.70	0.050	0.553	0.350	6.958	7.561	255.90	
9,356	19,859	15,941	3.75	0.051	0.569	0.400	8.734	9.354	255.95	
9,580	20,329	16,412	3.80	0.051	0.585	0.450	10.681	11.317	256.00	Top of Pond

Stormwater Management Facility
Stage Storage Discharge Table

CLIENT: Hansen Group Inc.
DATE: Nov 2024
PROJECT: Hewitts South
DESIGN: KR
FILE: PRA-23040
CHECKED: MF

Extended Detention Orifice		
Radius	0.063	m
Outlet Diameter	125	mm
Invert Elevation	253.70	m

Secondary Orifice		
Radius	0.263	m
Outlet Diameter	525	mm
Invert Elevation	254.80	m

Control Weir Details		
Invert Elevation	255.55	m
Length	20.0	m
Sideslope	10	H : 1V
Downstream Length of Weir (m)	8.15	@255.55m

	Minimum		Provided		Elevation	
Total Permanent Pool Volume:	3110	m^3	3918	m^3	253.70	m
Extended Detention Volume:	810	m^3	1744	m^3	254.05	m

Orifice Outflow equation is for orifice flow given by:

$Q=0.63A(2gH)^{0.5}$

$Q=1.65\{[[\pi D^2/4][2\cos^{-1}\{[(D/2)-H]/(D/2)\}\{180/\pi\}/360)-[[(D/2)-H][DH-H^2]^{[1/2]}/H]\}H^{(1.5)}$

Where ponding elevation is above orifice centroid

Where ponding elevation is at or below orifice centroid

where;

Q = flow rate (m^3/s)
D= diameter of orifice (m)
A = area of orifice (m^2)
H = head on the orifice (m)
g = Acceleration due to gravity 9.81m/s^2

Trapezoidal Broad Crested Weir flow is determined by the combined discharge of representative triangular and rectangular broad crested weirs.

Rectangular Broad Crested Weir flow is given by: $Q=CL[H^{(3/2)}]$
Triangular Broad Crested Weir Flow is given by: $Q=C[H^{(5/2)}]Tan(\alpha/2)$

Where C is a constant definied by, $y=(a+bx)/(1+cx+dx^2)$ for rectangular & triangular broad crested weirs. x = head divided by downstream Length of Weir (H/L)

where;

Q = flow rate (m^3/s)
L = length (m)
H = head on the weir (m)
α = angle at apex of triangle (radians)
C = constant (refer to Triangular and Rectangular 'C' Equations)

Rectangular 'C' Equation		**Triangular 'C' Equation**	
a	-10383.48985	a	-1.0071E-05
b	3418997.012	b	143.5986704
c	2131595.078	c	114.5046511
d	-235014.2466	d	-4.768574216

Storm Water Management Facility
SWMF Quality Design Notes

CLIENT: Hansen Group Inc.

DATE: Nov 2024

PROJECT: Hewitts South

DESIGN: KR

FILE: PRA-23040

CHECKED: MF

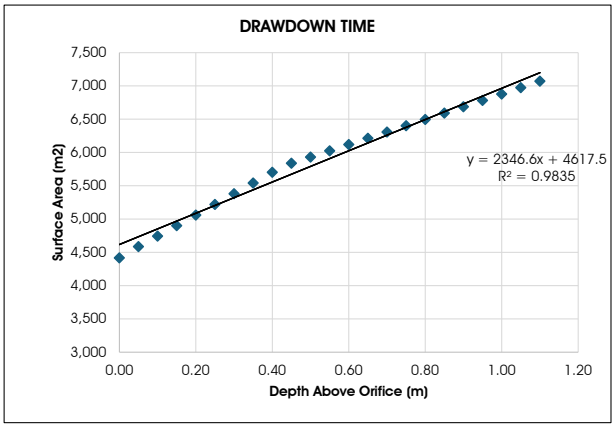
	Area (ha)	TIMP(%)
Total Area	20.26	56.5%
Post Development Drainage Area	20.26	56.5%

Permanent Pool and Extended Detention Volumes:

Drainage Area	20.26	ha
Imperviousness	56.5%	

Imperviousness	WetPond Storage Vol.	
0%		m^3/ha
35%	140	m^3/ha
55%	190	m^3/ha
70%	225	m^3/ha
85%	250	m^3/ha
100%		m^3/ha

Excerpt - MOE Table 3.2, March 2003



Volumetric Criteria:

Total Water Quality Volumetric Criteria	193.5	m^3/ha
Extended Detention Volumetric Criteria	40.0	m^3/ha
Permanent Pool Volumetric Criteria	153.5	m^3/ha

SWMF Volume Requirements:

Total Water Quality Volume (WQV) Required	3920	m^3
Extended Detention Storage Volume Required	810	m^3/s
Permanent Pool Storage Volume Required	3110	m^3
Extended Detention Volume Provided	5381	m^3
Permanent Pool Storage Volume Provided	3918	m^3
Total Water Quality Volume Provided	9299	m^3
PCSWMM 25mm 4hr CHI Water Quality Volume	1620.0	m^3

Based on Eqn. 4.11 MOE SWM Planning and Design Manual

Hydraulic Detention Time		
Intercept of Regression, C3	4617.5	
Slope of Regression, C2	2346.6	
Orifice Area	0.0123	m^2
Invert Secondary Orifice Elevation	254.80	m
Depth over Primary Orifice Centroid (WQV WL)	1.100	m
Drawdown Time - Ultimate Ponding Level	339,954	Sec
	94.4	Hours
Extended Detention Elevation	254.05	m
Depth over Orifice (WQV WL)	0.288	m
Drawdown Time - Extended Detention Ponding Level	153,804	Sec
	42.7	Hours

SWMF Drawdown Requirements

Minimum Drawdown Time, MOE Table 4.7	24	Hours

Forebay Calculations:

Maximum Forebay Permanent Pool Area	883.6	m^2
Total Permanent Pool Area Provided	4,418	m^2
Max. Percentage of total Permanent Pool Area	20	%

SWMF Forebay Requirements:

Forebay Width Provided	20	m
Forebay Length Provided	65	m
Forebay Depth Provided	1.50	m
Forebay Length : Width Ratio Provided	3.3	:1
Forebay Area Provided	1329.0	m^2
Minimum Forebay Length, MOE Table 4.7	47.5	m
Minimum Forebay Depth, MOE Table 4.7	1.00	m
Maximum Forebay Area, MOE Table 4.7	20	% of total
Minimum Forebay L : W, MOE Table 4.7	2.00	:1
Preferred Forebay L : W, MOE Table 4.7	3.00	:1

Maximum 1.0m ponding above permanent pool elevation during 10 year event.

MOE Equation 4.5 - Forebay Settling Length

Dist = SQRT((r*Q_p)/V_s)

Forebay Length Required	Dist	13.6	m
Length-to-width ratio of forebay	r	3.3	:1
Q_p from the pond during design quality storm	Q_p	0.017	m^3/s
Settling velocity	V_s	0.0003	m/s

MOE Equation 4.6 - Dispersion Length

Dist = (8*Q)/(d*Vf)

Length of dispersion	Dist	47.5	m
Inlet (Pipe Capacity) flowrate-5 yr	Q	4.45	m^3/s
Depth of the permanent pool in the forebay	d	1.50	m
Desired velocity in the forebay	Vf	0.50	m/s

Design Criteria Check:

Is Max. Required WQV Met?	YES
Is Min. Required Drawdown Time Met?	YES
Is Required Forebay Length Provided?	YES
Is Minimum Forebay Depth Provided?	YES
Is Maximum Forebay Area Provided?	NO
Is Minimum L : W Ratio Provided?	YES
Is Preferred L : W Ratio Provided?	YES

Project:	Hewitts South Subdivision	Date:		Nov-24	
File No.:	PRA-23040	Designed:		KR	
Subject:	BMP Sizing Design Notes - LID4	Checked:		MF	
Revisions:					

BMP Design Parameters		
BMP	**LID-4**	
Catchment Area, ha	1.27	
Imperviousness, %	73	
25mm Volume, m^3	316.50	*(25mm x Catchment Area)*
Catchment RVCT, m^3	231.05	*(25mm x Imp Area)*
25mm Event Volume, m^3	217.00	*(PCSWMM 25mm WQE Simulation)*
MOE Volume, 40 m^3/ha	50.64	*(Table 3.2 MOE Design Guidelines)*
Chamber Type	SC-800	
Chamber Height, mm	838	
Stone Above Chambers, mm	152	
Stone Below Chambers, mm	152	
Stone Void Ratio	0.40	
LID Footprint, m^2	408.35	
Provided Volume, m^3	**333.66**	
Design Infiltration Rate, mm/hr	14	*(GEI Consultants, Infiltration Testing Letter, Nov 4 2024)*
LID Drawdown Period, hrs	38.67	*(PCSWMM 25mm WQE Simulation)*

Project:	Hewitts South Subdivision	Date:		Nov-24	
File No.:	PRA-23040	Designed:		KR	
Subject:	BMP Sizing Design Notes - LID3	Checked:		MF	
Revisions:					

BMP Design Parameters		
BMP	**LID-3**	
Catchment Area, ha	0.83	
Imperviousness, %	80	
25mm Volume, m^3	206.25	*(25mm x Catchment Area)*
Catchment RVCT, m^3	165.00	*(25mm x Imp Area)*
25mm Event Volume, m^3	158.00	*(PCSWMM 25mm WQE Simulation)*
MOE Volume, 40 m^3/ha	33.00	*(Table 3.2 MOE Design Guidelines)*
Chamber Type	SC-310	
Chamber Height, mm	405	
Stone Above Chambers, mm	152	
Stone Below Chambers, mm	152	
Stone Void Ratio	0.40	
LID Footprint, m^2	533.18	
Provided Volume, m^3	**206.13**	
Design Infiltration Rate, mm/hr	52	*(GEI Consultants, Infiltration Testing Letter, Nov 4 2024)*
LID Drawdown Period, hrs	8.25	*(PCSWMM 25mm WQE Simulation)*

Project:	Hewitts South Subdivision	Date:		Nov-24	
File No.:	PRA-23040	Designed:		KR	
Subject:	BMP Sizing Design Notes - LID2	Checked:		MF	
Revisions:					

BMP Design Parameters		
BMP	**LID-2**	
Catchment Area, ha	1.00	
Imperviousness, %	85	
25mm Volume, m^3	250.25	*(25mm x Catchment Area)*
Catchment RVCT, m^3	212.71	*(25mm x Imp Area)*
25mm Event Volume, m^3	207.00	*(PCSWMM 25mm WQE Simulation)*
MOE Volume, 40 m^3/ha	40.04	*(Table 3.2 MOE Design Guidelines)*
Chamber Type	SC-800	
Chamber Height, mm	838	
Stone Above Chambers, mm	305	
Stone Below Chambers, mm	305	
Stone Void Ratio	0.40	
LID Footprint, m^2	316.13	
Provided Volume, m^3	**259.83**	
Design Infiltration Rate, mm/hr	40	*(GEI Consultants, Infiltration Testing Letter, Nov 4 2024)*
LID Drawdown Period, hrs	16.83	*(PCSWMM 25mm WQE Simulation)*

Project:	Hewitts South Subdivision	Date:		Nov-24	
File No.:	PRA-23040	Designed:		KR	
Subject:	BMP Sizing Design Notes - LID1	Checked:		MF	
Revisions:					

BMP Design Parameters		
BMP	**LID-1**	
Catchment Area, ha	1.75	
Imperviousness, %	84	
25mm Volume, m^3	437.70	*(25mm x Catchment Area)*
Catchment RVCT, m^3	367.67	*(25mm x Imp Area)*
25mm Event Volume, m^3	326.00	*(PCSWMM 25mm WQE Simulation)*
MOE Volume, 40 m^3/ha	70.03	*(Table 3.2 MOE Design Guidelines)*
Chamber Type	SC-800	
Chamber Height, mm	838	
Stone Above Chambers, mm	152	
Stone Below Chambers, mm	152	
Stone Void Ratio	0.40	
LID Footprint, m^2	624.98	
Provided Volume, m^3	**444.33**	
Design Infiltration Rate, mm/hr	17	*(GEI Consultants, Infiltration Testing Letter, Nov 4 2024)*
LID Drawdown Period, hrs	31	*(PCSWMM 25mm WQE Simulation)*

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

PRA-23040 LID1

BARRIE, ON, CANADA

SC-800 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-800.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-800 SYSTEM

1. STORMTECH SC-800 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-800 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

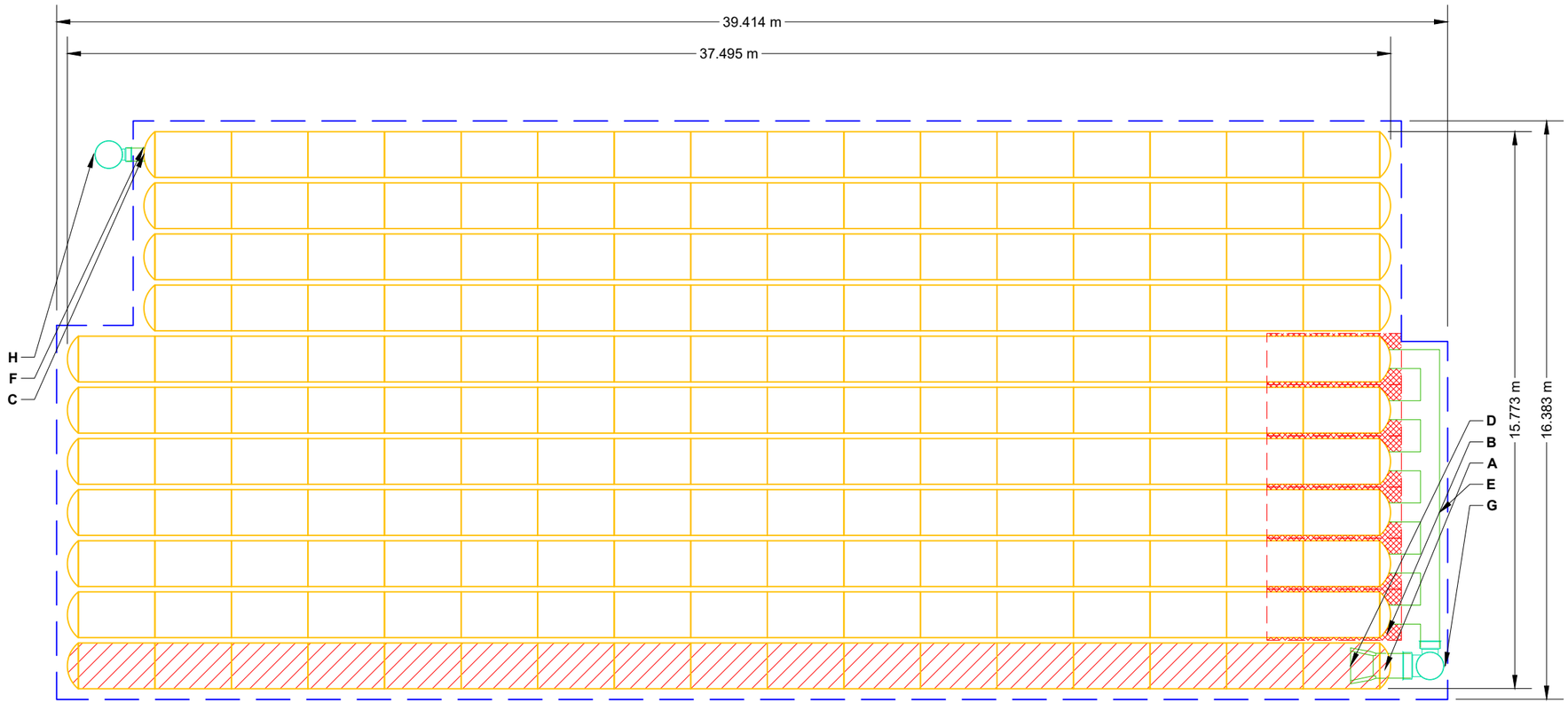
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
183	STORMTECH SC-800 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	260.429
22	STORMTECH SC-800 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	258.524
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	258.372
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	258.372
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	258.372
444.4	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	258.143
		TOP OF SC-800 CHAMBER:	257.991
		450 mm x 450 mm TOP MANIFOLD INVERT:	257.356
		600 mm ISOLATOR ROW PLUS INVERT:	257.211
625.0	SYSTEM AREA (m^2)	300 mm BOTTOM CONNECTION INVERT:	257.193
111.6	SYSTEM PERIMETER (m)	BOTTOM OF SC-800 CHAMBER:	257.152
		BOTTOM OF STONE:	257.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM CORED END CAP, PART#: SC800EPE24BPC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	58 mm	
PREFABRICATED END CAP	B	450 mm TOP CORED END CAP, PART#: SC800EPE18TPC / TYP OF ALL 450 mm TOP CONNECTIONS	203 mm	
PREFABRICATED END CAP	C	300 mm BOTTOM CORED END CAP, PART#: SC800EPE12BPC / TYP OF ALL 300 mm BOTTOM CONNECTIONS	41 mm	
FLAMP	D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
MANIFOLD	E	450 mm x 450 mm TOP MANIFOLD, ADS N-12	203 mm	
PIPE CONNECTION	F	300 mm BOTTOM CONNECTION	41 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	G	750 mm DIAMETER (610 mm SUMP MIN)		408 L/s IN
NYLOPLAST (OUTLET)	H	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

PRA-23040 LID1

BARRIE, ON, CANADA

DATE: 11/05/2024 | DRAWN: KR | CHECKED: N/A

PROJECT #:

DESCRIPTION	CHK	DRW	DATE

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

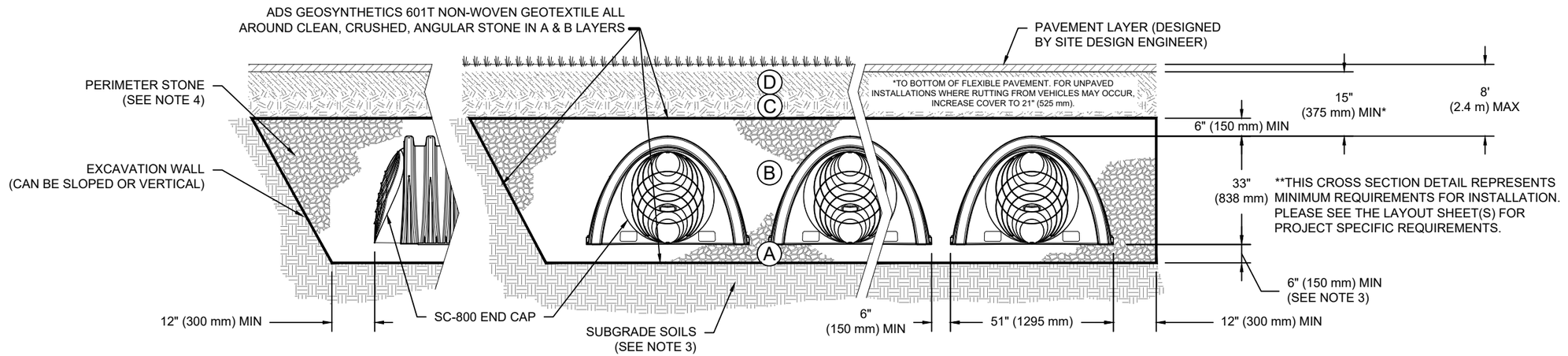
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 150

ACCEPTABLE FILL MATERIALS: STORMTECH SC-800 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 15" (375 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-800 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

PRA-23040 LID1
BARRIE, ON, CANADA
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4640 TRUEMAN BLVD
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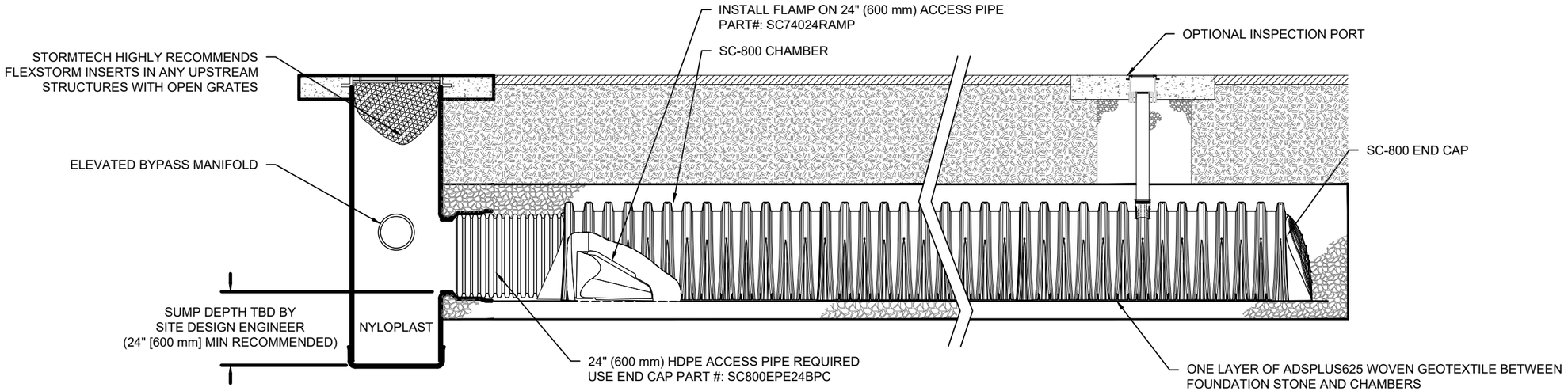

SC-800 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

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

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

NOTES

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

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

PRA-23040 LID1
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Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
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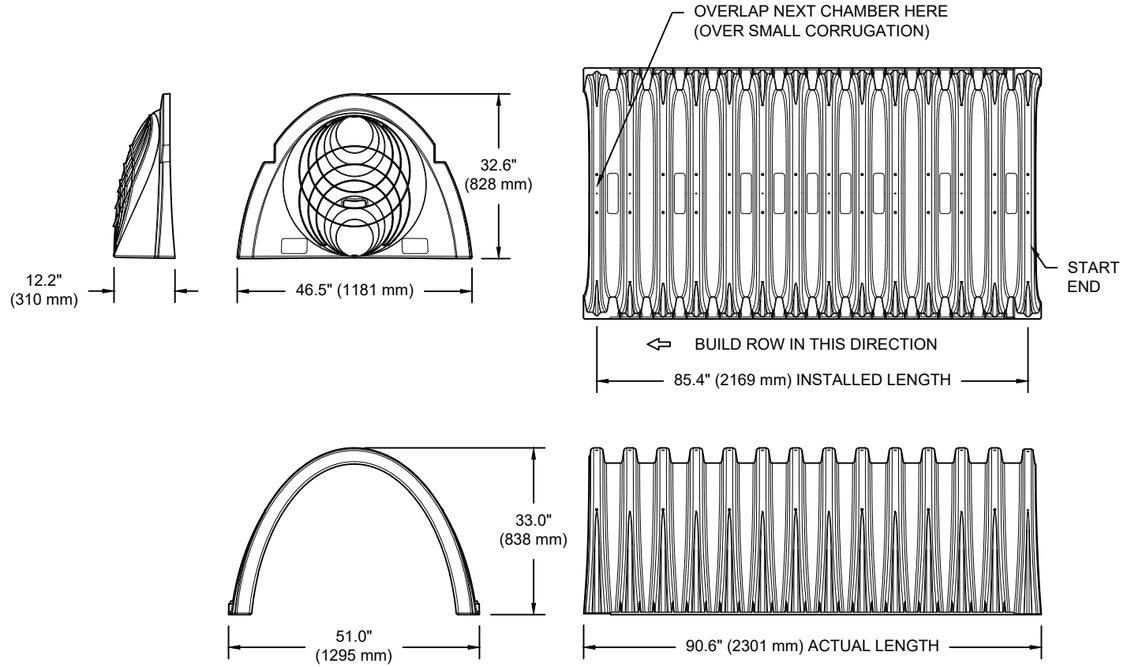
SC-800 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	81.0 CUBIC FEET	(2.29 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

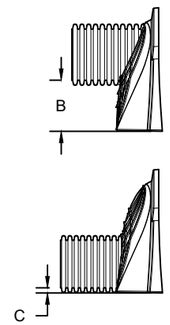
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	46.5" X 32.6" X 10.5"	(1181 mm X 828 mm X 267 mm)
END CAP STORAGE	3.4 CUBIC FEET	(0.09 m³)
MINIMUM INSTALLED STORAGE**	15.4 CUBIC FEET	(0.43 m³)
WEIGHT	15.7 lbs.	(7.1 kg)

* ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS
**ASSUMES 6" (152 mm) STONE ABOVE AND BELOW END CAPS, 6" (152 mm) BETWEEN ROWS, 12" (305 mm) BEYOND END CAPS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "BPC"
PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "TPC"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	



NOTE: ALL DIMENSIONS ARE NOMINAL

PRA-23040 LID1
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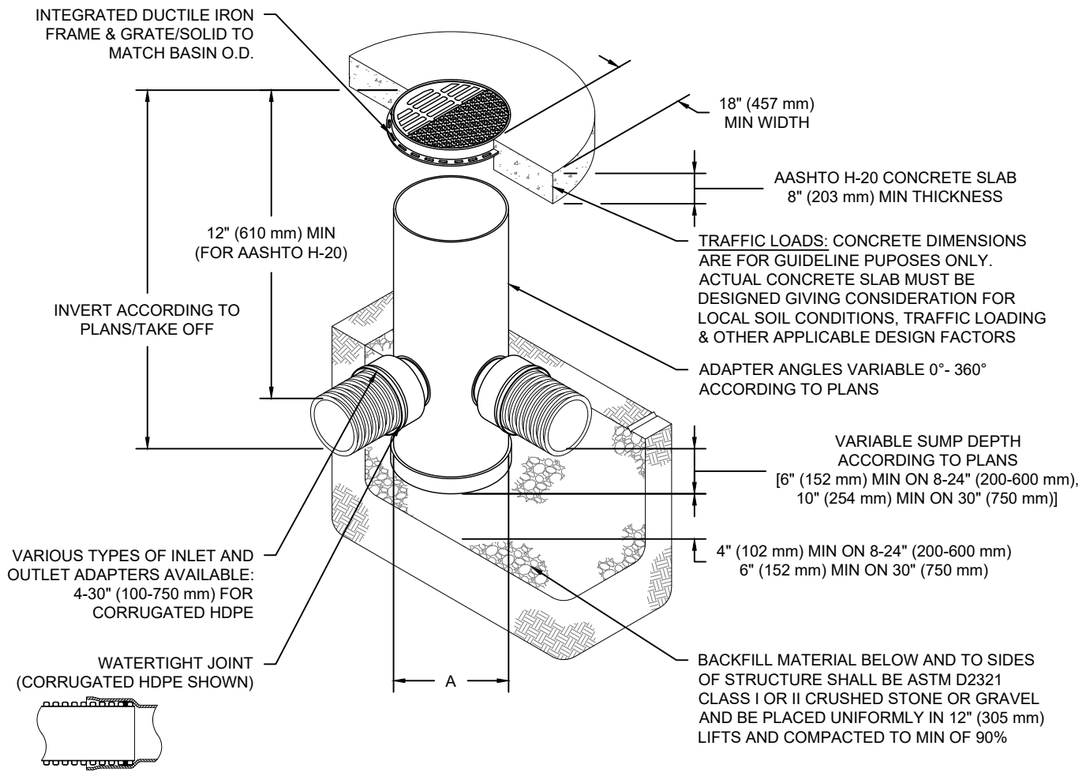
NYLOPLAST DRAIN BASIN

NTS



NOTES

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

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

PRA-23040 LID1

BARRIE, ON, CANADA

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Nyloplast®

770-932-2443 | WWW.NYLOPLAST-US.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
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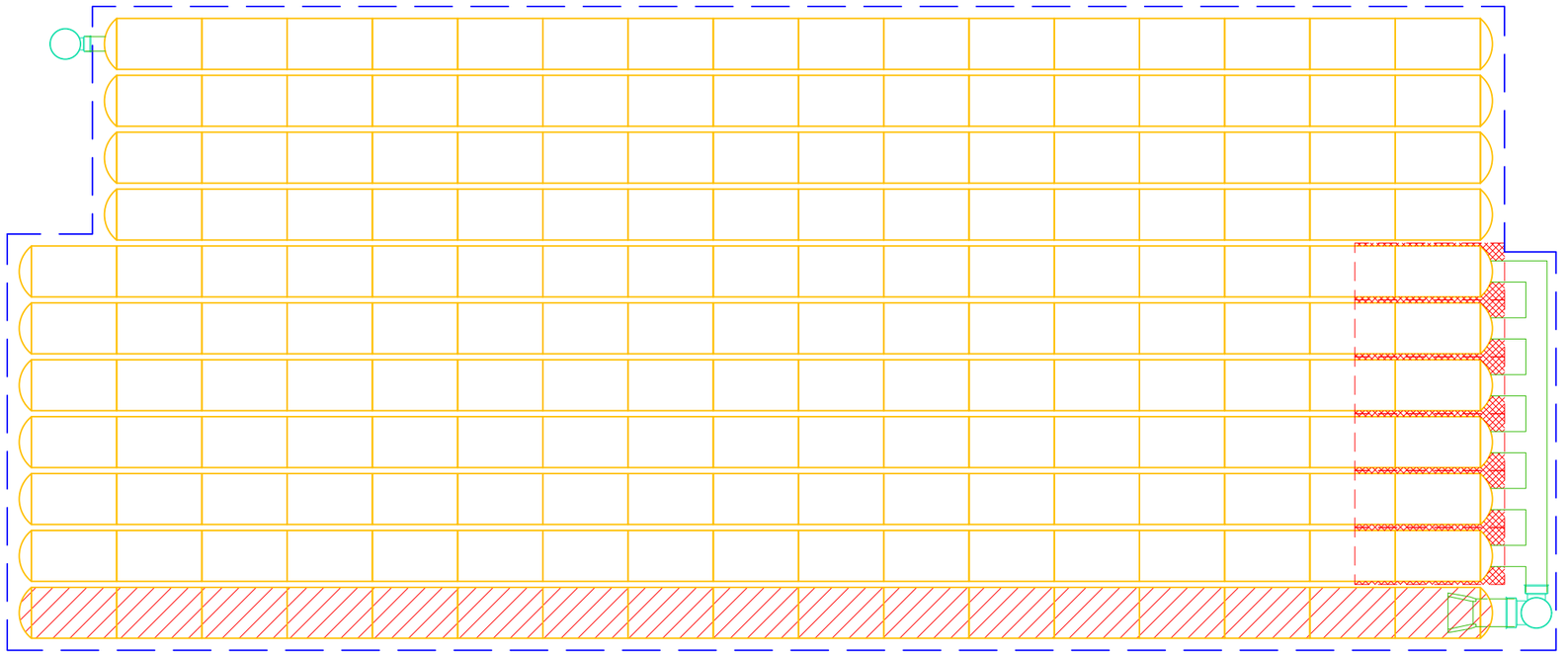
ADS



PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

PRA 23040 LID2

BARRIE, ON, CANADA

SC-800 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-800.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-800 SYSTEM

1. STORMTECH SC-800 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-800 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

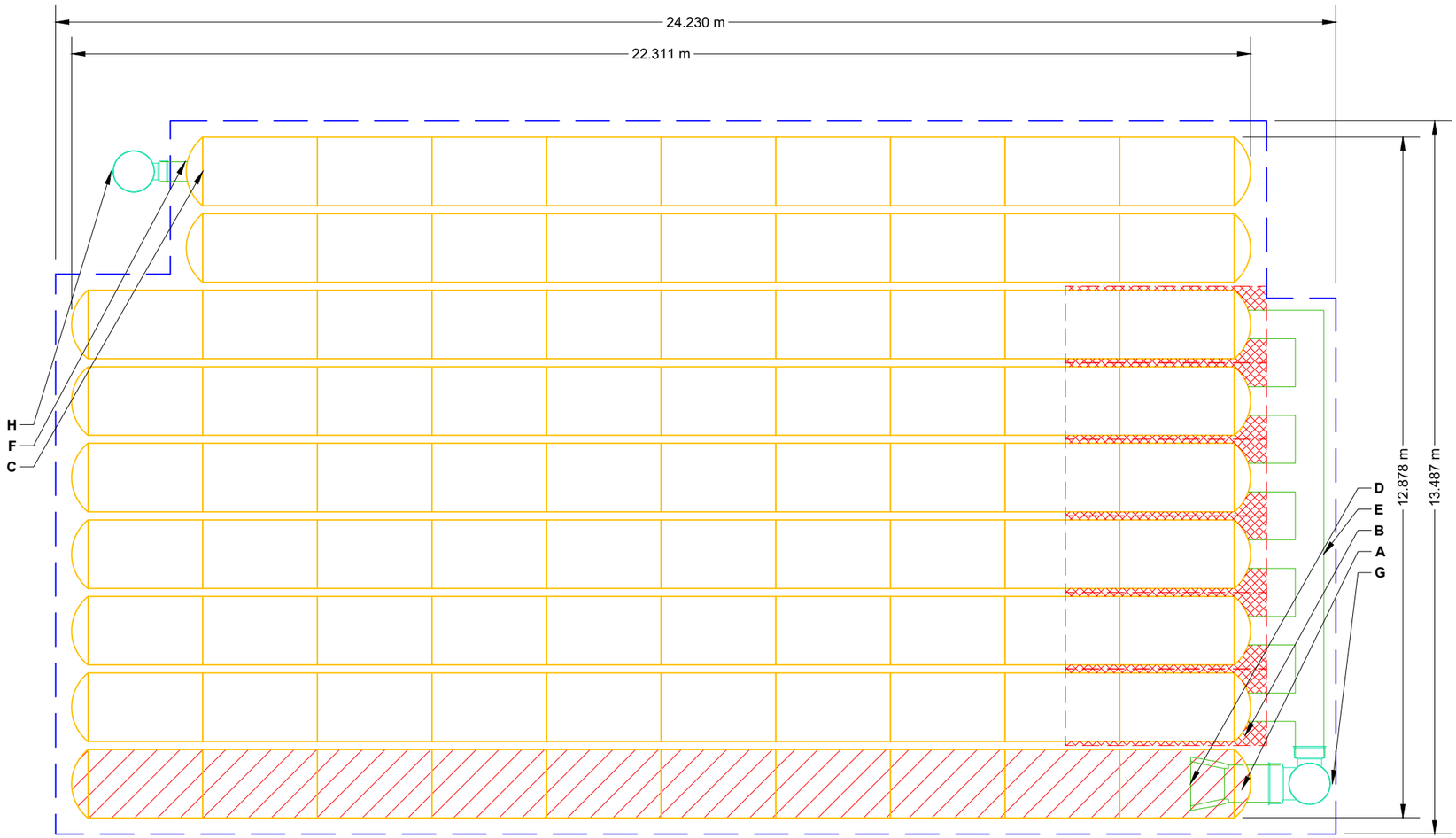
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
88	STORMTECH SC-800 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	263.482
18	STORMTECH SC-800 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	261.577
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	261.424
305	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	261.424
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	261.424
259.8	INSTALLED SYSTEM VOLUME (m^3) BELOW ELEVATION 261.348 (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	261.348
		TOP OF SC-800 CHAMBER:	261.043
		450 mm x 450 mm TOP MANIFOLD INVERT:	260.408
		600 mm ISOLATOR ROW PLUS INVERT:	260.263
		300 mm BOTTOM CONNECTION INVERT:	260.246
316.1	SYSTEM AREA (m^2)	BOTTOM OF SC-800 CHAMBER:	260.205
75.4	SYSTEM PERIMETER (m)	BOTTOM OF STONE:	259.900

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM CORED END CAP, PART#: SC800EPE24BPC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	58 mm	
PREFABRICATED END CAP	B	450 mm TOP CORED END CAP, PART#: SC800EPE18TPC / TYP OF ALL 450 mm TOP CONNECTIONS	203 mm	
PREFABRICATED END CAP	C	300 mm BOTTOM CORED END CAP, PART#: SC800EPE12BPC / TYP OF ALL 300 mm BOTTOM CONNECTIONS	41 mm	
FLAMP	D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
MANIFOLD	E	450 mm x 450 mm TOP MANIFOLD, ADS N-12	203 mm	
PIPE CONNECTION	F	300 mm BOTTOM CONNECTION	41 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	G	750 mm DIAMETER (610 mm SUMP MIN)		408 L/s IN
NYLOPLAST (OUTLET)	H	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

PRA 23040 LID2

BARRIE, ON, CANADA

DATE: 11/04/2024 | DRAWN: KR | CHECKED: N/A

PROJECT #:

DESCRIPTION	CHK	DRW	DATE

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

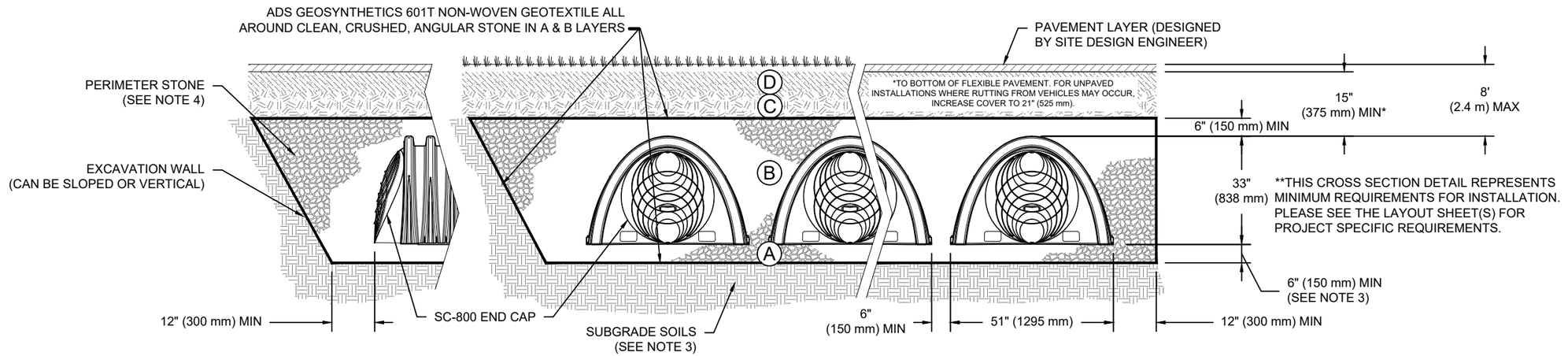
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

ACCEPTABLE FILL MATERIALS: STORMTECH SC-800 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 15" (375 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-800 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

PRA 23040 LID2
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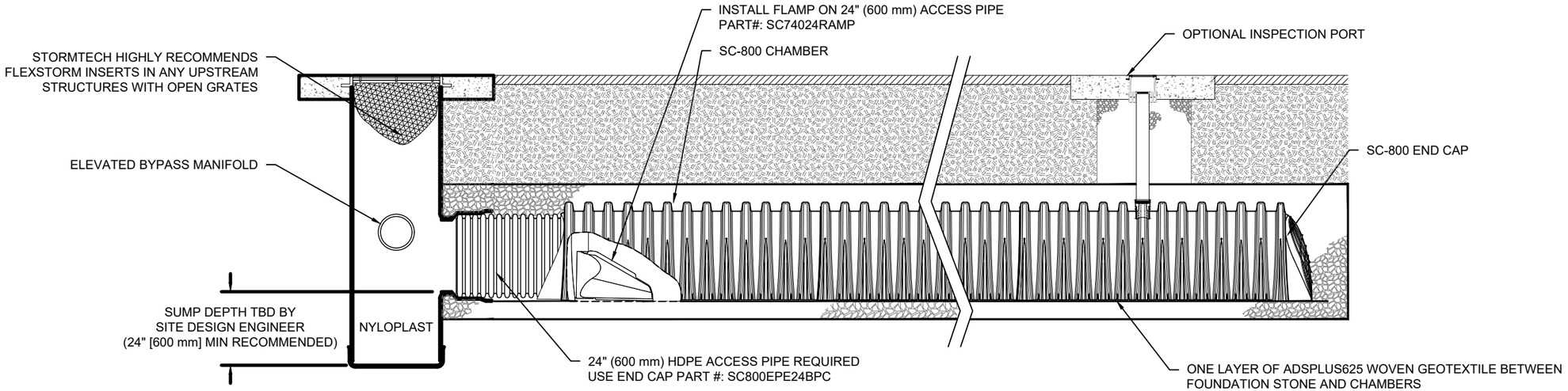

SC-800 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

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

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

NOTES

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

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

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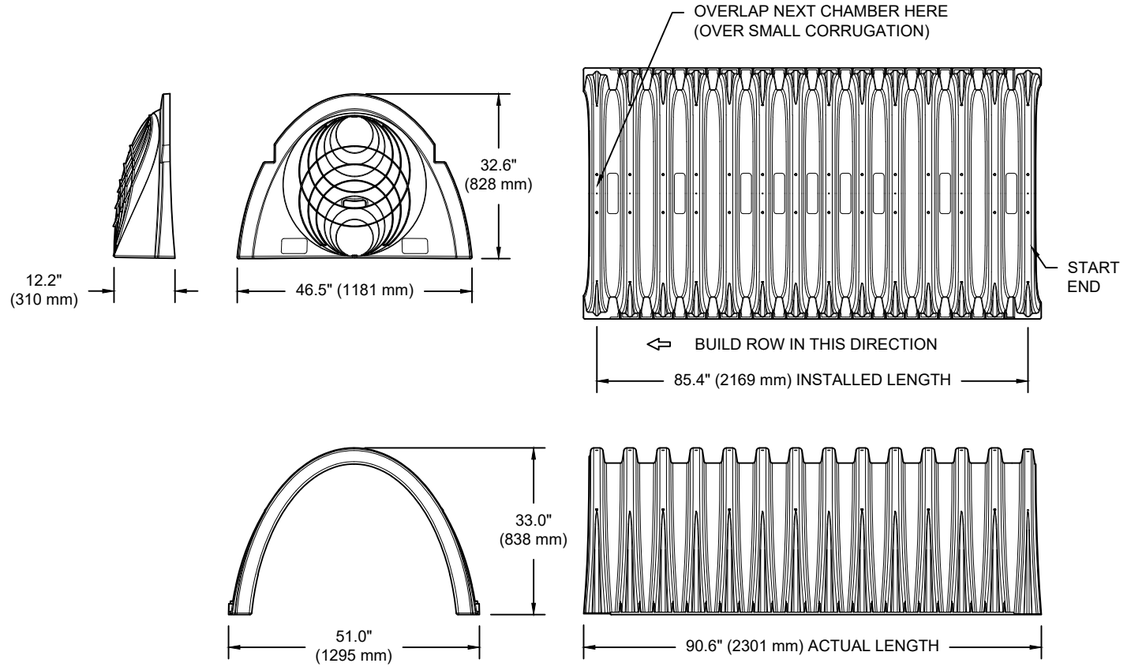
SC-800 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	81.0 CUBIC FEET	(2.29 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

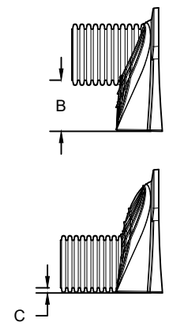
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	46.5" X 32.6" X 10.5"	(1181 mm X 828 mm X 267 mm)
END CAP STORAGE	3.4 CUBIC FEET	(0.09 m³)
MINIMUM INSTALLED STORAGE**	15.4 CUBIC FEET	(0.43 m³)
WEIGHT	15.7 lbs.	(7.1 kg)

* ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS
**ASSUMES 6" (152 mm) STONE ABOVE AND BELOW END CAPS, 6" (152 mm) BETWEEN ROWS, 12" (305 mm) BEYOND END CAPS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "BPC"
PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "TPC"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	



NOTE: ALL DIMENSIONS ARE NOMINAL

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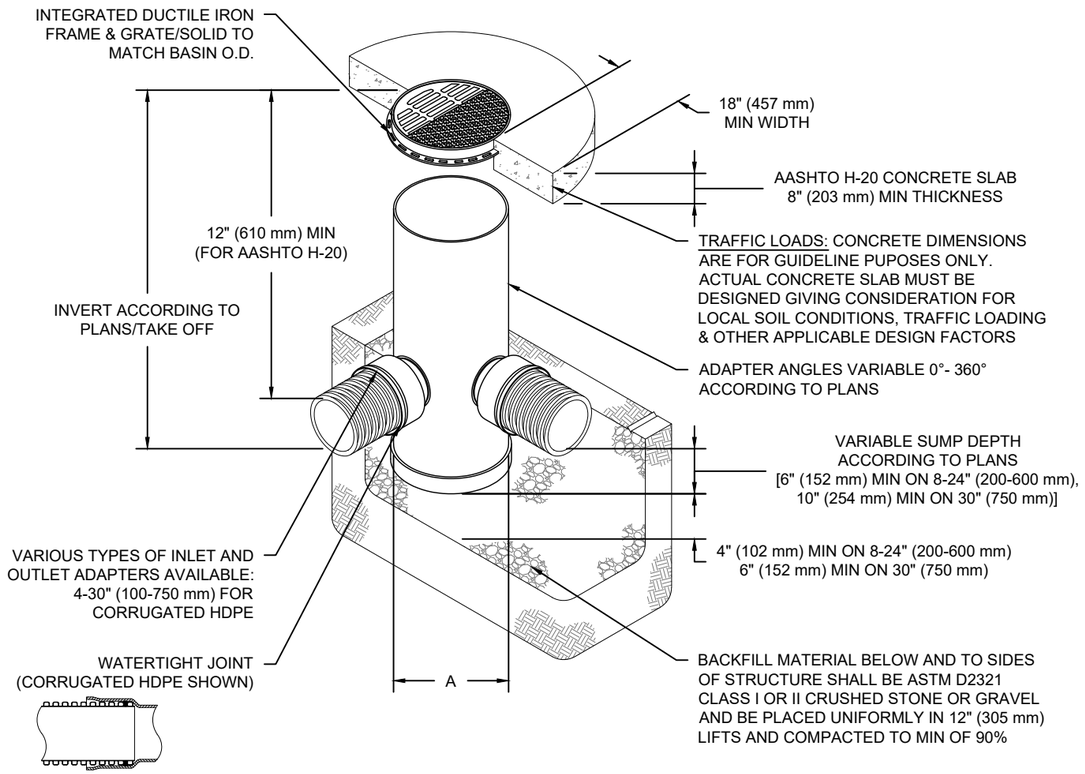
NYLOPLAST DRAIN BASIN

NTS



NOTES

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

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

PRA 23040 LID2

BARRIE, ON, CANADA

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DATE	DRW	CHK	DESCRIPTION

Nyloplast®

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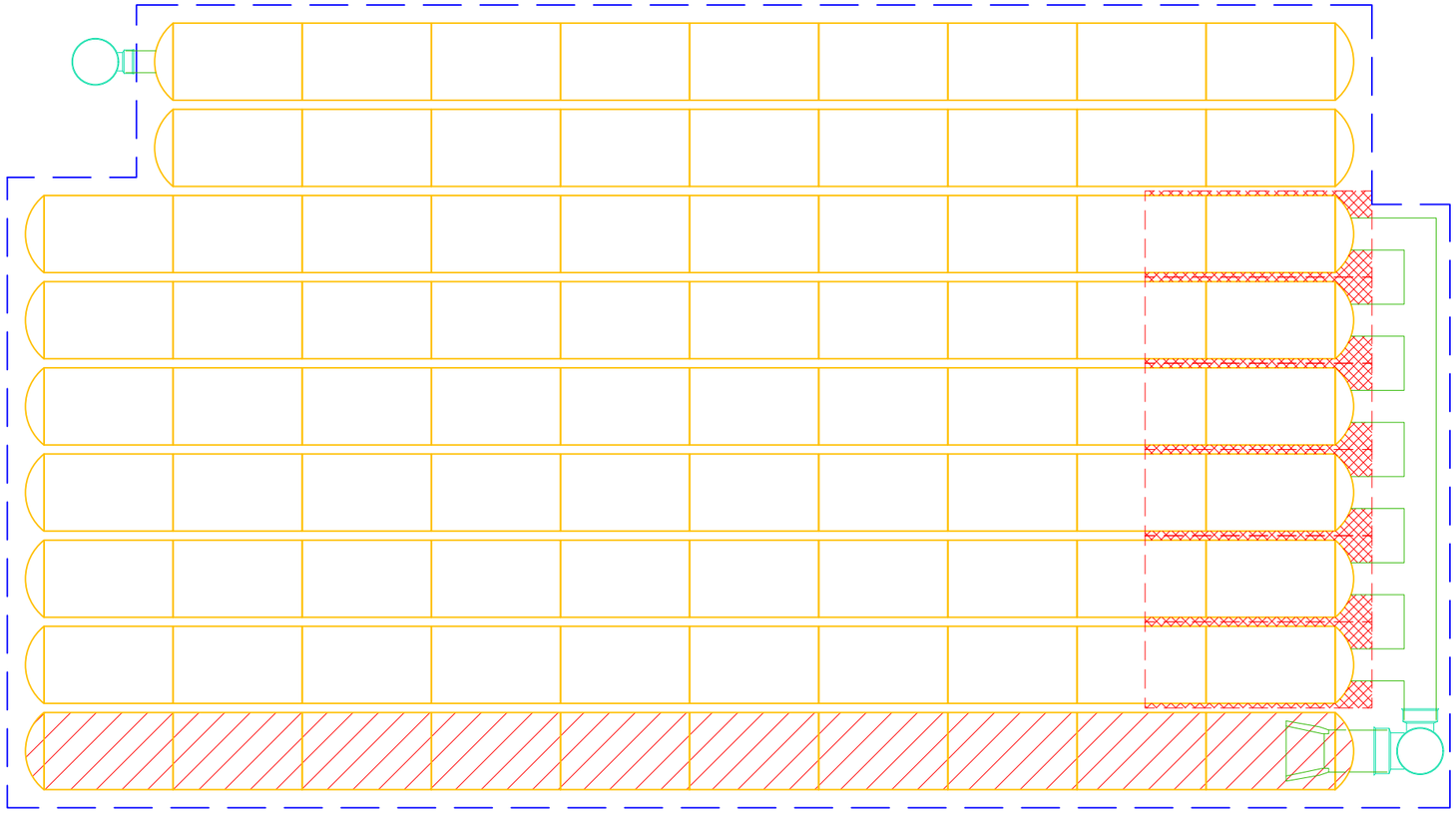
ADS.



PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
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PRA-23040 LID3

BARRIE, ON, CANADA

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

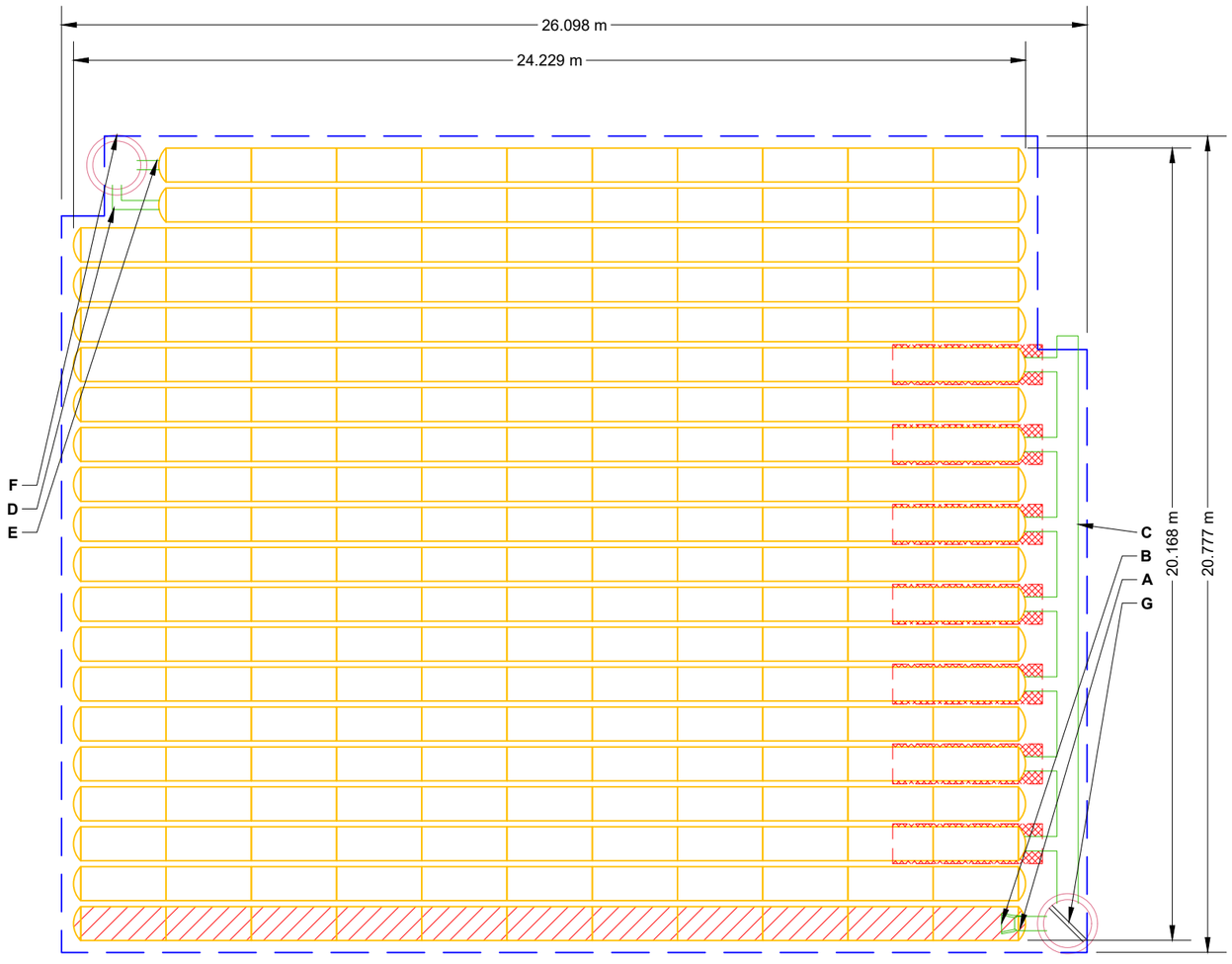
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
218	STORMTECH SC-310 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	264.197
40	STORMTECH SC-310 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	262.368
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	262.216
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	262.216
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	262.216
206.4	INSTALLED SYSTEM VOLUME (m^3) BELOW ELEVATION 261.911 (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	261.911
		TOP OF SC-310 CHAMBER:	261.759
		450 mm x 300 mm BOTTOM MANIFOLD INVERT (300 mm PIPE):	261.375
		300 mm ISOLATOR ROW PLUS INVERT:	261.375
		200 mm x 200 mm BOTTOM MANIFOLD INVERT:	261.368
533.2	SYSTEM AREA (m^2)	200 mm BOTTOM CONNECTION INVERT:	261.368
93.7	SYSTEM PERIMETER (m)	BOTTOM OF SC-310 CHAMBER:	261.352
		450 mm x 300 mm BOTTOM MANIFOLD INVERT (450 mm PIPE):	261.225
		BOTTOM OF STONE:	261.200

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	300 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC310ECEZ / TYP OF ALL 300 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	23 mm	
FLAMP	B	INSTALL FLAMP ON 300 mm ACCESS PIPE / PART#: SC31012RAMP		
MANIFOLD	C	450 mm x 300 mm ADS N-12 (450 mm PIPE) 450 mm x 300 mm ADS N-12 (300 mm PIPE)	-128 mm 23 mm	
MANIFOLD	D	200 mm x 200 mm BOTTOM MANIFOLD, MOLDED FITTINGS	15 mm	
PIPE CONNECTION	E	200 mm BOTTOM CONNECTION	15 mm	
CONCRETE STRUCTURE	F	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		40 L/s OUT
CONCRETE STRUCTURE W/WEIR	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		369 L/s IN



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

PRA-23040 LID3

BARRIE, ON, CANADA

DATE: 11/04/2024 | DRAWN: KR | CHECKED: N/A

PROJECT #:

DATE	DRW	CHK	DESCRIPTION

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 150

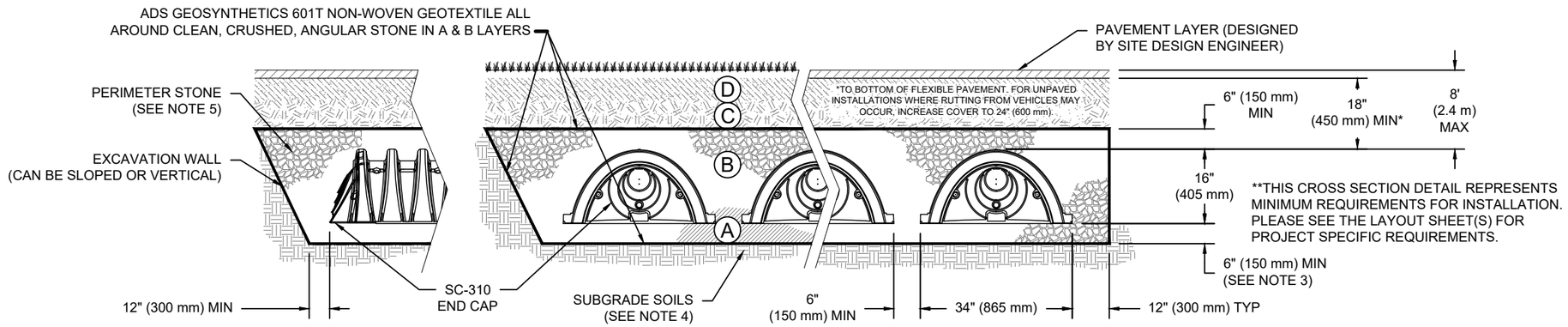
StormTech® Chamber System

1-800-821-6710 | WWW.STORMTECH.COM

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

PRA-23040 LID3
BARRIE, ON, CANADA
DATE: 11/04/2024 | DRAWN: KR | CHECKED: N/A
PROJECT #:

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Chamber System
1-800-821-6710 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
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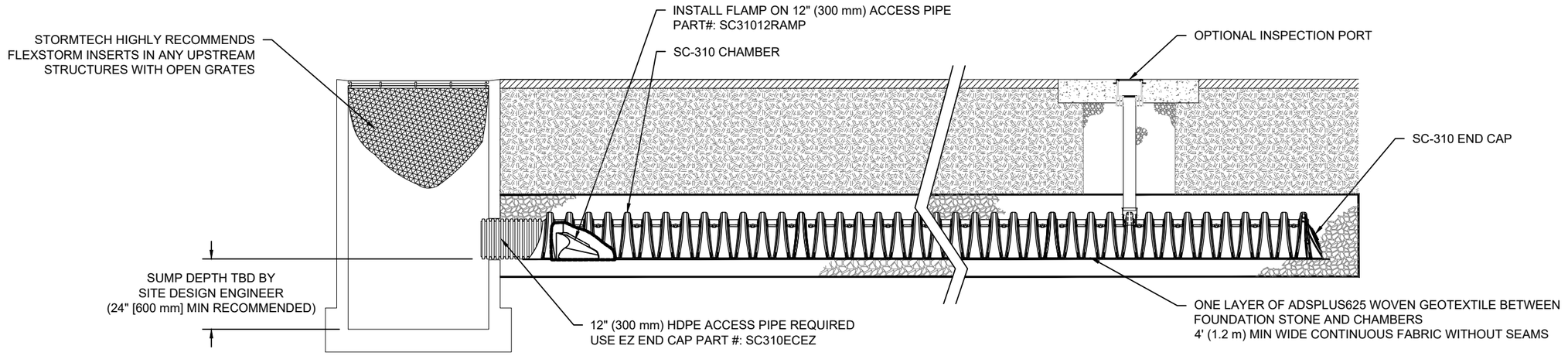

SC-310 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

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

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

NOTES

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

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

PRA-23040 LID3
BARRIE, ON, CANADA
DATE: 11/04/2024 | DRAWN: KR | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

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Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

ADS
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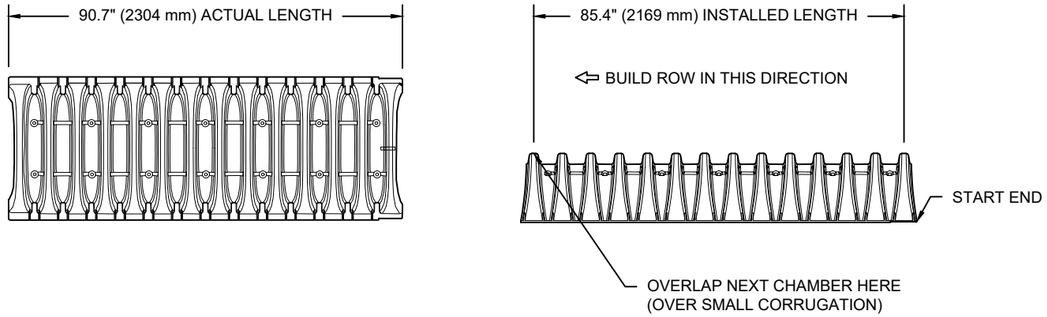
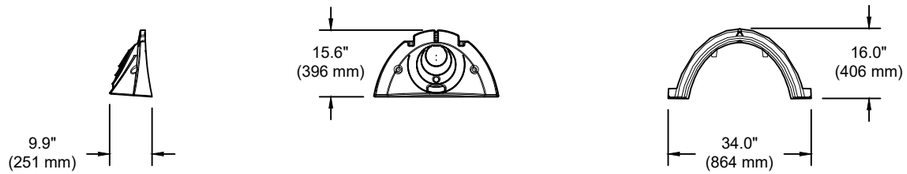
HILLIARD, OH 43026
1-800-733-7473

SC-310 TECHNICAL SPECIFICATION

NTS

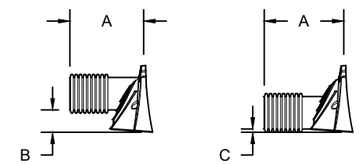




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-800-821-6710.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

PRA-23040 LID3
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4640 TRUEMAN BLVD
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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
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PRA 23040 LID 4

BARRIE, ON, CANADA

SC-800 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-800.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-800 SYSTEM

1. STORMTECH SC-800 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-800 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

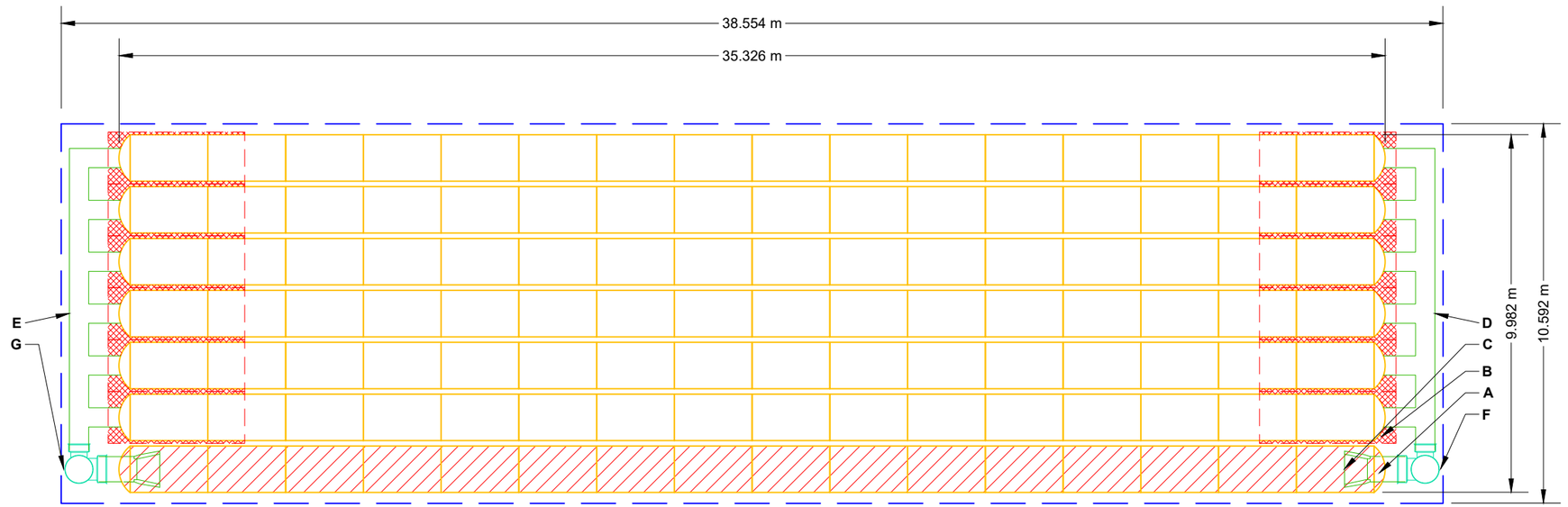
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
112	STORMTECH SC-800 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	261.732
14	STORMTECH SC-800 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	259.827
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	259.674
305	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	259.674
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	259.674
333.6	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	259.598
		TOP OF SC-800 CHAMBER:	259.293
		450 mm x 450 mm TOP MANIFOLD INVERT:	258.658
		450 mm x 450 mm TOP MANIFOLD INVERT:	258.658
408.4	SYSTEM AREA (m^2)	600 mm ISOLATOR ROW PLUS INVERT:	258.514
98.3	SYSTEM PERIMETER (m)	600 mm ISOLATOR ROW PLUS INVERT:	258.514
		BOTTOM OF SC-800 CHAMBER:	258.455
		BOTTOM OF STONE:	258.150

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM CORED END CAP, PART#: SC800EPE24BPC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	58 mm	
PREFABRICATED END CAP	B	450 mm TOP CORED END CAP, PART#: SC800EPE18TPC / TYP OF ALL 450 mm TOP CONNECTIONS	203 mm	
FLAMP	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP (TYP 2 PLACES)		
MANIFOLD	D	450 mm x 450 mm TOP MANIFOLD, ADS N-12	203 mm	
MANIFOLD	E	450 mm x 450 mm TOP MANIFOLD, ADS N-12	203 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	F	750 mm DIAMETER (610 mm SUMP MIN)		408 L/s IN
NYLOPLAST (INLET W/ ISO PLUS ROW)	G	750 mm DIAMETER (610 mm SUMP MIN)		408 L/s IN



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

PRA 23040 LID 4

BARRIE, ON, CANADA

DATE: 11/08/2024 | DRAWN: KR | CHECKED: N/A

PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

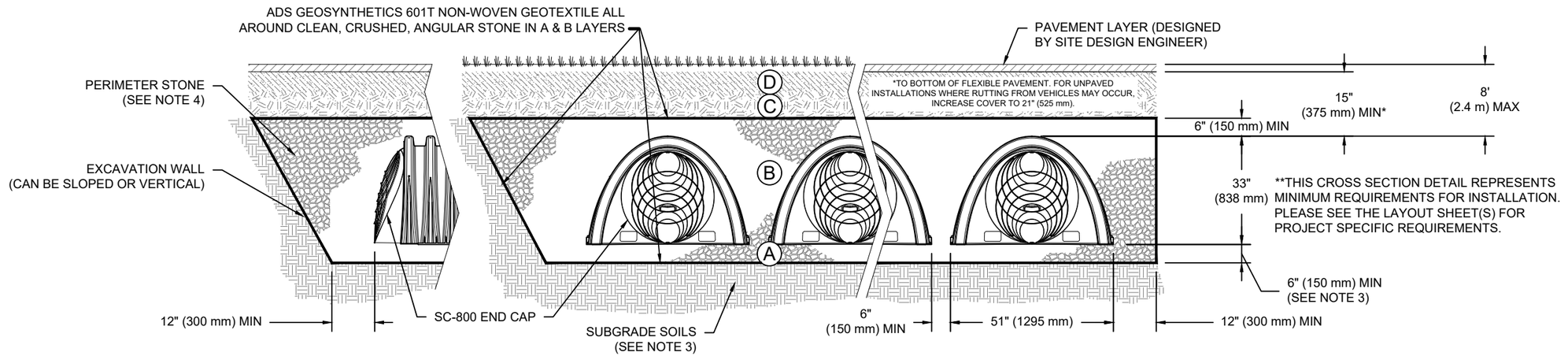
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 150

ACCEPTABLE FILL MATERIALS: STORMTECH SC-800 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 15" (375 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

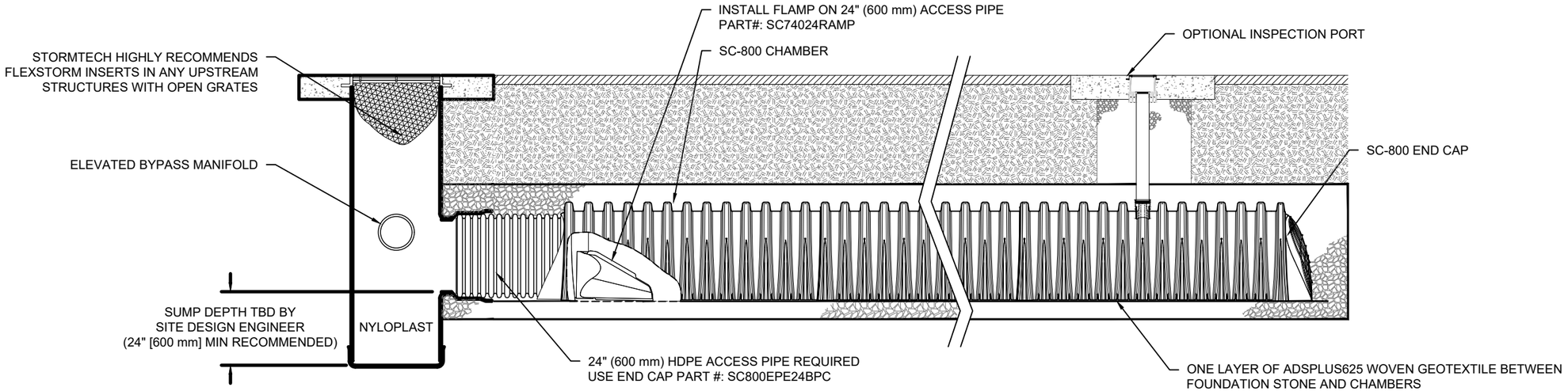
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-800 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

PRA 23040 LID 4
BARRIE, ON, CANADA
DATE: 11/08/2024 | DRAWN: KR | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



SC-800 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

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

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

NOTES

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

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

PRA 23040 LID 4
BARRIE, ON, CANADA
DATE: 11/08/2024 | DRAWN: KR | CHECKED: N/A
PROJECT #:

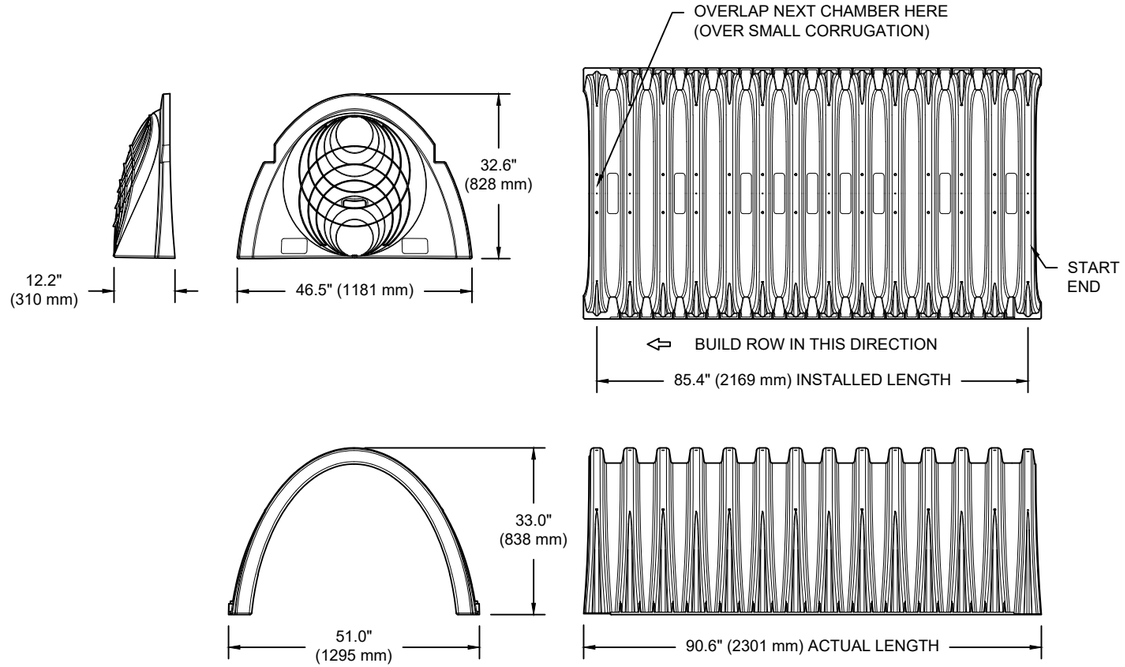
DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SC-800 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	81.0 CUBIC FEET	(2.29 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

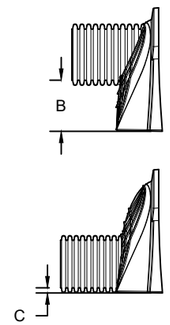
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	46.5" X 32.6" X 10.5"	(1181 mm X 828 mm X 267 mm)
END CAP STORAGE	3.4 CUBIC FEET	(0.09 m³)
MINIMUM INSTALLED STORAGE**	15.4 CUBIC FEET	(0.43 m³)
WEIGHT	15.7 lbs.	(7.1 kg)

* ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS
**ASSUMES 6" (152 mm) STONE ABOVE AND BELOW END CAPS, 6" (152 mm) BETWEEN ROWS, 12" (305 mm) BEYOND END CAPS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "BPC"
PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "TPC"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	



NOTE: ALL DIMENSIONS ARE NOMINAL

PRA 23040 LID 4
BARRIE, ON, CANADA
DATE: 11/08/2024 | DRAWN: KR | CHECKED: N/A
PROJECT #:

DESCRIPTION	CHK	DRW	DATE

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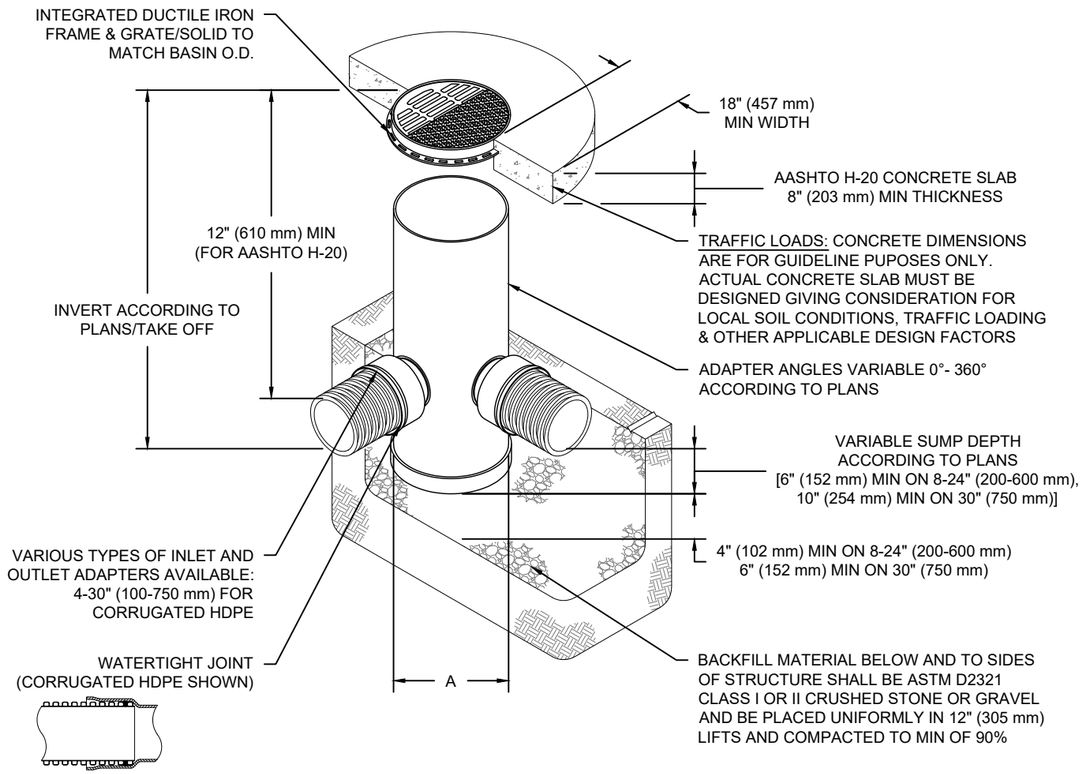
NYLOPLAST DRAIN BASIN

NTS



NOTES

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

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

PRA 23040 LID 4

BARRIE, ON, CANADA

DATE: 11/08/2024 | DRAWN: KR | CHECKED: N/A

PROJECT #:

DATE	DRW	CHK	DESCRIPTION

Nyloplast®

770-932-2443 | WWW.NYLOPLAST-US.COM

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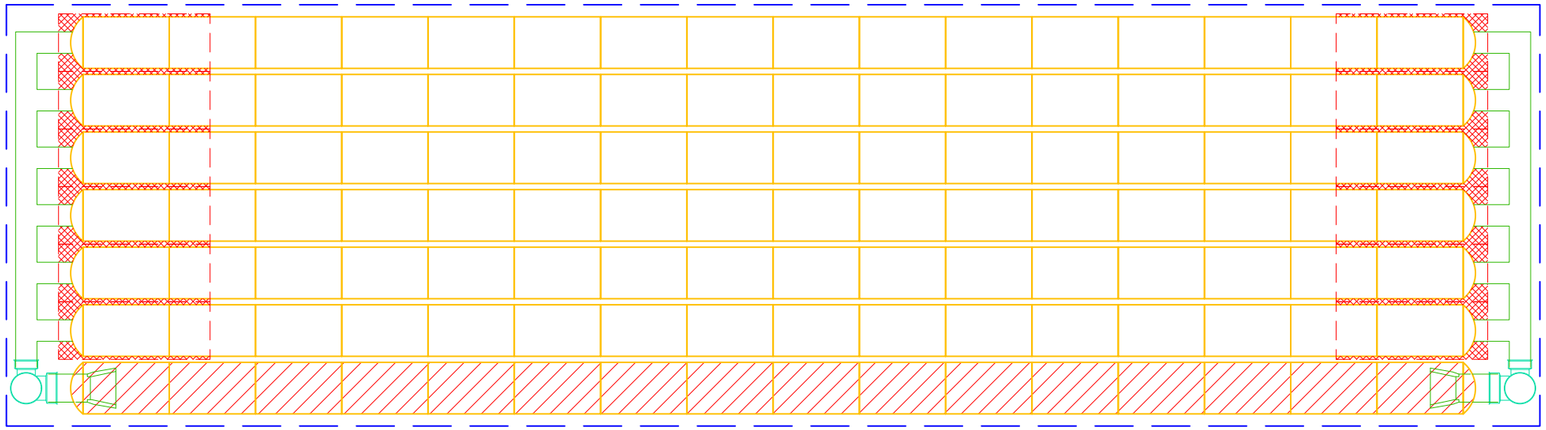
HILLIARD, OH 43026
1-800-733-7473



ADS OGS Sizing Summary

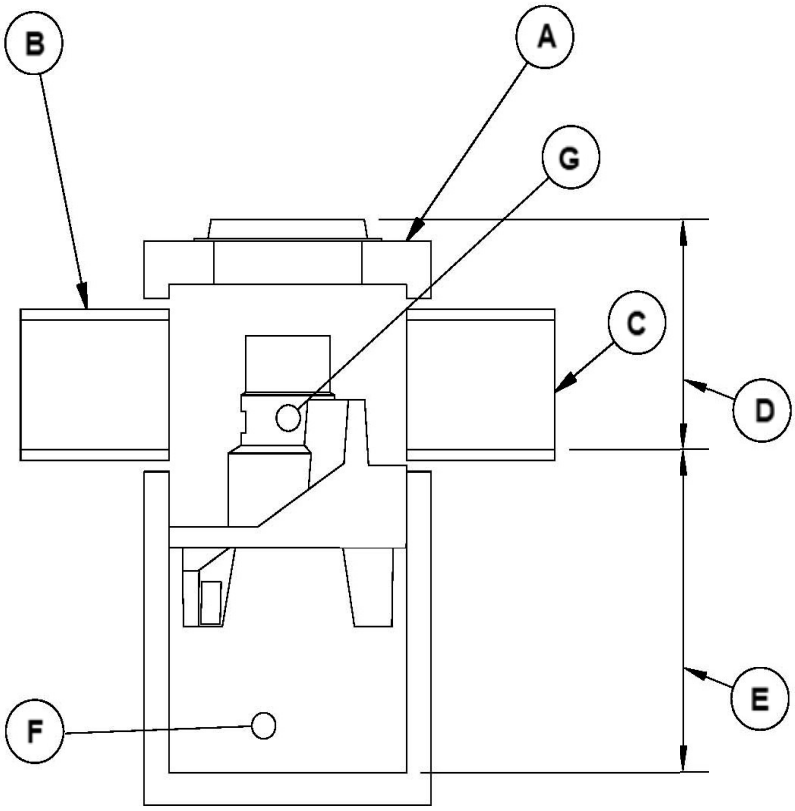
Project Name:	Hewitts South Subdivision - OGS 1 Lockhart Rd
Consulting Engineer:	The Jones Consulting Group Ltd.
Location:	Barrie, Ontario
Sizing Completed By:	Haider Nasrullah

Email: haider.nasrullah@adspipe.com

Treatment Requirements		
Treatment Goal:	Enhanced (MOE)	
Selected Parameters:	80% TSS	90% Volume
Selected Unit:	**FD-4HC**	

Site Details	
Site Area:	2.25 ha
% Impervious:	---
Rational C:	0.75
Rainfall Station:	Barrie, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	---

Summary of Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	81.0%	>90%
FD-5HC	85.0%	>90%
FD-6HC	87.0%	>90%
FD-8HC	92.0%	>90%
FD-10HC	94.0%	>90%



FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	450 mm
Outlet Pipe Diameter (C):	450 mm
Height, T/G to Outlet Invert (D):	2000 mm
Height, Outlet Invert to Sump (E):	1515 mm
Sediment Storage Capacity (F):	0.78 m^3
Oil Storage Capacity (G):	723 L
Recommended Sediment Depth for Maintenance:	440 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s

Site Elevations:	
Rim Elevation:	100.00
Inlet Pipe Elevation:	98.00
Outlet Pipe Elevation:	98.00

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name: Hewitts South Subdivision - OGS 1 Lockhart Rd

Consulting Engineer: The Jones Consulting Group Ltd.

Location: Barrie, Ontario

Net Annual Removal Efficiency Summary: FD-4HC

Rainfall Intensity(1)	Fraction of Rainfall(1)	FD-4HC Removal Efficiency(2)	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.3%	96.1%	0.3%
1.00	25.7%	90.1%	23.2%
1.50	5.3%	86.7%	4.6%
2.00	13.4%	84.4%	11.3%
2.50	5.5%	82.7%	4.6%
3.00	3.7%	81.3%	3.0%
3.50	7.2%	80.2%	5.7%
4.00	3.4%	79.2%	2.7%
4.50	2.4%	78.3%	1.9%
5.00	4.3%	77.6%	3.4%
6.00	3.6%	76.2%	2.8%
7.00	4.3%	75.2%	3.3%
8.00	3.4%	74.2%	2.5%
9.00	1.6%	73.4%	1.2%
10.00	2.1%	72.7%	1.5%
20.00	8.9%	68.2%	6.1%
30.00	2.3%	65.6%	1.5%
40.00	1.0%	63.9%	0.7%
50.00	0.5%	62.6%	0.3%
100.00	0.7%	58.7%	0.4%
150.00	0.1%	56.5%	0.0%
200.00	0.0%	55.0%	0.0%
		Total Net Annual Removal Efficiency:	81%
		Total Runoff Volume Treated:	>90%

Notes:

(1) Rainfall Data: 1978:2007, HLY03, Barrie, ONT, 6110557.

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.

ADS OGS Sizing Summary

Project Name:	Hewitts South Subdivision - OGS 2 Park Blk
Consulting Engineer:	The Jones Consulting Group Ltd.
Location:	Barrie, Ontario
Sizing Completed By:	Haider Nasrullah

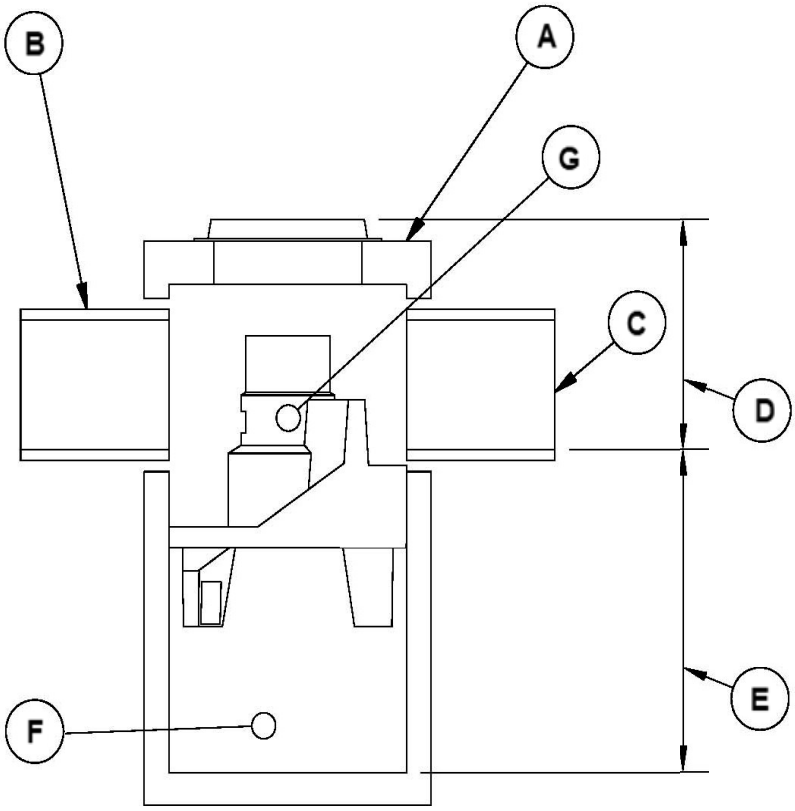
Email: haider.nasrullah@adspipe.com

Treatment Requirements		
Treatment Goal:	Enhanced (MOE)	
Selected Parameters:	80% TSS	90% Volume
Selected Unit:	**FD-4HC**	

Site Details	
Site Area:	0.86 ha
% Impervious:	---
Rational C:	0.65
Rainfall Station:	Barrie, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	164 L/s

Summary of Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	90.0%	>90%
FD-5HC	93.0%	>90%
FD-6HC	94.0%	>90%
FD-8HC	97.0%	>90%
FD-10HC	98.0%	>90%

FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	450 mm
Outlet Pipe Diameter (C):	450 mm
Height, T/G to Outlet Invert (D):	2000 mm
Height, Outlet Invert to Sump (E):	1515 mm
Sediment Storage Capacity (F):	0.78 m³
Oil Storage Capacity (G):	723 L
Recommended Sediment Depth for Maintenance:	440 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s



Site Elevations:	
Rim Elevation:	100.00
Inlet Pipe Elevation:	98,
Outlet Pipe Elevation:	98.00

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name: Hewitts South Subdivision - OGS 2 Park Blk

Consulting Engineer: The Jones Consulting Group Ltd.

Location: Barrie, Ontario

Net Annual Removal Efficiency Summary: FD-4HC

Rainfall Intensity[(1)]	Fraction of Rainfall[(1)]	FD-4HC Removal Efficiency[(2)]	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.3%	100.0%	0.3%
1.00	25.7%	99.8%	25.7%
1.50	5.3%	96.1%	5.1%
2.00	13.4%	93.6%	12.5%
2.50	5.5%	91.7%	5.1%
3.00	3.7%	90.1%	3.4%
3.50	7.2%	88.8%	6.4%
4.00	3.4%	87.7%	2.9%
4.50	2.4%	86.8%	2.1%
5.00	4.3%	85.9%	3.7%
6.00	3.6%	84.5%	3.1%
7.00	4.3%	83.3%	3.6%
8.00	3.4%	82.3%	2.8%
9.00	1.6%	81.4%	1.3%
10.00	2.1%	80.6%	1.7%
20.00	8.9%	75.5%	6.7%
30.00	2.3%	72.8%	1.7%
40.00	1.0%	70.8%	0.7%
50.00	0.5%	69.4%	0.4%
100.00	0.7%	65.0%	0.5%
150.00	0.1%	62.6%	0.0%
		Total Net Annual Removal Efficiency:	90%
		Total Runoff Volume Treated:	>90%

Notes:

(1) Rainfall Data: 1978:2007, HLY03, Barrie, ONT, 6110557.

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.

Ontario
MINISTRY OF THE ENVIRONMENT

Database Version: V 2.0 Release Update
Update Date: 30-Mar-12

Project DEVELOPMENT Summary

DEVELOPMENT: Hewitts South Subdivision
Subwatershed: Hewitts Creek

Total Pre-Development Area (ha):	15.58	Total Pre-Development Phosphorus Load (kg/yr):	2.96

Pre-Development Land Use	Area (ha)	P coeff. (kg/ha)	P Load (kg/yr)
Cropland	15.58	0.19	2.96

POST-DEVELOPMENT LOAD

Post-Development Land Use	Area (ha)	P coeff. (kg/ha)	Best Management Practice applied with P Removal Efficiency		P Load (kg/yr)
High Intensity - Residential	15.58	1.32	Treatment Train Approach	66%	6.99

		P Load (kg/yr)
Post-Development Area Altered:	15.58	
Total Pre-Development Area:	15.58	
Unaffected Area:	0	
Pre-Development:		2.96
Post-Development:		20.57
Change (Pre - Post):		-17.61
		595% Net Increase in Load
Post-Development (with BMPs):		6.99
Change (Pre - Post):		-4.03
		136.21% Net Increase in Load

DEVELOPMENT: **Hewitts South Subdivision**
Subwatershed: **Hewitts Creek**

CONSTRUCTION PHASE LOAD

SUMMARY WITH IMPLEMENTATION OF BMPs	P Load (kg/yr)
Pre-Development:	**2.96**
Construction Phase Amortized Over 8 Years :	to be determined
Post-Development:	**6.99**
Post-Development + Amortized Construction:	**to be determined**
Pre-Development Load - Post-Development Load:	**-4.03**
Conclusion:	**136% Increase in Load**
Pre-Development Load - (Post-Development + Amortized Construction Load):	**to be determined**
Conclusion:	**to be determined**

Based on a comparison of Pre-Development and Post-Development loads, and in consideration of Construction Phase loads, the Ministry would encourage the Municipality to:

Not approve development as site specific appropriate

WATER BALANCE CALCULATIONS
Hansen Group Inc.
Hewitt's Gate South
Barrie, ON
PROJECT No.300041559

BURNSIDE

TABLE G-3

Water Balance for Pre- and Post-Development Land Use Conditions (with no SWM/LID measures in place) - East Catchment Development Area

Land Use Description	Approx. Land Area* (m^2)	Estimated Impervious Fraction for Land Use*	Estimated Impervious Area (m^2)	Runoff from Impervious Area** (m/a)	Runoff Volume from Impervious Area (m^3/a)	Estimated Pervious Area (m^2)	Runoff from Pervious Area** (m/a)	Runoff Volume from Pervious Area (m^3/a)	Infiltration from Pervious Area** (m/a)	Infiltration Volume from Pervious Area (m^3/a)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/a)
Pre-Development Land Use												
Open Space /Agricultural/Rural Residential	155,819	0.03	4,675	0.793	3,707	151,144	0.136	20,538	0.204	30,808	24,245	30,808
TOTAL PRE-DEVELOPMENT	**155,819**		**4,675**		**3,707**	**151,144**		**20,538**		**30,808**	**24,245**	**30,808**
Post-Development Land Use (with no LID measures in place)												
Single Detached Residential	15,492	0.50	7,746	0.793	6,142	7,746	0.132	1,025	0.246	1,903	7,167	1,903
Townhouse Residential	22,382	0.60	13,429	0.793	10,649	8,953	0.132	1,184	0.246	2,200	11,833	2,200
Medium Density Residential	52,932	0.75	39,699	0.793	31,480	13,233	0.132	1,751	0.246	3,251	33,231	3,251
Roads and Reserves	42,351	0.66	27,952	0.793	22,165	14,399	0.132	1,905	0.246	3,538	24,070	3,538
Stormwater Management Block	16,231	0.00	0	0.793	0	16,231	0.132	2,147	0.246	3,988	2,147	3,988
Open Space	5,019	0.05	251	0.793	199	4,768	0.132	631	0.246	1,171	830	1,171
Commercial	1,412	0.80	1,130	0.793	896	282	0.132	37	0.246	69	933	69
TOTAL POST-DEVELOPMENT	**155,819**		**90,206**		**71,531**	**65,613**		**8,680**		**16,121**	**80,211**	**16,121**
									% Change from Pre to Post		331	48
									Effect of development (with no mitigation)		3.3 times increase in runoff	48% reduction of infiltration

* data provided by Jones Consulting Nov 2024

** figures from Tables G-1 and G-2

To balance pre- to post-,
the infiltration target (m^3/a)= **14,687**

WATER BALANCE CALCULATIONS
Hansen Group Inc.
Hewitt's Gate South
Barrie, ON
PROJECT No.300041559

BURNSIDE

TABLE G-4

Water Balance for Pre- and Post-Development Land Use Conditions (with no SWM/LID measures in place) - West Catchment Development Area

Land Use Description	Approx. Land Area* (m^2)	Estimated Impervious Fraction for Land Use*	Estimated Impervious Area (m^2)	Runoff from Impervious Area** (m/a)	Runoff Volume from Impervious Area (m^3/a)	Estimated Pervious Area (m^2)	Runoff from Pervious Area** (m/a)	Runoff Volume from Pervious Area (m^3/a)	Infiltration from Pervious Area** (m/a)	Infiltration Volume from Pervious Area (m^3/a)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/a)
Pre-Development Land Use												
Open Space /Agricultural/Rural Residential	18,143	0.06	1,089	0.793	863	17,054	0.136	2,317	0.204	3,476	3,181	3,476
TOTAL PRE-DEVELOPMENT	**18,143**		**1,089**		**863**	**17,054**		**2,317**		**3,476**	**3,181**	**3,476**
Post-Development Land Use (with no LID measures in place)												
Medium Density Residential	15,874	0.75	11,906	0.793	9,441	3,969	0.132	525	0.246	975	9,966	975
Roads and Reserves	2,269	0.66	1,498	0.793	1,187	771	0.132	102	0.246	190	1,290	190
TOTAL POST-DEVELOPMENT	**18,143**		**13,403**		**10,628**	**4,740**		**627**		**1,165**	**11,255**	**1,165**
										% Change from Pre to Post	354	66
										Effect of development (with no mitigation)	3.5 times increase in runoff	66% reduction of infiltration

* data provided by Jones Consulting Nov 2024

** figures from Tables G-1 and G-2

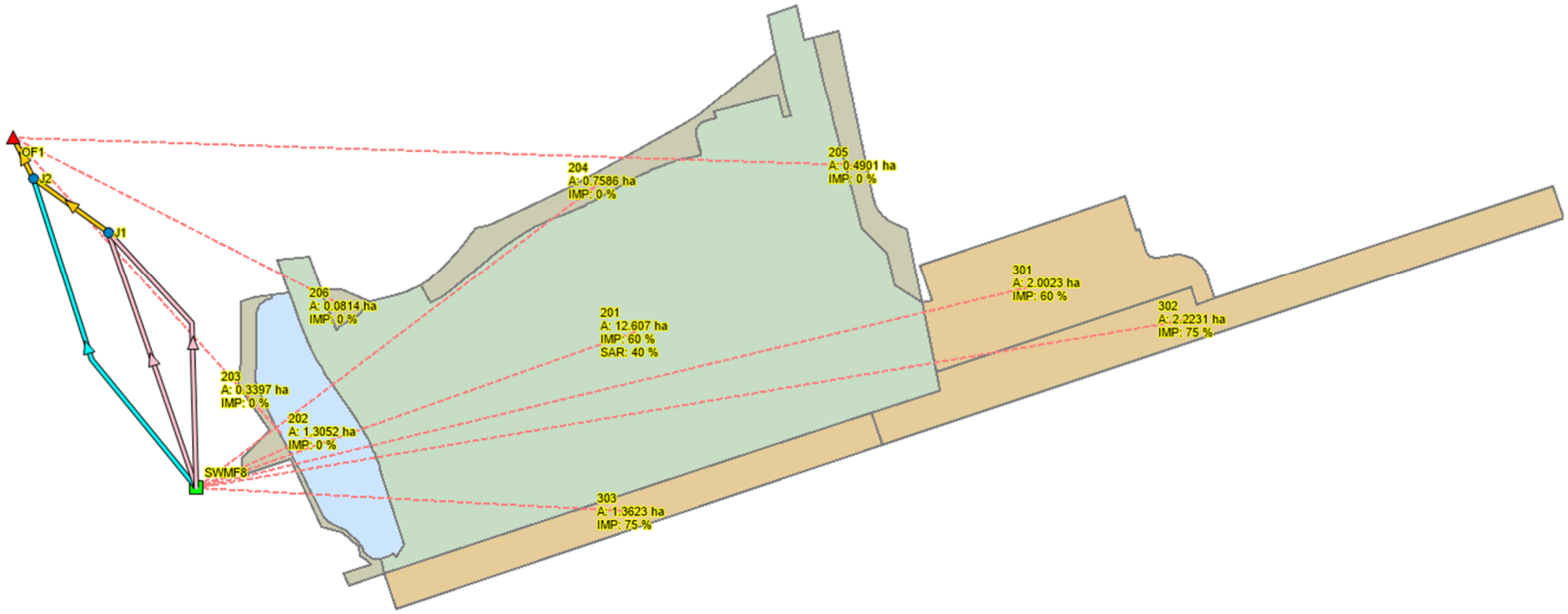
To balance pre- to post-,
the infiltration target (m^3/a)= **2,312**

Appendix B

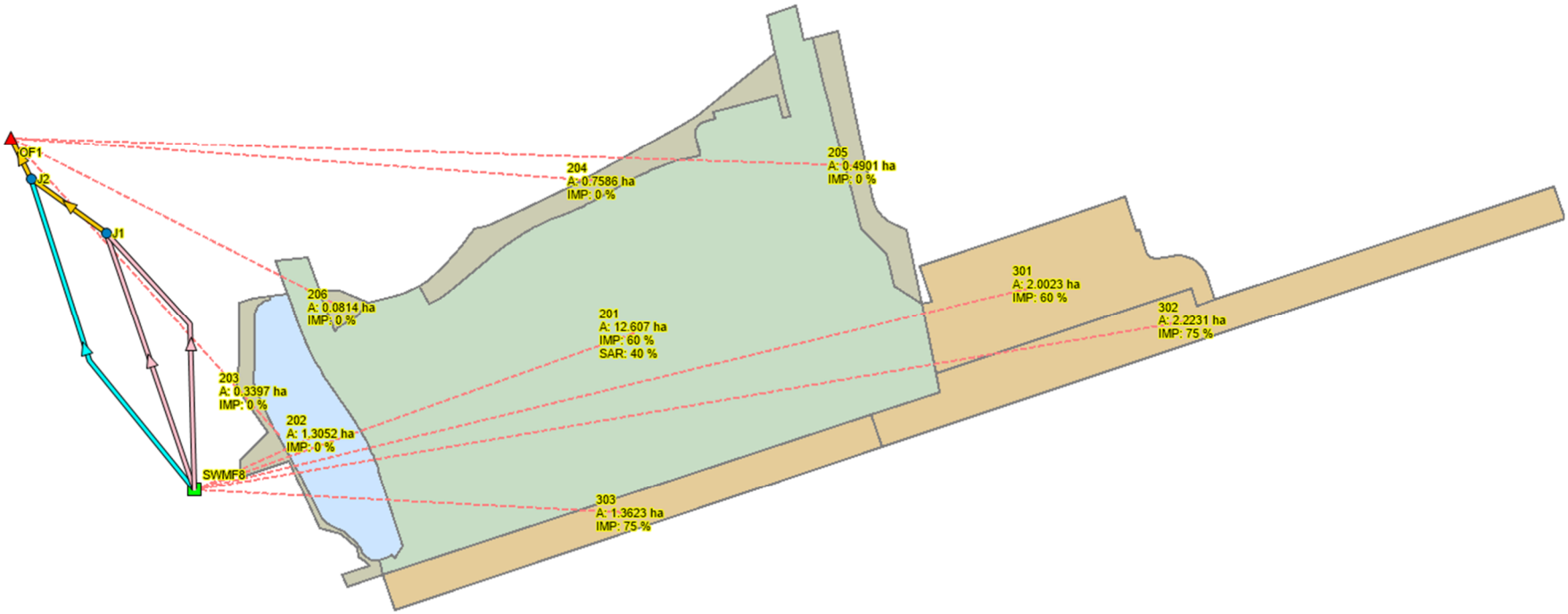
PCSWMM Schematic & Model Output

- PCSWMM Post-Development Peak Flow Model Schematic
- PCSWMM Post-Development Peak Flow Model Detailed Status Report
- PCSWMM Post-Development Peak Flow Model Graphical Output
  Ponding Depths for SCS 24h Storms
- PCSWMM Post-Development Peak Flow Model Graphical Output
  Ponding Volumes for SCS 24h Storms
- PCSWMM Post-Development Peak Flow Model Graphical Output
  System outflows for SCS 24h Storms
- PCSWMM Post-Development LID Model Schematic
- PCSWMM Post-Development LID Model Detailed Status Report
- PCSWMM Post-Development LID Model Graphical Output
  Ponding Volumes for 25mm Water Quality Event

Post Development Peak Flow Model Schematic – Minor Events (< 5-year Storm)



Post Development Peak Flow Model Schematic – Major Events (> 5-year Storm)



EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 02: maximum depth increased for Node SWMF8

****
Element Count
****
Number of rain gages 26
Number of subcatchments ... 9
Number of nodes 4
Number of links 5
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm4hrCHI_WQE	25mm4hrCHI_WQE	INTENSITY	5 min.
COB_100yr12hrSCS	COB_100yr12hrSCS	INTENSITY	6 min.
COB_100yr24hrSCS	COB_100yr24hrSCS	INTENSITY	15 min.
COB_100yr4hrChicago	COB_100yr4hrChicago	INTENSITY	10 min.
COB_100yr6hrSCS	COB_100yr6hrSCS	INTENSITY	6 min.
COB_10yr12hrSCS	COB_10yr12hrSCS	INTENSITY	6 min.
COB_10yr24hrSCS	COB_10yr24hrSCS	INTENSITY	15 min.
COB_10yr4hrChicago	COB_10yr4hrChicago	INTENSITY	10 min.
COB_10yr6hrSCS	COB_10yr6hrSCS	INTENSITY	6 min.
COB_25yr12hrSCS	COB_25yr12hrSCS	INTENSITY	6 min.
COB_25yr24hrSCS	COB_25yr24hrSCS	INTENSITY	15 min.
COB_25yr4hrChicago	COB_25yr4hrChicago	INTENSITY	10 min.
COB_25yr6hrSCS	COB_25yr6hrSCS	INTENSITY	6 min.
COB_2yr12hrSCS	COB_2yr12hrSCS	INTENSITY	6 min.
COB_2yr24hrSCS	COB_2yr24hrSCS	INTENSITY	15 min.
COB_2yr4hrChicago	COB_2yr4hrChicago	INTENSITY	10 min.
COB_2yr6hrSCS	COB_2yr6hrSCS	INTENSITY	6 min.
COB_50yr12hrSCS	COB_50yr12hrSCS	INTENSITY	6 min.

COB_50yr24hrSCS	COB_50yr24hrSCS	INTENSITY	15	min.
COB_50yr4hrChicago	COB_50yr4hrChicago	INTENSITY	10	min.
COB_50yr6hrSCS	COB_50yr6hrSCS	INTENSITY	6	min.
COB_5yr12hrSCS	COB_5yr12hrSCS	INTENSITY	6	min.
COB_5yr24hrSCS	COB_5yr24hrSCS	INTENSITY	15	min.
COB_5yr4hrChicago	COB_5yr4hrChicago	INTENSITY	10	min.
COB_5yr6hrSCS	COB_5yr6hrSCS	INTENSITY	6	min.
Hazel	Hazel	INTENSITY	60	min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	12.61	2521.40	60.00	1.5000	COB_100yr24hrSCS	SWMF8
202	1.31	326.30	0.00	2.0000	COB_100yr24hrSCS	SWMF8
203	0.34	84.92	0.00	1.5000	COB_100yr24hrSCS	OF1
204	0.76	108.37	0.00	1.5000	COB_100yr24hrSCS	OF1
205	0.49	245.05	0.00	1.5000	COB_100yr24hrSCS	OF1
206	0.08	27.13	0.00	1.5000	COB_100yr24hrSCS	OF1
301	2.00	400.46	60.00	1.0000	COB_100yr24hrSCS	SWMF8
302	2.22	222.31	75.00	1.0000	COB_100yr24hrSCS	SWMF8
303	1.36	136.23	75.00	1.0000	COB_100yr24hrSCS	SWMF8

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	253.70	2.30	0.0	
J2	JUNCTION	253.60	1.94	0.0	
OF1	OUTFALL	251.70	1.00	0.0	
SWMF8	STORAGE	253.70	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	10.0	0.9500	0.0130
C2	J2	OF1	CONDUIT	39.6	4.8178	0.0130
OR1	SWMF8	J1	ORIFICE			
OR2	SWMF8	J1	ORIFICE			
W1	SWMF8	J2	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.75	0.44	0.19	0.75	1	1.09
C2	TRAPEZOIDAL	1.00	15.00	0.60	25.00	1	179.72

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN

Starting Date 02/17/2023 00:00:00
Ending Date 02/20/2023 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	2.828	133.602
Evaporation Loss	0.000	0.000
Infiltration Loss	1.132	53.484
Surface Runoff	1.686	79.661
Final Storage	0.023	1.082
Continuity Error (%)	-0.468	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.685	16.849
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	1.465	14.646
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.220	2.203
Continuity Error (%)	-0.002	

```
  ***************************
  Time-Step Critical Elements
  ***************************
  Link C1 (94.70%)


  *******************************
  Highest Flow Instability Indexes
  *******************************
  All links are stable.


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.42 sec
  Average Time Step           :     2.99 sec
  Maximum Time Step           :     5.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :    49.20 %
      3.155 -  1.991 sec      :    32.62 %
      1.991 -  1.256 sec      :    18.18 %
      1.256 -  0.792 sec      :     0.00 %
      0.792 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------------
-------------
                            Total      Total      Total      Total     Imperv       Perv      Total       Total
Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff
Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm         mm         mm    10^6 ltr
CMS
```

201		133.60	0.00	0.00	49.62	79.22	35.84	83.38	10.51	5.48	0.624
202		133.60	0.00	0.00	90.20	0.00	44.07	44.07	0.58	0.49	0.330
203		133.60	0.00	0.00	90.47	0.00	43.75	43.75	0.15	0.12	0.327
204		133.60	0.00	0.00	91.85	0.00	42.19	42.19	0.32	0.22	0.316
205		133.60	0.00	0.00	89.45	0.00	45.00	45.00	0.22	0.20	0.337
206		133.60	0.00	0.00	89.97	0.00	44.35	44.35	0.04	0.03	0.332
301		133.60	0.00	0.00	49.69	79.26	35.78	83.34	1.67	0.86	0.624
302		133.60	0.00	0.00	38.45	99.19	34.84	94.36	2.10	0.96	0.706
303		133.60	0.00	0.00	38.45	99.19	34.84	94.36	1.29	0.59	0.706

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.12	0.33	254.03	0 12:43	0.33
J2	JUNCTION	0.01	0.04	253.65	0 12:43	0.04
OF1	OUTFALL	0.01	0.04	251.74	0 12:43	0.04
SWMF8	STORAGE	0.91	1.81	255.51	0 12:43	1.81

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.000	0.444	0 12:43	0	13.9	0.002
J2	JUNCTION	0.000	0.444	0 12:43	0	13.9	0.005
OF1	OUTFALL	0.576	0.715	0 12:00	0.724	14.6	0.000
SWMF8	STORAGE	8.375	8.375	0 12:00	16.1	16.1	0.001

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SWMF8	5.411	33	0	0	11.987	73	0 12:43	0.444

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	98.50	0.086	0.715	14.646
System	98.50	0.086	0.715	14.646

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.444	0 12:43	5.11	0.41	0.25
C2	CONDUIT	0.444	0 12:43	1.94	0.00	0.04
OR1	ORIFICE	0.042	0 12:43			1.00
OR2	ORIFICE	0.402	0 12:43			1.00
W1	WEIR	0.000	0 00:00			0.00

****
Flow Classification Summary
****

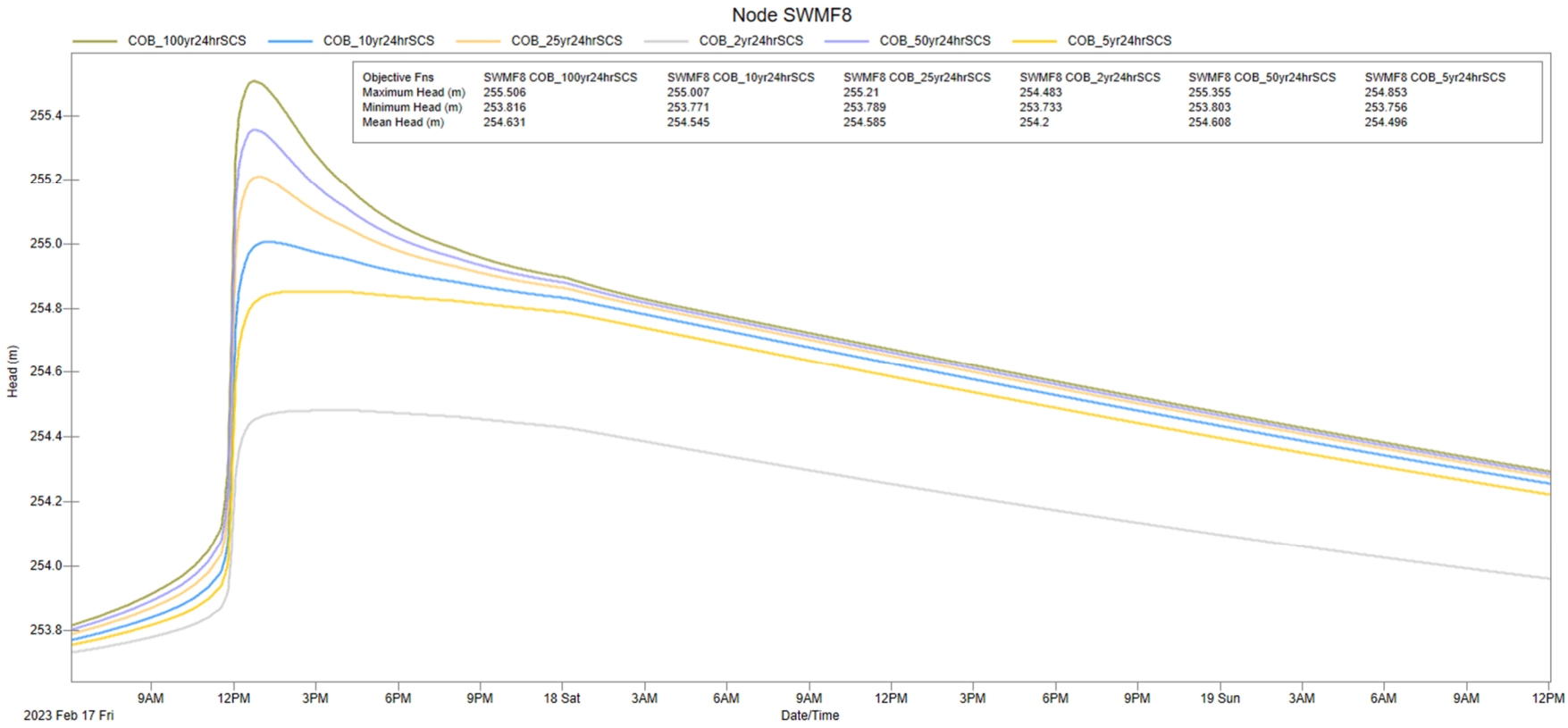
Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.01	0.00	0.00	0.00	0.99	0.00	0.00	0.13	0.00
C2	1.00	0.01	0.00	0.00	0.00	0.99	0.00	0.00	0.02	0.00

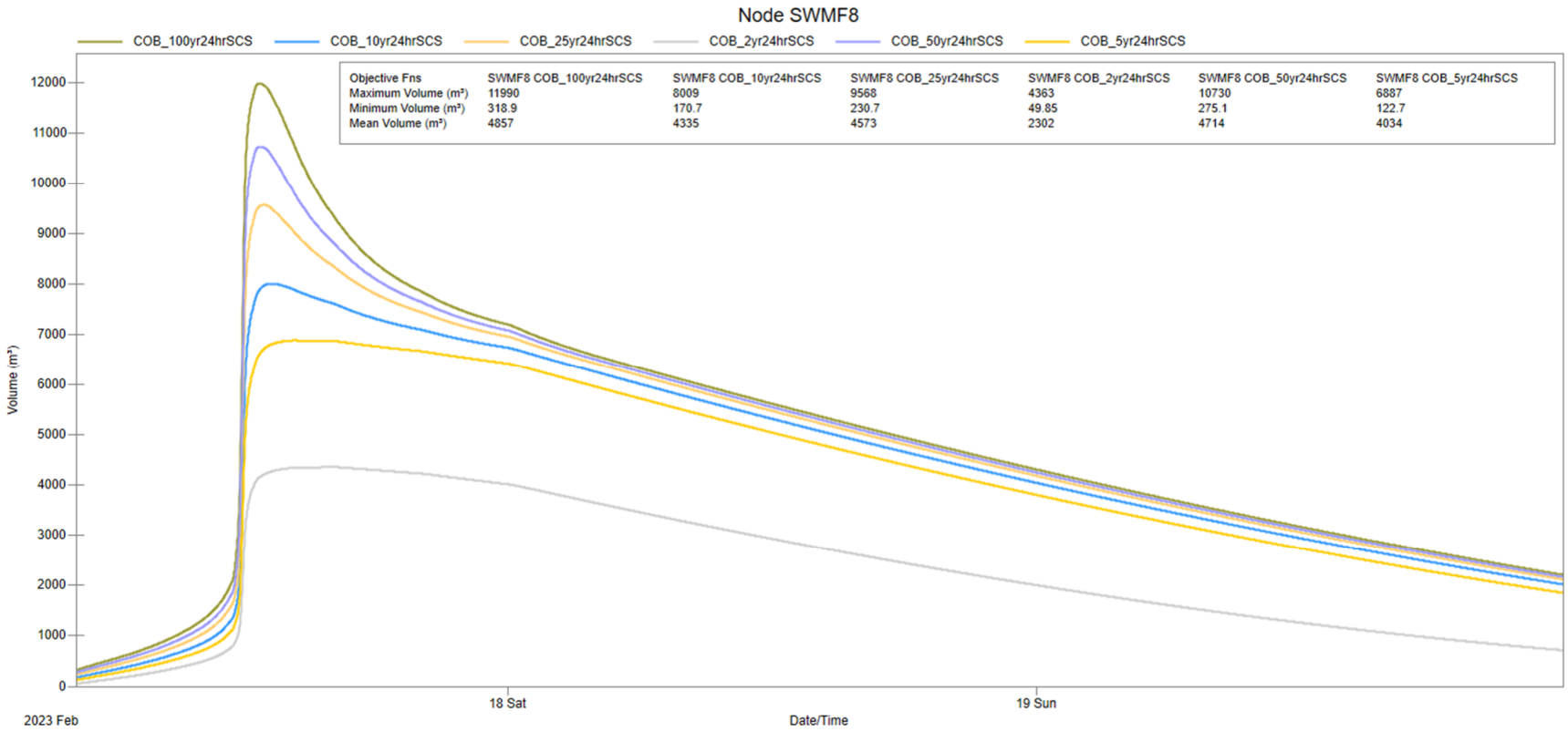
****
Conduit Surcharge Summary

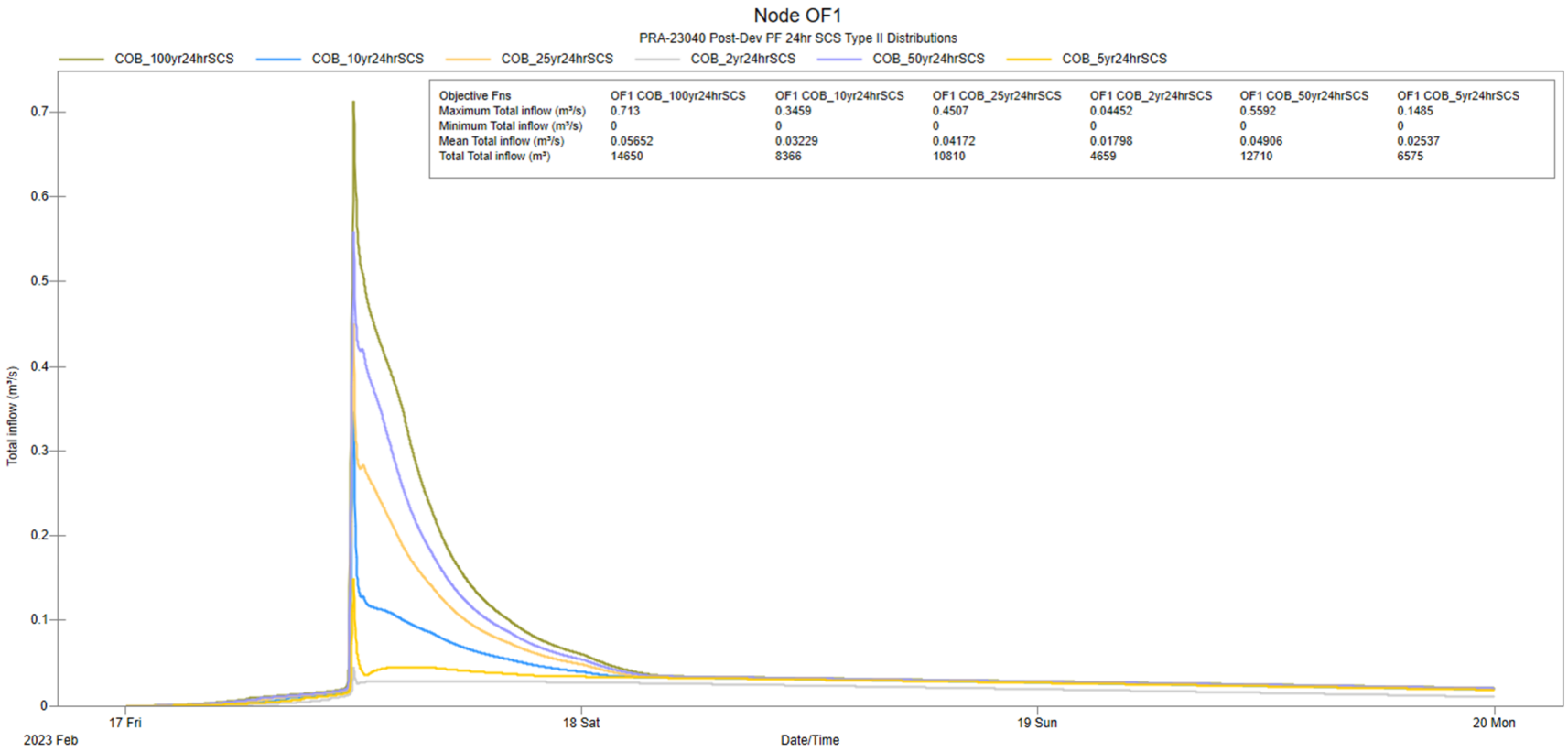
****

No conduits were surcharged.

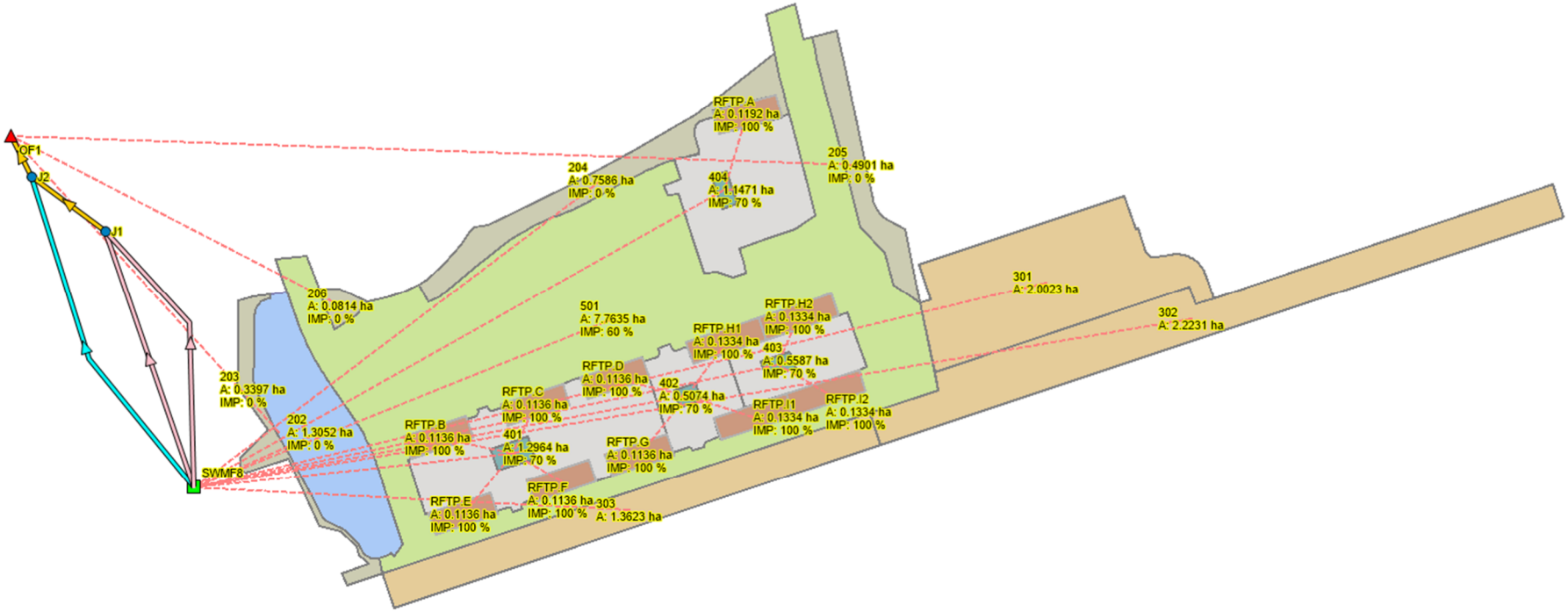
Analysis begun on: Fri Nov 8 11:34:51 2024
Analysis ended on: Fri Nov 8 11:34:51 2024
Total elapsed time: < 1 sec


Node SWMF8
COB_100yr24hrSCS
COB_10yr24hrSCS
COB_25yr24hrSCS
COB_2yr24hrSCS
COB_50yr24hrSCS
COB_5yr24hrSCS
Objective Fns | SWMF8 COB_100yr24hrSCS | SWMF8 COB_10yr24hrSCS | SWMF8 COB_25yr24hrSCS | SWMF8 COB_2yr24hrSCS | SWMF8 COB_50yr24hrSCS | SWMF8 COB_5yr24hrSCS
Maximum Head (m) | 255.506 | 255.007 | 255.21 | 254.483 | 255.355 | 254.853
Minimum Head (m) | 253.816 | 253.771 | 253.789 | 253.733 | 253.803 | 253.756
Mean Head (m) | 254.631 | 254.545 | 254.585 | 254.2 | 254.608 | 254.496
Head (m)
255.4
255.2
255.0
254.8
254.6
254.4
254.2
254.0
253.8
9AM
12PM
3PM
6PM
9PM
18 Sat
3AM
6AM
9AM
12PM
3PM
6PM
9PM
19 Sun
3AM
6AM
9AM
12PM
2023 Feb 17 Fri
Date/Time


Node SWMF8
COB_100yr24hrSCS
COB_10yr24hrSCS
COB_25yr24hrSCS
COB_2yr24hrSCS
COB_50yr24hrSCS
COB_5yr24hrSCS
Objective Fns | SWMF8 COB_100yr24hrSCS | SWMF8 COB_10yr24hrSCS | SWMF8 COB_25yr24hrSCS | SWMF8 COB_2yr24hrSCS | SWMF8 COB_50yr24hrSCS | SWMF8 COB_5yr24hrSCS
Maximum Volume (m³) | 11990 | 8009 | 9568 | 4363 | 10730 | 6887
Minimum Volume (m³) | 318.9 | 170.7 | 230.7 | 49.85 | 275.1 | 122.7
Mean Volume (m³) | 4857 | 4335 | 4573 | 2302 | 4714 | 4034
Volume (m³)
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2023 Feb
18 Sat
19 Sun
Date/Time


Node OF1
PRA-23040 Post-Dev PF 24hr SCS Type II Distributions
COB_100yr24hrSCS
COB_10yr24hrSCS
COB_25yr24hrSCS
COB_2yr24hrSCS
COB_50yr24hrSCS
COB_5yr24hrSCS
Objective Fns | OF1 COB_100yr24hrSCS | OF1 COB_10yr24hrSCS | OF1 COB_25yr24hrSCS | OF1 COB_2yr24hrSCS | OF1 COB_50yr24hrSCS | OF1 COB_5yr24hrSCS
Maximum Total inflow (m³/s) | 0.713 | 0.3459 | 0.4507 | 0.04452 | 0.5592 | 0.1485
Minimum Total inflow (m³/s) | 0 | 0 | 0 | 0 | 0 | 0
Mean Total inflow (m³/s) | 0.05652 | 0.03229 | 0.04172 | 0.01798 | 0.04906 | 0.02537
Total Total inflow (m³) | 14650 | 8366 | 10810 | 4659 | 12710 | 6575
Total inflow (m³/s)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
17 Fri
2023 Feb
18 Sat
19 Sun
20 Mon
Date/Time

PRA-23040 Post Development LID Model – 25mm WQE Schematic



EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 02: maximum depth increased for Node SWMF8

****
Element Count
****
Number of rain gages 27
Number of subcatchments ... 28
Number of nodes 4
Number of links 5
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm4hrCHI_WQE	25mm4hrCHI_WQE	INTENSITY	5 min.
COB_100yr12hrSCS	COB_100yr12hrSCS	INTENSITY	6 min.
COB_100yr24hrSCS	COB_100yr24hrSCS	INTENSITY	15 min.
COB_100yr4hrChicago	COB_100yr4hrChicago	INTENSITY	10 min.
COB_100yr6hrSCS	COB_100yr6hrSCS	INTENSITY	6 min.
COB_10yr12hrSCS	COB_10yr12hrSCS	INTENSITY	6 min.
COB_10yr24hrSCS	COB_10yr24hrSCS	INTENSITY	15 min.
COB_10yr4hrChicago	COB_10yr4hrChicago	INTENSITY	10 min.
COB_10yr6hrSCS	COB_10yr6hrSCS	INTENSITY	6 min.
COB_25yr12hrSCS	COB_25yr12hrSCS	INTENSITY	6 min.
COB_25yr24hrSCS	COB_25yr24hrSCS	INTENSITY	15 min.
COB_25yr4hrChicago	COB_25yr4hrChicago	INTENSITY	10 min.
COB_25yr6hrSCS	COB_25yr6hrSCS	INTENSITY	6 min.
COB_2yr12hrSCS	COB_2yr12hrSCS	INTENSITY	6 min.
COB_2yr24hrSCS	COB_2yr24hrSCS	INTENSITY	15 min.
COB_2yr4hrChicago	COB_2yr4hrChicago	INTENSITY	10 min.
COB_2yr6hrSCS	COB_2yr6hrSCS	INTENSITY	6 min.
COB_50yr12hrSCS	COB_50yr12hrSCS	INTENSITY	6 min.

COB_50yr24hrSCS	COB_50yr24hrSCS	INTENSITY	15 min.
COB_50yr4hrChicago	COB_50yr4hrChicago	INTENSITY	10 min.
COB_50yr6hrSCS	COB_50yr6hrSCS	INTENSITY	6 min.
COB_5yr12hrSCS	COB_5yr12hrSCS	INTENSITY	6 min.
COB_5yr24hrSCS	COB_5yr24hrSCS	INTENSITY	15 min.
COB_5yr4hrChicago	COB_5yr4hrChicago	INTENSITY	10 min.
COB_5yr6hrSCS	COB_5yr6hrSCS	INTENSITY	6 min.
Hazel	Hazel	INTENSITY	60 min.
ZERO	ZERO	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
202	1.31	326.30	0.00	2.0000	25mm4hrCHI_WQE	SWMF8
203	0.34	84.92	0.00	1.5000	25mm4hrCHI_WQE	OF1
204	0.76	108.37	0.00	1.5000	25mm4hrCHI_WQE	SWMF8
205	0.49	245.05	0.00	1.5000	25mm4hrCHI_WQE	OF1
206	0.08	27.13	0.00	1.5000	25mm4hrCHI_WQE	OF1
301	2.00	400.46	60.00	1.0000	25mm4hrCHI_WQE	SWMF8
302	2.22	222.31	75.00	1.0000	25mm4hrCHI_WQE	SWMF8
303	1.36	136.23	75.00	1.0000	25mm4hrCHI_WQE	SWMF8
401	1.30	259.28	70.00	1.5000	25mm4hrCHI_WQE	LID1
402	0.51	101.48	70.00	1.5000	25mm4hrCHI_WQE	LID2
403	0.56	111.74	70.00	1.5000	25mm4hrCHI_WQE	LID3
404	1.15	229.42	70.00	1.5000	25mm4hrCHI_WQE	LID4
501	7.76	1552.70	60.00	1.5000	25mm4hrCHI_WQE	SWMF8
LID1	0.06	9.35	25.00	0.5000	ZERO	SWMF8
LID2	0.03	3.16	25.00	0.5000	ZERO	SWMF8
LID3	0.05	5.33	25.00	0.5000	ZERO	SWMF8
LID4	0.04	4.08	25.00	0.5000	ZERO	SWMF8
RFTP.A	0.12	34.06	100.00	1.5000	25mm4hrCHI_WQE	LID4
RFTP.B	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID1
RFTP.C	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID1
RFTP.D	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID2
RFTP.E	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID1
RFTP.F	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID1
RFTP.G	0.11	32.46	100.00	1.5000	25mm4hrCHI_WQE	LID2
RFTP.H1	0.13	38.11	100.00	1.5000	25mm4hrCHI_WQE	LID2

RFTP.H2	0.13	38.11	100.00	1.5000	25mm4hrCHI_WQE	LID3
RFTP.I1	0.13	38.11	100.00	1.5000	25mm4hrCHI_WQE	LID2
RFTP.I2	0.13	38.11	100.00	1.5000	25mm4hrCHI_WQE	LID3

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
LID1	LID1	1	625.00	0.00	100.00	100.00	100.00
LID2	LID2	1	316.00	0.00	100.00	100.00	100.00
LID3	LID3	1	533.00	0.00	100.00	100.00	100.00
LID4	LID4	1	408.00	0.00	100.00	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	253.70	2.30	0.0	
J2	JUNCTION	253.60	1.94	0.0	
OF1	OUTFALL	251.70	1.00	0.0	
SWMF8	STORAGE	253.70	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	19.0	0.5000	0.0130
C2	J2	OF1	CONDUIT	39.6	4.8178	0.0130
OR1	SWMF8	J1	ORIFICE			
OR2	SWMF8	J1	ORIFICE			
W1	SWMF8	J2	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.75	0.44	0.19	0.75	1	0.79
C2	TRAPEZOIDAL	1.00	15.00	0.60	25.00	1	179.72

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 02/17/2023 00:00:00
Ending Date 02/20/2023 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.529	24.780
Evaporation Loss	0.000	0.000
Infiltration Loss	0.389	18.206
Surface Runoff	0.122	5.689
Final Storage	0.022	1.031
Continuity Error (%)	-0.587	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.122	1.215
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.109	1.094
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.012	0.121
Continuity Error (%)	-0.004	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****

All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
5.000 - 3.155 sec	:	100.00 %
3.155 - 1.991 sec	:	0.00 %
1.991 - 1.256 sec	:	0.00 %
1.256 - 0.792 sec	:	0.00 %
0.792 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
202	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
203	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
204	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
205	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000

206	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
301	25.00	0.00	0.00	15.58	13.95	0.00	8.37	0.17	0.14	0.335
302	25.00	0.00	0.00	12.62	17.45	0.64	11.11	0.25	0.16	0.444
303	25.00	0.00	0.00	12.62	17.45	0.64	11.11	0.15	0.10	0.444
401	25.00	0.00	0.00	7.50	16.27	0.00	16.27	0.21	0.18	0.651
402	25.00	0.00	0.00	7.50	16.27	0.00	16.27	0.08	0.07	0.651
403	25.00	0.00	0.00	7.50	16.27	0.00	16.27	0.09	0.08	0.651
404	25.00	0.00	0.00	7.50	16.27	0.00	16.27	0.19	0.16	0.651
501	25.00	0.00	0.00	15.58	13.94	0.00	8.36	0.65	0.58	0.335
LID1	0.00	521.03	0.00	521.03	0.00	0.00	0.00	0.00	0.00	0.000
LID2	0.00	655.80	0.00	655.80	0.00	0.00	0.00	0.00	0.00	0.000
LID3	0.00	296.90	0.00	296.90	0.00	0.00	0.00	0.00	0.00	0.000
LID4	0.00	531.27	0.00	531.27	0.00	0.00	0.00	0.00	0.00	0.000
RFTP.A	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.B	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.C	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.D	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.E	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.F	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.G	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.02	1.009
RFTP.H1	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.03	1.009
RFTP.H2	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.03	1.009

RFTP.I1	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.03	1.009
RFTP.I2	25.00	0.00	0.00	0.00	25.23	0.00	25.23	0.03	0.03	1.009

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
LID1	LID1	521.03	0.00	521.03	0.00	0.00	0.00	0.00	-0.00
LID2	LID2	655.80	0.00	655.80	0.00	0.00	0.00	0.00	0.00
LID3	LID3	296.90	0.00	296.90	0.00	0.00	0.00	0.00	0.00
LID4	LID4	531.27	0.00	531.27	0.00	0.00	0.00	0.00	-0.00

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.04	0.07	253.77	0 04:05	0.07
J2	JUNCTION	0.00	0.01	253.61	0 04:05	0.01
OF1	OUTFALL	0.00	0.01	251.71	0 04:05	0.01
SWMF8	STORAGE	0.08	0.23	253.93	0 04:04	0.23

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.000	0.013	0 04:05	0	1.09	0.006
J2	JUNCTION	0.000	0.013	0 04:05	0	1.09	0.006
OF1	OUTFALL	0.000	0.013	0 04:05	0	1.09	0.000
SWMF8	STORAGE	0.984	0.984	0 01:25	1.22	1.22	0.001

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS

SWMF8	0.382	2	0	0	1.083	7	0	04:04	0.013	

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	98.33	0.004	0.013	1.094
System	98.33	0.004	0.013	1.094

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.013	0 04:05	1.47	0.02	0.05
C2	CONDUIT	0.013	0 04:05	0.51	0.00	0.01
OR1	ORIFICE	0.013	0 04:05			1.00
OR2	ORIFICE	0.000	0 00:00			0.00
W1	WEIR	0.000	0 00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

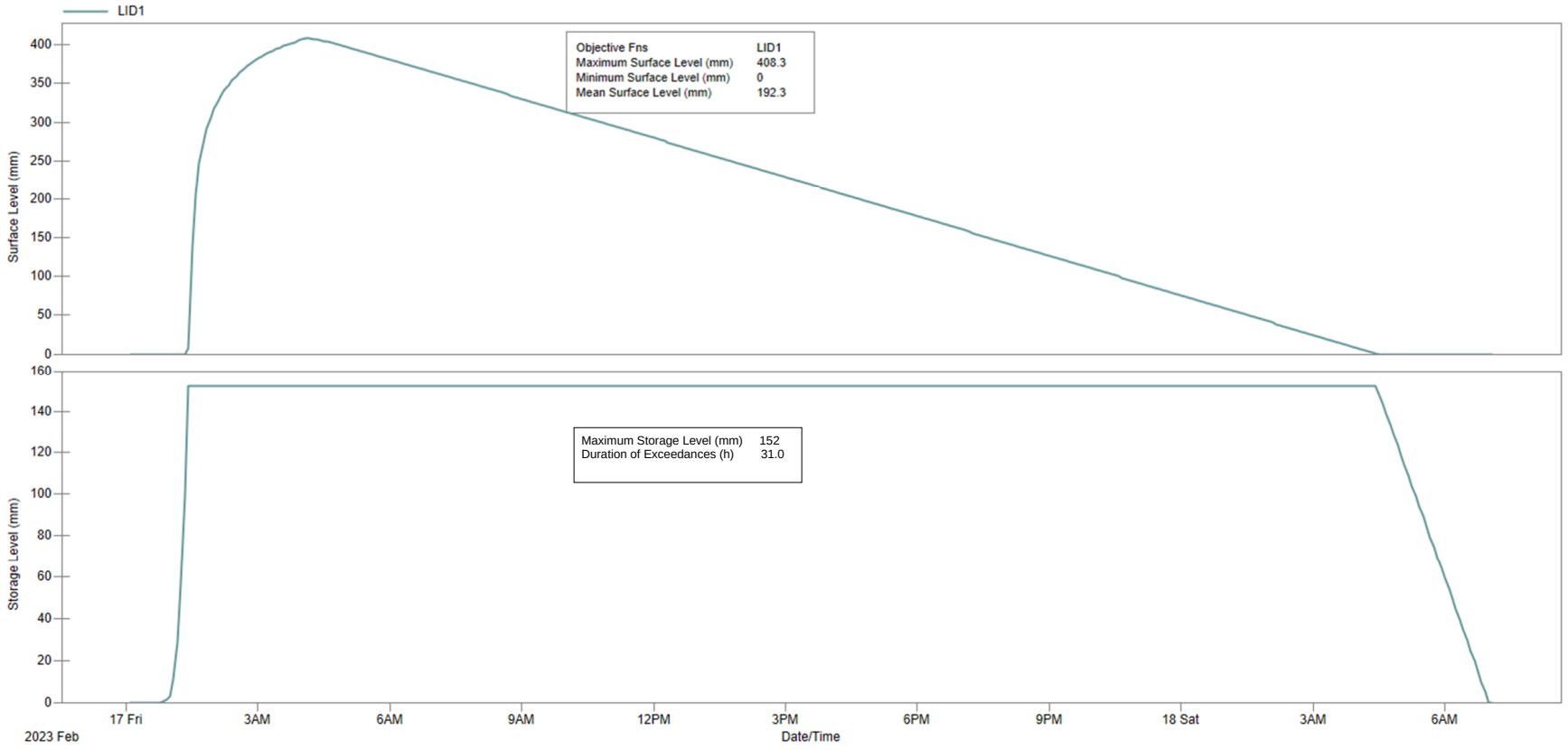
C1	1.00	0.01	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00
C2	1.00	0.01	0.00	0.00	0.00	0.98	0.00	0.00	0.36	0.00

****
Conduit Surcharge Summary
****

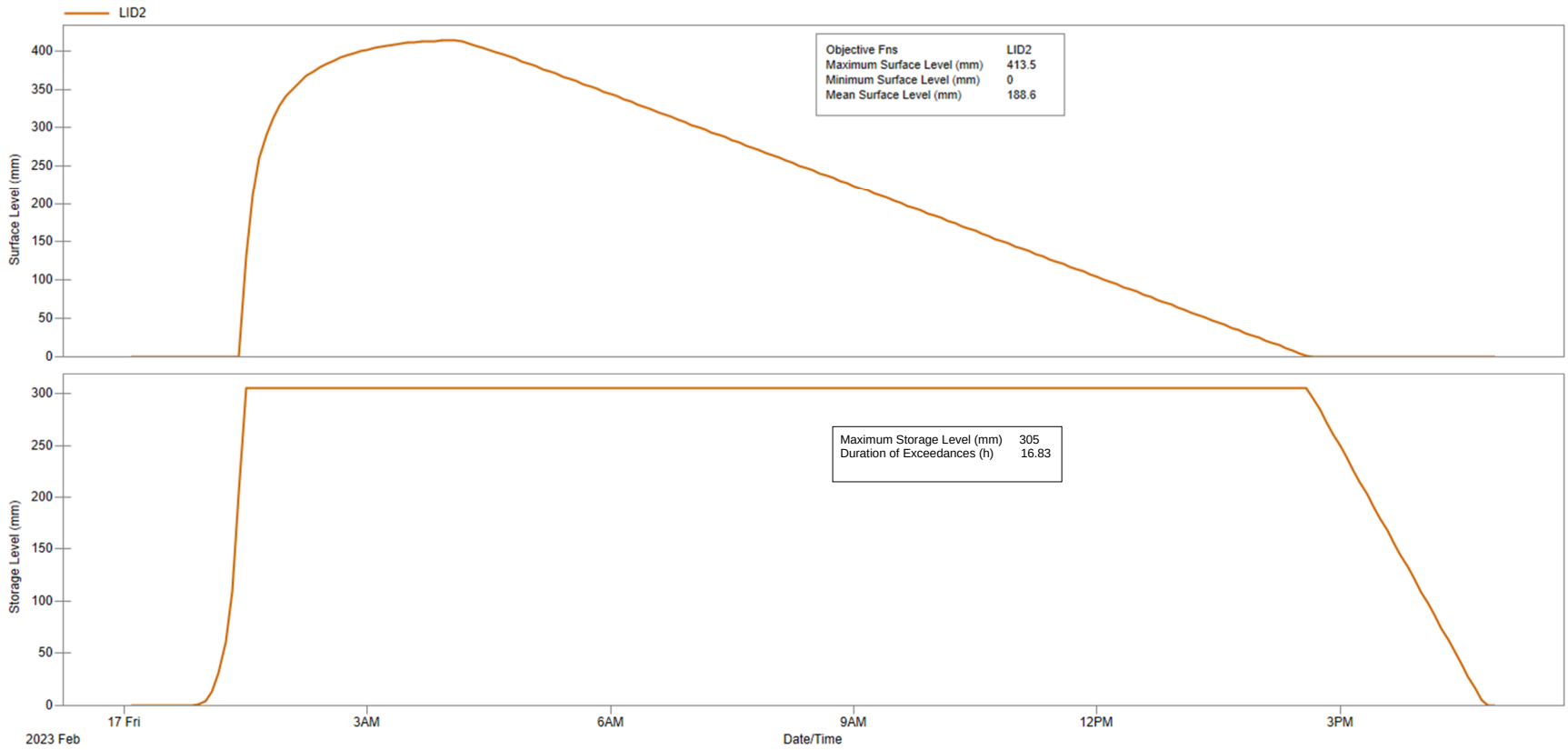
No conduits were surcharged.

Analysis begun on: Fri Nov 8 11:27:54 2024
Analysis ended on: Fri Nov 8 11:27:55 2024
Total elapsed time: 00:00:01

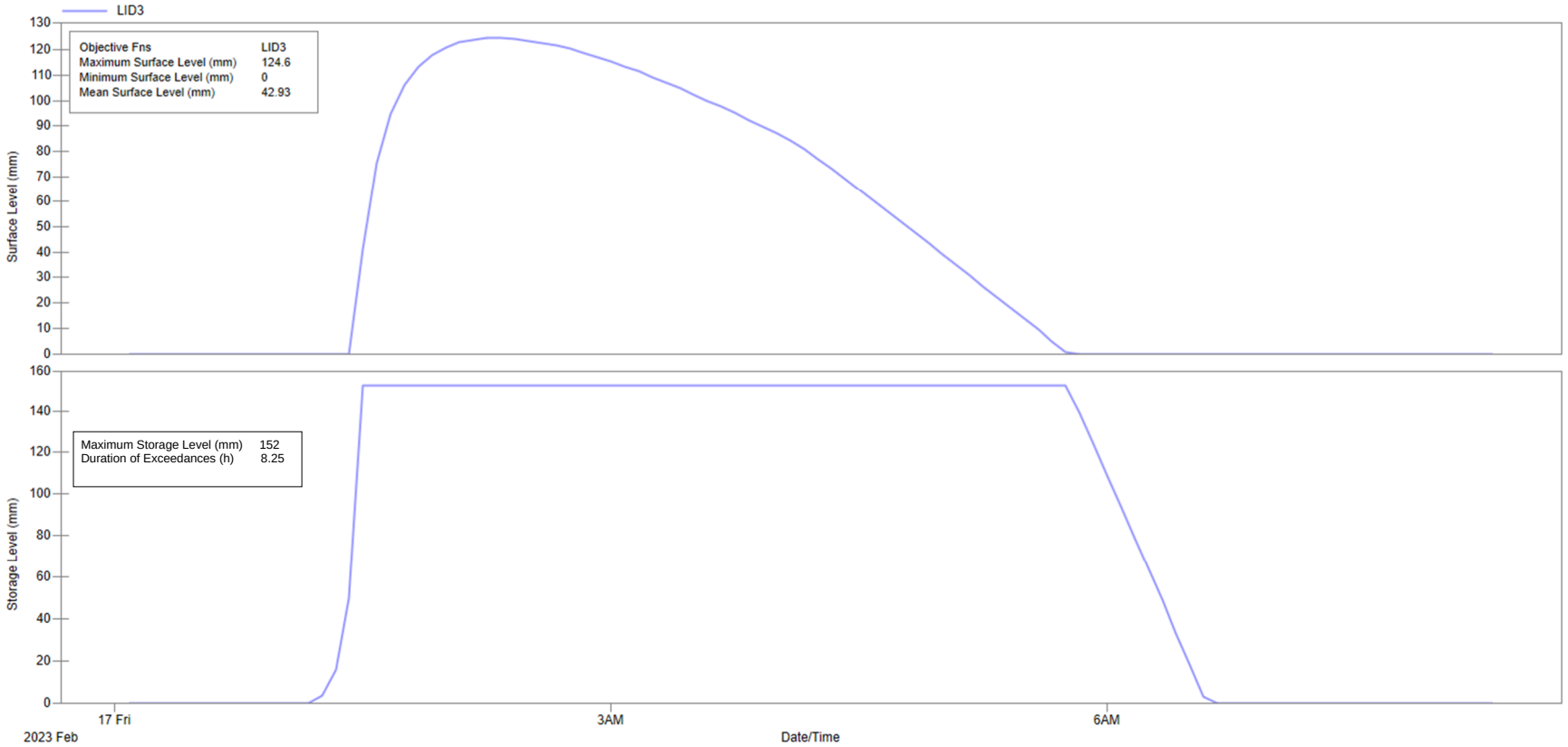
LID-1 Ponding Level – 25mm WQE Event



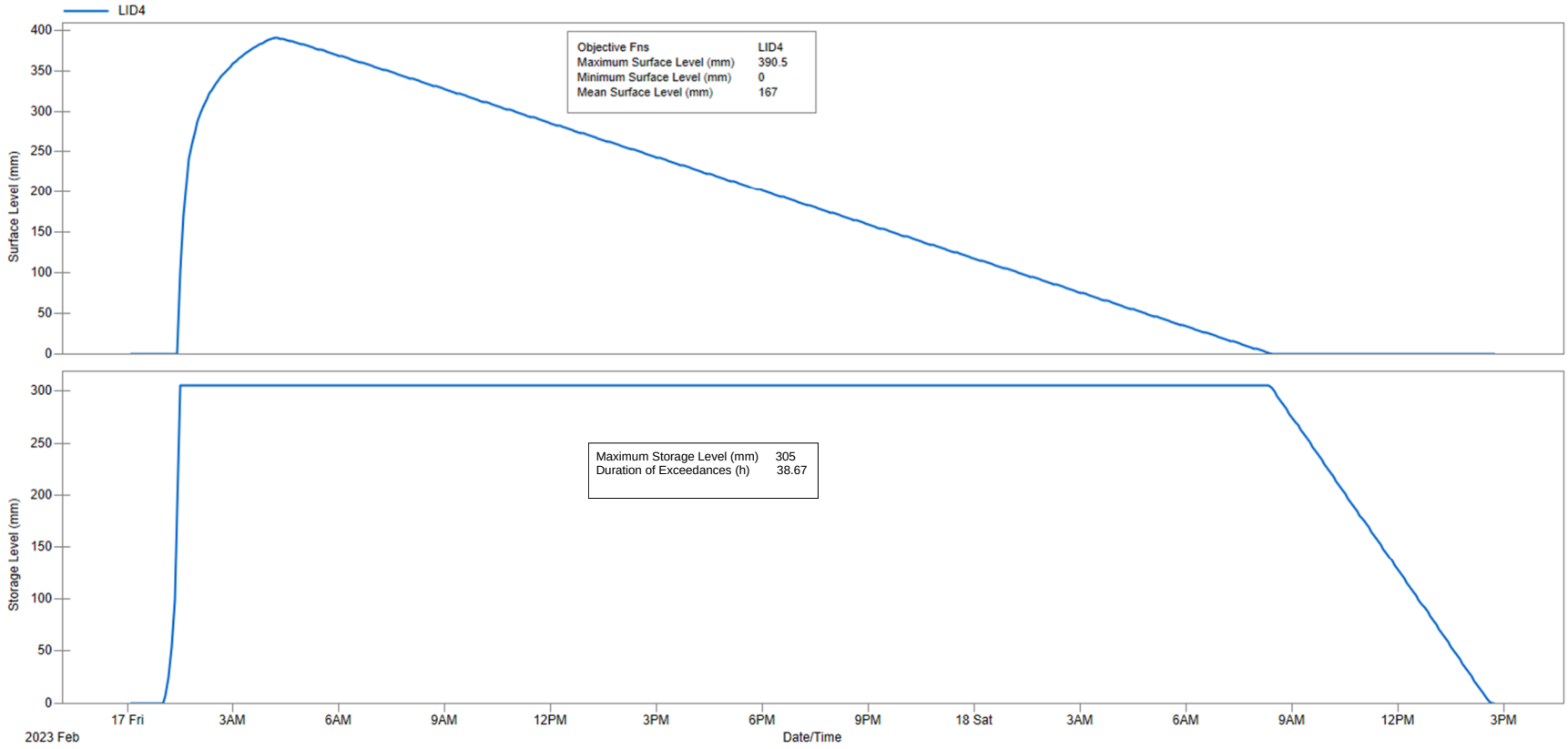
LID-2 Ponding Level – 25mm WQE Event



LID-3 Ponding Level – 25mm WQE Event



LID-4 Ponding Level – 25mm WQE Event



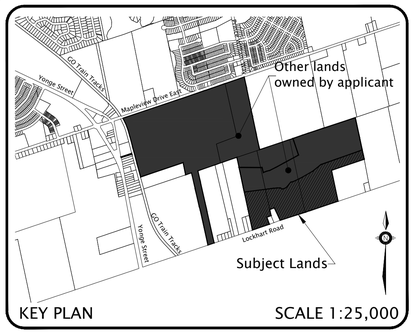
Appendix C

External Information

- Draft Plan of Subdivision prepared by TJCG, dated November 19, 2024
- Excerpt from Soils Map of Simcoe County, Ontario, Soil Survey Report No. 29
- Minutes of Ontario Municipal Board (OMB) Settlement for Special Defined Policy Area 2 Section 9.3.3.2d

Draft Plan of Subdivision

Part of Lot 19, and Part of Lot 20, Concession 12
Former Township of Innisfil,
Now in the
City of Barrie
2024



ENVIRONMENTAL PROTECTION
FUTURE OPEN SPACE
FUTURE RESIDENTIAL
FUTURE STORMWATER MANAGEMENT
OTHER LANDS OWNED BY APPLICANT
PART 4, PLAN 51R – 39092
PART 1, PLAN 51R – 39092
PART 1, PLAN 51R – 10172
PART 1, PLAN 51R–19847
PART 2, PLAN 51R–39092
PART 5, PLAN 51R–39092
PART 6, PLAN 51R–39092
PART 7, PLAN 51R–39092
PART 3, PLAN 51R–39092
Prince William Way
Future Prince William Way
Future Terry Fox Drive
Street 'A' (Prince William Way)
Street 'B' (Terry Fox Drive)
Street 'C'
Street 'D'
Block 84 Environmental Protection (4.70 ha.)
Block 85 Environmental Protection (1.40 ha.)
Block 86 Environmental Protection (3.00 ha.)
Block 87 Environmental Protection (0.07 ha.)
Block 76 6 Storey Building (60 units) (0.60 ha.)
Block 77 Medium Density (58 units) (0.52 ha.)
Block 78 Medium Density (4.16 ha.)
Block 79 Medium Density (1.56 ha.)
Block 80 Parkland (0.50 ha.)
Block 81 Commercial (0.14 ha.)
Block 82 Stormwater Management (1.54 ha.)
Block 83 6.0m Servicing Block
Block 88 Road Widening
Block 89 Road Widening
Block 90 0.3m Reserve
Block 91 0.3m Reserve
Block 92 0.3m Reserve
Block 93 0.3m Reserve
Block 94 Private Road (Access to 960 Lockhart Road) (0.06 ha.)
LOCKHART ROAD
ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 10 AND 11
TOWN OF INNISFIL

LEGEND

Proposed Regional Floodplain
(As per OMB decision file no. PL140772)

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON DRAFT PLAN
b) SHOWN ON DRAFT PLAN
c) SHOWN ON KEY PLAN
d) RESIDENTIAL, SWM, EP, & OPEN SPACE
e) SHOWN ON DRAFT PLAN
f) SHOWN ON DRAFT PLAN
g) SHOWN ON DRAFT PLAN
h) MUNICIPAL PIPED WATER TO BE PROVIDED
i) SANDY CLAY LOAM
j) SHOWN ON DRAFT PLAN
k) ALL MUNICIPAL SERVICES TO BE PROVIDED
l) SHOWN ON DRAFT PLAN

NOTES

ⓘ This symbol indicates that corner unit driveway may start at the edge of pavement radius, not at the 2.0m setback from end of radius.

STATISTICS	Area (ha.)	Units
■ 11.0m Singles (LOT 1)	0.05 ha.	1 unit
☼ 10.4m Singles (LOTS 2 & 3, 22 – 25, & 35 – 45)	0.54 ha.	17 units
▼ 9.0m Singles (LOTS 4 – 21, 26 – 34, & 46 – 52)	0.95 ha.	34 units
Street Townhomes (6.0m/unit) (BLOCKS 64, 74 & 75)	0.24 ha.	14 units
Street Townhomes (4.5m/unit) (BLOCKS 53 – 63)	1.03 ha.	81 units
Back to Back Townhomes (6.8m/unit) (BLOCKS 65 – 73)	1.00 ha.	90 units
Medium Density (BLOCKS 76 – 79)	6.84 ha.	950 units
Open Space (BLOCKS 80)	0.50 ha.	
Commercial (BLOCKS 81)	0.14 ha.	
Stormwater Management & Drainage (BLOCKS 82 & 83)	1.56 ha.	
Environmental Protection (BLOCKS 84 – 87)	9.17 ha.	
0.3m Reserves, Private Road, and Widenings (BLOCKS 88 – 94)	0.98 ha.	
Roads	3.49 ha.	
27.0m Major Collector – Street 'A' – Future 'Prince William Way' – Street 'B' – Future 'Terry Fox Drive'		
18.0m Local Road – Streets 'C' & 'D'		
12.0m Laneway – Laneway 'E' – 'I'		
TOTAL	26.49 ha.	1187 units

0 10 50 100M
SCALE 1 : 1500 (A1)

Pratt –Lockhart
Draft Plan of Subdivision

OWNER'S CERTIFICATE

I, THE UNDERSIGNED, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS, HEREBY AUTHORIZE THE JONES CONSULTING GROUP LTD., TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE CITY OF BARRIE FOR APPROVAL.

DATE — PRATT DEVELOPMENT INC.
CRISDAWN CONSTRUCTION INC.

DATE — HANSEN GROUP INC.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE — GURJIT MAHANT, OLS
ONTARIO LAND SURVEYOR

SCHEDULE OF REVISIONS		
DATE	DESCRIPTION	DRAWN
MARCH 20, 2024	CHANGES TO MED DENSITY BLOCK DIVISION	m.c.r.
MARCH 26, 2024	CHANGES TO MED DENSITY BLOCK DIVISION	m.c.r.
AUG. 7, 2024	REDUCE MED DENSITY BLOCK AND REVISE L SHAPE AREA	m.c.r.
AUG. 22, 2024	NEW LAYOUT–OPT.1 & ENG COMMENTS ADDRESSED	m.c.r.
AUG. 22, 2024	NEW LAYOUT BASED ON OPT.1	m.c.r.
AUG. 23, 2024	NEW LAYOUT BASED ON 8A–1	m.c.r.
AUG. 28, 2024	NEW LAYOUT BASED ON 8A–2	m.c.r.
SEPT. 12, 2024	NEW OLS BOUNDARY/PRINCE WILLIAM WAY ADJUSTMENT	m.c.r.
SEPT. 26, 2024	ADDITION OF 0.9m DEPTH TO STHs ALONG STREET 'D'	m.c.r.
OCT. 7, 2024	CHANGE TO WIDTH OF B2B UNITS TO MAKE FIT	m.c.r.
OCT. 11, 2024	UPDATE OWNERSHIP NAMES ON SIGNING BLOCK	m.c.r.
NOV. 15, 2024	UPDATE DP WITH NEW FLOODPLAIN LINEWORK	m.c.r.
NOV. 19, 2024	UPDATE DP WITH NEW SWM BOUNDARY	m.c.r.

Raymond J. Duhamel
REGISTERED PROFESSIONAL PLANNER
R.P.P.

Date Issued:	NOV. 20, 2023
Checked By:	RD
Project No.:	PRA–12160
Drawn By:	m.c.r.
Drawing Name:	PRA–23040–DP–5A–5.dwg

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
Phone: 705-734-2538 Fax: 705-734-1056
www.jonesconsulting.com

PRATT LOCKHART
CITY OF BARRIE

SOIL MAP
OF
SIMCOE COUNTY
ONTARIO

SOUTH SHEET

SOIL SURVEY REPORT No. 29

Scale 1 inch to 1 mile or 1:63360

Miles 1 ½ 0 1 2 3 4 Miles

CONTOUR INTERVAL 25 FEET
All Elevations in Feet above Mean Sea Level

Roads:
paved
secondary
other roads
path
Railway: double track — Upper / Lower
single track — Top / Side
Bridge: Underpass or overpass
Boundaries: County
township surveyed
Indian Reserve
section line
surveyed line
Electric Power Line

REFERENCE

Telephone: trunk route
Triangulation Station
Boundary or Survey Monument
Benchmark
Spot Height (in feet)
House, Barn
Buildings
Mill or Factory
School
Church
with Tower or Spire
Post Office
Telephone Exchange
Mine or Open cut
Cemetery or Churchyard
Quarry
Sand or Gravel Pit
Cliff
Cutting
Embankment, Dump, etc.
Lighthouse
Wharf or Pier
Foreshore Flats
Swamp or Marsh
Lake or Slough (non permanent)
Stream (intermittent)
Contours, elevation
depression

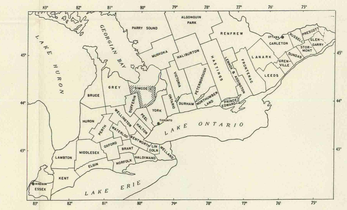
LEGEND

SERIES	OSPREY	VASEY	BONDHEAD	GUERIN	LYONS	HARRISTON	WIARTON	PARKHILL	HARKAWAY	OTONABEE
TYPE, SYMBOL, ACREAGE	loam Opl 1,300	sandy loam Vasl 71,700 sandy loam — steep phase Vasl-s 17,300 sandy loam — stony phase Vasl-b 13,400	loam Bl 41,400 sandy loam Bs 33,900 sandy loam — stony phase Bs-s 5,200 sandy loam — stony phase Bs-b 3,600	loam Gul 5,400 sandy loam Gus 1,700 sandy loam — stony phase Gul-s 3,100 sandy loam — stony phase Gus-b 500	loam Ll 1,700 loam — stony phase Ll-s 100	loam Hl 8,800 loam — steep phase Hl-s 2,000 silt loam Hs 11,300	loam Wl 12,700 loam — stony phase Wl-b 900	loam Pal 2,100	loam Hal 1,400	loam Ol 17,100 loam — steep phase Ol-s 400 loam — stony phase Ol-b 2,200
COLOUR										
SOIL MATERIALS	Pale brown, calcareous, stony loam till.	Light grey, calcareous and non-calcareous, sandy loam till.	Light grey, calcareous, loam and sandy loam till			Pale yellow, calcareous, loam and silt loam till.			Pale yellow, calcareous, loam and silt loam till.	Light grey, calcareous, loam till.
DRAINAGE	Good.	Good.	Good.	Imperfect.	Poor.	Good.	Imperfect.	Poor.	Good.	
TOPOGRAPHY	Irregular, steeply sloping.	Smooth, moderately to steeply sloping.	Smooth, moderately to steeply sloping.	Smooth, gently sloping.	Smooth, very gently sloping.	Smooth, moderately to steeply sloping.	Smooth, gently sloping.	Smooth, very gently sloping.	Smooth, steeply sloping.	Smooth, moderately to steeply sloping.
SURFACE STONINESS	Very stony.	Moderately to very stony.	Slightly to very stony.	Slightly to moderately stony.	Slightly to very stony.	Slightly stony.	Slightly to very stony.	Slightly stony.	Moderately stony.	Moderately to very stony.
SURFACE REACTION	Neutral.	Slightly to medium acid.	Neutral.			Neutral.	Neutral to alkaline.	Alkaline.	Alkaline.	Neutral to alkaline.
GREAT SOIL GROUP	Brown Forest.	Brown Podzolic and Grey-Brown Podzolic	Grey-Brown Podzolic.		Dark Grey Gleisolic.	Grey-Brown Podzolic.		Dark Grey Gleisolic.	Brown Forest.	

SERIES	VINCENT	DUNEDIN	TIOGA	ALLISTON	GRANBY	CALEDON	BURFORD	SARGENT	GWILLIMBURY	GILFORD	WYEVALE	DUNDONALD	EDENVALE
TYPE, SYMBOL ACREAGE	clay loam Vc 2,700	clay Duc 500	loamy sand Tis 75,500 sandy loam Tisl 44,500 fine sandy loam Tisf 17,900 loamy sand — eroded phase Tis-e 1,300 loamy sand — steep phase Tis-s 9,500	sandy loam Ans 63,500 fine sandy loam Ansf 1,200 sandy loam — stony phase Ans-b 1,200	sandy loam Grl 17,900 fine sandy loam Grf 4,900 sandy loam — stony phase Grl-b 300	gravelly loam Cg 1,000	gravelly loam Bg 3,100	gravelly sandy loam Sts 1,900 gravelly sandy loam — steep phase Sts-s 1,200	gravelly sandy loam Gb 1,900 gravelly sandy loam — stony phase Gg-b 400	gravelly loam Gll 800	gravelly sandy loam Wg 10,000	sandy loam Ds 16,000 fine sandy loam Dr 1,000	sandy loam Es 2,600
COLOUR													
SOIL MATERIALS	Light brown, calcareous clay loam till.	Dark reddish brown, calcareous clay till.	Grey, calcareous outwash sand.			Brown, calcareous gravel and cobble stone.	Pale brown to grey calcareous gravel and cobble stone.	Pale brown, calcareous outwash gravel.			Grey, non-calcareous gravel outwash.	Outwash sand underlain by grey calcareous loam or sandy loam till at depths of 2 feet or less.	
DRAINAGE	Good.	Good.	Good.	Imperfect.	Poor.	Good.	Good.	Good.	Imperfect.	Poor.	Good.	Good.	Imperfect.
TOPOGRAPHY	Smooth, moderately sloping.	Irregular, steeply sloping.	Smooth, gently to irregular, steeply sloping.	Smooth, very gently sloping.	Level.	Smooth, moderately sloping.	Smooth, gently sloping.	Smooth, gently sloping.	Smooth, very gently sloping.	Level to depressional.	Smooth, gently sloping.	Smooth, gently sloping.	Smooth, very gently sloping.
SURFACE STONINESS	Slightly stony.	Slightly stony.	Stonefree to moderately stony.	Stonefree.		Moderately cobbly.	Moderately to very cobbly.	Stonefree.	Moderate to very stony.	Stonefree.	Moderately Stony.	Stonefree.	
SURFACE REACTION	Neutral to alkaline.	Neutral.	Medium acid.		Slightly acid.	Slightly acid.	Slightly acid.	Neutral to alkaline.	Alkaline.		Medium acid.	Slightly acid.	
GREAT SOIL GROUP	Brown Forest.	Brown Forest.	Podzol.		Dark Grey Gleisolic.	Grey-Brown Podzolic.	Grey-Brown Podzolic.	Brown Forest.		Dark Grey Gleisolic.	Podzol.	Grey-Brown Podzolic.	

SERIES	BOOKTON	BERRIEN	WAUSEON	PERCY	SCHOMBERG	SMITHFIELD	SIMCOE	MINESING	BENNINGTON	FARMINGTON	ROCK	MUCK	MARSH	BOTTOM LAND
TYPE, SYMBOL ACREAGE	sandy loam Bcs 9,000 fine sandy loam Bcf 3,100	sandy loam Brs 10,200 fine sandy loam Brf 3,400	sandy loam Was 1,500 fine sandy loam Waf 1,500	loam Pls 1,700 fine sandy loam — stony phase Plfs-s 200	silty clay loam Shsc 47,800 silt loam Shs 2,100 silty clay loam-stony phase Shsc-s 300 silty clay loam-eroded phase Shsc-e 600 silt loam — stony phase Shs-s 700	silty clay loam Smsc 20,200 silt loam Sms 6,800	silty clay loam Sisc 3,100 silt loam Sis 3,900 phase Sisc-b 100	mucky clay Mmsc 10,900 mucky silty clay loam Mms 4,200	very fine sandy loam Bnf 9,400	loam Fl 9,000	R 1,100	M 60,600	Ma 2,800	B.L. 4,900
COLOUR														
SOIL MATERIALS	Outwash sand underlain by calcareous clay or silty clay loam at depths of 2 feet or less.			Pale brown, calcareous outwash, fine loamy sand or fine sandy loam.	Calcareous lacustrine varved silt loam and clay.			Lacustrine, marl, silt, loam and clay.	Fine sandy loam or silt loam underlain by clay till or clay at depths less than 3 feet.	Calcareous loam till. Limestone rock at depths less than 1 foot.	Bare rock with little or no soil cover.	Well decomposed organic material over 1 foot. Usually underlain by rock, sand, silt or clay.	Variable.	Recent alluvium.
DRAINAGE	Good.	Imperfect.	Poor.	Good.	Good.	Imperfect.	Poor.	Poor.	Good.	Good.		Very poor.	Very poor.	Variable.
TOPOGRAPHY	Smooth, moderately sloping.	Smooth, gently sloping.	Smooth, very gently sloping.	Smooth, gently sloping.	Smooth, moderately to steeply sloping.	Smooth, gently sloping.	Smooth, very gently sloping.	Level.	Smooth, moderately sloping.	Smooth, very gently sloping.	Very steep.	Depressional.	Depressional.	Variable.
SURFACE STONINESS	Stonefree.			Stonefree.	Stonefree to very stony.	Stonefree.		Stonefree.	Stonefree.	Slightly stony.		Stonefree.	Stonefree.	Variable.
SURFACE REACTION	Slightly to medium acid.	Slightly acid.	Neutral.	Neutral.	Neutral.	Neutral to Alkaline.	Alkaline.	Alkaline.	Slightly acid.	Alkaline.		Neutral.	Neutral.	Variable.
GREAT SOIL GROUP	Grey-Brown Podzolic.		Dark Grey Gleisolic.	Grey-Brown Podzolic.	Grey-Brown Podzolic.		Dark Grey Gleisolic.	Dark Grey Gleisolic.	Grey-Brown Podzolic.	Brown Forest.		Organic.		Alluvial.

KEY MAP



Soil Survey by the Department of Soils, Ontario Agricultural College, Guelph and the Research Branch, Canada Department of Agriculture, Ottawa.

Compiled, drawn and published by the Soil Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, 1969, from base maps supplied by the Department of Mines and Technical Surveys, Ottawa.

PL140770
PL140771
PL140772

ONTARIO MUNICIPAL BOARD

IN THE MATTER OF subsection 17(24) of the *Planning Act*, R.S.O. 1990, c. P. 13, as amended

Appellant:	Crisdawn Construction Inc.
Appellant:	1580532 Ontario Limited
Appellant:	Ministry of Municipal Affairs and Housing
Appellant:	Simcoe County District School Board; and others
Subject:	Proposed Official Plan Amendment No. 39
Municipality:	City of Barrie
OMB Case No.:	PL140771
OMB File No.:	PL140771

IN THE MATTER OF subsection 17(24) of the *Planning Act*, R.S.O. 1990, c. P. 13, as amended

Appellant:	War Horse Holdings Limited
Appellant:	Trans Canada Pole Ltd.
Appellant:	Finger Lakes Estates Inc.
Appellant:	Crisdawn Construction Inc.; and others
Subject:	Proposed Official Plan Amendment No. 40
Municipality:	City of Barrie
OMB Case No.:	PL140772
OMB File No.:	PL140772

MINUTES OF SETTLEMENT

B E T W E E N:

CRISDAWN CONSTRUCTION INC. ("CRISDAWN")

- and -

THE CORPORATION OF THE CITY OF BARRIE (the "CITY")

WHEREAS, on July 16, 2014, Crisdawn appealed (Appeal #7) the City's proposed Official Plan Amendments No. 39 and 40 with respect to the Natural Heritage System ("NHS") designation and related policies on the portions of its lands referred to as Areas 1 and 2;

AND WHEREAS Crisdawn and the City's expert witnesses have met to try to reduce and resolve issues, without the need for a contested hearing;

AND WHEREAS those experts have reached agreement to recommend appropriate policy language and mapping for both Area 1 and Area 2 which Crisdawn and the City have agreed will resolve Crisdawn Appeal #7;

AND WHEREAS Crisdawn has also filed a supportive appeal, Appeal #19, which is not affected by this settlement;

NOW THEREFORE, in consideration of the payment by each Party to the other Party of the sum of two dollars ($2.00), the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. The Recitals above are true.

2. The parties agree to ask the Board to:

   (a) allow Crisdawn Appeal #7 to the extent that the Board will modify the text and schedules of Official Plan Amendment 39 and Official Plan Amendment 40 in accordance with what is set out in the attached Schedules A and B;

   (b) approve those instruments as they relate to Areas 1 and 2; and

   (c) dismiss the balance of Crisdawn Appeal #7.

3. The parties have also agreed upon the provisions of the Memorandum of Agreement attached as Schedule C.

4. Upon execution of these Minutes of Settlement, Crisdawn and the City will advise the Board and other parties involved in the NHS hearing that they have reached a settlement of Crisdawn's site-specific appeal (Appeal #7).

5. Subject to the direction of the Board, the City will call witnesses as it determines appropriate at the hearing starting on July 20, 2015 to give evidence in support of this settlement. Crisdawn will also call such witnesses as may be necessary to support the settlement.

6. If difficulties arise with respect to implementing this settlement, the parties agree that the Board may be spoken to.

7. These Minutes of Settlement constitute the entire agreement between the Parties with respect to the matters set out herein, and supersede all prior agreements, negotiations and understandings with respect thereto.

8. These Minutes of Settlement may be executed in one or more counterparts, which together shall constitute a complete set of these Minutes of Settlement, and executed counterparts may be delivered by e-mail or facsimile transmission. A PDF or facsimile copy of these Minutes of Settlement will have the same force and effect as an original.

IN WITNESS WHEREOF the Parties have executed these Minutes of Settlement as of the date(s) indicated below:

Crisdawn Construction Inc.

Date: July 15, 2015

_____

Per: DON PATTI

I have authority to bind the Corporation.

The Corporation of the City of Barrie

Date: July , 2015

_____

Per: **Jeff Lehman, Mayor**

_____

Per: **Dawn McAlpine, City Clerk**

Schedule "A"

Modifications to Official Plan Amendment 39 policies in respect of Area 1:

9.3.3.2 High (S) Constraint, Medium and Low Constraint Stream Corridor Areas

c) High (S) Constraint Stream Corridor Areas – Special Defined Policy Area 1

The High (S) Constraint Stream Corridor Area –Special Defined Policy Area 1 shown on Schedule 9B, the location and boundaries of the High (S) Constraint Stream Corridor Area designation may be modified and shall be determined based on satisfaction of the following tests:

i) Hydrologic connection to Hewitt's Creek will be maintained or enhanced; and,

ii) Enhancements or ecological offsetting will be completed within the Hewitt's Creek Subwatershed and/or Lake Simcoe Region Conservation Authority Watershed within the City of Barrie to provide an overall net benefit or net gain for the removal of any features and functions of this Natural Heritage System area.

Ecological offsetting will consider the following compensatory measures through the preparation of an Ecological Offsetting Strategy (EOS) to the satisfaction of the City and LSRCA:

- Replacement of woodland feature at a ratio of 2:1 (replacement : loss)
- Replacement of wetland feature at a ratio of 3:1 (replacement : loss)
- Creation or enhancement of watercourse corridors using natural channel design principles
- NHS compensation based on a Natural Capital Assessment or Ecological Goods and Services (EGS) Evaluation

The implementation of the ecological offsetting will be concurrent with the removal of the features and will be completed within one (1) year of the commencement of their removal. Monitoring will be required as part of the EOS in order to ensure the effectiveness of the ecological offset.

Provided that both the City of Barrie, and the Lake Simcoe Region Conservation Authority with respect to its own legislative and regulatory powers, are satisfied that the above tests have been met, and that the proposal fulfills the provisions of the federal Fisheries Act, residential development may be permitted without an amendment to the Official Plan. This may include, where the tests are met, all the lands in the Defined Policy Area 1 shown on Schedule 9B.

Subject to the satisfaction of the above tests, the lands or a portion of the lands adjacent to Mapleview Drive between Prince William Way and Royal Jubilee Drive (approximately 4 hectares) shall be developed for Medium Density Residential, in accordance with Section 9.5.8 for affordable housing in conformity with the provisions of Section 3.3. The remainder of the Defined Policy Area shall be developed as a "Residential Area" in accordance with Section 9.5.7.

Modifications to Official Plan Amendment 39 policies in respect of Area 2:

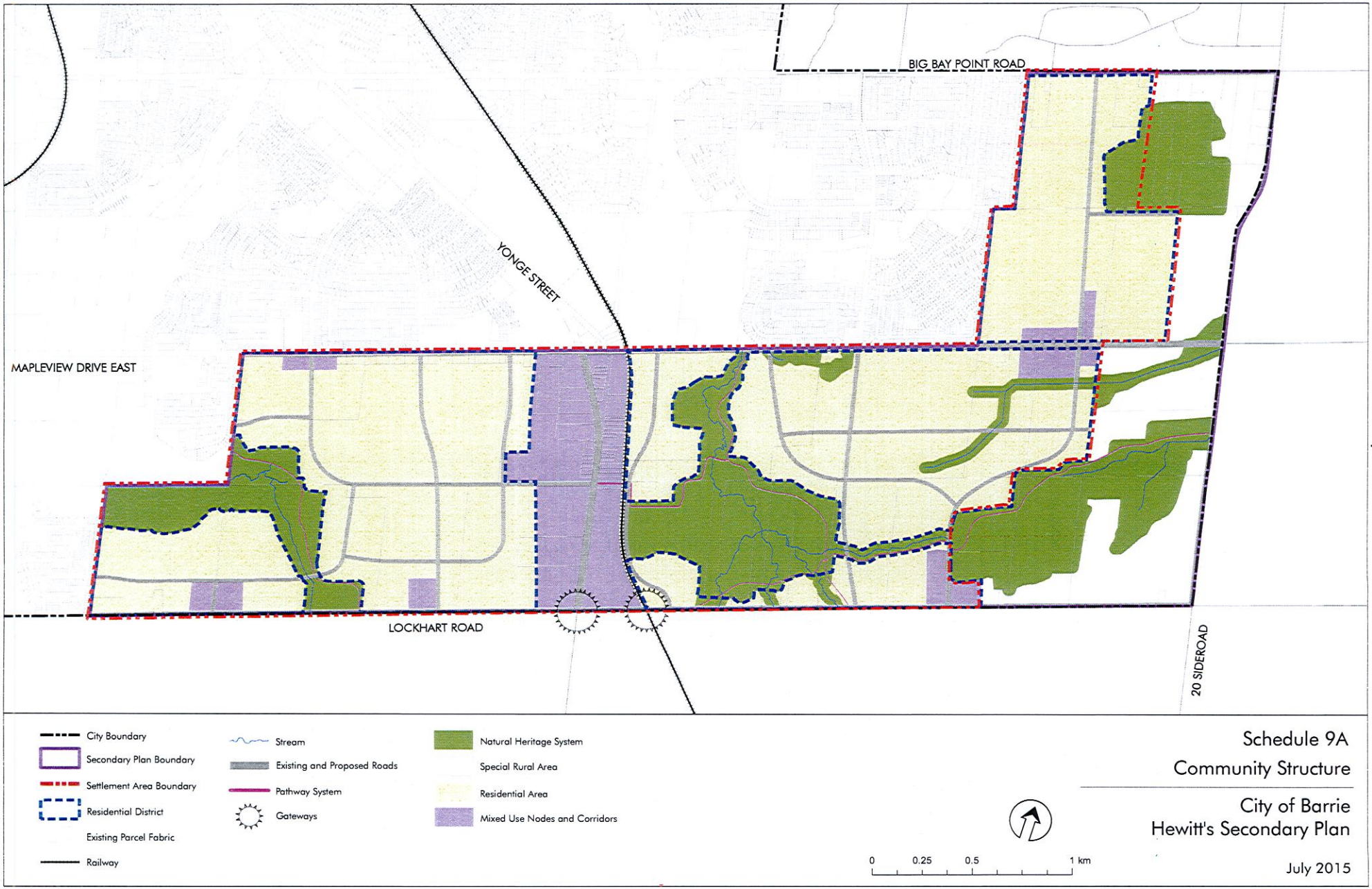
9.3.3.2 High (S) Constraint, Medium and Low Constraint Stream Corridor Areas

d) High (S) Constraint Stream Corridor Area –Special Defined Policy Area 2

In addition to the requirements of Sections 9.3.2.3 c) and 9.3.3.2 b), for the High (S) Constraint Stream Corridor Area –Special Defined Policy Area 2 shown on Schedule 9B, the location and boundaries of the floodplain related to the Stream Corridor Area shall be modified and/or relocated such that the floodplain area, meander belt width and related features, including channel and required setbacks are accommodated within the High (S) Constraint Stream Corridor Area designation which will have a width of 60 metres. As part of the redesign of the floodplain area, cut/fill will be permitted on the adjacent residential land, such that the relocated floodplain area occurs within the 60 metre Corridor Area. Further, any proposed road crossings through the Corridor Area will be subject to road ecology principles in order to maintain corridor function objectives and connectivity.

Schedule "B"

Modifications to Official Plan Amendment 39 and Official Plan Amendment 40 schedules in respect of Areas 1 and 2:

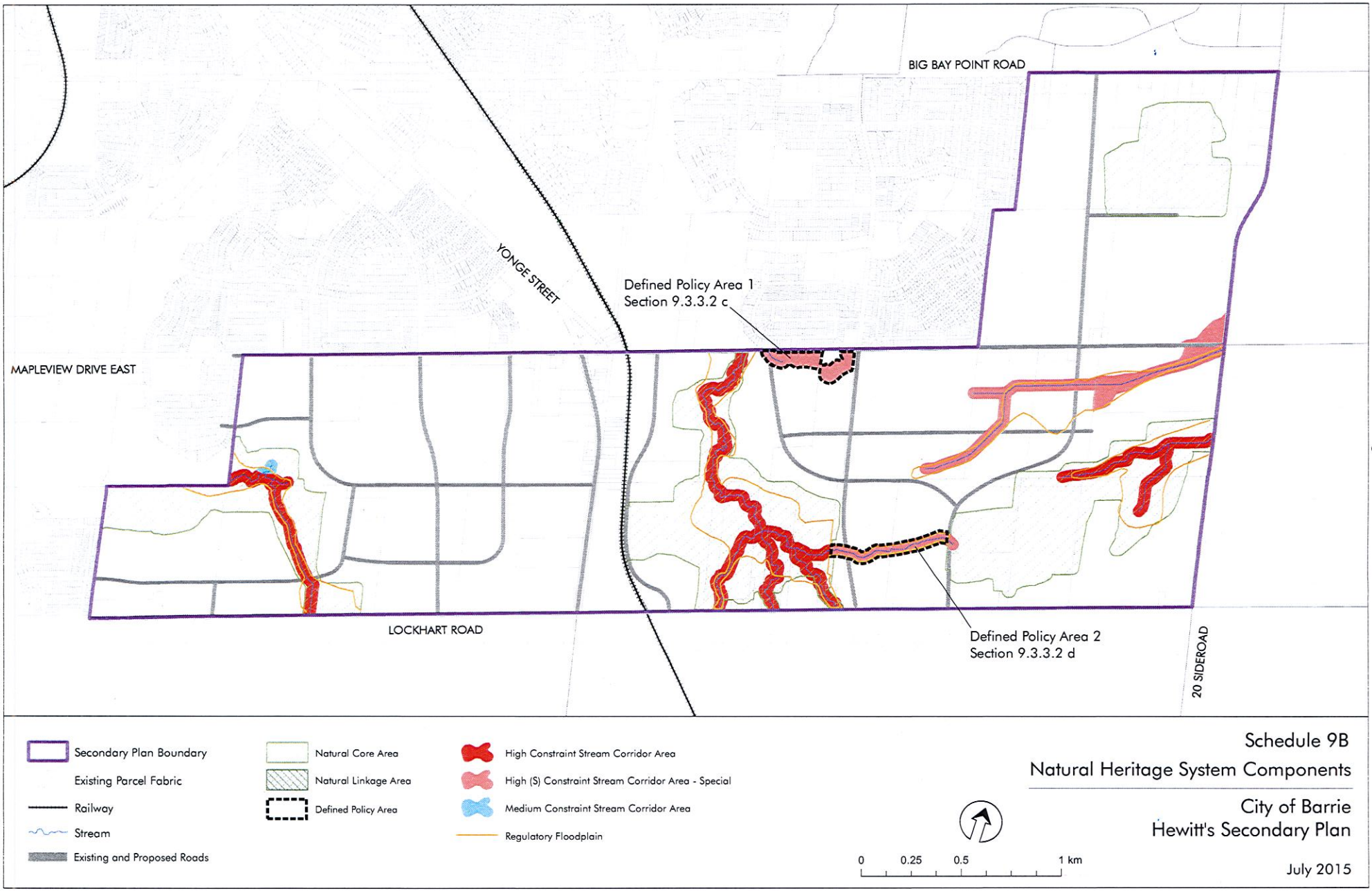


Schedule 9A

Community Structure

City of Barrie
Hewitt's Secondary Plan

July 2015



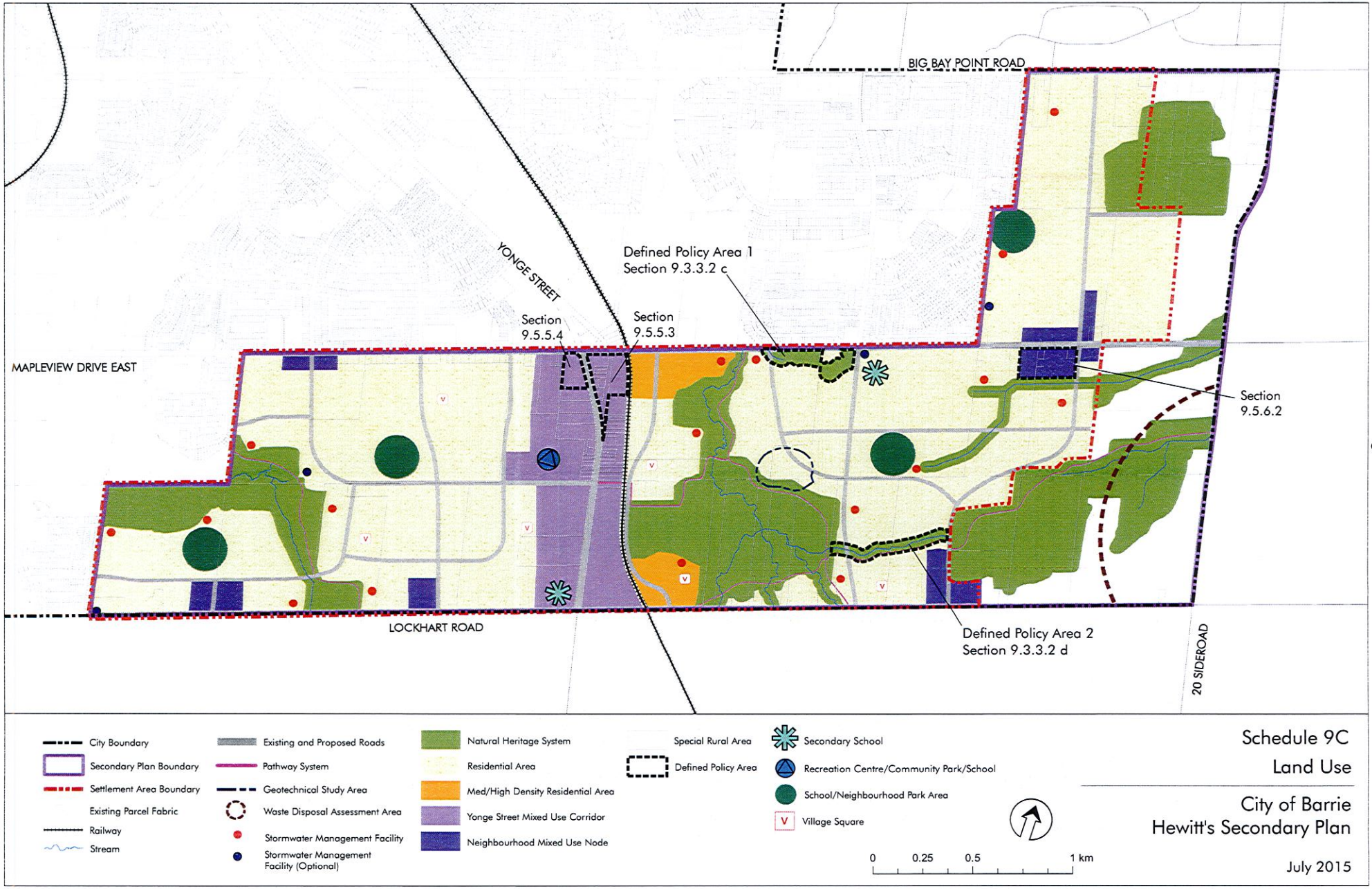
Schedule 9B

Natural Heritage System Components

City of Barrie

Hewitt's Secondary Plan

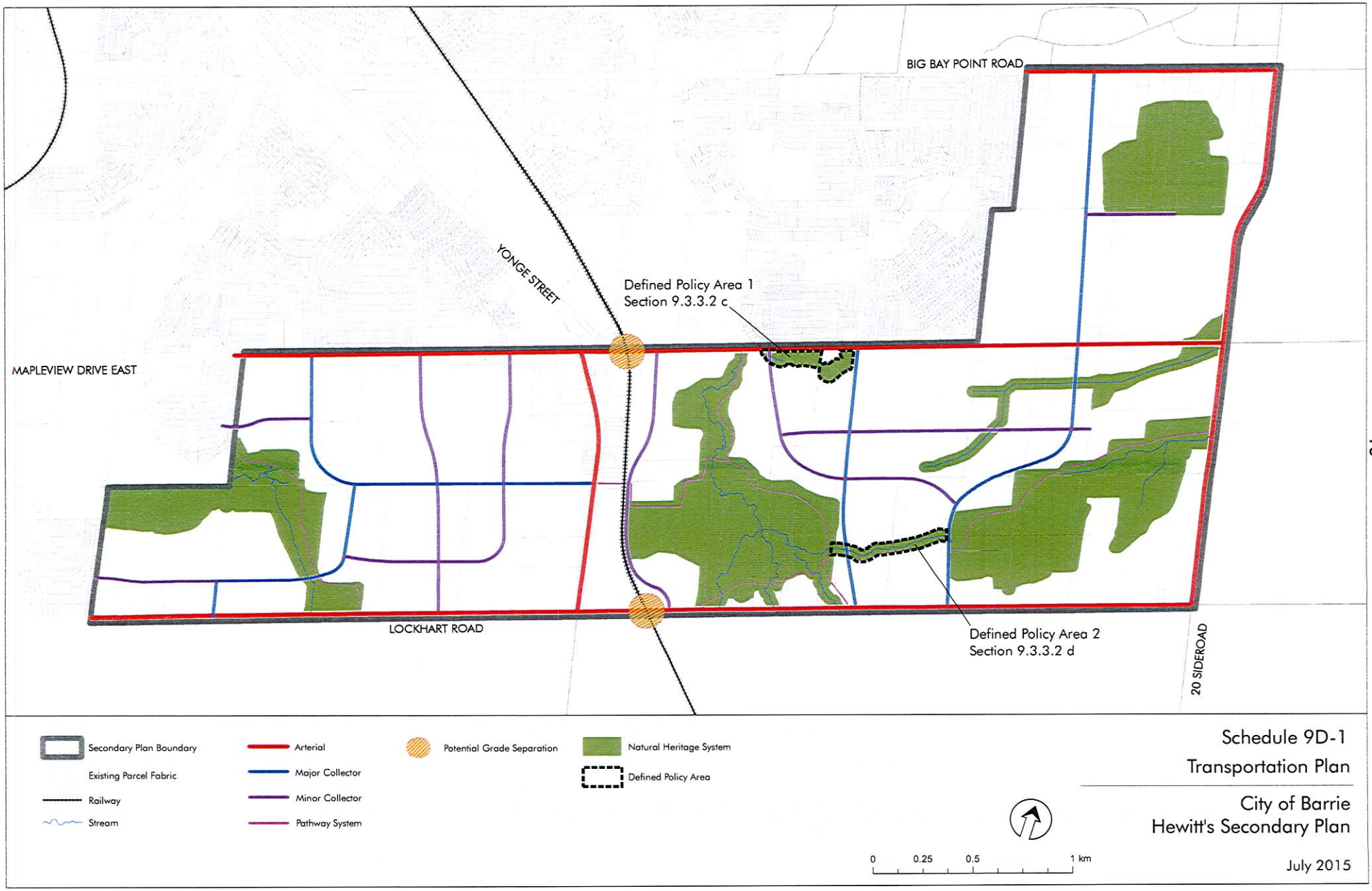
July 2015



Schedule 9C
Land Use

City of Barrie
Hewitt's Secondary Plan

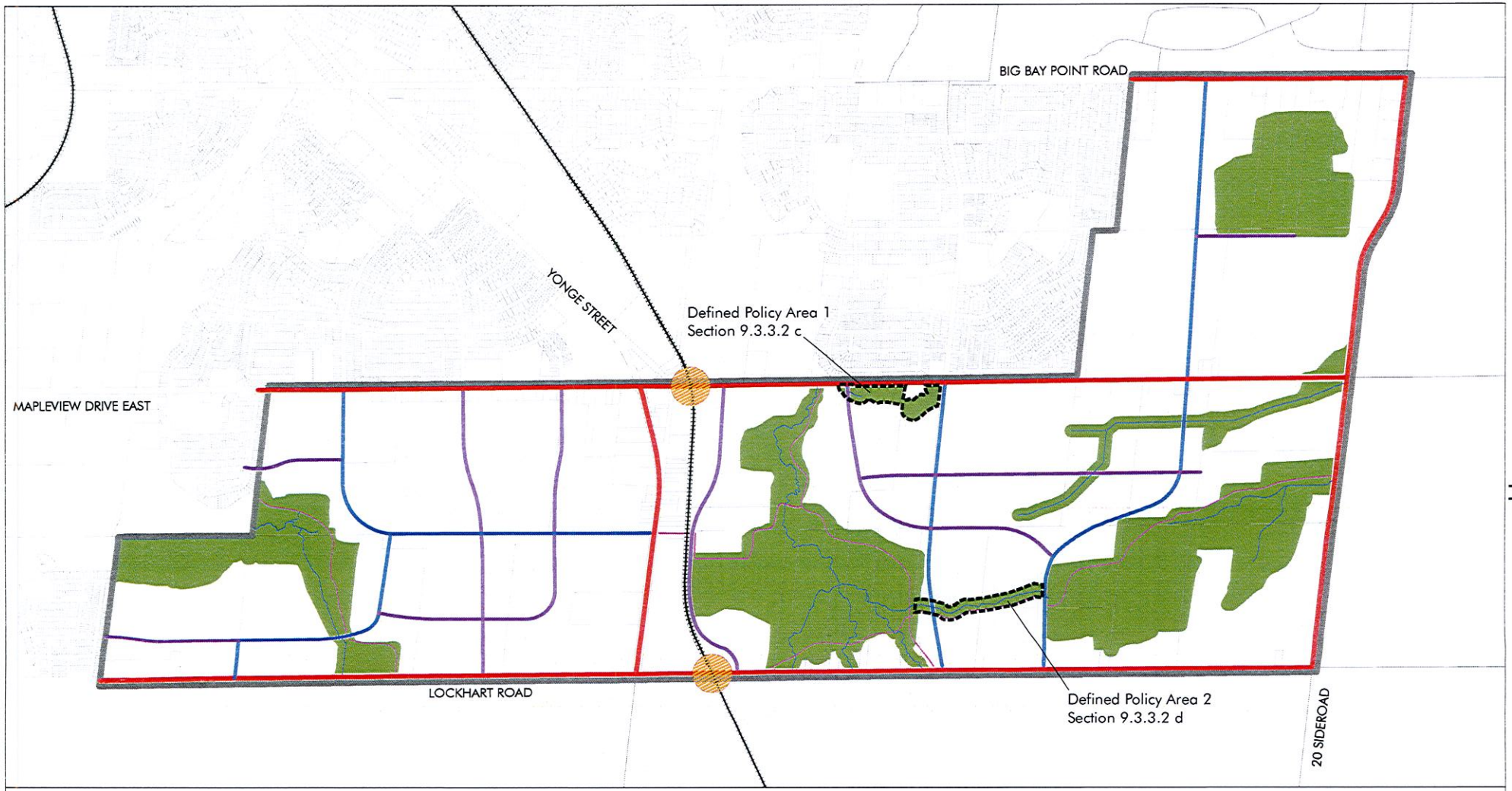
July 2015



Schedule 9D-1
Transportation Plan

City of Barrie
Hewitt's Secondary Plan

July 2015

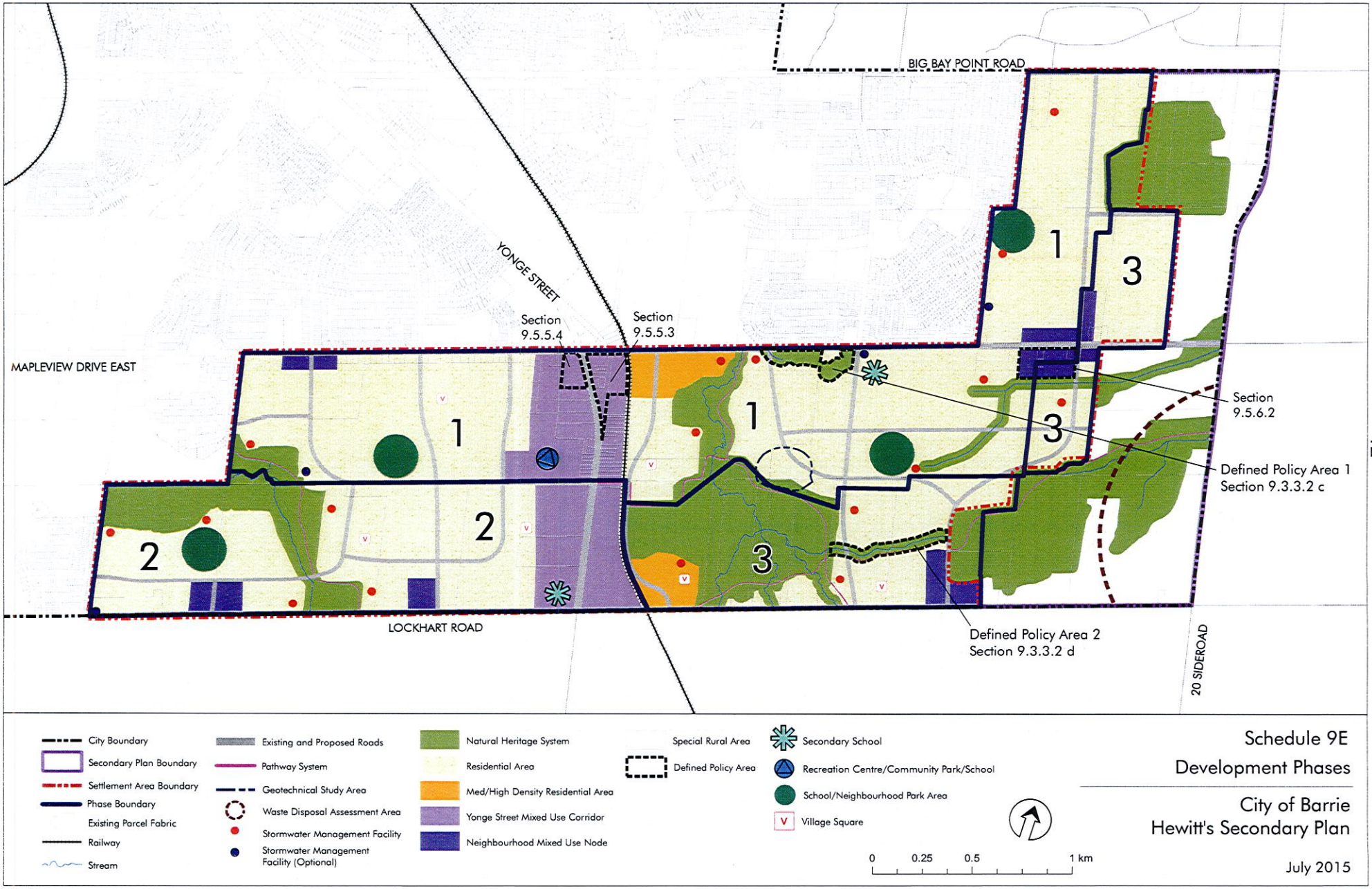


Schedule 9D-2
Street Widening Plan

City of Barrie
Hewitt's Secondary Plan

July 2015

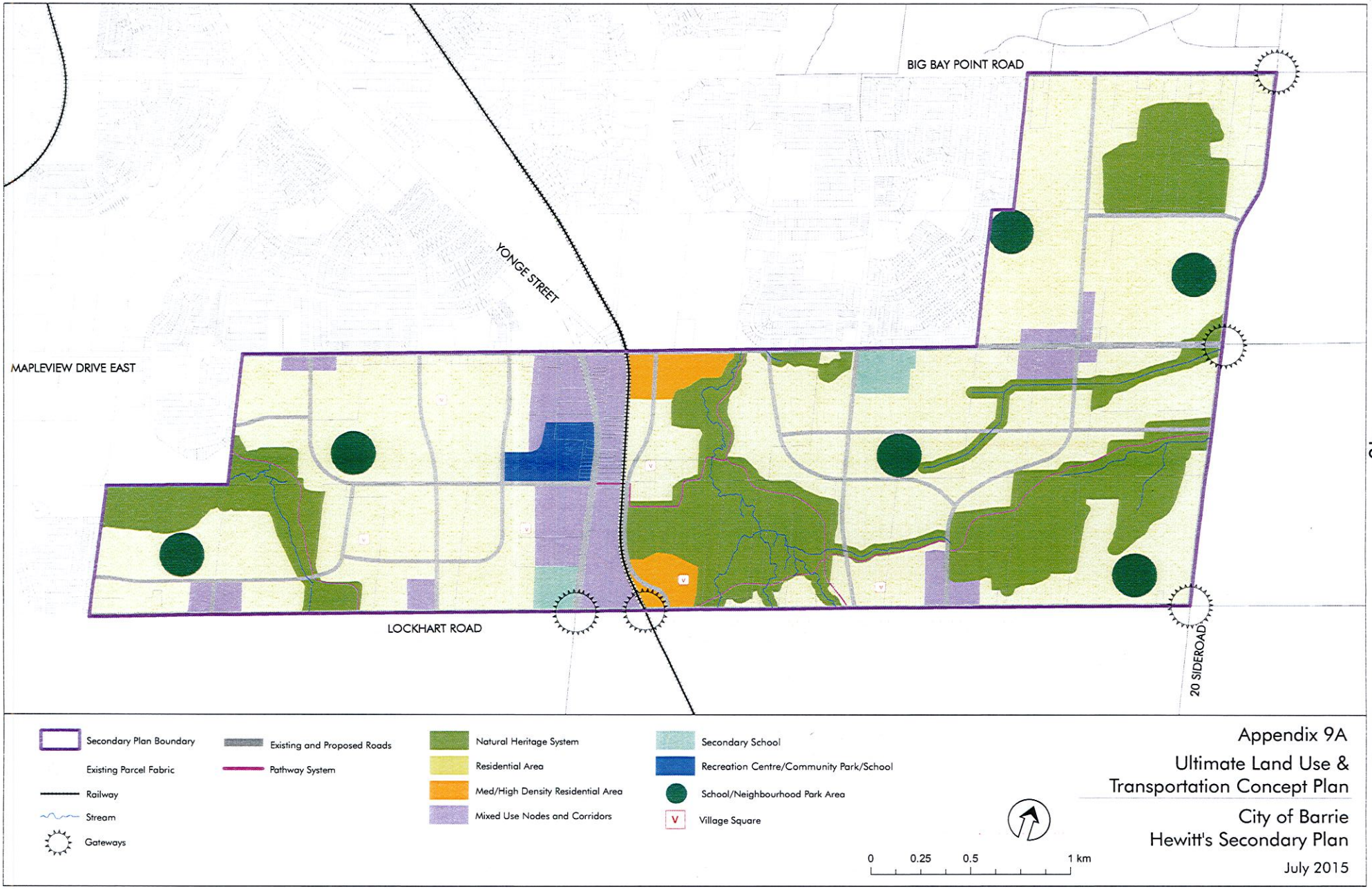
GA1



Schedule 9E
Development Phases

City of Barrie
Hewitt's Secondary Plan

July 2015



Appendix 9A

Ultimate Land Use & Transportation Concept Plan

City of Barrie
Hewitt's Secondary Plan

July 2015

191

APPENDIX 9B

HEWITT'S SECONDARY PLAN - MASTER PLAN

LEGEND

- Secondary Plan Boundary
- Settlement Area Boundary
- * Potential Floodline Boundary
- Existing and Proposed Roads
- Railway
- Natural Heritage System
- Residential Area
- Med / High Density Residential Area
- Yonge Mixed Use Corridor
- Neighbourhood Mixed Use Node
- Neighbourhood Park Area
- School
- Recreation Centre/Community Park/ School
- Village Square
- Stormwater Management Facility
- Special Rural Area

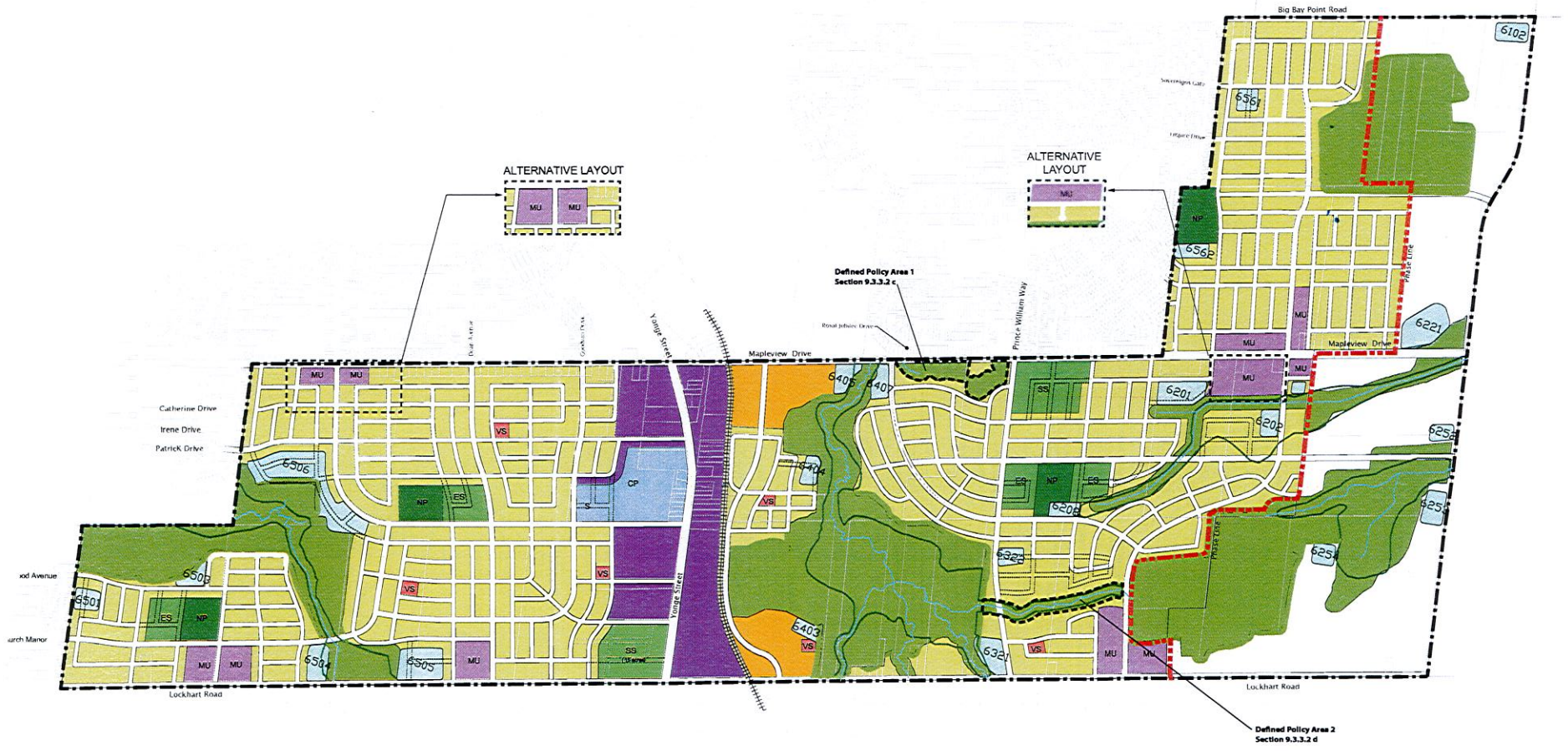
JULY 2015

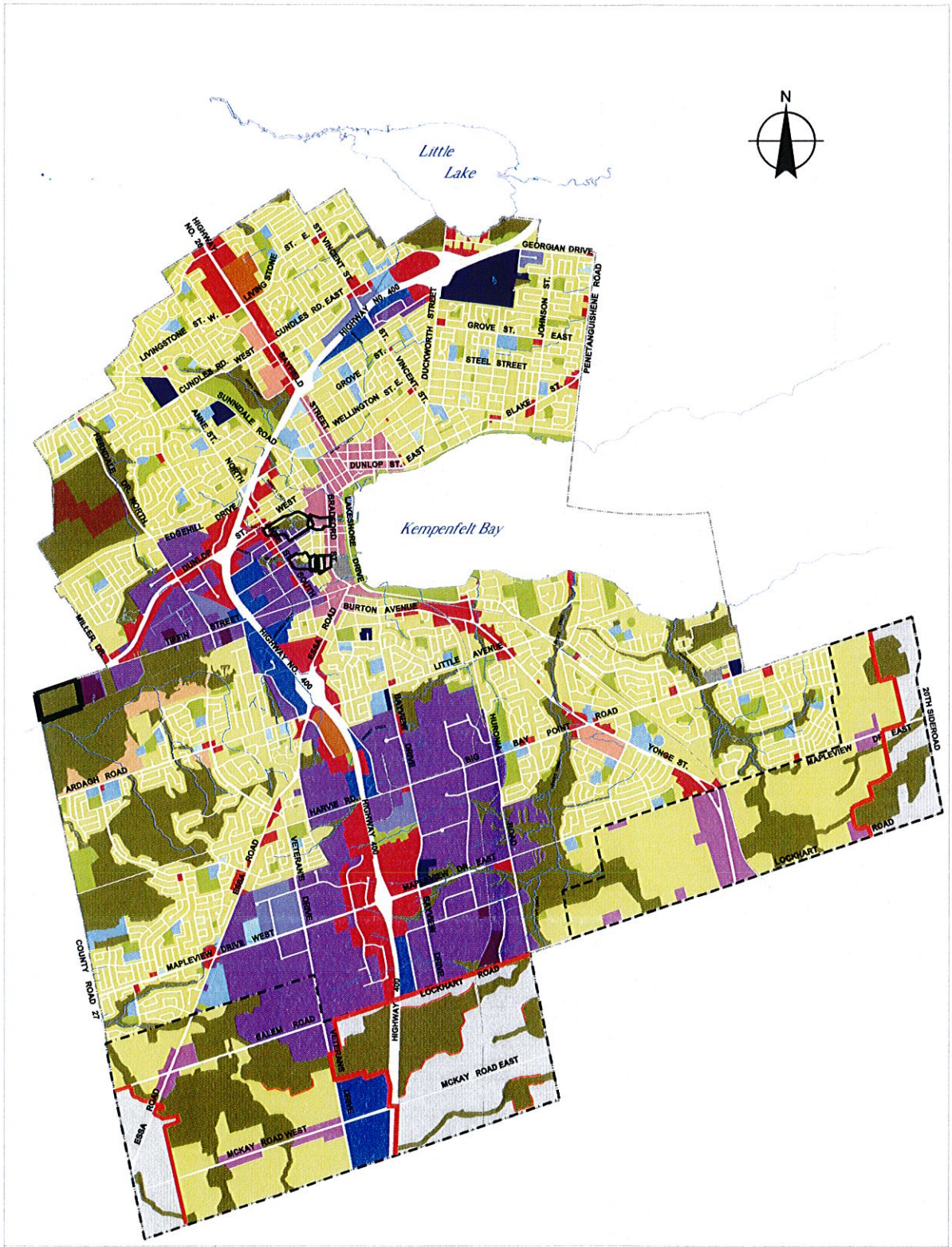
150 0 75 150 300 750m

SCALE 1:7500

N

* The Potential Floodline reflects a floodline which could result from modifications such as culvert improvements which reduce areas subject to flooding. It is recognized that these floodlines have not been approved and that the detailed delineation of the Regulatory Floodplain is required to be completed at the planning/design stages of development. The actual developable area will be defined at that time.





The City of BARRIE

Schedule 1 to OFFICIAL PLAN AMENDMENT 40

- Residential
- City Centre
- General Commercial
- Mixed-Use Nodes and Corridors
- Community Centre Commercial
- Regional Centre Commercial
- Business Park
- General Industrial
- Settlement Area Boundary
- Highway 400 Industrial
- Restricted Industrial
- Institutional
- Educational Institutional
- Major Institutional
- Open Space
- Environmental Protection Area
- Special Rural Area
- Areas to be Designated Natural Heritage System
- Water Treatment Centre
- Waste Management Facility
- Future Urban
- Waste Disposal Assessment Area Non decision per section 4.7.2.8
- City Boundary
- Application currently before the Ontario Muncipal Board (OMB)
- Salem Secondary Plan Area
- Hewitt's Secondary Plan Area

SCHEDULE A
Land Use

JULY 2015

500 0 500 1000 metres

COA

The City of BARRIE

Schedule 3 to OFFICIAL PLAN AMENDMENT 40

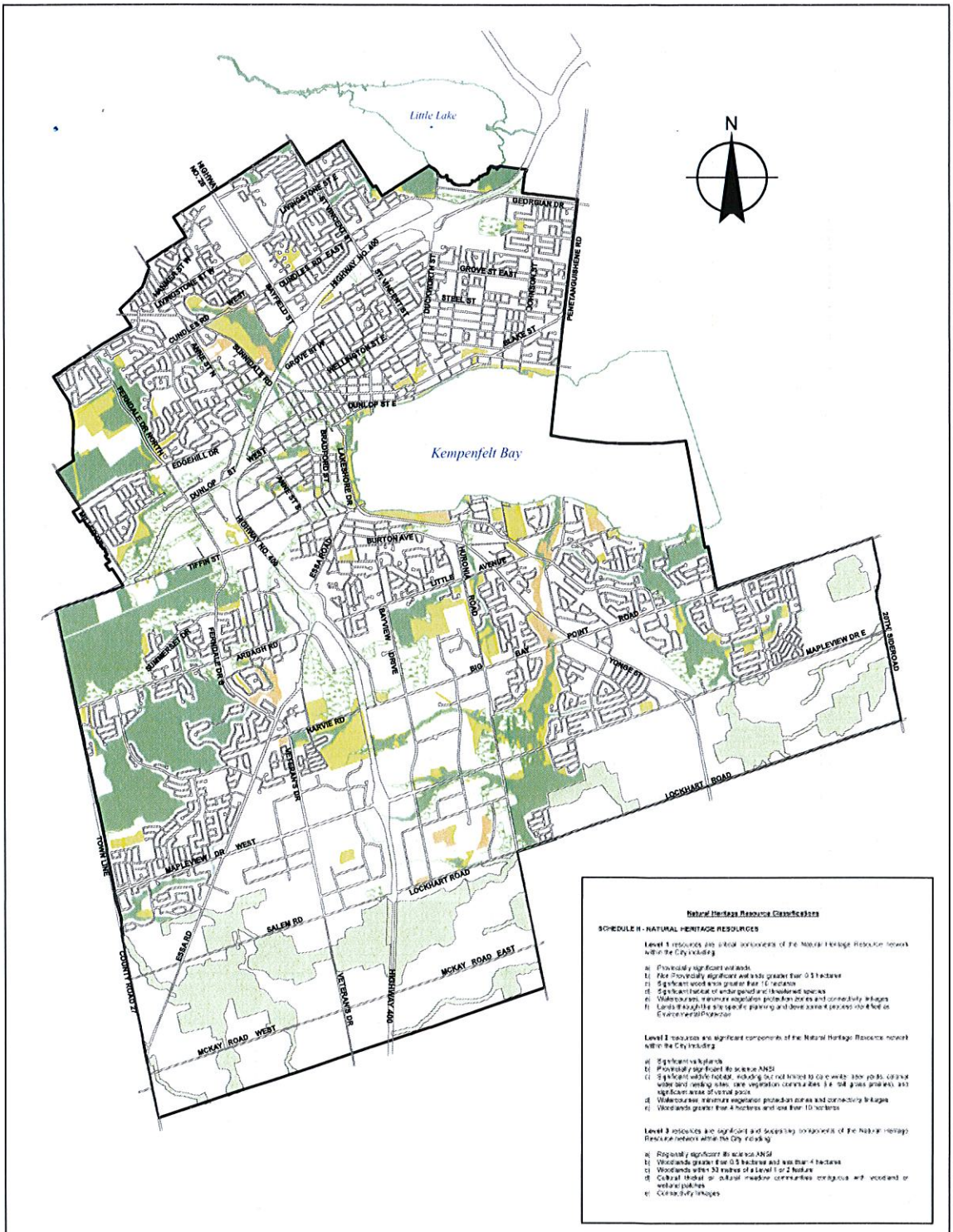
A DEFINED POLICY AREA

HEIGHT REVIEW STUDY

CITY BOUNDARY

SCHEDULE C
Defined Policy Areas

June 2015



Natural Heritage Resource Classifications

SCHEDULE H - NATURAL HERITAGE RESOURCES

Level 1 resources are critical components of the Natural Heritage Resource network within the City including:

a) Provincially significant wetlands
b) Non Provincially significant wetlands greater than 0.5 hectares
c) Significant woodlands greater than 10 hectares
d) Significant habitat of endangered and threatened species
e) Watercourses, minimum vegetation protection zones and connectivity linkages
f) Lands through the site specific planning and development process not identified as Environmental Protection

Level 2 resources are significant components of the Natural Heritage Resource network within the City including:

a) Significant valleylands
b) Provincially significant life science ANSI
c) Significant wildlife habitat, including but not limited to cliff walls, bear yards, colonial waterbird nesting sites, deer vegetation communities (i.e. staging areas), and significant areas of vernal pools
d) Watercourses, minimum vegetation protection zones and connectivity linkages
e) Woodlands greater than 4 hectares and less than 10 hectares

Level 3 resources are significant and supporting components of the Natural Heritage Resource network within the City including:

a) Regionally significant life science ANSI
b) Woodlands greater than 0.5 hectares and less than 4 hectares
c) Woodlands within 30 metres of a Level 1 or 2 feature
d) Cultural thicket or cultural meadow communities contiguous with woodland or wetland patches
e) Connectivity linkages

The City of BARRIE

Schedule 8 to
OFFICIAL PLAN AMENDMENT 40

- Level 1
- Level 1 With Existing Development Designation Subject to 3.5.2.4 d)
- Level 2
- Level 3
- Natural Heritage System Salem and Hewitt's Secondary Plan Areas

Schedule H
Natural Heritage Resources
July 2015

Note, Office consolidation, please consult the Planning Services Department for an accurate reference. Not to be reproduced without permission from the City of Barrie Planning Services Department.

Schedule "C"

MEMORANDUM OF AGREEMENT

BETWEEN:

CRISDAWN CONSTRUCTION INC.
("CRISDAWN")

- and -

THE CORPORATION OF THE CITY OF BARRIE
(the "CITY")

In conjunction with the text and schedule modifications that form part of the resolution of Crisdawn Appeal #7, Crisdawn and the City (the "Parties") also agree, in relation to Area 2, that:

1. The Regulatory Floodlines for the 60m corridor as shown on Drawing FL1, attached as Schedule 1, define the approximate extent of floodplain within the corridor subject to detailed grading and final approved hydrologic and hydraulic calculations.

2. Floodplain storage calculations have been completed balancing system storage over the length of the corridor based on future land use compared to existing conditions. The floodplain storage calculations include fill to be placed within the existing floodplain for construction of the proposed north south collector roads.

3. The fill area will be developed for residential development.

4. On Drawing FL1, attached as Schedule 1, the typical section includes a 60 m corridor. The corridor will include a constructed low flow channel (with a geometry to be determined at detailed design), a 36 m +/- constructed meander belt, side slopes varying from 7(h):1(v) to 4(h):1(v) with an average of 5(h):1(v) and a 6m wide erosion access on both the north and south sides. The edge of the 60m corridor will define the setback from the Regulatory Floodline. The principles of natural channel and bio-engineering shall be considered in the final design of the constructed channel.

5. The detailed design of the channel shall generally conform to the geometry and configuration shown on Drawing FL1, attached as Schedule 1. This configuration will need to demonstrate that it can safely convey proposed Regulatory flows from the east.

6. The elevations along the edge of the corridor may be adjusted to facilitate grading on adjacent lands so long as these adjustments do not impact the Regulatory Floodline.

7. The design of the culvert(s) at the collector roads is to consider hydraulics, terrestrial passage and stream stability and is to be completed at the detailed design stage.

8. Subject to addressing the above requirements the City and LSRCA shall issue any required permits / approvals to allow for the construction of the channel within the 60m corridor and the placement of fill within the area designated residential.

IN WITNESS WHEREOF the Parties have executed this Memorandum of Agreement as of the date(s) indicated below:

Crisdawn Construction Inc.

Date: July 15, 2015

_____

Per: Don Pratt

I have authority to bind the Corporation.

The Corporation of the City of Barrie

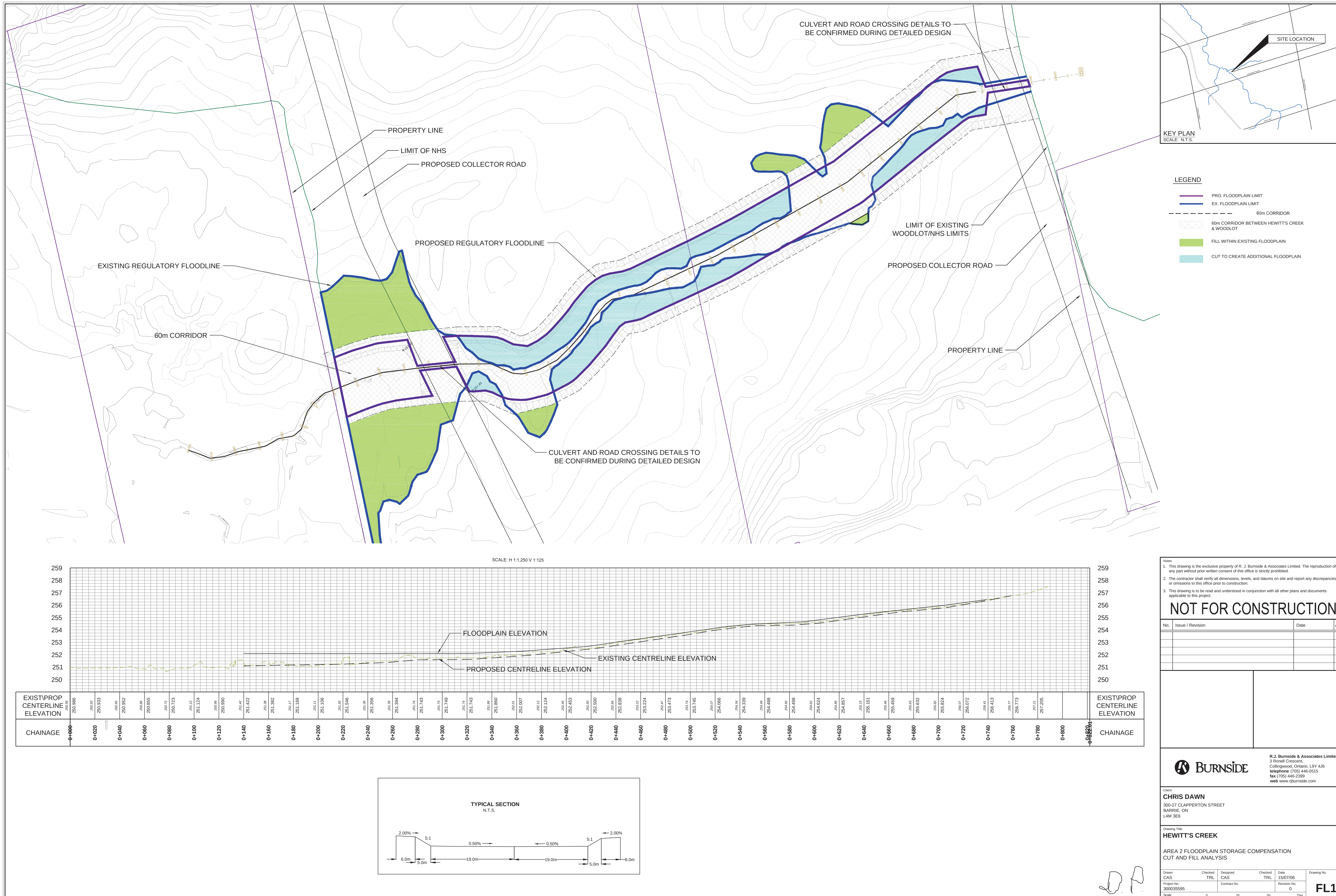
Date: July , 2015

_____

Per: **Jeff Lehman, Mayor**

_____

Per: **Dawn McAlpine, City Clerk**


CULVERT AND ROAD CROSSING DETAILS TO BE CONFIRMED DURING DETAILED DESIGN
PROPERTY LINE
LIMIT OF NHS
PROPOSED COLLECTOR ROAD
PROPOSED REGULATORY FLOODLINE
EXISTING REGULATORY FLOODLINE
60m CORRIDOR
LIMIT OF EXISTING WOODLOT/NHS LIMITS
PROPOSED COLLECTOR ROAD
PROPERTY LINE
CULVERT AND ROAD CROSSING DETAILS TO BE CONFIRMED DURING DETAILED DESIGN
SITE LOCATION
KEY PLAN
SCALE: N.T.S.
LEGEND
PRO. FLOODPLAIN LIMIT
EX. FLOODPLAIN LIMIT
60m CORRIDOR
60m CORRIDOR BETWEEN HEWITT'S CREEK & WOODLOT
FILL WITHIN EXISTING FLOODPLAIN
CUT TO CREATE ADDITIONAL FLOODPLAIN
SCALE: H 1:1,250 V 1:125
FLOODPLAIN ELEVATION
EXISTING CENTRELINE ELEVATION
PROPOSED CENTRELINE ELEVATION
EXIST\PROP CENTERLINE ELEVATION
CHAINAGE
TYPICAL SECTION
N.T.S.
2.00%
5:1
0.50%
6.0m
5.0m
19.0m
Notes
1. This drawing is the exclusive property of R. J. Burnside & Associates Limited. The reproduction of any part without prior written consent of this office is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
NOT FOR CONSTRUCTION
No. Issue / Revision Date Auth.
BURNSIDE
R.J. Burnside & Associates Limited
3 Ronell Crescent,
Collingwood, Ontario, L9Y 4J6
telephone (705) 446-0515
fax (705) 446-2399
web www.rjburnside.com
Client
CHRIS DAWN
300-27 CLAPPERTON STREET
BARRIE, ON
L4M 3E6
Drawing Title
HEWITT'S CREEK
AREA 2 FLOODPLAIN STORAGE COMPENSATION
CUT AND FILL ANALYSIS
Drawn CAS Checked TRL
Designed CAS Checked TRL
Date 15/07/06
Drawing No. FL1
Project No. 300035595
Contract No.
Revision No. 0
Scale 1:1,250
0 25 50 75m
File: \\BARKLEY\AdeptWork\Shared Work Areas\032860 - Annexed Lands\05_Figures\150626 (Floodplain Area 2 Figures)\FL1 - Area 2 Floodplain Compensation_150706_1_1_0974.sv$.dwg Date Plotted: July 10, 2015 - 3:10 PM

Appendix D

Stormwater Management Drawings

- STM-1 Storm Subcatchment Area Plan
- SWM-1 Stormwater Management Plan Pre-Development Conditions
- SWM-2 Stormwater Management Plan Post-Development Conditions Peak Flow Model
- SWM-3 Stormwater Management Plan Post-Development Conditions Low Impact Development Model
- PND-1 Stormwater Management Pond SWMF#8 Plan View
- PND-2 Stormwater Management Pond SWMF#8 Sections & Details
- LID-1 LID Sections & Details Park Infiltration Gallery
- P-6 Profile, Medium Density Block STA 0+000 to STA 0+444.37

960 LOCKHART ROAD

EXISTING RESIDENTIAL

1000 LOCKHART ROAD

MATCHLINE A

LOCKHART ROAD

EXT.1 0.75 1.84

LEGEND:

50.0m –375mmø STM @ 0.5%

PROPOSED STORM SEWER, PIPE DIAMETER, MAINTENANCE HOLE AND FLOW DIRECTION

POST–DEVELOPMENT SUBCATCHMENT AREAS

OVERLAND FLOW DIRECTION

DRAFT PLAN OF SUBDIVISION

253.00 EX. CONTOUR AND ELEVATION

CATCHMENT ID NUMBER — 106 — 1.20 0.65 — AREA IN HECTARES (ha)

RUNOFF CO–EFFICIENT

MAPLEVIEW DRIVE EAST
SCDSB
BISTRO 6 LANDS
HEWITT'S CREEK
HEWITT'S GATE EAST LANDS
BULUT LANDS
CAMPBELL LANDS
HEWITT'S CENTRAL SUBDIVISION
HEWITT SOUTH SUBDIVISION
GO TRAIN TRACKS
YONGE STREET
LOCKHART ROAD
NTS
SUBJECT SITE

HEWITT'S CENTRAL SUBDIVISION

STORMWATER MANAGEMENT FACILTY #8. EXTENDED DETENTION WET POND

PROPOSED AVENUE (NAMED BY OWNER – HEWITTS CENTRAL SUBDIVISION)

PRINCESS WILLIAM WAY

TERRY FOX DRIVE

LID–1 LID–2 LID–3

LSRCA REGULATION BOUNDARY

ENVIRONMENTAL PROTECTION

960 LOCKHART ROAD

EXT.2 0.75 2.38

EXT.3 0.75 1.36

EXT.1 0.75 1.84

LOCKHART ROAD

MATCHLINE A

BENCHMARK:

BENCHMARK NO: 01019865454 LOCATED ON CONCRETE BRIDGE CARRYING MAPLEVIEW DRIVE E OVER LOVER'S CREEK, 0.65KM EAST OF HURONIA ROAD. TABLET IS SET HORIZONTALLY IN THE NORTH FACE, 5.45M NORTH OF CENTRELINE OF ROAD, 28CM WEST OF THE NORTHEAST END OF BRIDGE, 19CM TOP OF COPING. N4910788.889 E607264.100 ELEV 241.861

BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR, THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.506

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 246.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD. APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N4909870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER M. G. PUS 100149153 11-19-2024 PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

STORM SUBCATCHMENT AREA PLAN

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1066

DESIGN	KS/VB	SCALE: 1:1250	DATE OCTOBER 2024
DRAWN	KS	PROJECT PRA–23040	DWG. Nº STM–1
CHECKED	MF		

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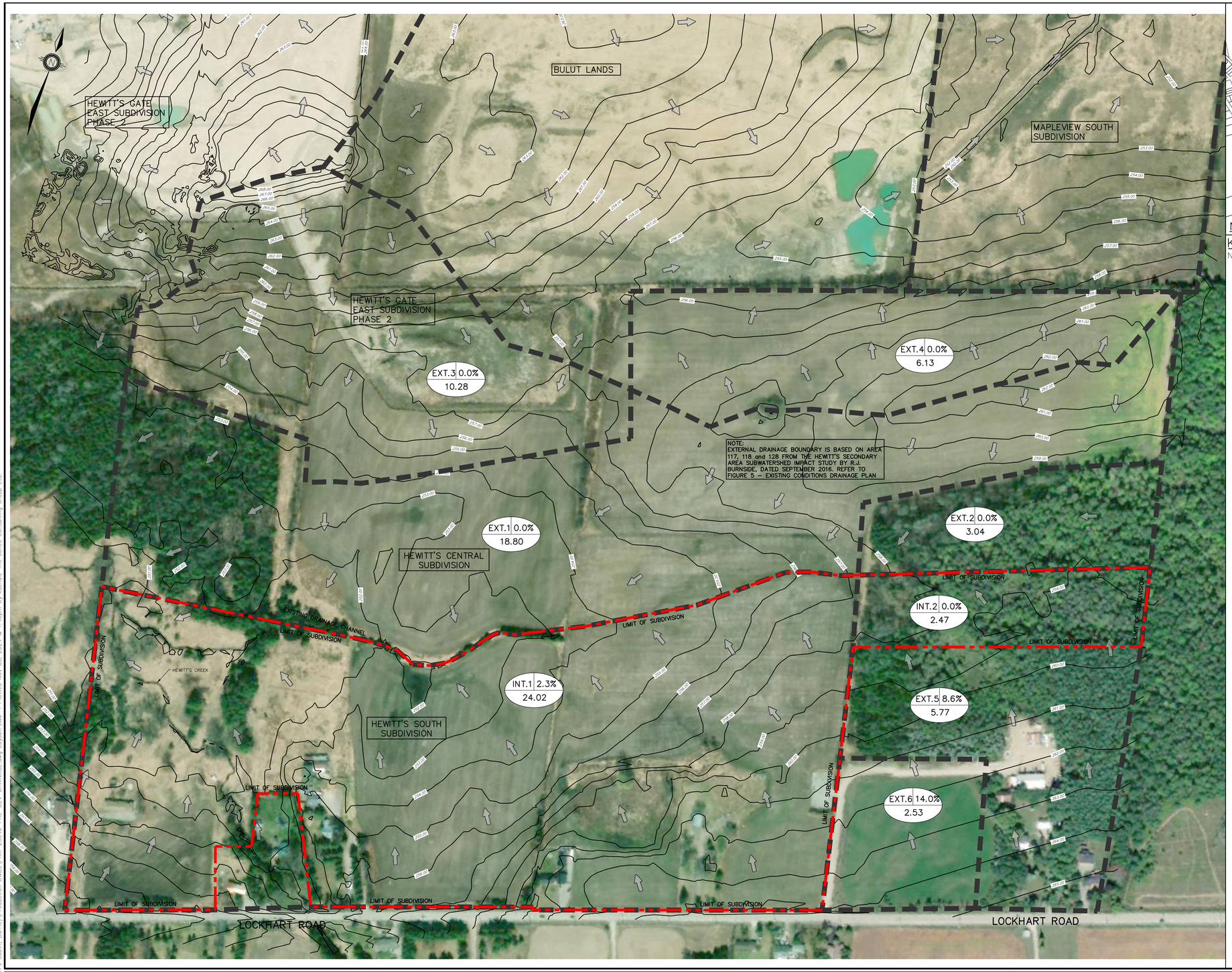

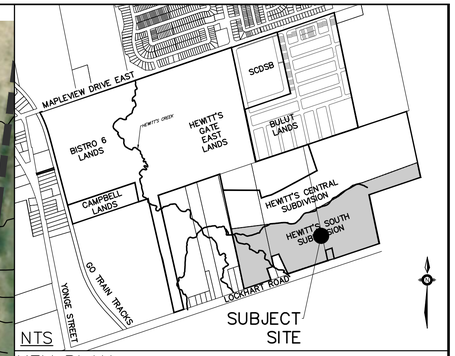

KEY PLAN
NTS

LEGEND

- LIMIT OF SUBDIVISION
- EXISTING PRE-DEVELOPMENT STORM DRAINAGE
- 253.00 EX. CONTOUR AND ELEVATION
- CATCHMENT BOUNDARY
- CATCHMENT AREA ID NUMBER
- IMPERVIOUSNESS %
- AREA (ha.)

REFERENCES:

BENCHMARK:

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BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.506

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE. WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 246.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD. APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N4909870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER
M. G. PUS
100149153
11-19-2024
PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

STORMWATER MANAGEMENT PLAN
PRE-DEVELOPMENT CONDITIONS

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1066

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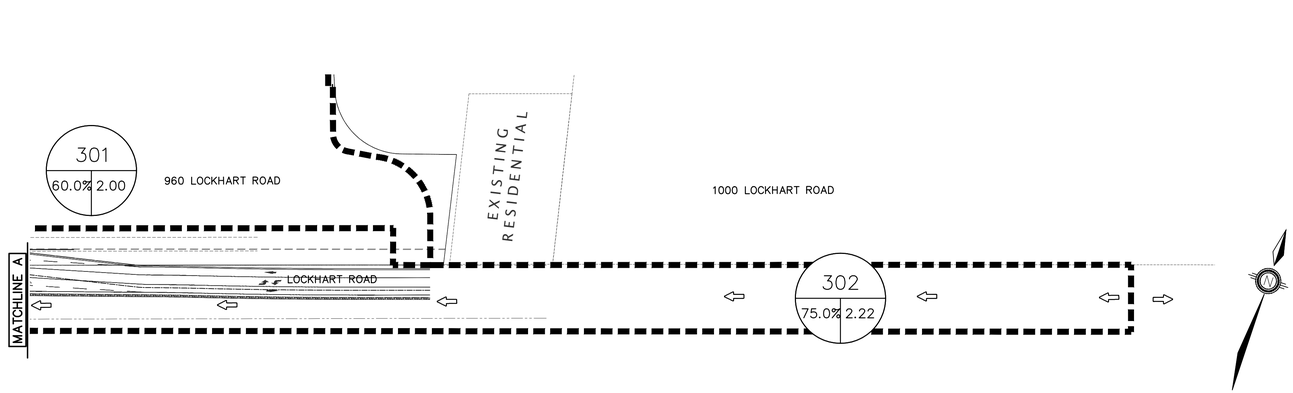
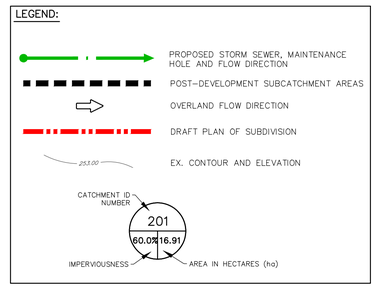
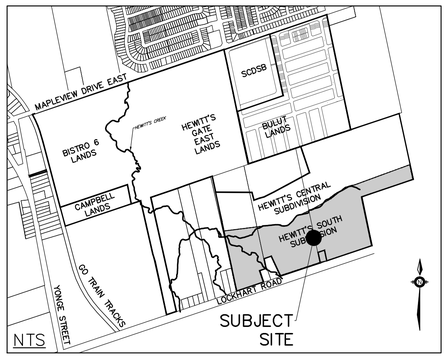
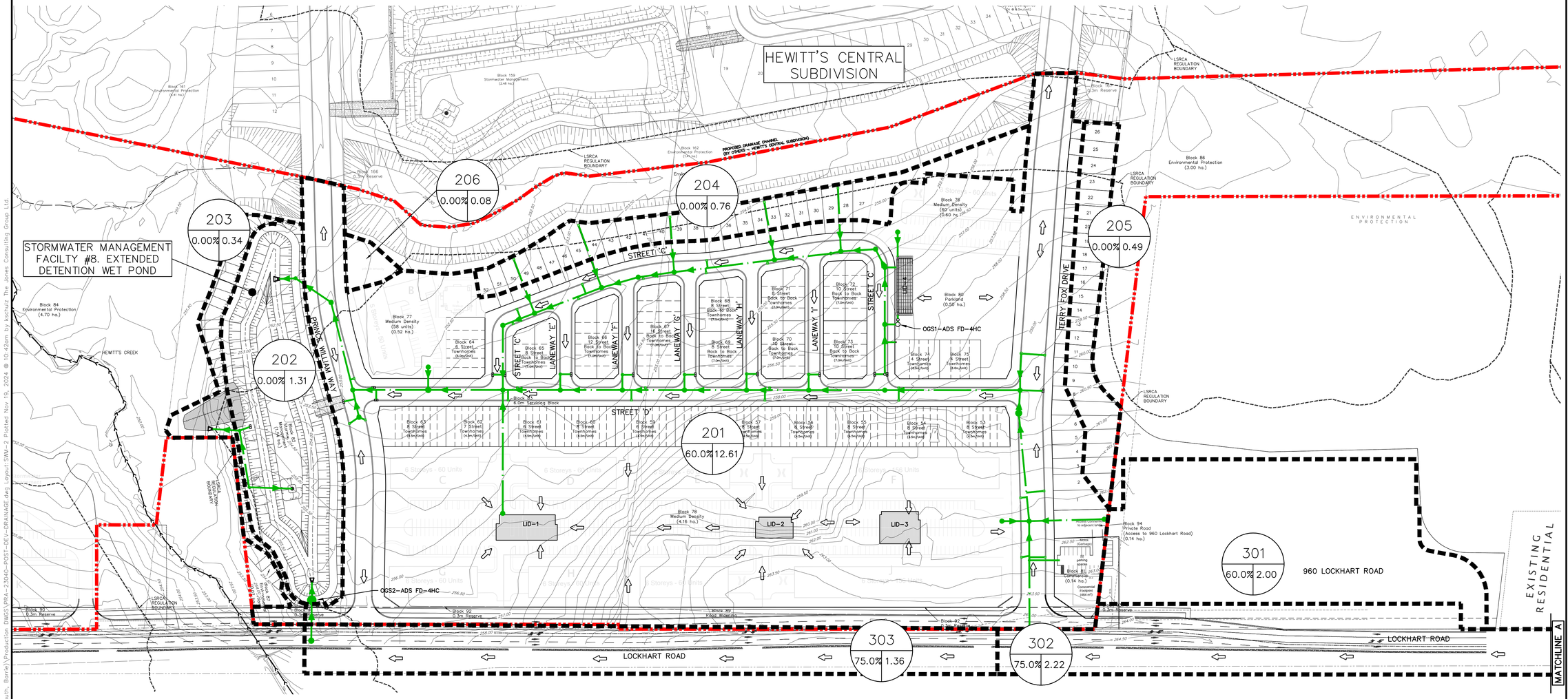
CHECKED	MF		









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BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD, APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N4909870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

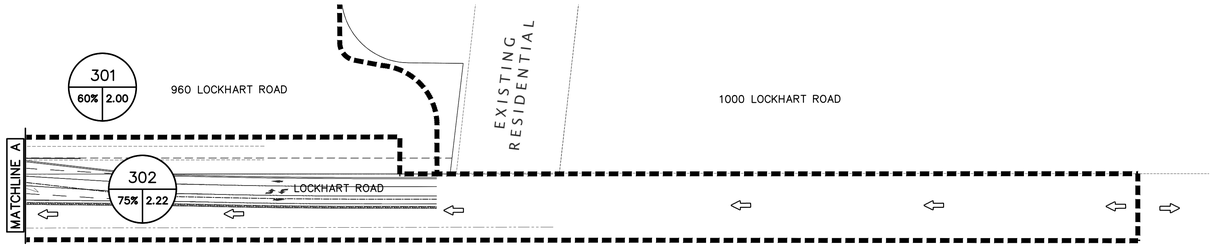
LICENSED PROFESSIONAL ENGINEER M. G. RUS 100149153 11-19-2024 PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

STORMWATER MANAGEMENT PLAN
POST-DEVELOPMENT CONDITIONS
PEAK FLOW MODEL

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	KS/VBS	SCALE: 1:1250	DATE NOVEMBER 2024
DRAWN	VBS	PROJECT PRA-23040	DWG. Nº SWM-2
CHECKED	MF		



LEGEND:

- PROPOSED STORM SEWER, MAINTENANCE HOLE AND FLOW DIRECTION
- POST-DEVELOPMENT SUBCATCHMENT AREAS
- OVERLAND FLOW DIRECTION
- DRAFT PLAN OF SUBDIVISION
- 253.00 EX. CONTOUR AND ELEVATION

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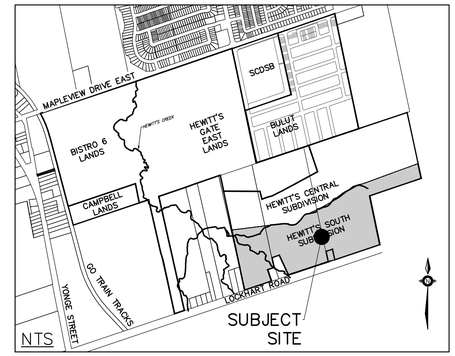

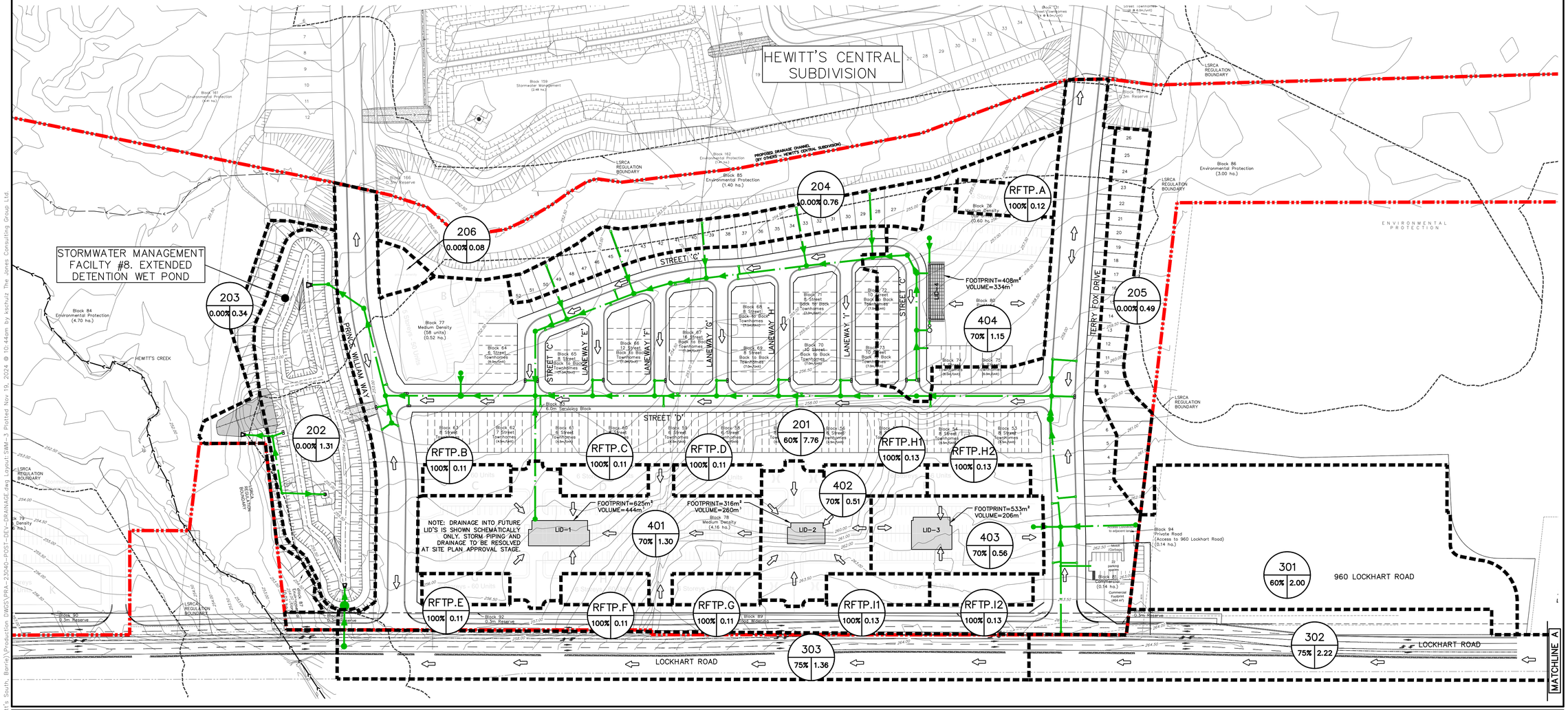

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BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.998

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD. APPROXIMATELY 1.02m WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N4909870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER — M. G. RUS — 100149153 — 11-19-2024 — PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

STORMWATER MANAGEMENT PLAN
POST-DEVELOPMENT CONDITIONS
LOW IMPACT DEVELOPMENT MODEL

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	KS/VBS	SCALE: 1:1250	DATE NOVEMBER 2024
DRAWN	VBS	PROJECT PRA-23040	DWG. Nº SWM-3
CHECKED	MF		

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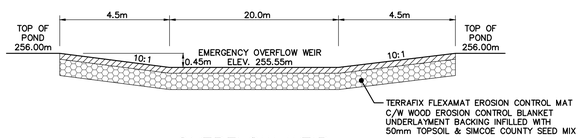
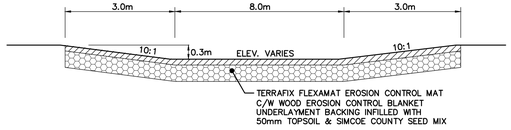
The Jones Consulting Group, Ltd



OVERFLOW WEIR

NOT TO SCALE

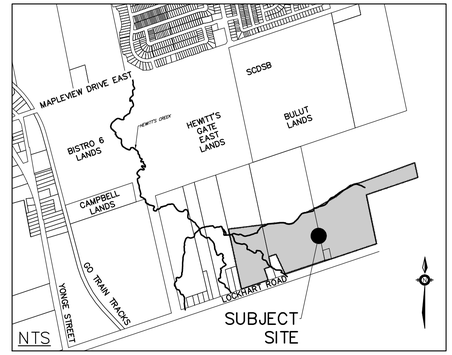


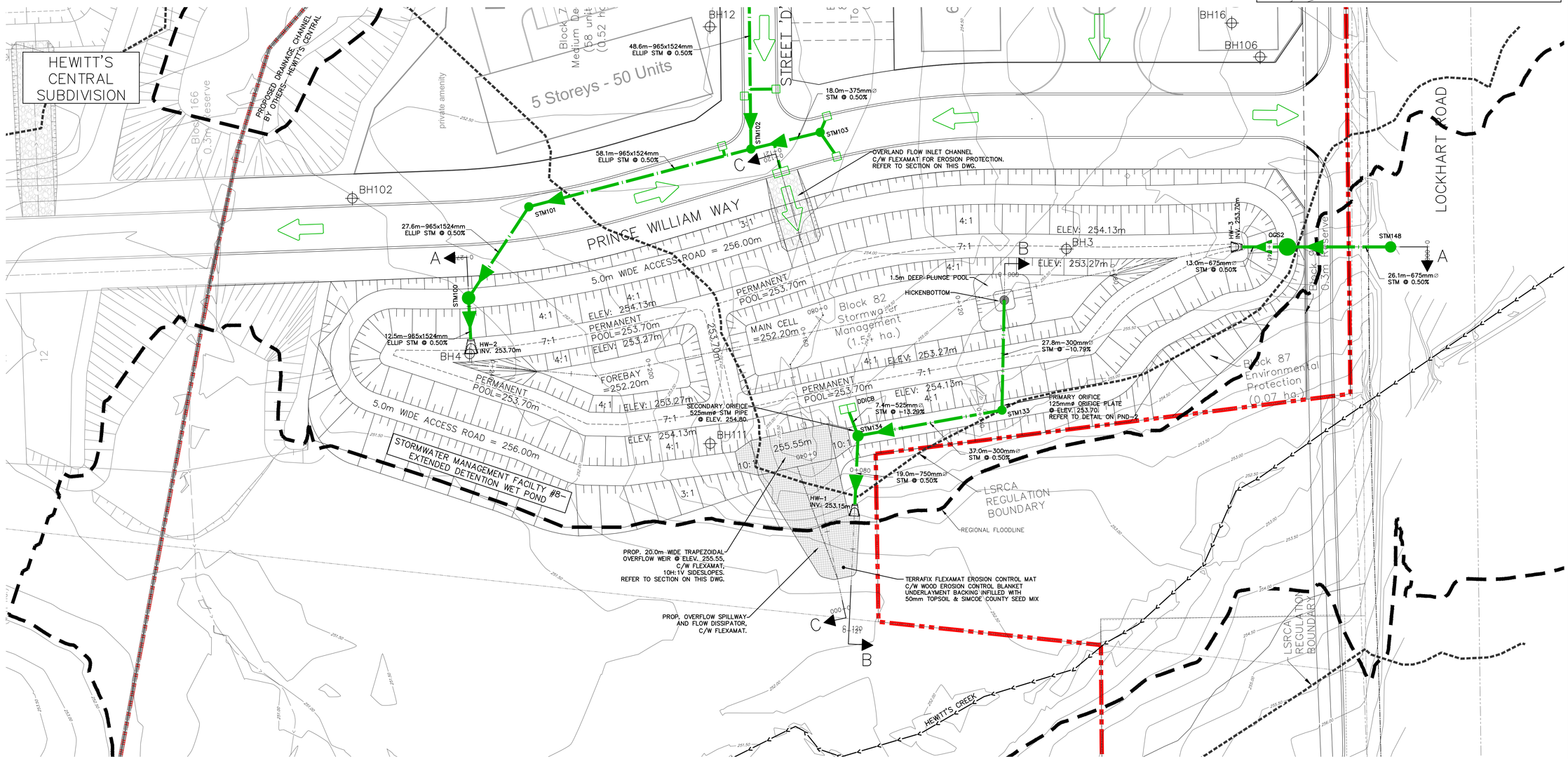
OVERLAND FLOW INLET CHANNEL

NOT TO SCALE

LEGEND:

- PROPOSED LOCAL 5-YEAR STORM SEWER, MAINTENANCE HOLE AND DIRECTION OF FLOW
- DIRECTION OF POST-DEVELOPMENT 100 YEAR OVERLAND FLOW ROUTE
- EXISTING SURFACE CONTOUR AND ELEVATION
- DRAFT PLAN OF SUBDIVISION





BENCHMARK:

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BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.998

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD. APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N4909969870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER M. G. RUS 100149153 11-19-2024 PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

STORMWATER MANAGEMENT POND SWMF #8
PLAN VIEW

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	MF/KS	SCALE: 1:500	DATE OCTOBER 2024
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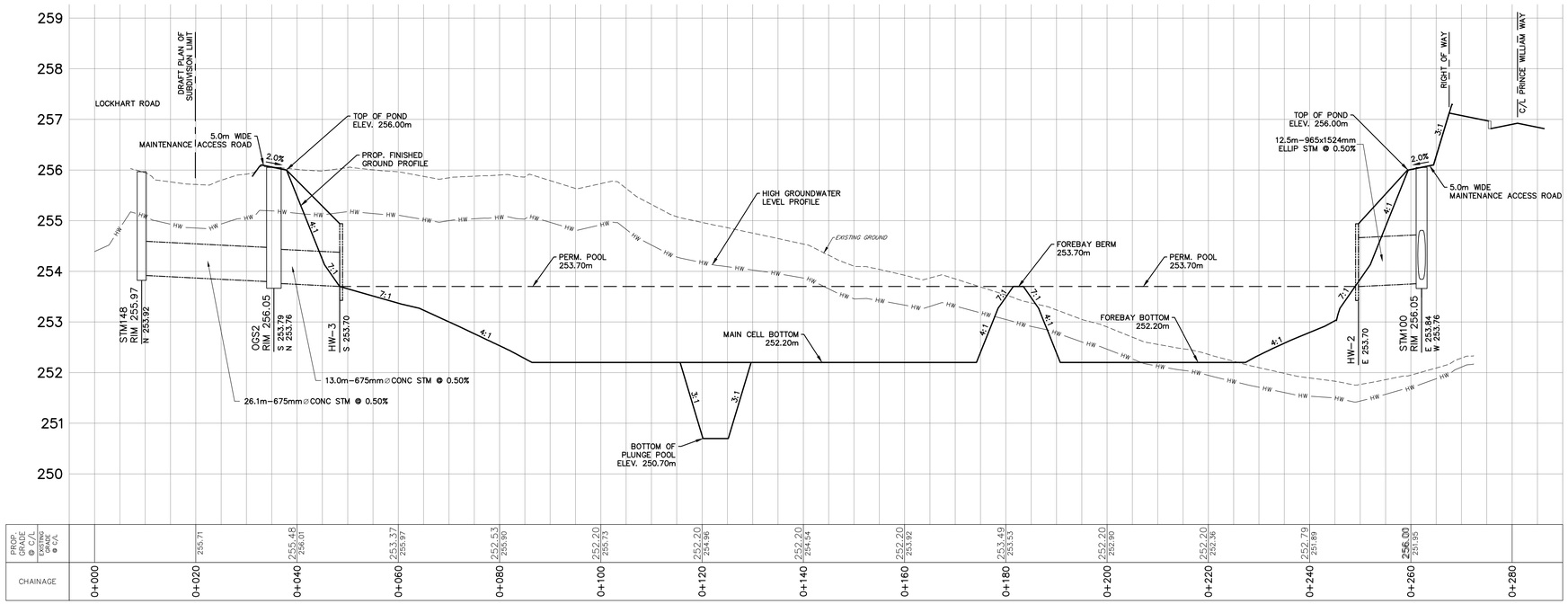
CHECKED	DR		



SECTION A–A

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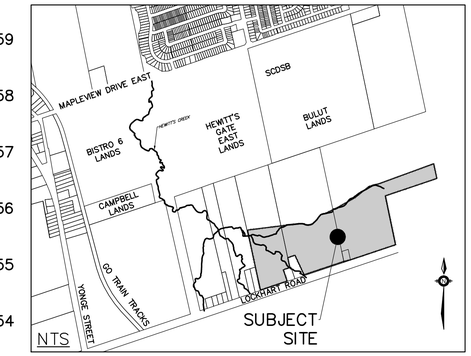
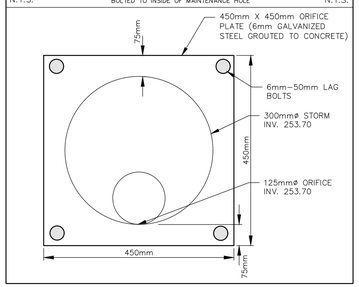
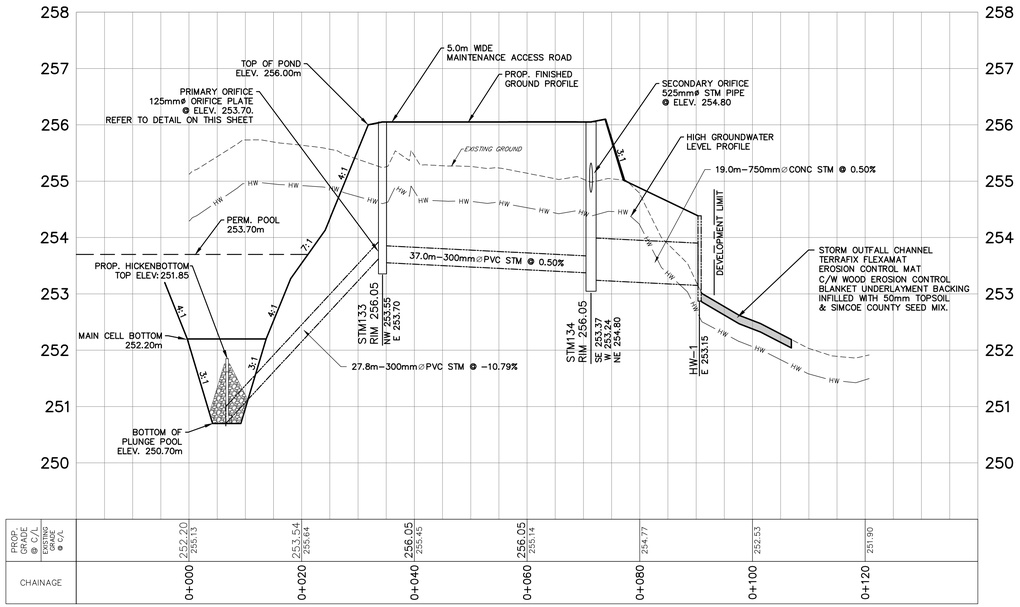


PRIMARY ORIFICE

ORIFICE PLATE

N.T.S. — BOLTED TO INSIDE OF MAINTENANCE HOLE — N.T.S.





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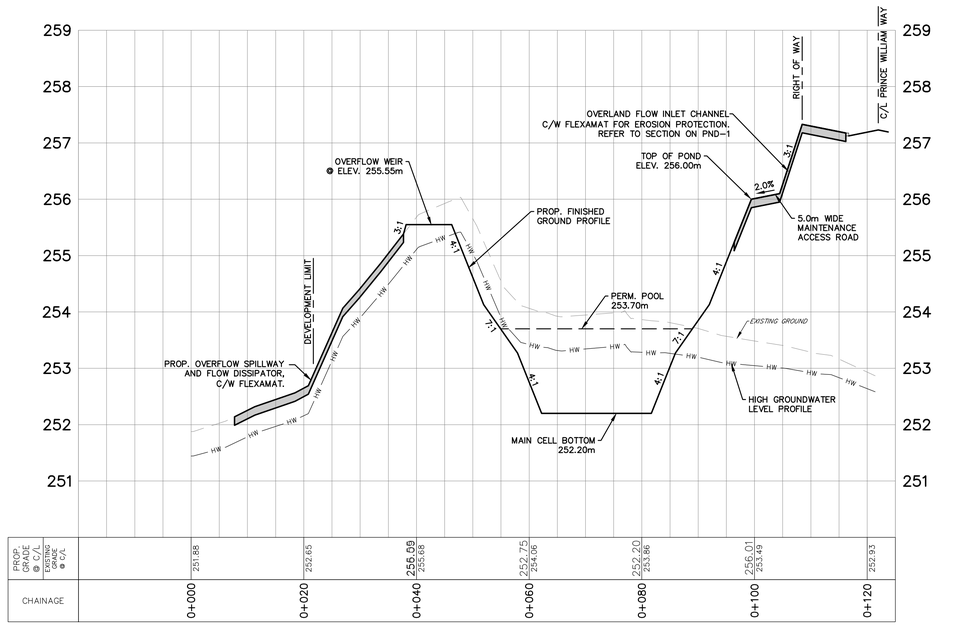

SECTION C–C

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VERT.1:50

BENCHMARK:

BENCHMARK NO: 01019865454 LOCATED ON CONCRETE BRIDGE CARRYING MAPLEVIEW DRIVE E OVER LOVER'S CREEK, 0.65KM EAST OF HURONIA ROAD. TABLET IS SET HORIZONTALLY IN THE NORTH FACE, 5.45M NORTH OF CENTRELINE OF ROAD, 28CM WEST OF THE NORTHEAST END OF BRIDGE, 19CM TOP OF COPING. N4910788.889 E607264.100 ELEV 241.861

BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 160 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE, WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD, APPROXIMATELY 1.03km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N49009870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

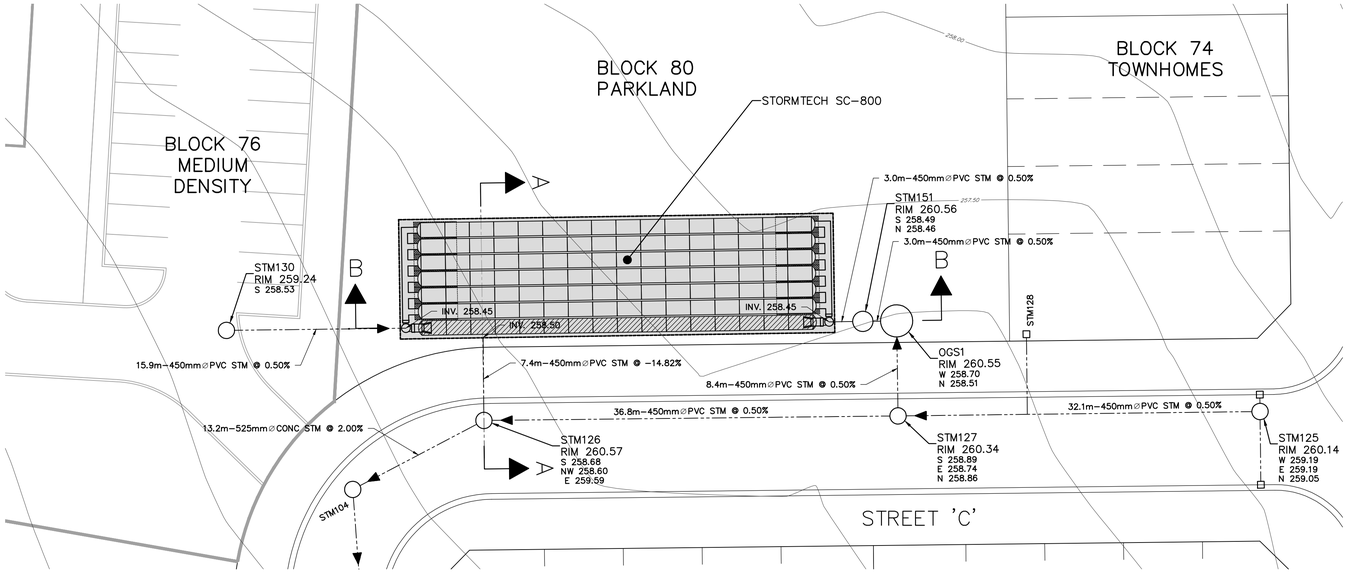
LICENSED PROFESSIONAL ENGINEER — M. G. PUS — 100149153 — 11-19-2024 — PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

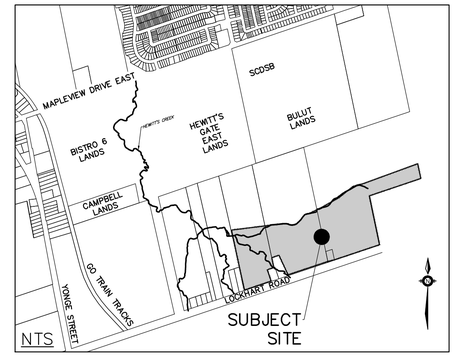
STORMWATER MANAGEMENT POND
SWMF #8
SECTIONS

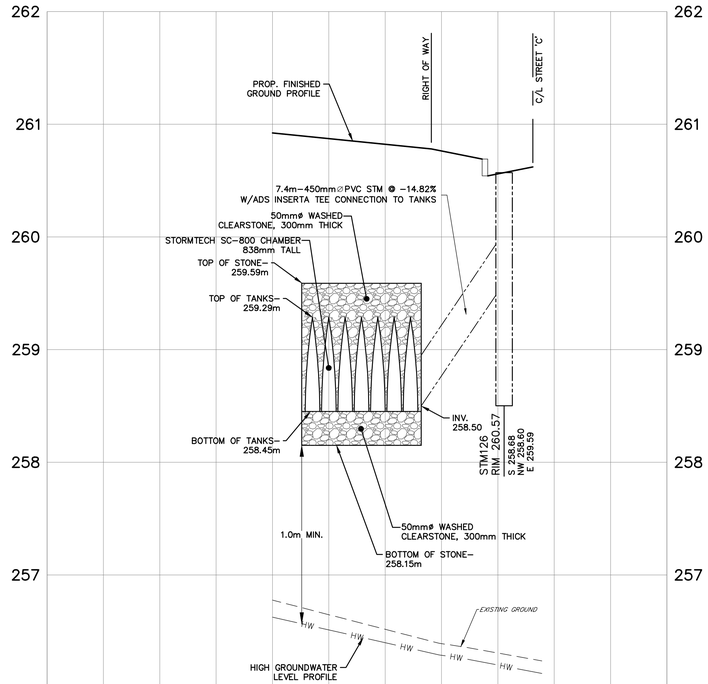
JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1066

DESIGN	MF/KS	SCALE: AS NOTED	DATE OCTOBER 2024
DRAWN	KS	PROJECT PRA-23040	DWG. Nº PND-2
CHECKED	DR		

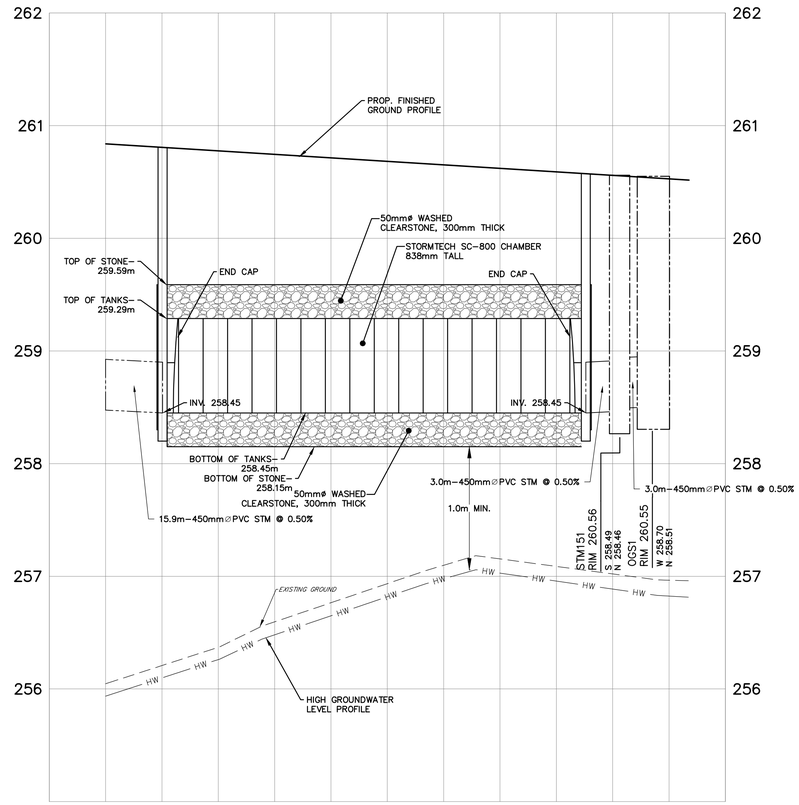


PLAN VIEW
1:250





SECTION A-A
HOR. 1:250
VERT. 1:25



SECTION B-B
HOR. 1:250
VERT. 1:25

BENCHMARK:

BENCHMARK NO: 01019865454 LOCATED ON CONCRETE BRIDGE CARRYING MAPLEVIEW DRIVE E OVER LOVER'S CREEK, 0.65KM EAST OF HURONIA ROAD. TABLET IS SET HORIZONTALLY IN THE NORTH FACE, 5.45M NORTH OF CENTRELINE OF ROAD, 28CM WEST OF THE NORTHEAST END OF BRIDGE, 19CM TOP OF COPING. N4910788.889 E607264.100 ELEV 241.861

BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL - 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911810 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD, APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N49009870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER
M. G. PUS
100149153
11-19-2024
PROVINCE OF ONTARIO

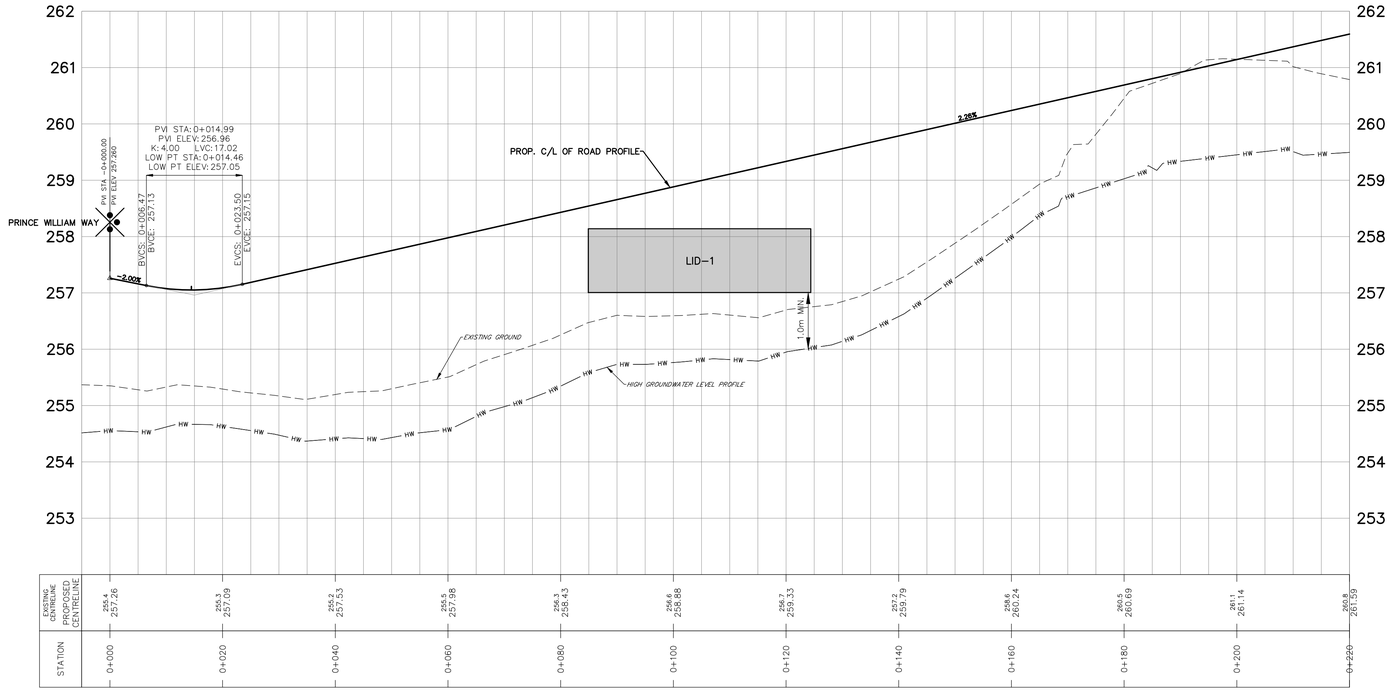
HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

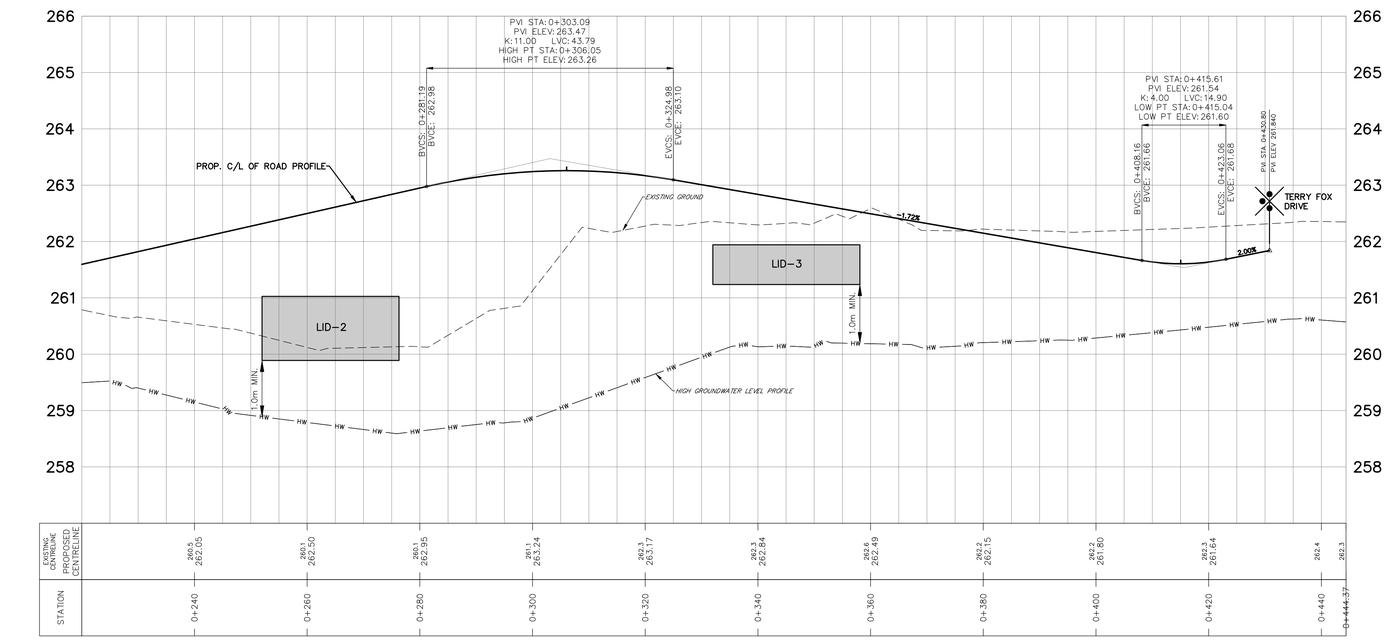
LID SECTIONS & DETAILS
PARK INFILTRATION GALLERY

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	MF/KS	SCALE: AS NOTED	DATE OCTOBER 2024
DRAWN	KS	PROJECT PRA-23040	DWG. Nº LID-1
CHECKED	DR		

MEDIUM DENSITY BLOCK





PRELIMINARY–NOT FOR CONSTRUCTION

BENCHMARK:

BENCHMARK NO: 01019865454 LOCATED ON CONCRETE BRIDGE CARRYING MAPLEVIEW DRIVE E OVER LOVER'S CREEK. 0.656M EAST OF HURONIA ROAD. TABLET IS SET HORIZONTALLY IN THE NORTH FACE, 5.45M NORTH OF CENTRELINE OF ROAD, 28CM WEST OF THE NORTHEAST END OF BRIDGE, 19CM TOP OF COPING. N4910788.889 E607264.100 ELEV 241.861

BENCHMARK NO: 03120030029 MAPLEVIEW HEIGHTS ELEMENTARY SCHOOL – 180 ESTHER DR. THE VERTICAL MONUMENT IS SET FLUSH IN CONCRETE FLAGPOLE BASE 4.7m SOUTH FROM THE SOUTHEAST CORNER OF THE MAIN ENTRANCE TO SCHOOL AND TABLET IS ON THE SOUTHSIDE OF THE FLAGPOLE BASE. N4911610 E607799 ELEV 250.508

BENCHMARK NO: 03120080054 LOCATED ON THE SOUTH LIMIT OF MAPLEVIEW DRIVE WEST APPROXIMATELY 1km EAST OF HURONIA ROAD. N4910878.122 E607601.062 ELEV 248.996

BENCHMARK NO: 03120110013 LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD. APPROXIMATELY 1.02km WEST OF THE YONGE STREET AND HURONIA ROAD INTERSECTION N49009870.257 E608733.580 ELEV 252.807

NO.	REVISIONS	DATE	INITIAL
1.	SUBMISSION FOR DRAFT PLAN APPROVAL	NOV.2024	MF

LICENSED PROFESSIONAL ENGINEER
M. G. RUS
100149153
11-19-2024
PROVINCE OF ONTARIO

HANSEN GROUP INC.
HEWITT'S SOUTH SUBDIVISION

PROFILE
MEDIUM DENSITY BLOCK
STA. 0+000 TO STA. 0+444.37

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN MF/KS	SCALE: H.1:500 V.1:50	DATE OCTOBER 2024	
DRAWN KS	PROJECT PRA–23040	DWG. Nº P–6	
CHECKED DR			