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36 Years

Hard Rock Ottawa
4837 Albion Road

Servicing & Stormwater Management Report

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HARD ROCK OTTAWA

4837 ALBION ROAD
OTTAWA, ONTARIO

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

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Issued: November 20, 2019

Novatech File: 116111
Report Ref: R-2019-196

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November 20, 2019

City of Ottawa
Planning Infrastructure and Economic Development Department
110 Laurier Avenue West, 4th Floor
Ottawa, ON
K1P 1J1

Attention: **Allison Hamlin, MCIP, RPP, Planner II**

Reference: **4837 Albion Road Hard Rock Ottawa**
Servicing and Stormwater Management Report
Novatech File No.: 116111

Novatech has prepared this Servicing and Stormwater Management Report, on behalf of Hard Rock Ottawa, in support of Site Plan and Re-Zoning Applications for review and approval.

The report addresses how the proposed development will be serviced by watermain, sanitary sewer, storm sewers, and stormwater management.

Should you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager | Land Development Engineering

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- PCSWMM Packaged Model Files
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1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed Hard Rock Casino Expansion at 4837 Albion Road within Ottawa, Ontario. This report will support a Site Plan and Re-Zoning Application for the proposed development. **Figure 1** is a Key Plan showing the site location.

This report outlines the site sanitary and water servicing, along with the proposed storm drainage and stormwater management strategy for the proposed development.

1.1 Background

The existing Rideau Carleton Raceway and OLG Slots property is located at 4837 Albion Road. The subject property was recently severed into two separate parcels. The Rideau Carleton Raceway has retained the 43.8-hectare undeveloped parcel to the east of the existing racetrack that fronts onto Bank Street. Hard Rock Ottawa presently owns the 40.5-hectare parcel that fronts on to Albion Road. This is the property that is subject to this application.

The 40.5-hectare property at 4837 Albion Road is bound by Albion Road to the West, vacant undeveloped land to the north, the retained Rideau Carleton Raceway property to the east, and farmland to the south. The site slopes away from Albion Road to the low point north of the existing horse barns. **Figure 2** shows the existing site conditions.

Prior to the recent severance the original raceway facility consisted of the raceway building with buffet restaurant, grandstand and racetrack with apron as well as stables, barns and horseman's kitchen located at the rear of the site. The original raceway facility was serviced by a private well and septic system. The existing septic bed continues to service the barn, stables and horseman's kitchen.

In 2000, the existing raceway building was expanded to accommodate the addition of the OLG slots. This expansion included the following works:

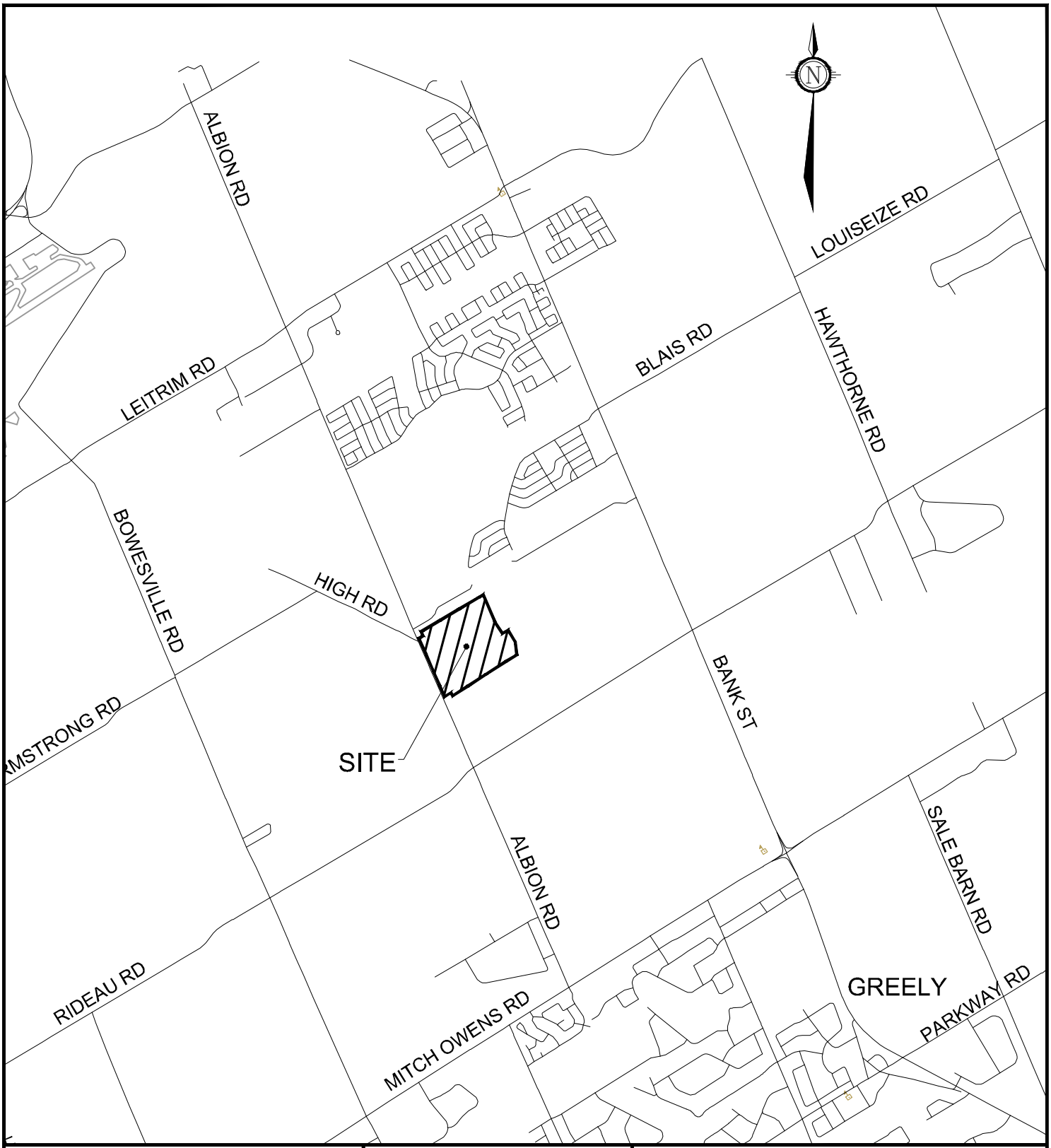
- Expansion of the existing watermain system and addition of the fire suppression system.
- Watermain installed across the property to the east connecting to the existing watermain along Bank Street.
- Storm drainage and stormwater management infrastructure.

In 2006, the sanitary sewer system was added with a pump station.

In 2018, a rezoning application was approved by the City of Ottawa for the addition of 20 gaming tables to the existing OLG slots casino and the proposed hotel.

1.2 Proposed Development

The proposed Hard Rock Casino expansion will consist of an 8-storey hotel with 178 rooms, multiple different restaurants with a total of approximately seat count of 775, a live auditorium with 1600 seats, and approximately 2000 gaming positions all under one roof. The proposed expansions will also include expansions and improvements to the existing parking area and laneways. **Figure 3** shows the proposed site development.



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KEY PLAN

CITY OF OTTAWA

4837 ALBION ROAD
HARD ROCK OTTAWA

DATE	JOB	FIGURE
NOV 2019	116111	FIG 1

M:\2016\116111\CAD\Design\Figures\Report Figures\116111-KP-FIG1.dwg, FIG 1, Nov 07, 2019 - 3:01pm, amestwarp

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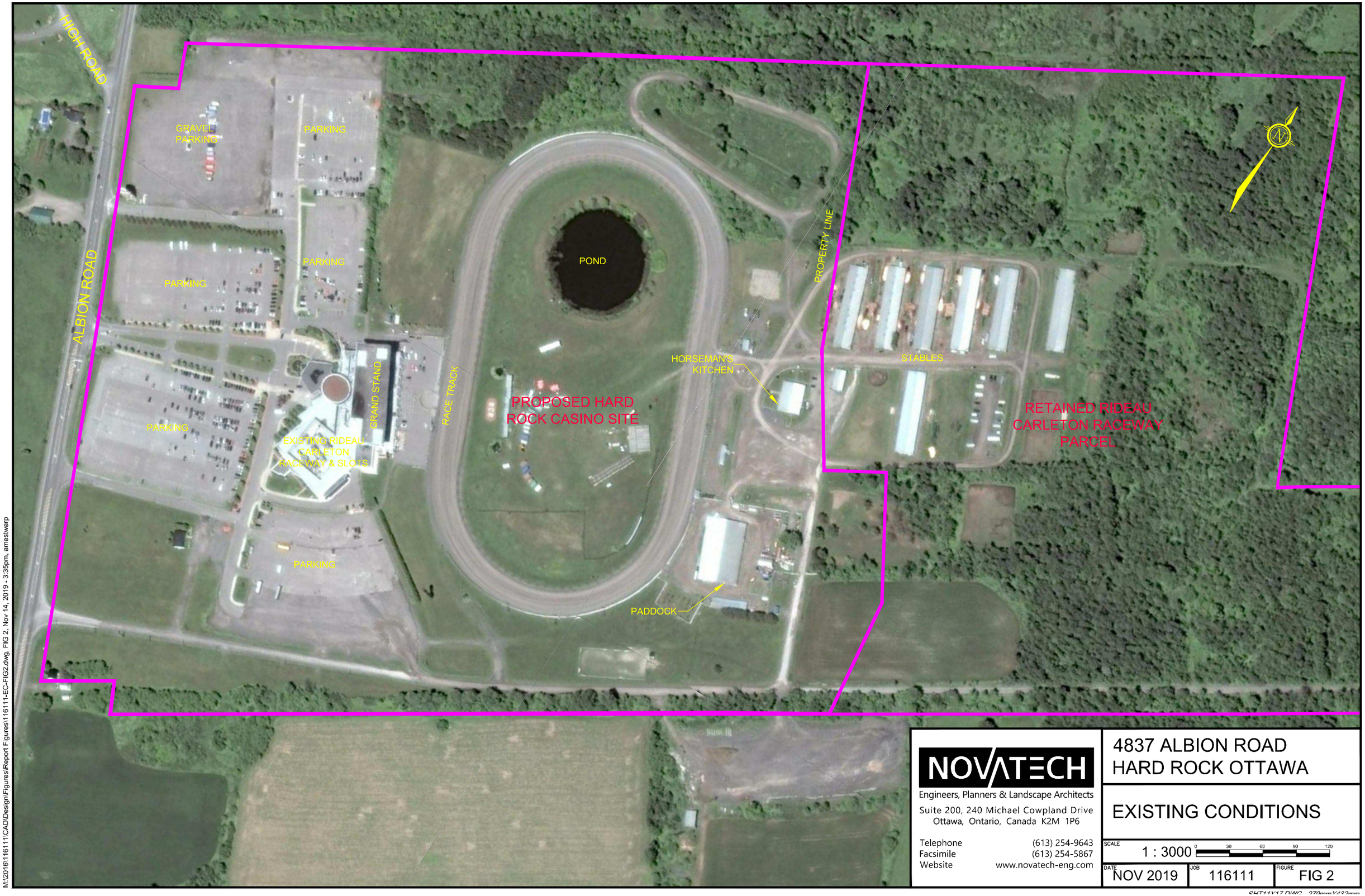

M:\2016\116111\CAD\Design\Figures\Report Figures\116111-EC-FIG2.dwg, FIG 2, Nov 14, 2019 - 3:35pm, amestwarp

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4837 ALBION ROAD HARD ROCK OTTAWA

EXISTING CONDITIONS

SCALE 1 : 3000 (0, 30, 60, 90, 120)

DATE	JOB	FIGURE
NOV 2019	116111	FIG 2

SHT11X17.DWG 279mmX432mm

HIGH ROAD

ALBION ROAD

EX. SWM POND

EX. RACE TRACK

EX. GRAND STAND

EX. RIDEAU CARLETON RACEWAY AND SLOTS

HOTEL

HARD ROCK CASINO ADDITION

LIVE AUDITORIUM

HORSEMAN'S KITCHEN

STABLES

PADDOCK

N

M:\2016\116111\CAD\Design\Figures\Report Figures\116111- PS-FIG 3.dwg, FIG3, Nov 13, 2019 - 3:51pm, amestwarp

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4837 ALBION ROAD
HARD ROCK OTTAWA

PROPOSED SITE PLAN

SCALE 1 : 3000 (0, 30, 60, 90, 120)

DATE NOV 2019 | JOB 116111 | FIGURE FIG 3

SHT11X17.DWG - 279mmX432mm

1.3 Site Constraints

Paterson Group performed the geotechnical investigation in support of the proposed development and provided the following report '*Geotechnical Investigation Proposed Building Expansion, 4837 Albion Road, Ottawa, ON Paterson Group' dated October 30, 2019.* The report indicates that bedrock is expected to range from 15m-25m below existing grade and the groundwater table is expected to be at a depth greater than 7m below existing grade. There is a permissible grade raise restriction of 2.0m above existing ground only where a clay deposit is present. An MECP permit to take water is not anticipated during construction; however, if pumping exceeds anticipated rates than a permit to take water application should be filed.

1.4 Background Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing and stormwater management strategies. This report should be read in conjunction with the following:

- *Geotechnical Investigation, Proposed Building Expansion, 4837 Albion Road, Ottawa, ON Paterson Group (October 30, 2019)*
- *Serviceability Report, 4837 Albion Road, Hard Rock Ottawa, Ottawa, Ontario, Novatech (January 2018)*
- *Sanitary Sewer Brief Rideau Carleton Raceway David McManus Engineering Ltd. (October 6, 2005)*
- *Sanitary Sewage Report Rideau Carleton Raceway David McManus Engineering Ltd. (October 6, 2005)*
- *Rideau Carleton Raceway Expansion Servicing Options Study Oliver, Mangione, McCalla & Associates (March 7, 2000)*
- *Rideau Carleton Raceway Stormwater Design Oliver, Mangione, McCalla & Associates (September 3, 1999)*
- *Leitrim Development Area, Stormwater Management Environmental Study Report and Pre-Design. Golder Associates Limited (August 1994)*
- *Planning for Leitrim and Integrated Approach, Volume II Master Drainage Plan Cumming Cockburn Limited (August 1991)*

2.0 WATER SERVICING

2.1 Existing Water Services

The existing development is currently serviced from the existing 400mm diameter watermain to the northeast of the site in the Bank Street right-of-way. A 200mm diameter private watermain extends through the property to the east from Bank Street to an existing hydrant by the northwest corner of the property just outside of the Albion Road right-of-way. The existing private 200mm diameter watermain provides a potable water service for the existing Rideau Carleton Raceway Operations, the OLG slots, the horseman's kitchen and paddock at the rear of the racetrack.

Existing Fire Suppression

There are existing holding tanks and a dry hydrant for fire suppression that service the existing building and sprinkler system.

There is an existing well on the property that provides the following functions:

- Pumps water to the existing fountain in the middle of the racetrack area.
- Pumps water to the existing fire suppression tanks.
- Supplies water (non-domestic) to the existing stables.

2.2 Proposed Water Servicing

The existing 200mm diameter watermain will continue to service the existing development and provide service for the proposed Hard Rock expansion. The existing building water system will be extended internally to the proposed Hard Rock expansion to provide domestic water. Refer to the General Plan of Services (dwg 116111-GP) for watermain servicing details.

2.2.1 Domestic Water Demands

Design Criteria from the City of Ottawa Water Distribution Guidelines and the Ontario Building Code were used to calculate the theoretical water demands for proposed expansion. The demand calculations are based on flow requirements for the proposed different uses on site.

The water demand calculations for the existing facility are based on historical water record data. Detailed water record information and calculations are provided in **Appendix A**. The domestic water demands for the existing and proposed developments are summarized in **Table 2.1** below.

Table 2.1: Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)
Existing RCR and OLG Slots	*1.01	1.52	2.74
Proposed Restaurants, Hard Rock Auditorium, Casino Additions	2.65	3.98	7.16
Proposed Hard Rock Hotel	0.83	2.08	4.58
Existing + Proposed Expansion	**4.49**	**7.58**	**14.48**

**Existing average daily demand calculated from 2015-2017 water meter data.*

2.2.2 Fire Flow

Fire flow requirements for the proposed building expansion were calculated by the Mechanical Consultant, SNC Lavalin; refer to Fire Protection Water Supply letter prepared by SNC Lavalin provided in **Appendix A**. This letter indicates that a 300,000 US gallon tank and 1250 USGPM fire pump will be installed to provide adequate fire protection for the existing building and proposed building expansion.

The domestic water demand information was submitted to the City of Ottawa for boundary conditions. The boundary conditions were provided for the existing 400mm watermain on Bank Street. The results of the boundary conditions are summarized below in **Table 2.2**.

Table 2.2: Boundary Condition Summary

Condition	Service Connection Location	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	Bank Street	4.49	80psi (Max)	67
Peak Hour	Bank Street	14.48	40psi (Min)	48

These boundary conditions were input into the hydraulic model EPANET for analyzing the performance of the existing watermain systems for the following two (2) theoretical conditions:

1) High Pressure check under Average Day conditions
2) Peak Hour demand

The model indicates that the existing private 200mm watermain on site can provide adequate pressures for domestic use. Therefore, based on the proceeding analysis it can be concluded that the watermain, as designed, will provide adequate system pressures for domestic demands.

Refer to **Appendix A** for detailed model results, schematics of the model and boundary conditions.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Services

The existing development is currently serviced by an existing 250mm diameter gravity sanitary sewer. The conveyance of sanitary flows is as follows:

- Sanitary flows are conveyed to a private pump station at the north side of the property.
- The existing pump station pumps sanitary flows through a 150mm diameter sanitary forcemain.
- The forcemain outlets to an existing 250mm diameter gravity sanitary sewer within the High Road right-of-way; connecting to an existing 250mm diameter sanitary sewer along Earl Armstrong Road.

- The Earl Armstrong Road sanitary sewer connects to an existing 675mm diameter trunk sanitary sewer approximately 800 meters south west of the Bowesville Road intersection in an unopened road allowance.

A portion of the City of Ottawa Sewer Mapping (geoOttawa) is included in **Appendix B** for reference.

There is an existing septic system east of the existing paddock that services the existing horseman's kitchen, and paddock behind the racetrack. The existing septic system on the inside of the racetrack has been abandoned.

3.2 Proposed Sanitary Services

It is proposed to construct a new 250mm diameter sanitary service for the expansion and connect into the existing sanitary sewer by the rear northeast corner of the proposed building expansion. Refer to the General Plan of Services (116111-GP) for details.

3.2.1 Sanitary Flows

Flows from the existing development have been calculated using the previously noted historical water usage data. Flows for the proposed development have been calculated using criteria provided in Section 4 of City of Ottawa Sewer Design Guidelines and the Ontario Building Code. Detailed calculations are provided in **Appendix B** for reference.

The sanitary flows are summarized below in **Table 3.1**.

Table 3.1: Sanitary Flow Summary

Use	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Design Flow (L/s)
Existing RCR and OLG Slots	*1.52	4.13	5.65
Proposed Restaurants, Hard Rock Auditorium, Casino Additions	3.97	**N/A	3.97
Proposed Hard Rock Hotel	2.66	**N/A	2.66
Existing + Expansion	**8.15**	**4.13**	**12.28**

**Existing peak flows calculated from 2015-2017 water meter data with a commercial peaking factor applied.*

***Infiltration flow accounted for in existing development sanitary flow calculations from the David McManus Engineering Ltd. Sanitary Sewage Report Rideau Carleton Raceway Report, Dated October 6, 2005.*

The total theoretical peak sanitary flow for the development including the existing Rideau Carleton Raceway was calculated to be 12.28 L/s. The total sanitary flow is calculated based on a total development area of 14.74ha.

The existing 250mm diameter sewer on site at a minimum slope of 0.28% has a theoretical capacity of 31.4 L/s. The capacity of the existing pump station will be discussed in the following section of the report.

3.3 Existing Sanitary Sewers and Pump Station

The existing 250mm diameter gravity sanitary sewer in High Road was originally designed to accommodate the 20-year expansion plan for the Rideau Carleton Raceway. The 20-year plan included a hotel, 1500 seat theater, retail center, trade center and golf course.

The total sanitary peak flow for the 20-year plan was estimated to be 20.64 L/s. This was allocated to the existing pump station and existing sanitary sewer in High Road.

Existing Forcemains and Pumps

The forcemain size and pumps were selected such that only minimal changes would be required in the future to allow for increased servicing flows from current conditions to the predicted 20-year flows.

A Flygt Pump model NP-3102-463 was selected and operates under normal conditions at a flow rate of 17.2 L/s.

2005 Sanitary Sewage Report (High Road / Earl Armstrong Road)

The 2005 David McManus Engineering Ltd. Sanitary Sewage Report indicates that the existing 250mm gravity sewer in High Road and Earl Armstrong Road has an excess capacity of 6.01 L/s in the 20-year flow condition plus an allotted 5 L/s from the future Central Canada Exhibition Site located at the northwest corner of the Albion Road and Rideau Road intersection.

As such, there is adequate capacity in the existing sanitary sewer infrastructure for the proposed Hard Rock expansion. Refer to **Appendix B** for the 2005 David McManus Engineering Ltd. report.

Assessment on the Existing Pump Station

A Technical Memorandum prepared by Novatech (November 1, 2019) reviews and assesses the condition of the existing pump station. This Technical Memorandum had the following conclusions:

- Operation and Maintenance documentation be compiled for the existing system.
- Improvements for accessing the pump station be completed.
- Enter into a service agreement to provide regular service checks on the pump station and emergency response services.

A copy of the Technical Memorandum is provided in **Appendix B** for reference.

CCTV Investigation

A CCTV investigation was completed for the existing gravity sanitary sewer: High Road / Albion Road intersection to approximately 800m south west of the Bowesville Road intersection.

The CCTV Investigation Report prepared by Veolia compiles the CCTV information for the sanitary sewer. The recommendation, from Novatech's review, is to clean the full length of sanitary sewer as there appears to grease buildup in areas and debris.

A copy of the CCTV Investigation Report, CD of the video footage and Novatech's review is provided in **Appendix B** for reference.

4.0 STORM SEWER SYSTEM AND STORMWATER MANAGEMENT

4.1 Previous Studies

Leitrim Wetlands

The Rideau Carleton Raceway site drains northwards into the Findlay Creek Drain and the Leitrim Wetlands. The Leitrim Wetlands have been classified as a Provincially Significant Wetland.

The Leitrim Wetland was included in the following reports:

- *Planning for Leitrim and Integrated Approach, Volume II Master Drainage Plan Cumming Cockburn Limited (August 1991)*
- *Leitrim Development Area, Stormwater Management Environmental Study Report and Pre-Design. Golder Associates Limited (August 1994)*

Rideau Carleton Raceway Expansion (OLG Slots)

The Rideau Carleton Raceway was initially built in 1962. The site was previously developed without the incorporation of stormwater management practices. The site was subsequently expanded in 2000 to accommodate the addition of the OLG slots.

The expansion involved the installation of new storm drainage and stormwater management infrastructure; designed per the following report, provided in **Appendix C**:

- *Rideau Carleton Raceway Stormwater Design*
  Oliver, Mangione, McCalla & Associates (September 3, 1999)

The 1999 stormwater design included source controls, private storm sewer system and end-of-pipe stormwater management pond. Inlet control devices were used to restrict peak flows in the storm sewer system. Most catchbasins had offline arch-style infiltration chambers to promote infiltration.

The stormwater management pond is located within the middle of the race track area. The pond outlets via a culvert under the racetrack to a ditch on the north side of the existing horse barns. The remainder of the developed portion of the site east of the racetrack drains by a combination of sheet flows and channelized ditch flow to the same outlet location as the pond outlet ditch.

4.2 Stormwater Quantity Control (Allowable Release Rate)

The 1999 stormwater design identified an allowable release rate for the 13.74 ha redevelopment. The allowable release rate was to restrict the 100-year storm event to a 5-year pre-development level.

The CCL (1991) report referenced above provided a 5-year flow as 4,515 L/s for a 293 ha area. The 1999 stormwater design pro-rated this value to determine an allowable release rate of 213 L/s. This was the allowable release rate used in the 1999 design of the end-of-pipe stormwater management pond.

4.2.1 Allowable Release Rate for Proposed Storm Sewer System

The 1999 stormwater design included a storm sewer design sheet that identified flow restrictions for each storm sewer run. The overall peak flow to the stormwater management pond was to be controlled to 658.6 L/s.

The proposed storm drainage and stormwater management design is based on adhering to the flow restrictions specified in the 1999 storm sewer design sheet; provided in **Appendix C**.

4.3 Stormwater Management Criteria

Storm servicing for the site will be provided using a dual drainage system:

- Runoff will be stored, infiltrated, and conveyed by underground storage / infiltration chambers (minor system).
- Flows from large storm events that exceed the capacity of the minor system will be stored on the surface and conveyed along defined overland flow routes (major system).

Runoff from the site is controlled by the existing stormwater management pond before discharging to the Findlay Creek Drain.

4.3.1 Minor System (Storm Sewer) Design Criteria

Runoff from frequent events will be conveyed by the existing and proposed storm sewers (minor system). Inlet control devices will be used to restrict flows to the minor system.

Storm Sewer Design Criteria

The following is the storm sewer design criteria based on the City of Ottawa Sewer Design Guidelines (October 2012) and associated Technical Bulletins:

- Rational Method (Q) = 2.78CIA, where
  - Q = peak flow (L/s)
  - C = runoff coefficient
    - C = (0.70 * %Imp.) + 0.20
  - I = rainfall intensity for a 2-year return period (mm/hr)
    - $I_{2yr} = 732.951 / [(Tc(min) + 6.199)]^{0.810}$
  - A = site area (ha)
- Minimum Pipe Size = 250 mm; Minimum / Maximum Full Flow Velocity = 0.8 m/s / 3.0 m/s

The proposed storm sewers will be sized to convey the peak flows corresponding to a 2-year return period storm event. Per the 1999 storm sewer design sheet, the existing storm sewers were initially sized to convey the restricted peak flows for a 5-year return period storm event.

Refer to the storm sewer design sheets provided in **Appendix C**.

Inlet Control Devices

Inlet control devices (ICDs) will restrict inflows to the minor system. ICDs will be sized to control minor system peak flows to the allowable release rates specified in **Section 4.2.1**. These allowable release rates are based on the restricted flows per the 1999 storm sewer design sheet.

Hydraulic Grade Line

The proposed storm sewers will be designed to ensure the hydraulic grade line (HGL) for a 100-year storm event will provide a minimum 0.30 m clearance from the underside of footing (USF) elevation.

4.3.2 Major System (Overland Flow) Design Criteria

Flows that exceed the restricted release rates will be stored on the surface. The proposed grading design provides an overland flow path towards the stormwater management pond in the race track area and the private laneway to the southeast. Refer to the Grading Plan (Drawing 116111-GR).

Major System (Overland Flow) Design Criteria

The following overland flow criteria will be applied to the proposed design:

- Promote surface storage by ponding stormwater on the surface.
- Ensure no ponding on the surface during a 2-year event.
- Ensure that major system flows have a maximum dynamic depth of 0.35 m during the 100-year event.
- Ensure that water levels will not touch the building envelope / lowest opening during the Stress Test event (100-year +20%).

4.3.3 Water Quality Treatment Criteria

The proposed development is within the jurisdiction of the Rideau Valley Conservation Authority. The water quality treatment criteria for the proposed development is to provide an Enhanced level of water quality treatment. This corresponds to 80% long-term removal of total suspended solids (TSS).

Water quality treatment will be provided by a combination of the underground storage / infiltration chambers and the existing stormwater management pond located in the race track area.

4.3.4 Best Management Practices and Low Impact Development

The proposed development is to utilize the use of best management practices (BMPs) and low impact development (LID) techniques. This will reduce the impacts of the proposed development development on the hydrologic cycle; and mitigate the reduction in groundwater infiltration / recharge resulting from the proposed increase in impervious areas.

4.4 Proposed Storm Infrastructure

The existing storm sewer network will need to be modified for the proposed development as a large area of the existing parking lot area will be developed / redeveloped. Refer to the General Plan of Services (drawing 116111-GP) for the existing / proposed storm servicing design.

The existing stormwater management design concept will be continued and incorporated into any modifications to the storm sewer system. This includes surface ponding in parking areas, source controls via infiltration basins and storage of stormwater on building roofs.

4.4.1 Underground Storage / Infiltration Chambers

Underground storage will be required for the proposed development to attenuate runoff. By adhering to the 1999 flow restrictions surface ponding would occur during the 2-year storm event. Underground storage is provided to store runoff from a 2-year storm event and infiltrate stormwater for a 5mm (4-hour Chicago) storm.

The underground storage systems will consist of Stormtech SC-740 arch-type chambers (or approved equivalent), which are covered in 50mm dia. (D50) clearstone. The chambers will be installed under the parking areas immediately upstream each inlet. The invert elevation of the outlet pipe or ICD from the chambers will be perched 0.10m above the bottom of the chambers to provide storage for infiltration.

A total of 529 Stormtech SC-740 arch-type chambers will provide approximately 1,119.8 m^3 of underground storage. Storage is provided in the chambers and surrounding clearstone.

Refer to **Appendix C** for further details. The proposed layout of underground storage chambers is shown on the General Plan of Services (drawing 116111-GP).

The underground storage / infiltration chamber system is consistent with the 1999 approach for stormwater management.

4.4.2 Surface Storage

The parking areas have been designed to store runoff from storms that exceed the capacity of the underground storage chambers at each inlet. The site has been graded to ensure that ponding is confined within the parking areas at a maximum depth of 0.35 m (static ponding + dynamic flow).

Overland flow paths have been provided to ensure that runoff from extreme storm events that exceed the available storage can be safely directed towards the stormwater management pond.

4.5 Stormwater Quality Control

Stormwater quality control will be provided via the underground storage / infiltration chambers and the end-of-pipe stormwater management pond.

4.5.1 Underground Storage (Infiltration)

Water quality treatment will initially be provided by the underground storage / infiltration chambers (source controls).

The underground storage chambers have been designed per the following design guidance provided in the MOE Stormwater Management Planning (SWMP) and Design Manual (March 2003), for a pervious pipe / infiltration system for stormwater management:

1 Provide storage volume per the water quality storage requirements provided in Table 3.2 (MOE, 2003).

2 Provide storage volumes for the pervious pipe / infiltration system equal to the runoff from a 5mm – 4-hour storm (minimum) and 15mm – 4-hour storm (maximum).

3 Native soils should have a percolation rate greater than 15 mm/hr.

4 The bottom of the storage layer should be located at least 1m above the depth of bedrock and seasonally high groundwater table.

Existing Infiltration

Under existing conditions quality control of stormwater is provided using a combination of source and conveyance controls. Source controls are provided in the form of dry wells (infiltration chambers) installed at each catchbasin.

The provided storage for infiltration is 6.7 m^3 per inlet via 10x arch-type infiltration chambers. This value was based the total area to the existing catchbasins (6.47 ha) multiplied by the runoff coefficient and 5mm. The total storage volume of 226 m^3 was divided by the number of catchbasins (34) that are connected to a dry well.

Proposed Infiltration

The underground storage chambers will be set 0.10m below the outlet pipe / ICD. This is to provide storage within the chambers and clearstone base for infiltration. Additional infiltration will also be provided due to the restrictiveness of the ICDs and high percolation rate of the surficial sandy soils. The required and provided storage volumes are provided in **Appendix D**.

4.5.2 Stormwater Management Pond

The stormwater management pond in the middle of the race track area was sized to provide water quality treatment for a 12.88 ha area with an assumed 85% imperviousness. Runoff from the building rooftop was not included in the calculations as rooftop runoff does not required water quality treatment.

The pond is considered a 'wet pond' with a permanent pool and extended detention. The 1999 stormwater design provided required storage volumes based on the MOE Stormwater Management Practices, Planning and Design Manual (June 1994), which was superseded in by the SWMP and Design Manual (March 2003).

Table 4.1 provides a comparison of the provided and required permanent pool and extended detention volumes. The 2019 design required storage volumes are based on Table 3.2 in the SWMP and Design Manual (March 2003).

Table 4.1: Water Quality Treatment Volumes (SWM Pond)

Pond Feature	Provided Storage Volume	Required Storage Volume	
		1999 Design	2019 Design
Permanent Pool	5,179 m^3	2,705 m^3 (210 m^3/ha x 12.88 ha)	2,449 m^3 (206 m^3/ha x 11.87 ha)
Extended Detention	2,350 m^3	515 m^3 (40 m^3/ha x 12.88 ha)	475 m^3 (40 m^3/ha x 11.87 ha)
TOTAL	**7,529 m^3**	**3,220 m^3**	**2,924 m^3**

The 1999 stormwater management report assumed a 12.88 ha area based on 85% imperviousness. The proposed development will have less treatable area (11.87 ha) due to the additional building. In addition, the overall imperviousness is slightly less (83%) than previously assumed. As such, post-development runoff volumes are anticipated to be less than previously assumed. Therefore, no modifications are proposed for the stormwater management pond.

4.6 Stormwater Management Modeling

A dual drainage stormwater management model (PCSWMM) for the existing and proposed storm infrastructure was prepared. The model provides estimated minor and major system peak flows, overland flow depths, HGL elevations, and on-site storage requirements.

The model is based on the previously established SWM criteria, such as adhering to the storm sewer flow restrictions provided in the 1999 storm sewer design sheet.

The model was built assuming the interim build-out of the site. It does not include the potential future entrance laneway to Earl Armstrong Road, should that road be extended.

4.6.1 PCSWMM Model Parameters

Design Storms

The model includes the following design storms based on the City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (October 2012):

- 3-hour Chicago Storm Distribution (10-minute time step)
- 12-hour SCS Storm Distribution (30-minute time step)

Each storm distribution includes the 2-year, 5-year, 100-year, and 100-year (+20%) return periods. The 100-year (+20%) return period is used to 'stress test' the storm drainage system. It has a 20% higher intensity and total volume compared to the 100-year event.

The 3-hour Chicago distribution generates the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design and analysis of the storm drainage system.

The 5mm & 15mm 4-hour Chicago storm distributions were used to estimate runoff volumes and determine infiltration storage requirements.

PCSWMM Model Schematics, Output Data and Modeling Files

PCSWMM model schematics and output data for the 2-year & 100-year 3-hour Chicago storm distribution is provided in **Appendix D**.

The PCSWMM modeling files are provided on the enclosed CD.

Subcatchment Areas

For modeling purposes, the site has been divided into subcatchments based on the drainage areas tributary to each inlet of the existing and proposed storm sewer systems. The subcatchment areas are shown on the Stormwater Management Area Plan (drawing 116111-SWM).

The hydrologic modeling parameters for each subcatchment were developed based on the Site Plan (Figure 3) and the Stormwater Management Plan specified above. Subcatchment parameters are provided in **Appendix D**.

Impervious Values

Runoff coefficients for each subcatchment area were determined based on the proposed site plan. Refer to the Stormwater Management Plan (drawing 116111-SWM) for details. Percent impervious values were calculated using the following formula:

$$\%imp = \frac{c - 0.2}{0.7}$$

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values as specified in the Sewer Design Guidelines were used for all catchments.

Horton's Equation:
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: f_o = 76.2 mm/hr
Final infiltration rate: f_c = 13.2 mm/hr
Decay Coefficient: k = 4.14/hr

Depression Storage

The default values for depression storage (1.57mm impervious / 4.67 mm pervious) have been applied to all catchments.

The 'zero impervious' parameter (areas with no depression storage) represents the percent of roof top areas to total impervious area. The 'zero impervious' parameter for the existing and proposed building rooftops is set to 100%.

Subarea Routing

Subarea routing for all subcatchments is set to 'direct to outlet'.

Equivalent Width

The 'Equivalent Width' parameter refers to the width of the subcatchment flow path.

The equivalent width parameter for all subcatchments is based on the measured flow length. Flow lengths were digitized in PCSWMM as described in Section 5.4.5.6 of the City of Ottawa Sewer Design Guidelines (October 2012).

The flow paths are shown on the PCSWMM model schematics provided in **Appendix D**.

Building Rooftop Release Rates / Storage

The building rooftops were simulated in PCSWMM based on an outlet rating curve and using a storage node to represent the available storage provided by the roof surface. For modeling purposes, the available storage and flow rating curve for the roof drains has been multiplied by the number of drains on each roof, and the total rooftop storage lumped into a single storage node.

The outlet rating curve for the proposed building rooftop includes the following overall peak flows for the 5-year and 100-year storm events:

Rooftop Release Rates	5-year	100-year	Storage Provided
North Outlet (BLDG01)	31.3 L/s	46.0 L/s	525.6 m^3
East Outlet (BLDG02)	11.9 L/s	14.9 L/s	131.7 m^3
TOTAL	43.2 L/s	60.9 L/s	657.3 m^3

The existing building had an assumed release rate of 196.8 L/s, per the 1999 storm sewer design sheet. To adhere to this flow rate, the model has an assumed rooftop storage area in the existing rating curve that represents 50% of the existing roof area.

Refer to Roof Drain calculations provided in **Appendix C**.

Inlet Control Devices

The existing and proposed ICD's were sized to provide a 100-year peak flow that is equivalent to the restricted flow rate specified in the 1999 storm sewer design sheet.

Inlet control devices (ICD's) are represented in the model as theoretical circular orifices. The proposed ICD's will consist of IPEX Tempest LMF or MHF ICD's (or approved equivalent). ICD information is indicated on the General Plan of Services (drawing 116111-GP). Refer to correspondence and documentation for the Tempest LMF ICD's provided in **Appendix C**.

Storage Rating Curves

The stage-storage curves for each inlet were calculated based on the number of Stormtech SC-740 storage chambers provided (at a depth of 0.76 m) and based on the maximum amount of surface storage. Surface storage volumes were estimated based on the proposed Grading Plan (drawing 116111-GR) and existing 1:1000 topographic mapping provided by the City of Ottawa.

The total underground and surface storage for each inlet is provided in **Appendix D**.

Minor System Conduits (Bend / Exit Losses)

The minor system network was created in Civil3D and imported into PCSWMM. The following exit losses have been inputted into the model. They represent the loss coefficient based on the bend angle, as per the Appendix 6-B in the City of Ottawa Sewer Design Guidelines (October 2012).

Bend Angle	Loss Coefficient
0	0.00
15	0.09
30	0.21
45	0.39
60	0.64
75	0.96
90	1.32

Major System Conduits

Major system conduits (overland flow network) have been defined using rectangular transect with a 3m length, 3m bottom width, and 1m theoretical depth. These values have been chosen to reduce the amount of surface storage accounted for while maintaining model stability. Short conduit lengths lead to model stability issues.

Junctions representing high points have an invert elevation that represents either the lowest 'spill' elevation, depending on the path of the overland flow route.

Downstream Boundary Conditions (Outfalls)

The storm sewer outlet for the proposed development is the existing stormwater management pond. The pond storage volumes and outlet control structures are not included in the model. The model was run using a 'Normal' outfall for the minor system and 'Free' outfall for the major system.

4.6.2 Hydraulic Grade Line (PCSWMM)

The results of the analysis were used to determine if there would be any surcharging from the storm sewer system during the 100-year storm event. **Appendix D** provides a summary of the 100-year HGL elevation at each storm manhole, as well as a summary of the HGL elevations for a 20% increase (rainfall intensity and total precipitation) in the 100-year design event.

The results of the HGL analysis and the stress testing indicates that the proposed storm sewer does not surcharge during the 100-year event and 100-year (+20%) storm event. The existing storm sewer will surcharge slightly during the 100-year and 100-year (+20%) storm events.

4.6.3 Major System Design and Analysis

The major system network was evaluated using the PCSWMM model to ensure that the ponding depths conform to City of Ottawa standards. A summary of ponding depths at each inlet for the 2-year, 5-year, 100-year and 100-year (+20%) events are provided in **Appendix D**. Note that these ponding depths are conservative as they do not account for infiltration in the underlain sandy soils. As the underlying soils are highly permeable, actual ponding depths would be less.

There is no ponding during the 2-year storm event for the proposed inlets. In addition, the maximum static and dynamic ponding depths are less than 0.35m during the 100-year storm event, thereby meeting the major system criteria for the proposed areas.

The model indicates that there would be 2-year ponding for the existing catchbasins, and ponding depths will exceed 0.35m during the 100-year storm event. The release rates identified in the 1999 SWM report / storm sewer design sheet are being maintained. There is no change to the existing level of service within the existing parking areas. Note that the existing storm sewer system has been in operation since 2000 without any issues.

4.6.4 Summary of Peak Flows

Table 4.2 provides a summary of the minor system and major system peak flows.

Table 4.2: Summary of Peak Flows

Scenario	Allowable Release Rate[1] (L/s)	Peak Flow[2] (L/s)		
		Minor System	Major System	TOTAL
2-year	658.6 L/s	405.0	0.0	405.0
5-year		513.2	48.4	561.6
100-year		659.3	939.7	1,599.1
100-year (+20%)	-	672.4	1,822.6	2,495.0

(1) Allowable release rate is based on 1999 storm sewer design sheet.
(2) PCSWMM model results for the 3-hour Chicago storm distribution.

The 100-year minor system peak flow to the pond is controlled to just over the allowable release rate of 658.6 L/s for the 3-hour Chicago storm distribution. Peak flows for each storm sewer run are provided on the storm sewer design sheet (**Appendix C**).

The total 100-year major system peak flows to the pond are 939.7 L/s. The total minor and major system peak flow to the pond is 1,599.1 L/s.

The PCSWMM model is based on the existing and proposed storm drainage and grading design. By adhering to the allowable release rates specified in the 1999 storm sewer design sheet the site is overcontrolling the minor system, which results in additional major system flow.

5.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing catchbasins and manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (117203-ESC) for additional information.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the proposed watermain network confirms the following:

- The existing 200mm diameter watermain that connects to the existing watermain along Bank Street can service the proposed development.
- Connection to existing watermain will be via internal plumbing.
- An additional fire suppression tank may be required to provide adequate volume for fire demands for the proposed development.

Sanitary Servicing

The analysis of the proposed sanitary servicing confirms the following:

- There is adequate capacity within the existing sanitary servicing infrastructure including the existing sanitary sewer, forcemain and pump station, to service the proposed development.
- Connection to existing sanitary sewer will include a minor extension to the existing gravity system.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- No modifications are proposed for the stormwater management pond or pond outlet structure.
- Proposed storm sewer system will connect with the existing storm sewer system.
    - Storm sewers (minor system) have been designed to convey the uncontrolled 2-year peak flow using the Rational Method.
    - Inflows to the minor system will be controlled using Tempest LMF 'vortex' type inlet control devices (ICD's) to the restrictive flow rates specified in the 1999 storm sewer design sheet.
    - The existing storm servicing infrastructure can be modified to service the proposed development.
    - The 100-year hydraulic grade line (HGL) is below the storm sewer obvert. As such, the storm sewers do not surcharge during a 100-year event.
- Parking lot graded to maximize surface stormwater storage during storm events that exceed the allowable minor system inlet rate.
    - The major overland flow outlet for the site is the existing stormwater management pond.
    - No ponding of stormwater at the proposed inlets during a 2-year storm event.
    - Ponding depths will not exceed 0.35m for all storms up to and including the 100-year event.
- Underground storage will be provided to prevent surface ponding during a 2-year storm and promote infiltration for the first 5mm of runoff.
    - The underground storage / infiltration system will consist of Stormtech SC-740 arch-type chambers (or approved equivalent).

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

7.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

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Water Resources

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Director
Land Development Engineering

Appendix A

Water Servicing Information

HARD ROCK OTTAWA
RIDEAU CARLETON RACEWAY
WATER DEMANDS

Table 1.0: 4837 Albion Road City of Ottawa Water Meter Usage

Year	Month	Usage (m3)
2015	September	2,842
	October	2,364
	November	1,945
	December	1,694
2016	January	1,421
	February	1,284
	March	1,574
	April	1,539
	May	1,399
	June	2,133
	July	1,852
	August	2,468
	September	1,809
	October	1,694
	November	1,829
	December	1,508
2017	January	1,595
	February	1,728
	March	1,948
	April	2,228
	May	1,861
	June	1,980
	July	2,006
	August	2,582

Table 1.1 Existing Development Water Demand Calculations from Metered Usage

Condition	Total Usage (m^3)	No. of Months	Monthly Flow (m^3/month)	Daily Flow (m^3/day)	Avg Day Demand (L/s)	Max Day Demand (L/s)	Peak Hour Demand (L/s)
Average Months	45283	24	1887	63	0.73	1.09	1.97
Min Month	1284	1	1284	43	0.50	0.74	1.34
Max Month	2842	1	2842	95	1.10	1.64	2.96
Annual Max Month Avg	7892	3	2631	88	1.01	1.52	2.74

Design Parameters:

Commercial Peaking Factor (Section 4.0 Ottawa Water Distribution Guidelines)

Max. Daily Demand:	1.5	x Avg. Day
Peak Hourly Demand:	1.8	x Max. Day

Table 2.0: OLG Slots Water Meter Usage

Year	Month	Usage (m3)
2015	January	1,083
	February	1,009
	March	1,253
	April	1,235
	May	1,463
	June	1,270
	July	1,325
	August	1,328
	September	1,196
	October	1,177
	November	1,147
	December	881
2016	January	699
	February	709
	March	859
	April	872
	May	814
	June	1,091
	July	1,105
	August	1,139
	September	959
	October	984
	November	869
	December	807
2017	January	902
	February	988
	March	1,024
	April	1,011
	May	1,073
	June	1,101
	July	1,157
	August	1,175
	September	1,060
	October	1,040

Table 2.1 Existing OLG Slots Water Demand Calculation from Metered Usage

Condition	Total Usage (m^3)	No. of Months	Monthly Flow (m^3/month)	Daily Flow (m^3/day)	Avg Day Demand (L/s)	Max Day Demand (L/s)	Peak Hour Demand (L/s)	No. Existing Slots	OLG Slot Demand (L/Slot/day)
Average Months	35805	34	1053	35	0.41	0.61	1.10	1250	28
Min Month	699	1	699	23	0.27	0.40	0.73	1250	19
Max Month	1463	1	1463	49	0.56	0.85	1.52	1250	39
Annual Max Month Avg	3642	3	1214	40	0.47	0.70	1.26	1250	32

Design Parameters:

Commercial Peaking Factor (Section 4.0 Ottawa Water Distribution Guidelines)

Max. Daily Demand:	1.5	x Avg. Day
Peak Hourly Demand:	1.8	x Max. Day

NOVATECH
Engineers, Planners & Landscape Architects

HARD ROCK OTTAWA
RIDEAU CARLETON RACEWAY
WATER DEMANDS

JOB NO. 116111
DATE PREPARED: NOVEMBER 2019

Table 3.0: Water Demands Existing Building

Node	Commercial Demand (L/s)		
	* Avg Day	Max. Daily	Peak Hour
Existing Building	1.01	1.52	2.74

*Note: Average Day demand calculated from averaged peak month demand from City of Ottawa metered water usage from 2015-2017

Table 3.1: Water Demands Phase 2 Hard Rock Entertainment

Node	Commercial Yield				Commercial Demand (L/s)		
	Amenity / Attraction				Avg Day	Max. Daily	Peak Hour
	*Gaming Positions (No. Positions)	Restaurant Seats (No. Seats)	Hard Rock Live Auditorium (No. Seats)	**New Employees (No. Employees)			
Hard Rock Casino	2000	775	1600	483	2.65	3.98	7.16

*Note: Includes the 35 gaming tables from the phase1 additions.
**Note: Includes the additional 99 Full Time Equivalents from the phase 1 additions

Table 3.2: Water Demands Phase 2 Hard Rock Hotel

Node	Hotel Yield		Residential Demand (L/s)		
	Units		Avg Day	Max. Daily	Peak Hour
	Hotel Rooms	Total Population			
Hard Rock Hotel	178	320	0.83	2.08	4.58

Table 3.3: Water Demands Total Proposed and Existing Development

Node	Total Demand (L/s)		
	Avg Day	Max. Daily	Peak Hour
Existing + Hard Rock Addition	4.49	7.58	14.48

Design Parameters:

- Hotel population = 1.8 person/room
- Gaming Tables = 6 seats/table

Section 4.0 Ottawa Sewer Design Guidelines

- Restaurant (Steakhouse, Hard Rock Café, Casual dinning)	125	L/seat/day
- Auditoriums (No food)	20	L/seat/day
- Hotel	225	L/person/day
- Employees	75	L/person/day

Novatech Daily Usage Calculation

- OLG Slots (calculated based on existing usage)	32	L/slot/day
- Gaming Tables (based on existing slots calculation)	32	L/seat/day

Commercial Peaking Factor (Section 4.0 Ottawa Water Distribution Guidelines)

Max. Daily Demand:	1.5	x Avg. day
Peak Hourly Demand:	1.8	x Max. day

Residential Peaking Factor (Section 4.0 Ottawa Water Distribution Guidelines)

Max. Daily Demand:	2.5	x Avg. day
Peak Hourly Demand:	2.2	x Max. day

SNC·LAVALIN

2140 Regent St. South, Unit 12A
Sudbury, Ontario, Canada, P3E 5S8
705.675.6881 705.675.8330

City of Ottawa
110 Laurier Ave. West
Ottawa, Ontario K1P 1J1

Project No. **2019-667797**

October 29, 2019

Attention: **Ms. Terri Hunt**
Program Manager, Permits Approval
Building Code Services

Mr. Allan Evans
Fire Protection Engineer
Ottawa Fire Department

Fax: 613-580-2495

Re: **Hardrock Ottawa Phase 2 Expansion Casino and Hotel**
Fire Protection Water Supply
4837 Albion Road
Ottawa, Ontario

Hello Terri / Allan

As discussed at our meeting on Oct. 17th, we have reviewed and summarized the approach to fire protection for the Hard Rock Casino and Hotel site and provided Fire Underwriter's Survey calculations for Water Supply for Public Fire Protection as well as Ontario Building Code Water Supply calculations.

Fire suppression for the entire building (existing and new) will be provided by a new 300,000 gallon tank and 1250 USGPM fire pump meeting NFPA 20 requirements. A back up fire pump of similar capacity will also be provided. A common sprinkler and standpipe header serving all areas of the building will be installed and pressurized by the new pump(s).

The proposed 300,000 gallon tank will provide a 3.5+ hour capacity for areas of Extra Hazard sprinkler coverage (NFPA 13 requires only 1.5 to 2 hours period) and 2.5+ hours of capacity for areas with storage of hazardous products (a final confirmation of whether this requirement will be necessary cannot be done until the designs are finished – this is a worst case assumption). The flow / volume capacities noted above are calculated to meet NFPA 13 requirements and include in them a total hose allowance (inside and outside) of 500 USGPM.

The existing in-ground 150,000 gallon storage tanks (see attachment of original design drawings for the buried tanks) and 500 USGPM fire pump which serves the existing building would become redundant for NFPA fire protection purposes. The pump would be removed from service. The storage tanks would remain in place to provide a plenum of water available for the fire department to draft from to supply the Siamese connections and / or hydrants located around the site. We understand that a pumper truck is able to provide a flow of 5,000 LPM (1,321 USGPM). This storage will provide 1.5+ hours of flow at this rate.

Additional dry hydrants located around the building entrance, piped from the storage tank location would be provided to permit multiple access points for the flow provided by the pumper truck.

The Fire Underwriter's Survey Fire Flow Calculation for the entire building (see attachments) identifies a fire flow requirement of 240.8 L/s (3817 USGPM). The existing 150,000 gallon storage capacity will provide 30+ minutes at this flow rate.

The OBC / Fire Marshall Fire Protection Water Supply calculation (see attached) identifies a requirement for a storage capacity of 71,310 USG for a 30 minute supply at 2,377 USGPM. The existing 150,000 storage capacity will provide more than double that requirement.

Additional capacity for recharging the tanks, if accepted in an emergency situation, could be provided by the 8" domestic water service main that at present has been designated for domestic water use only.

If you have any questions of require clarifications please feel free to contact me.

SNC-LAVALIN INC.
Buildings Ontario

per: 

Jeff Hunter, P. Eng.
Mechanical Director

Document1

New Bldg - 28,638 m2
Exist Bldg - 8,764 m2
Total Bldg - 37,402 m2
sq.rt of A - 193.396

FIRE FLOW CALCULATION

Project: A **Street: A** **Municipality: A**

Formula F = 220 x c x Sq. Root "A"

F = the required fire flow in litres per minute
c = the coefficient related to type of construction
A = the total floor area in square meters

STEP 1: TYPE OF CONSTRUCTION TO DETERMINE "c" COEFFICIENT

c: 1.5 for Wood Frame Construction; c: 1.0 for Ordinary Construction;

c: 0.8 for Non-Combustible Construction; c: 0.6 for Fire-Resistive Construction

F = 220 x c 0.8 X Sq. Root "A" 193.396 = 34,038

STEP 2: INCREASE OR DECREASE FOR OCCUPANCY

Non-Combustible (+75%) Charge; Limited Combustible (+85%) Charge; Combustible (+100%) Free Burning (+115%) Charge; Rapid Burning (+125%) Charge

"APPLY ONE OF THESE CHARGES TO THE VALUE OBTAINED IN STEP 1 ROUNDED OFF TO THE NEAREST 1000."

Value from Step 1 34,000 X Charge 0.85 = 28,900

STEP 3: DETERMINE THE DECREASE FOR SPRINKLER SYSTEM

+50% For Complete Automatic Sprinkler Protection
+25% For Building With Fire Resistive or Non-Combustible Construction And Very Low Fire Hazard

Value from Step 2 28,900 X Above Value 0.5 = 14,450

Value from Step 2 28,900 - Answer from above 14,450 = 14,450

STEP 4: INCREASE FOR EXPOSURE FROM OTHER BUILDINGS

0 to 3 m (+25%); 3.1 to 10 m (+20%); 10.1 to 20 m (+15%); 20.1 to 30 m (+10%); 30.1 to 45 m (+5%)

THE TOTAL % SHALL BE THE SUM OF THE % FOR ALL SIDES, BUT SHALL NOT EXCEED 75%

Value from Step 2 14,450 X North Side Sep. Charge 0 = 0

Value from Step 2 14,450 X South Side Sep. Charge 0 = 0

Value from Step 2 14,450 X West Side Sep. Charge 0 = 0

Value from Step 2 14,450 X East Side Sep. Charge 0 = 0

TOTAL 0

Value from Step 3 14,450 + Total 0 = 14,450

STEP 5: TO DETERMINE THE FIRE FLOW

Take Value from Step 4 14,450 Divide By 60 = 240.8 L/S

3,817 USGPM

Ontario Building Code Water Supply Calculations

Required fire protection water supply for the entire Hard Rock facility has been calculated in accordance with the procedure provide in the Ontario Building Code Div. B Appendix A 3.2.5.7.:

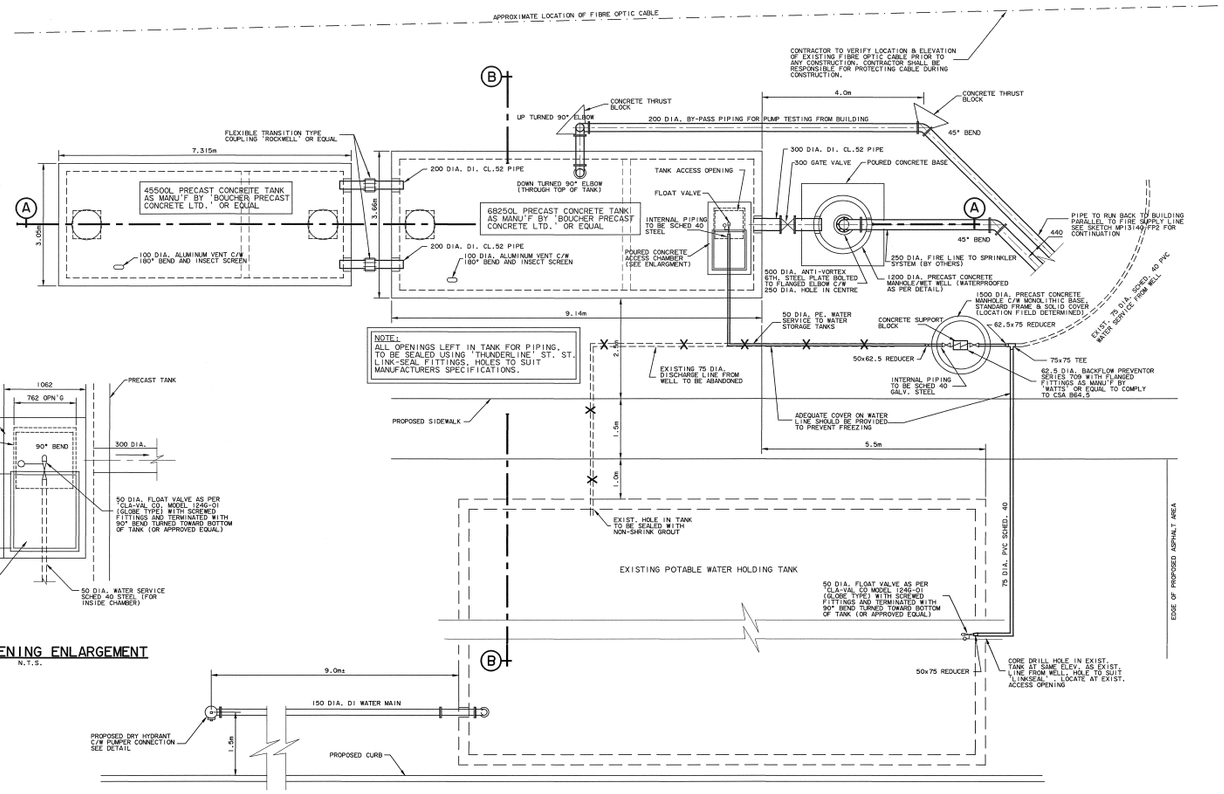
*Building group is Group A-1 (worst case of all areas within the building)

K	=	14	from Table 1 of Div. B Appendix A-3.2.5.7.
V	=	246,691	m^3
Stot	=	1	since the building is located further than 10m from a property line on all sides
Q	=	K x V x Stot	
	=	3,453,674	L

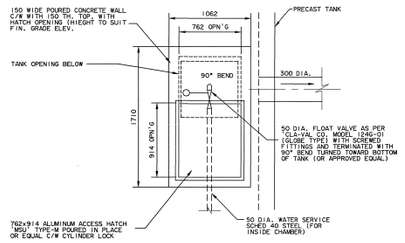
Building is greater than 600 sq. m (6,456 sq. ft.); refer to the 2nd row of Table 2 of Div. B Appendix A-3.2.5.7.

Q <270,000 L so from Table 2:

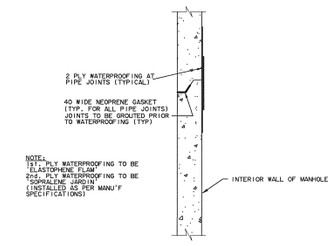
Req'd Flow	=	9,000	L/min for 30 min @ min. 140 kPa
Req'd on-site supply	=	270,000	L
		71,326USG	



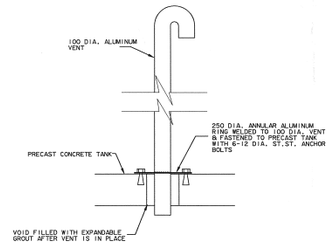
PLAN OF FIRE PROTECTION WATER TANKS
SCALE: 1:50



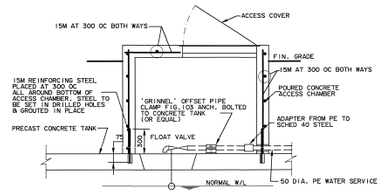
ACCESS OPENING ENLARGEMENT
N.T.S.



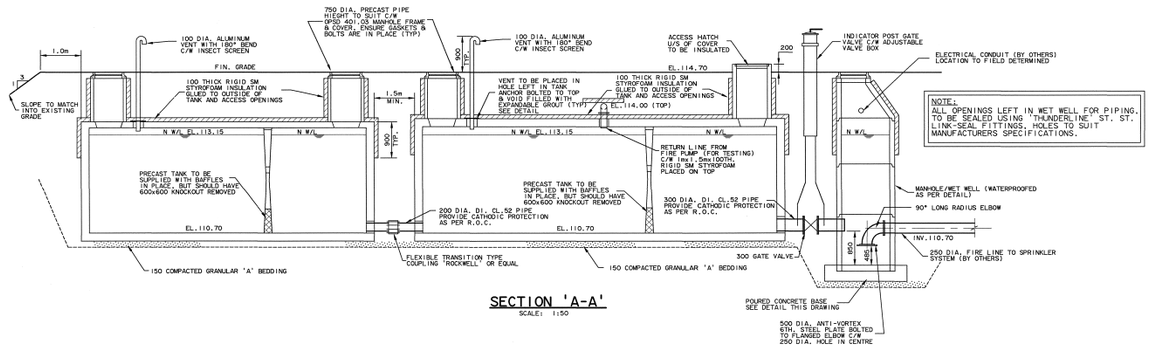
MANHOLE/WET WELL WATERPROOFING DETAIL
N.T.S.



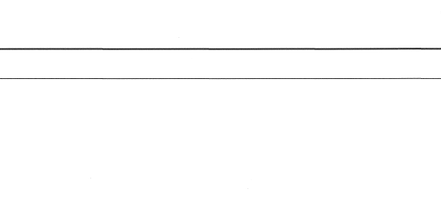
VENT DETAIL
N.T.S.



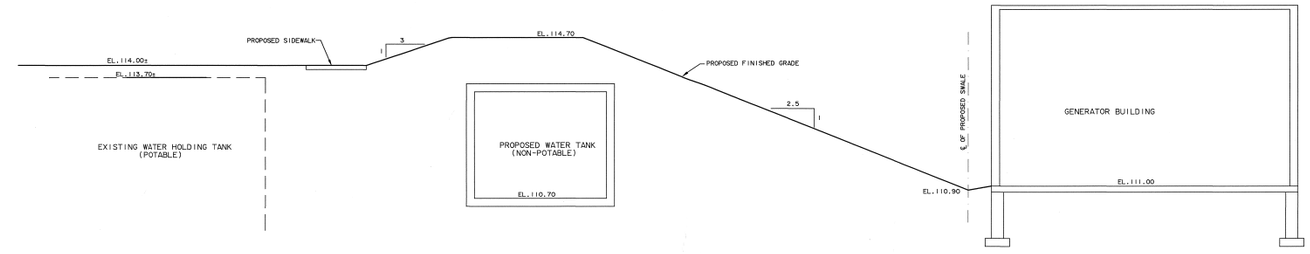
DISCHARGE DETAIL AT STORAGE TANK
N.T.S.



SECTION 'A-A'
SCALE: 1:50



MANHOLE/WET WELL BASE DETAIL
N.T.S.



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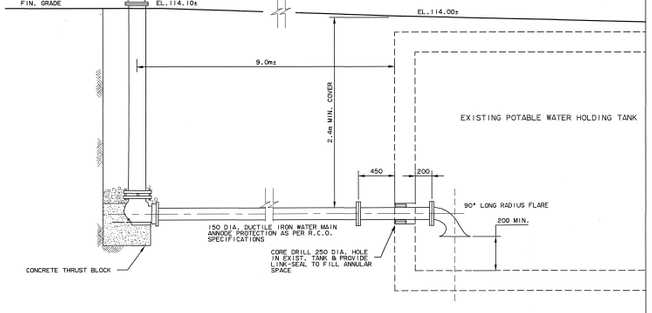


DRY HYDRANT DETAIL
N.T.S.

No.	DESCRIPTION	DATE	BY
5	WATER SUPPLY RELOCATED	25/11/99	GJR
4	GENERAL REVISIONS	17/11/99	GJR
3	GENERAL REVISIONS	22/10/99	GJR
2	ADDED CHAMBER DETAILS	8/10/99	GJR
1	RAISED FL. GENERATOR BLDG.	1/10/99	GJR

REVISIONS

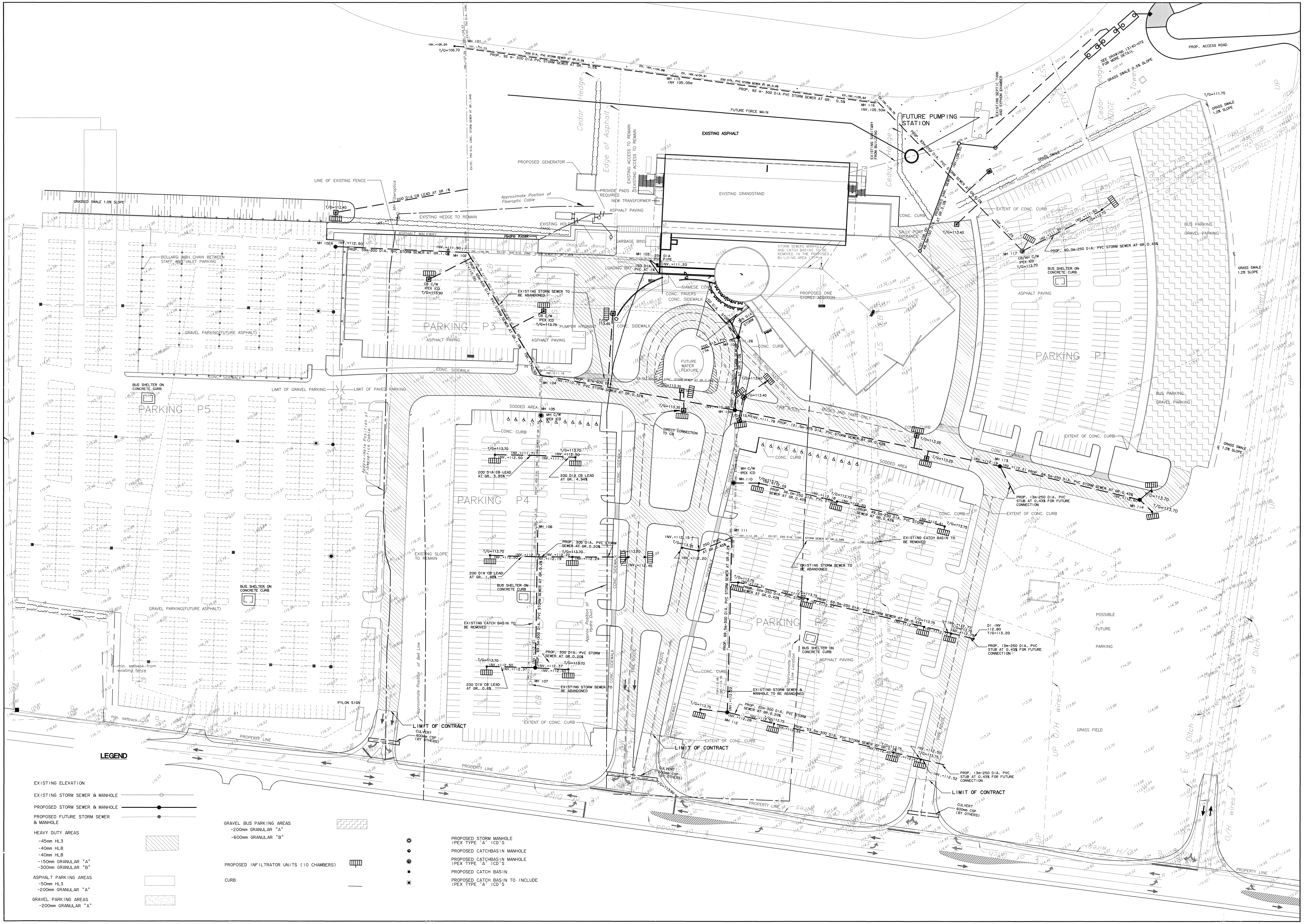
REGISTERED PROFESSIONAL ENGINEER D.F. McGOVERN PROVINCE OF ONTARIO
REGISTERED PROFESSIONAL ENGINEER D.W. SMITH PROVINCE OF ONTARIO
OMM A TROW COMPANY Trow
CONSULTING ENGINEERS, HYDROGEOLOGISTS & PLANNERS
Oliver, Mangione, McCalla & Associates a division of Trow Consulting Engineers Ltd.
154 COLONNADE RD. S. NEPEAN ONTARIO
PHONE (613) 225-9940
FAX (613) 225-7337

CLIENT: P.B.K. ARCHITECTS

PROJECT: RIDEAU CARLETON RACEWAY

TITLE: FIRE PROTECTION WATER TANKS

design by	G.J.R.	project no.	WP 13140A
drawn by	G.J.R.	drawing no.	FP-1
checked by	C.B.W.		
date	SEPT. 1999		
scale	AS SHOWN	revision no.	5



9	NEW CURB LAYOUT	4/10/99	GJR
8	ADDED EXISTING UTILITIES	29/09/99	AM
7	REVISED SITEPLAN	22/09/99	AM
6	ADD MH 102A	03/09/99	AMC
5	ISSUED FOR SITE PLAN AGREEMENT AND TENDER	27/08/99	AMC
4	ISSUED FOR SITE PLAN AGREEMENT AND TENDER	28/07/99	AMC
3	REMOVE STORM SEWERS SOUTH PARKING	16/07/99	AM
2	AS PER CITY OF GLOUCTER	6/08/99	AM
1	ROTATED HATCHING	21/06/99	MF

LICENSED PROFESSIONAL ENGINEER C.B. WARNOCK PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER D.W. SMITH PROVINCE OF ONTARIO

OMM A TROW COMPANY Trow
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CLIENT P.B.K. ARCHITECTS

PROJECT RIDEAU CARLETON RACEWAY

TITLE
SITE SERVICING PLAN

design by	C.B.W.	project no.	MP 13140A
drawn by	A.M.C.	drawing no.	SS1
checked by	C.B.W.		
date	JUNE 1999		
scale	1 : 500	revision no.	9

Boundary Conditions 4837 Albion Road

Information Provided

Date provided: 05 March 2018

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	120	3.9
Maximum Daily Demand	180	6.8
Peak Hour	324	13.3
Fire Flow Demand	0	0

- It is understood that these demands represent the total future demands for the property, including the existing demands associated with the Rideau Carleton Raceway

Location

Results

Connection 1 - 4837 Albion Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	164.7	67
Peak Hour	151.6	48
Max Day	151.6	48

[1] Ground Elevation = 117.3 m

Disclaimer

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

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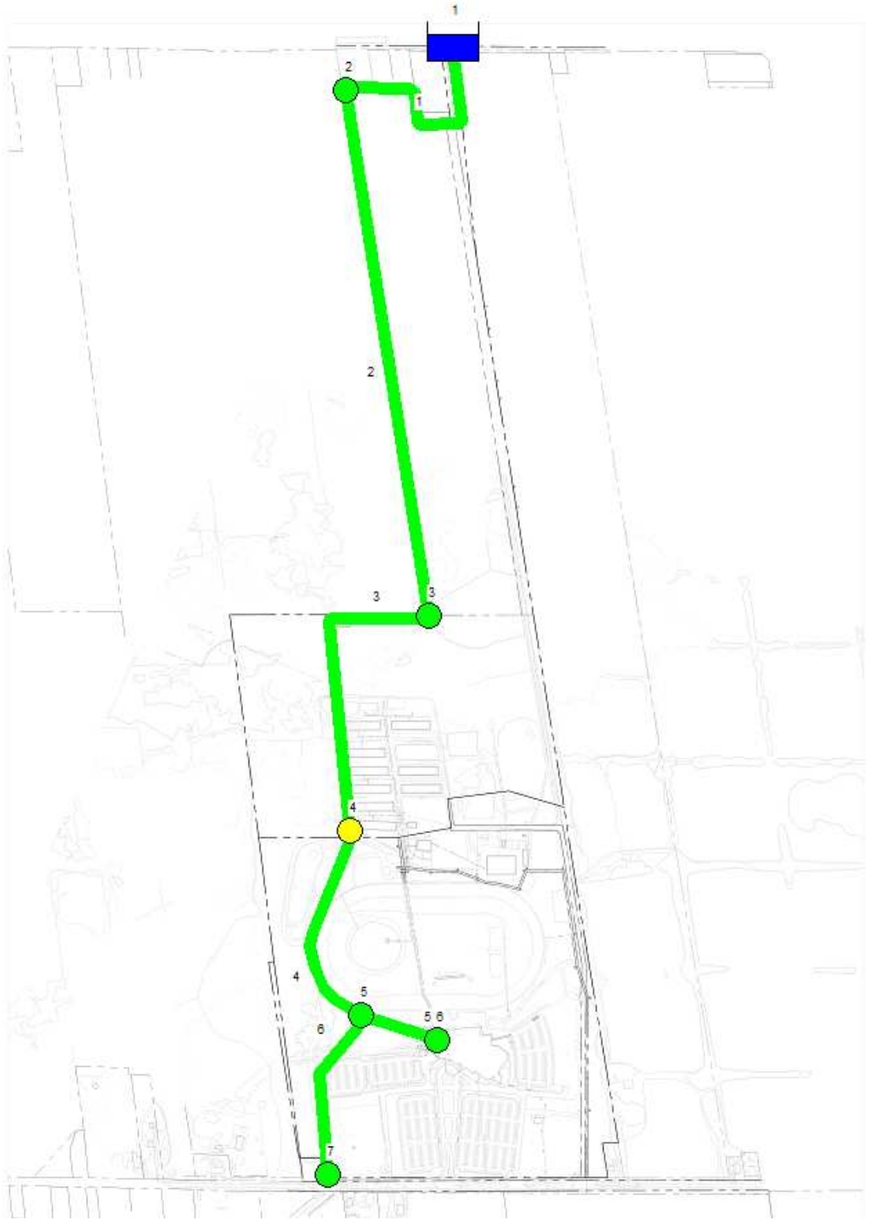
40.00
60.00
80.00
m

Diameter
150.00
200.00
250.00
300.00
mm



Day 1, 12:00 AM

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*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: High Pressure.net
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Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	425	200
2	2	3	1010	200
3	3	4	700	200
4	4	5	410	200
5	5	6	160	200
6	5	7	340	200

Node Results:

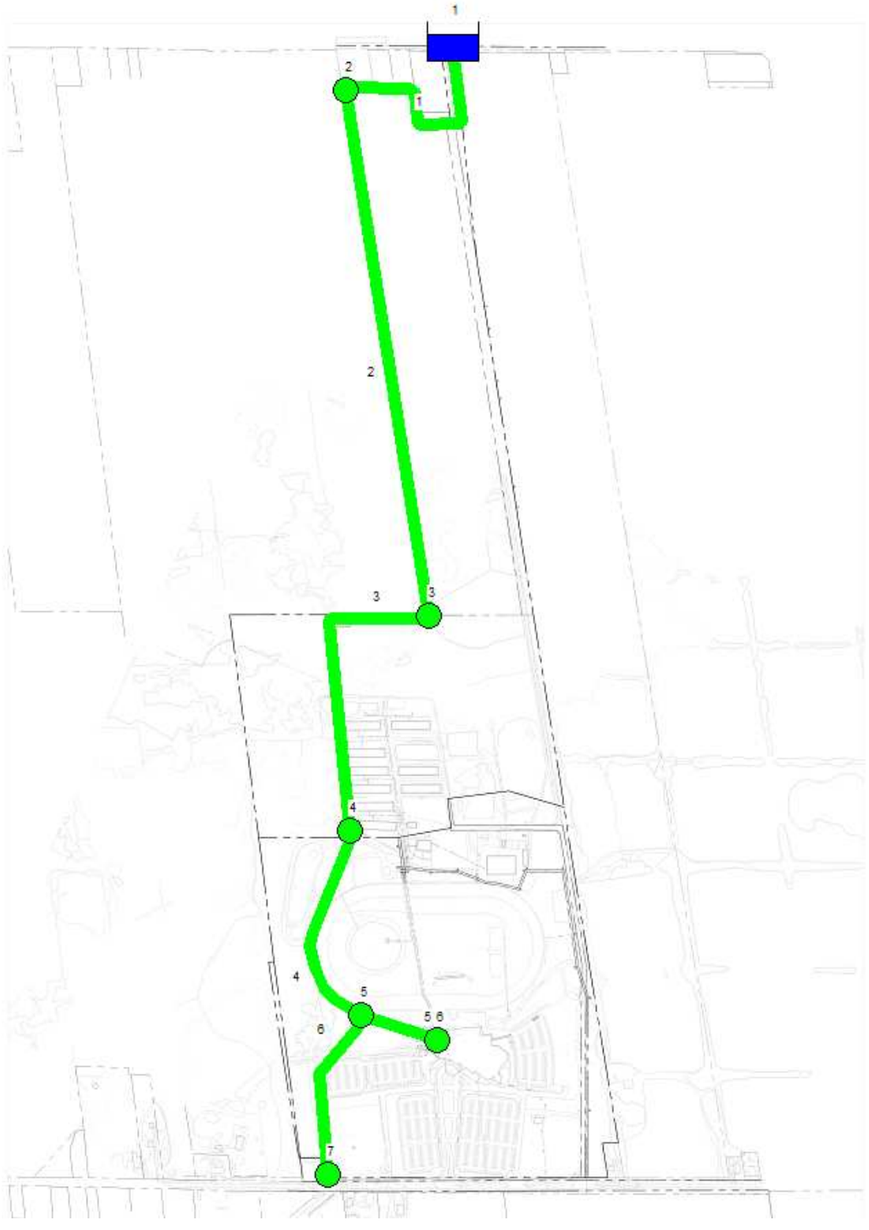
Node ID	Demand LPS	Head m	Pressure m	Quality	
2	0.00	164.63	52.63	0.00	
3	0.00	164.45	57.15	0.00	
4	0.00	164.33	60.33	0.00	
5	0.00	164.26	55.76	0.00	
6	4.49	164.24	50.24	0.00	
7	0.00	164.26	47.76	0.00	
1	-4.49	164.70	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	4.49	0.14	0.17	Open
2	4.49	0.14	0.17	Open
3	4.49	0.14	0.17	Open
4	4.49	0.14	0.17	Open
5	4.49	0.14	0.17	Open
6	0.00	0.00	0.00	Open

Pressure
20.00
40.00
60.00
80.00
m

Diameter
150.00
200.00
250.00
300.00
mm



Day 1, 12:00 AM

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******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: Peak Hour.net
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Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	425	200
2	2	3	1010	200
3	3	4	700	200
4	4	5	410	200
5	5	6	160	200
6	5	7	340	200

Node Results:

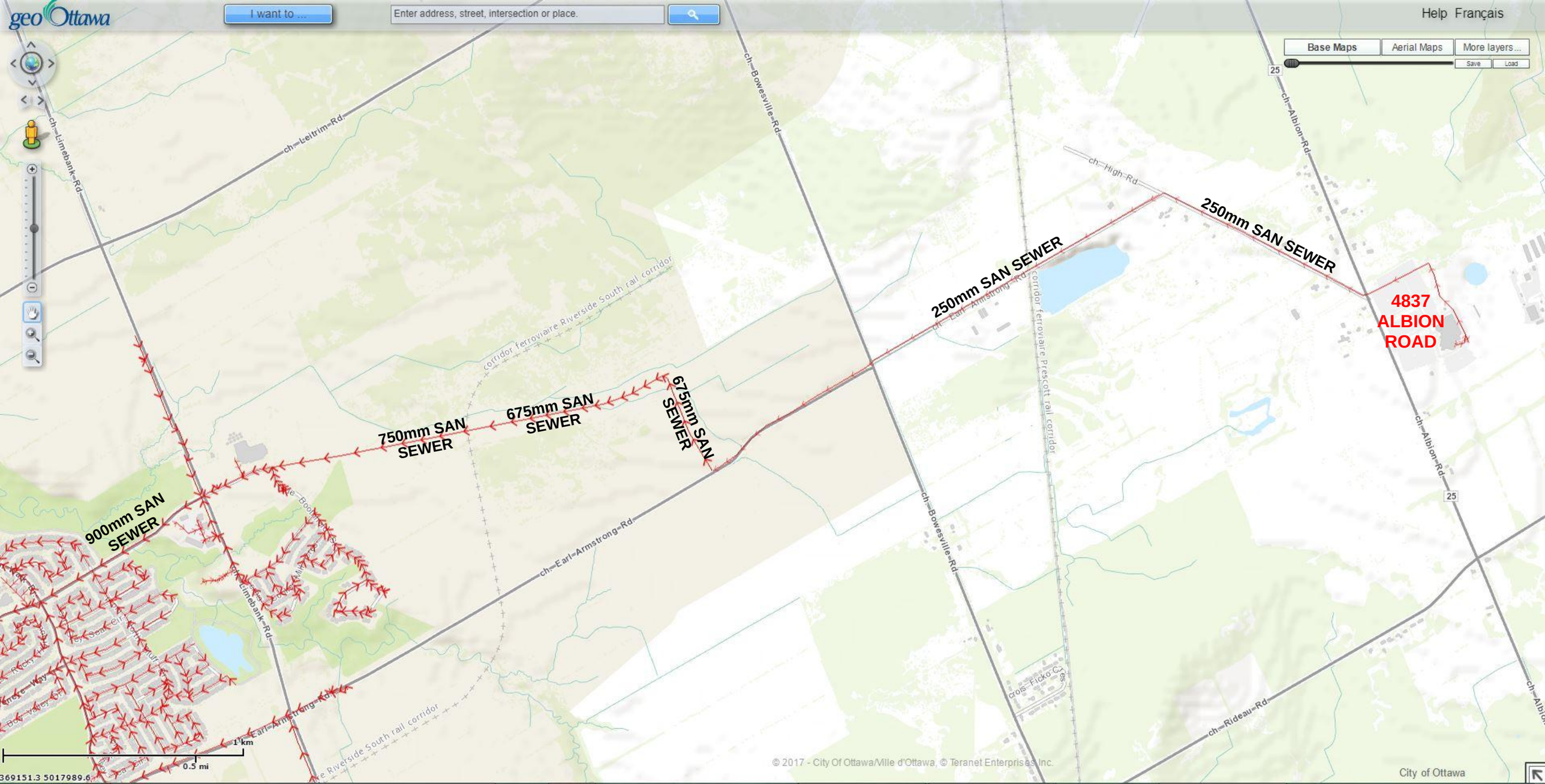
Node ID	Demand LPS	Head m	Pressure m	Quality	
2	0.00	164.06	52.06	0.00	
3	0.00	162.55	55.25	0.00	
4	0.00	161.50	57.50	0.00	
5	0.00	160.88	52.38	0.00	
6	14.48	160.65	46.65	0.00	
7	0.00	160.88	44.38	0.00	
1	-14.48	164.70	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	14.48	0.46	1.50	Open
2	14.48	0.46	1.50	Open
3	14.48	0.46	1.50	Open
4	14.48	0.46	1.50	Open
5	14.48	0.46	1.50	Open
6	0.00	0.00	0.00	Open

Appendix B

Sanitary Servicing Information


geo Ottawa
I want to ...
Enter address, street, intersection or place.
Help Français
Base Maps
Aerial Maps
More layers...
Save
Load
ch—Limebank—Rd
ch—Leitrim—Rd
ch—Bowesville—Rd
ch—High—Rd
ch—Albion—Rd
ch—Earl—Armstrong—Rd
ch—Rideau—Rd
corridor ferroviaire Riverside South rail corridor
corridor ferroviaire Prescott rail corridor
crois—Flicko Cres
25
250mm SAN SEWER
250mm SAN SEWER
4837 ALBION ROAD
675mm SAN SEWER
675mm SAN SEWER
750mm SAN SEWER
900mm SAN SEWER
1 km
0.5 mi
369151.3 5017989.6
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NOVATECH
Engineers, Planners & Landscape Architects

HARD ROCK OTTAWA
RIDEAU CARLETON RACEWAY
SANITARY FLOW ANALYSIS

JOB NO. 116111
DATE PREPARED: NOVEMBER 2019

Table 4.0: Sanitary Flow Calculations Existing and Proposed Development

Location	Existing Flow	Hard Rock Auditorium	Restaurant Additions	Gaming Positions	Employee Additions	Hotel Addition		Total Phase Restaurant / Casino Flow (L/s)	Total Phase Hotel Flow (L/s)	Total Cumulative Flow (L/s)	Peak Flow				Infiltration		Peak Design Flow (l/s)	PIPE					
Area	Flow (L/s)	No. Seats	No. Seats	No. Positions	No. Seats	No. Rooms	Total Population				Commercial Peak Factor	Residential Peak Factor	Phased Peak Flow (l/s)	Total Peak Flow (l/s)	Development Area (ha)	Infilt. Flow (l/s)		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
Existing 4837 Albion	1.01							1.01	0.00	1.01	1.5	N/A	1.52	1.52	14.74	4.13	5.65	250	0.28	N/A	31.4	0.64	18.0%
Hard Rock Casino Addition		1600	775	2000	483	178	320	2.65	0.83	3.66	1.5	3.2	6.63	8.15	14.74	4.13	12.28	250	0.28	N/A	31.4	0.64	39.1%

*Note: Sanitary flows for the Phase 2 additions include the phase 1 interim additions (35 gaming tables and 99 FTE employees).

Design Parameters:

- Hotel population = 1.8 person/room
- Gaming Position = 6 seats/position

Section 4.0 Ottawa Sewer Design Guidelines

- Restaurant (Steakhouse, Hard Rock Café, Casual dinning)	125	L/seat/Day
- Auditoriums (No food)	20	L/seat/Day
- Hotel	225	L/person/day
- Employees	75	L/person/day

Novatech Daily Usage Calculation

- OLG Slots (calculated based on existing usage)	32	L/slot/day
- Gaming Tables (based on existing slots calculation)	32	L/seat/Day
Commercial Peaking Factor (Section 4.0 Ottawa Sewer Design Guidelines)	1.5	
Residential Peaking Factor (Section 4.0 Ottawa Sewer Design Guidelines)	Harmon Formula	

Section 4.0 Ottawa Sewer Design Guidelines

- Extraneous Flows	0.28	L/s/effective gross ha

NOVATECH
Engineers, Planners & Landscape Architects

TECHNICAL MEMORANDUM

DATE: NOVEMBER 1, 2019

TO: FILE

FROM: CARL SCIUK

RE: JOB#116111: HARD ROCK CASINO – SANITARY PUMP STATION EXISTING CONDITIONS

The following technical memorandum will review condition of the Sanitary Pump Station which services this site:

The sanitary pump station is located approximately 240m north of the main building. Sewage is conveyed to the pump station via a 250mm gravity sewer. The station pumps sewage approximately 325m via a 150mm force main to an existing gravity sewer at the intersection of Albian Road and High Road [Drawings attached].

DME prepared a design report for the pump station in October 2005 [attached]. The report includes details of forcemain sizing, wet well sizing [for up to 20.64L/s], and pump sizing to accommodate a design flow of 17.2L/s and future flow of 20.64L/s.

The station consists of a control panel, fibreglass wet well, two submersible pumps, an ultrasonic level controller and floats [Refer to Xylem Sanitary Lift Station drawing attached]. The submersible sewage pumps [Flygt NP-3102-463] are each rated for peak flow of 17.2L/s and alter between duty and standby on each pump cycle. It appears the pumps operate primarily by ultrasonic levels, with floats providing backup control and high alarms. A high water alarm is wired to the central monitoring of the building. The pump station is connected to standby power which serves the entire facility in the event of a power outage. The wet well and associated equipment was installed in 2006. The wet well and associated control panel were supplied by Xylem. The wet well and associated internal equipment has been constructed to standards typical for municipal pump stations in Ottawa.

The wet well and control panel are accessed from the main parking lot via a 50m long gravel access pathway. The access pathway currently shows signs of surface erosion. The pathway should be maintained in good condition and plowed in the winter to ensure access for maintenance and emergencies. The pathway ends approximately 5m from the wet well and should extend closer to the wet well to ease both foot and vehicular access. The access hatches were not locked at the time of visit, but facility staff noted that locks will be installed soon. The control panel is located above grade on support posts and was locked. No documents for the facility were in the control panel.

We are not aware of any protocol for response to a high level alarm condition. The facility should ensure that the emergency contact is able to address alarms in a timely manner. Response should include procedures to follow at the pump station to evaluate and mitigate the issues, as well as contact with a service qualified technician and possibly a septic hauler.

There was no information available about past maintenance of the pump station. The inside of the wet well was quite grimy, and the inlet trash basket was full of debris. We recommend that a

maintenance contract with a minimum of quarterly site visits should be arranged. The site visits should include as a minimum: confirmation of each pump operation, confirmation of ultrasonic level control, confirmation of alarm floats & registration of high alarm at building control room, cleaning of trash basket and provision for emergency response. The initial site visit should also include a cleaning of wet well internals to clear off slime buildup.

The submersible sewage pumps are likely original and near the end of their service life. The pumps should be evaluated and upgraded prior to servicing the new facility. The wet well includes pump rails, a pump base and pump chain, so that pumps can easily be removed and replaced/upgraded to new station capacity if required without entering the wet well.

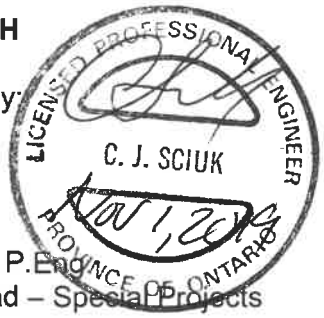
Conclusion

Based on the foregoing, the sanitary pump station is adequately designed and sized to service 17.2L/s [with capability to upgrade via pump impeller changes to 20.64L/s]. We recommend the following actions be taken to address existing conditions:

- Lock access hatches. Use a common key system for all padlocks including the control panel.
- Provide Operation and Maintenance documentation including: drawings of facility/control panel, protocol for emergencies, etc at the pump station.
- Improve access in the immediate vicinity of the pump station and maintain the gravel access road in both summer and winter
- Engage a qualified service contractor to make quarterly visits as a minimum. The service agreement should include reasonable emergency response times.
- Upgrade submersible pumps if required to meet sanitary service demands for the proposed hotel.

NOVATECH

Prepared by:



Carl Sciuk, P.Eng.
Project Lead – Special Projects

Enclosed

Sanitary Sewage Report by DME, October 6,2005
Xylem "Rideau Carleton Raceway Lift Station" Drawing, Rev 3
Site Drawing 2538-OS-P1, Rev 8
Site Drawing 2538-OS-P2, Rev 9

Sanitary Sewage Report

Rideau Carleton Raceway

D.M.E. Project No. 2538

Prepared by:

David McManus
Engineering Ltd.

September 12, 2005

Revised: October 6, 2005

400-30 Camelot Drive, Nepean, ON K2G 5X8 • Telephone (613) 225-1929 Fax (613) 225-7330 • E-mail: mcmanus@dmel.on.ca

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Figure 2: Site Plan

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Appendix B: System Hydraulics & Cycle Time Calculations
Appendix C: Electrical & Structural Info

DRAWINGS:

RCR Site Overall Servicing, 2538-OS4
RCR Site Forcemain Profile, 2538-OS P1
RCR Site Gravity Sewer Profile, 2538-OS P2
Pump Station Drawing

1.0 INTRODUCTION

The Rideau Carleton Raceway site is located at 4837 Albion Road within the City of Ottawa (former City of Gloucester). *Figure 1* shows the site location. The Raceway would like to upgrade its sanitary sewage system and this report is in support of the design drawings.

2.0 EXISTING CONDITIONS

Sanitary sewage currently drains to two existing holding/septic tanks and tile beds. The holding tanks require pumping frequently. The existing MOE Certificate of Approval for the present system requires a more permanent solution. Also, the City of Ottawa has recently increased the hauling and dumping fees for sewage thus so the Rideau Carleton Raceway would like to upgrade its sanitary sewage system.

3.0 PROPOSED DEVELOPMENT

It is proposed to install a gravity sewer from the main building to an on-site pump station. A forcemain would then be constructed from the on-site pump station to a gravity sanitary sewer at the intersection of Albion Road and High Road. A gravity sanitary sewer is to be constructed from Albion and High Road along High Road to Earl Armstrong Road and then along Earl Armstrong Road westerly to Canyon Walk Drive. This gravity sewer has been submitted for review and approval under separate cover. Figure 2 shows the sewers within the Rideau Carleton Raceway site. The attached drawings show, in more detail, the proposed gravity sewer, forcemain and pump station within the Rideau Carleton Raceway property.

4.0 DESIGN FLOWS

The Rideau Carleton Raceway has intentions of expanding their facilities. The proposed infrastructure has been designed to include any future expansion. Design flows are calculated in further detail in Appendix A and are summarized as follows:

Existing Peak Sanitary Flow = 7.51 L/s
10 year Peak Sanitary Flow = 10.51 L/s
20 year Peak Sanitary Flow = 20.64 L/s

5.0 GRAVITY SEWER

Approximately 385m of 250mm diameter gravity sanitary sewer at 0.35% is proposed from the existing building to the proposed pump station. The sewer has a capacity of 36.7L/s which is greater than the 20 year Peak Sanitary Flow predicted for the site. This gravity sanitary sewer is illustrated on dwg 2535-P1, attached.

6.0 SANITARY FORCEMAIN AND PUMP STATION

6.1 Forcemain

Approximately 325m of forcemain is to be installed from the pump station to the upstream manhole proposed for the gravity sewer at the intersection of Albion Road and High Road. The forcemain will be 150mm diameter in size. The forcemain size and pump has been selected such that only minimal changes may be required for servicing flows from current conditions to the predicted 20 year flows. Minor changes may be required such as changing the pump impellor.

6.2 Pump Station

The pump station is designed for a dual pump system. The pumps will be set to alternate at each cycle with the second pump starting in the event of a failure. The pump station will incorporate standard control systems with alarms in the event of a failure. All alarms will be remotely monitored in the Raceway Control room.

The total head loss is the sum of losses in the system including static head, dynamic head and fitting losses. The dynamic head loss is calculated using the Hazen Williams formula.

$$V = 0.85 C_H R^{0.63} S^{0.54}$$

Where
V = velocity = Flow/Area
C_H = Hazen Williams roughness coefficient (based on pipe material and age)
R = hydraulic radius (d/4 for a full pipe)
S = slope of the energy grade line (ratio of head loss to length of pipe)

The static head loss is calculated as the difference between the forcemain outlet invert and the liquid level in the wet well under given conditions. The MOE Guidelines for the Design of Sanitary Sewage Systems indicates there are three conditions to be analyzed. These conditions show the range from worst case scenario where the pump has to work the hardest to the best case scenario where the pump has to work the least.

Condition A:
Hazen Williams roughness coefficient = 120 and the water level is low in the wet well

Condition B:
Hazen Williams roughness coefficient = 130 and there is a median water level over the normal operation range in the wet well

Condition C:
Hazen Williams roughness coefficient = 140 and an overflow water level in wet well

Fitting losses are also calculated in terms of equivalent lengths of pipe per fitting.

Table 1 presents and totals the losses for a 150mm (6") forcemain. This is the amount of head that the pump must overcome in order to pump sewage at various flow rates through the pump system and forcemain. Therefore, system curves can be created for each condition and plotted with the pump performance curve to determine which pump to select.

A Flygt Pump model NP-3102-463 was selected and the system curve and pump performance curve are shown in Figure B1. A schematic of the pump station with respect to elevations is shown in Figure B2. From the pump performance curve, the pump will operated under normal conditions at a flow rate of 17.2 L/s. This flow rate is less than the estimated 20 Year Peak Flow of 20.64 L/s. Therefore, the pumps may have to be replaced to accommodate the actual 20 Year Peak Flows.

Cycle times for each of the existing, 10 year and 20 year flows are calculated and shown in Appendix B. The average cycle time should be around 10 minutes. The cycle times for the 20 Year Flows are greater than 10 minutes which is also an indication that the a different pump should be installed for the 20 Year Flows.

It is proposed to install a pre-fabricated fiberglass reinforced plastic (FRP) pumping station. The contractor is required to prepare the concrete pad for this pre-fabricated unit, connect the inlet and outlet pipes, install the pre-assembled pumps and make any necessary electrical connections. A drawing for the pump station, prepared by Barski Industries Ltd., for the pre-fabricated unit is contained at the rear of the report.

An overflow outlet has been provided to the existing holding tanks. The elevation of the overflow outlet is higher than the pump station outlet but lower and the building finished floor elevation. Refer to the Overall Servicing Drawings (dwg 2538-OS4) for more detailed information.

6.3 Wet Well

The minimum size for the wet well, according to MOE criteria, is a 2.4m diameter wet well. This minimum size will be used in this case in order to have adequate cycle times. The cycle times for the given flows are calculated in Appendix B. The cycle times help determine if the float levels for the different flow rates need to be adjusted.

6.4 Electrical & Structural

Electrical information in terms of ductwork required is shown on the enclosed plans and a Wiring Diagram is included in Appendix C. A detail for the structural slab required for the pump station is also included in Appendix C.

Cara Ruddle, P.Eng..	David McManus, P.Eng
Project Engineer	Principal

APPENDIX A:

SANITARY DESIGN FLOWS

Design Flows

The existing peak sanitary flow is estimated at 3.38 L/s. This number is based on Water Consumption Reports for the peak period, which is during the summer months, and using a peaking factor of 1.5. Infiltration is calculated based on estimated areas of development and using City criteria of 0.28L/s/ha. The flows are calculated as follows:

Existing Sanitary Flow = peak flow + Infiltration
Existing Sanitary Flow = 3.38 + (14.74 x 0.28)
Existing Sanitary Flow = 3.38 + 4.13
Existing Sanitary Flow = 7.51 L/s

The 10 Year Sanitary Flow includes a 240 room Hotel and 1500 seat Theatre which will be within the existing developed area of the property and so the infiltration is the same as for the existing flows.

10 Year Sanitary Flow = peak flow + infiltration
10 Year Sanitary Flow = 3.38 + 1.95 (hotel) + 1.05 (theatre) + 4.13
10 Year Sanitary Flow = 3.38 + 1.95 + 1.05 + 4.13
10 Year Sanitary Flow = 10.51 L/s

The 20 Year Sanitary Flow includes a Retail Centre, Trade Centre and Golf Course which is outside the current developed area.

20 Year Sanitary Flow = peak flow + infiltration
20 Year Sanitary Flow = 10.51 + 7.25 +(10.26x0.28)
20 Year Sanitary Flow = 10.51 + 7.25 + 2.87
20 Year Sanitary Flow = 20.64 L/s

APPENDIX B:

SYSTEM HYDRAULICS & CYCLE TIME CALCULATIONS

Existing Flows

Design Peak Flow = 7.51 L/s
Actual (peak) Flow = 17.2 L/s (from Pump Performance Curve)
Average Flow rate = 65% of design peak flow

$$\text{Run Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{flow rate out – average flow incoming}}$$

$$\text{Run Time} = \frac{4.52 \times (105.4-105.05)}{17.2/1000 - 0.65 \times 7.51/1000}$$

Run Time = 128.4 seconds
Run Time = 2.14 minutes

$$\text{Fill Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Average flow incoming – no outgoing flow}}$$

$$\text{Fill Time} = \frac{4.52 \times (105.4 - 105.05)}{0.65 \times 7.51/1000 - 0}$$

Fill Time = 324.1 seconds
Fill Time = 5.4 minutes

Total Cycle Time = Run Time + Fill Time
Total Cycle Time = 2.14 + 5.4
Total Cycle Time = 7.54 minutes

$$\text{Minimum Cycle Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Flow rate out – no incoming flow}}$$

$$\text{Minimum Cycle Time} = \frac{4.52 \times (105.4-105.05)}{17.2/1000 - 0}$$

Minimum Cycle Time = 92.0 seconds
Minimum Cycle Time = 1.53 minutes

10 Year Flows

Design Peak Flow = 10.51 L/s
Actual (peak) Flow = 17.2 L/s (from Pump Performance Curve)
Average Flow rate = 65% of design peak flow

$$\text{Run Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{flow rate out – average flow incoming}}$$

$$\text{Run Time} = \frac{4.52 \times (105.4-105.05)}{17.2/1000 - 0.65 \times 10.51/1000}$$

Run Time = 152.58 seconds
Run Time = 2.54 minutes

$$\text{Fill Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Average flow incoming – no outgoing flow}}$$

$$\text{Fill Time} = \frac{4.52 \times (105.4 - 105.05)}{0.65 \times 10.51/1000 - 0}$$

Fill Time = 231.57 seconds
Fill Time = 3.86 minutes

Total Cycle Time = Run Time + Fill Time
Total Cycle Time = 2.54 + 3.86
Total Cycle Time = 6.40 minutes

$$\text{Minimum Cycle Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Flow rate out – no incoming flow}}$$

$$\text{Minimum Cycle Time} = \frac{4.52 \times (105.4-105.05)}{17.2/1000 - 0}$$

Minimum Cycle Time = 92.0 seconds
Minimum Cycle Time = 1.53 minutes

20 Year Flows

Design Peak Flow = 20.64 L/s
Actual (peak) Flow = 17.2 L/s (from Pump Performance Curve)
Average Flow rate = 65% of design peak flow

$$\text{Run Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{flow rate out – average flow rate incoming}}$$

$$\text{Run Time} = \frac{4.52 \times (105.4-104.72)}{17.2/1000 - 0.65 \times 20.64/1000}$$

Run Time = 812.26 seconds
Run Time = 13.54 minutes

$$\text{Fill Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Average flow incoming – no outgoing flow}}$$

$$\text{Fill Time} = \frac{4.52 \times (105.4 - 104.72)}{0.65 \times 20.64/1000 - 0}$$

Fill Time = 229.10 seconds
Fill Time = 3.82 minutes

Total Cycle Time = Run Time + Fill Time
Total Cycle Time = 13.54 + 3.82
Total Cycle Time = 17.36 minutes

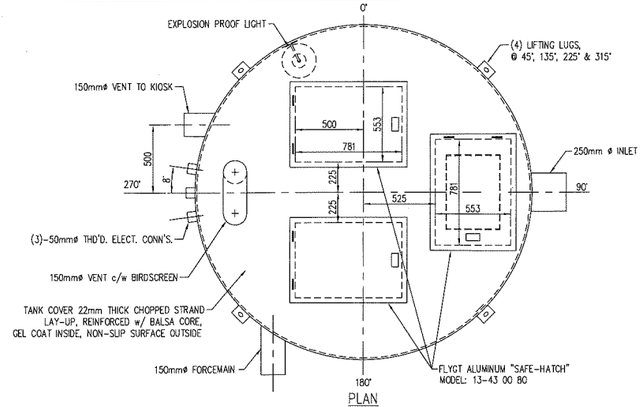
$$\text{Minimum Cycle Time} = \frac{\text{area of wet well x (pump start level – pump stop level)}}{\text{Flow rate out – no incoming flow}}$$

$$\text{Minimum Cycle Time} = \frac{4.52 \times (105.4-104.72)}{17.2/1000 - 0}$$

Minimum Cycle Time = 178.70 seconds
Minimum Cycle Time = 2.98 minutes

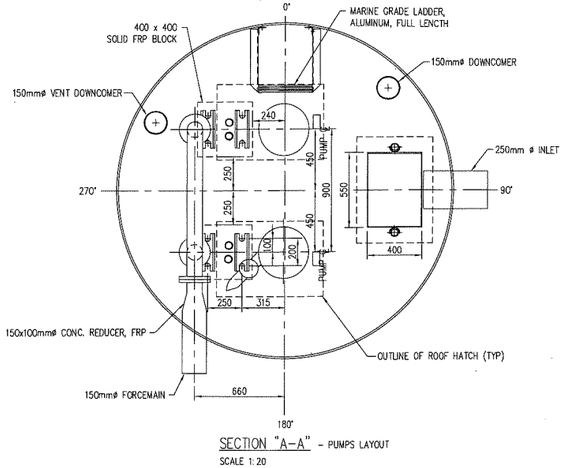
APPENDIX C:

ELECTRICAL AND STRUCTURAL INFORMATION



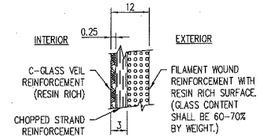
PLAN

SCALE 1:20



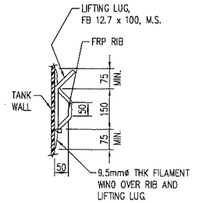
SECTION "A-A" - PUMPS LAYOUT

SCALE 1:20



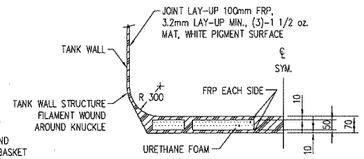
DETAIL "1" - VESSEL WALL

N.T.S.



DETAIL "2" - LIFTING LUG

SCALE 1:10



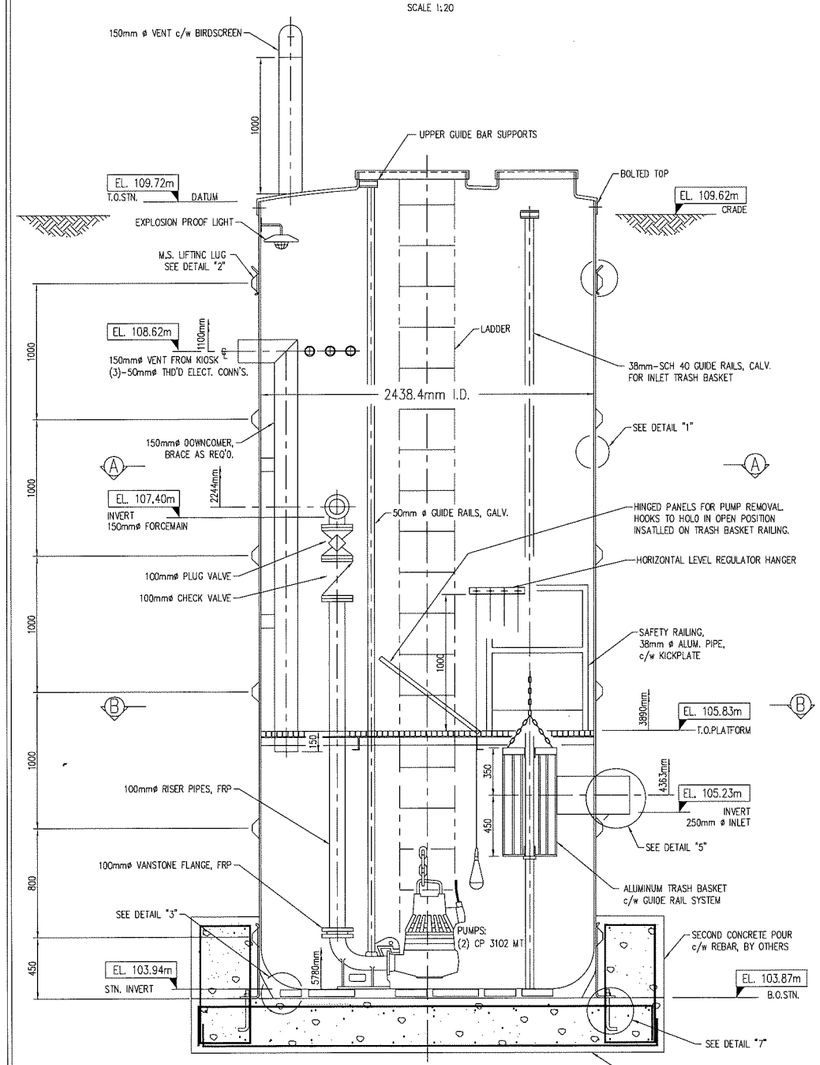
DETAIL "3" - BOTTOM BASE

N.T.S.

NOTE:
ACTUAL LOCATION OF LUGS MAY VARY. DO NOT LOCATE ANCHOR BOLTS UNTIL RECEIPT OF COMPLETED STATION OR TEMPLATE OF HOLD DOWN LUG LOCATIONS.

DETAIL "4" - HOLD DOWN LUG

SCALE 1:10

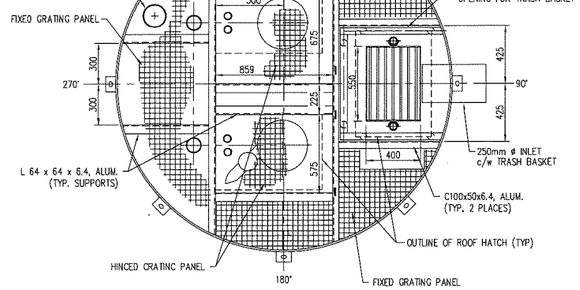


ELEVATION

SCALE 1:20

NOTE: SEE PLAN VIEW FOR TRUE ORIENTATION

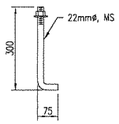
NOTE:
CONCRETE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. FOUNDATION TO BE DESIGNED & SUPPLIED BY OTHERS.



NOTES:
1. ALL GRATING PANELS TO BE 38 x 38 x 38 HIGH FRP
2. ALL SUPPORTS TO BE ALUMINUM

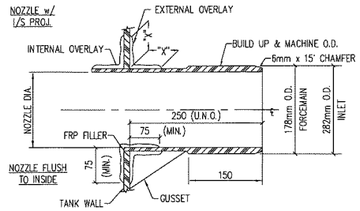
SECTION "B-B" - PLATEORM LAYOUT

SCALE 1:20



DETAIL "7" - ANCHOR BOLT

SCALE 1:10 (BY OTHERS)



NOZZLE NOTES

A MINIMUM OF 2 LAYERS OF WOVEN ROVING IS REQUIRED FOR NOZZLE PORTION OF OVERLAY. TANK PORTION OF OVERLAY SHALL BE SAME THICKNESS AS TANK WALL. DIMENSION "X" SHALL BE GREATER THAN ONE HALF THE NOZZLE DIAMETER. INTERNAL OVERLAY TO HAVE A MINIMUM OF 2 LAYERS MATT. FRP REINFORCING MATERIAL TO BE CUT TO A SHAPE TO ENSURE A SMOOTH LAMINATE.

O.D.'s REPRESENT THICKNESSES REQUIRED FOR ADEQUATE NOZZLE STRENGTH. TO BE CONNECTED TO EXTERIOR PIPING WITH A ROBAR TRANSITION COUPLER OR EQUAL.

DETAIL "5" - TYPICAL NOZZLE, MACHINED

N.T.S.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	
1	8	HOLD DOWN LUGS, MS	
2	4	LIFTING LUGS, MS.	
3	3	FLYGT ALUMINUM "SAFE-HATCH" ACCESS FRAMES MODEL 13-43 00 80	
4			
5	1	MARINE GRADE SAFETY LADDER, ALUMINUM, FULL LENCTH	
6	1	250mmø INLET, MACHINED, FRP c/w ALUMINUM TRASH BASKET & GUIDE RAILS	
7	1	150mmø FORCEMAIN, MACHINED, FRP, c/w (2) 100mm ø RISER PIPES, FLxVANSTONE	
		(1)-100mm LR 90° ELL, FLxFRP; (1)-100mmø STR. TEE, FRP	
8	1	150mm ø VENT, FRP, c/w 180° RET. BEND & BIRDSCREEN	
9	1	150mmø VENT TO KIOSK, FRP, c/w DOWNCOMER	
10	3	50mmø THD'D. ELECTRICAL CONNECTIONS	
11	8	20mmø PUMP BASE BOLTS, 304 SS	
12	4	50mmø GUIDE BARS, GALV.	
13	2	38mm-SCH 40 GUIDE BARS, GALV. (TRASH BASKET)	
14	1	EXPLOSION PROOF LIGHT, APPLETON 100 WATT MODEL ABLB 1075	
15	1	INTERMEDIATE PLATFORM, FULL DIAMETER c/w ALUMINUM SUPPORT MEMBERS,	
		FRP GRATING PANELS, HINGED HATCHES FOR PUMP REMOVAL, OPENING FOR	
		TRASH BASKET REMOVAL c/w REMOVABLE HAND RAILINGS	
16	8	22mmø ANCHOR BOLTS, MS	(BY OTHERS)
17	2	UPPER GUIDE BAR SUPPORTS	(BY FLYGT)
18	2	PUMP CP 3102 MT DN100, c/w DISCHARGE ELBOW	(BY FLYGT)
19	2	100mmø CHECK VALVE	(BY FLYGT)
20	2	100mmø PLUG VALVE	(BY FLYGT)
21	1	HORIZONTAL LEVEL REGULATOR HANGER	(BY FLYGT)

FABRICATION DESIGN STANDARDS

1. FLYGT SPECIFICATION GE-1008-04, REVISION MAY 2002
2. AMEC 4S-1Q.01 MANUFACTURE AND INSTALLATION FOR FRP STRUCTURES
3. AMEC 4S-1Q.02 FRP PRESSURE PIPE, FITTINGS AND FLANGES
4. CANADIAN GOVERNMENT STANDARD 41-GP-22

GENERAL NOTES

1. WINDING ANGLE - 70°
2. TANK WALL - 12mm THICK, (9) COVERS
3. LINER - C-GLASS VEIL AND (2)-1 1/2 oz. MATT
4. RESIN - ASHLAND 1951 ISOPHTHALIC
5. EXTERIOR (ABOVE GRADE)
   TO HAVE DARK GREEN GELCOAT
6. INTERIOR FINISH: WHITE ISOPHTHALIC NPG GELCOAT
7. DIMENSIONS ARE IN MILLIMETERS U.N.O.

INSTALLATION PROCEDURES

THE FOLLOWING RECOMMENDATIONS ARE BASED ON FLYGT EXPERIENCE AND ARE IN NO WAY MEANT TO REPLACE THE ENGINEERS INSTRUCTIONS OR SPECIFICATIONS AND MUST BE USED IN CONJUNCTION WITH THE EXISTING AND ANTICIPATED CONDITIONS AT THE JOBSITE.

1. USE THE LIFTING LUGS PROVIDED FOR VERTICAL HANDLING.
2. USE SLINGS AROUND THE MAIN TANK FOR HORIZONTAL HANDLING.
3. ENSURE UNIT IS STANDING VERTICAL ON CONCRETE PAD.
4. BOLT UNIT FIRMLY AND SQUARELY IN PLACE, SHIM WHERE NECESSARY.
5. ENCASE BOTTOM RIB IN CONCRETE TO A MINIMUM HEIGHT OF 150mm ABOVE RIB TO PROVIDE ANCHORAGE. REBAR TO CONNECT SECOND POUR TO CONCRETE BASE PAD.
6. WHEN EXTERNAL VALVES ARE MOUNTED, SUPPORT PIPING CONNECTIONS DIRECT TO CONCRETE PAD.
7. MAINTAIN A DRY SITE UNTIL BACKFILLING OPERATIONS COMMENCE.
8. USE A GOOD QUALITY SCREENING OR SAND AS BACKFILL MATERIAL TO 90% COMPACTION.
9. PLACE THE BACKFILL IN EQUAL INCREMENTS NOT EXCEEDING 300mm THICK AROUND THE STATION TO PREVENT UNBALANCED LOADS BEING IMPOSED DURING BACKFILLING OPERATIONS. PROGRESSIVELY TAMP BACKFILL AROUND STATION TO FULL HEIGHT TO REDUCE SETTLEMENT TO AN ABSOLUTE MINIMUM.

REV	DATE	DESCRIPTION	BY
3	2006/02/24	REVISED ROOF ACCESS HATCHES	LMc
2	2005/12/01	PLATFORM RELOCATED	LMc
1	2005/11/29	ELEVATION CHANGES	LMc
0	2005/09/30	ISSUED FOR APPROVAL	LMc

TOLERANCES (U.N.O.)

LINEAR	ANGULAR
X ± 1.5	X.X ± 1/2°

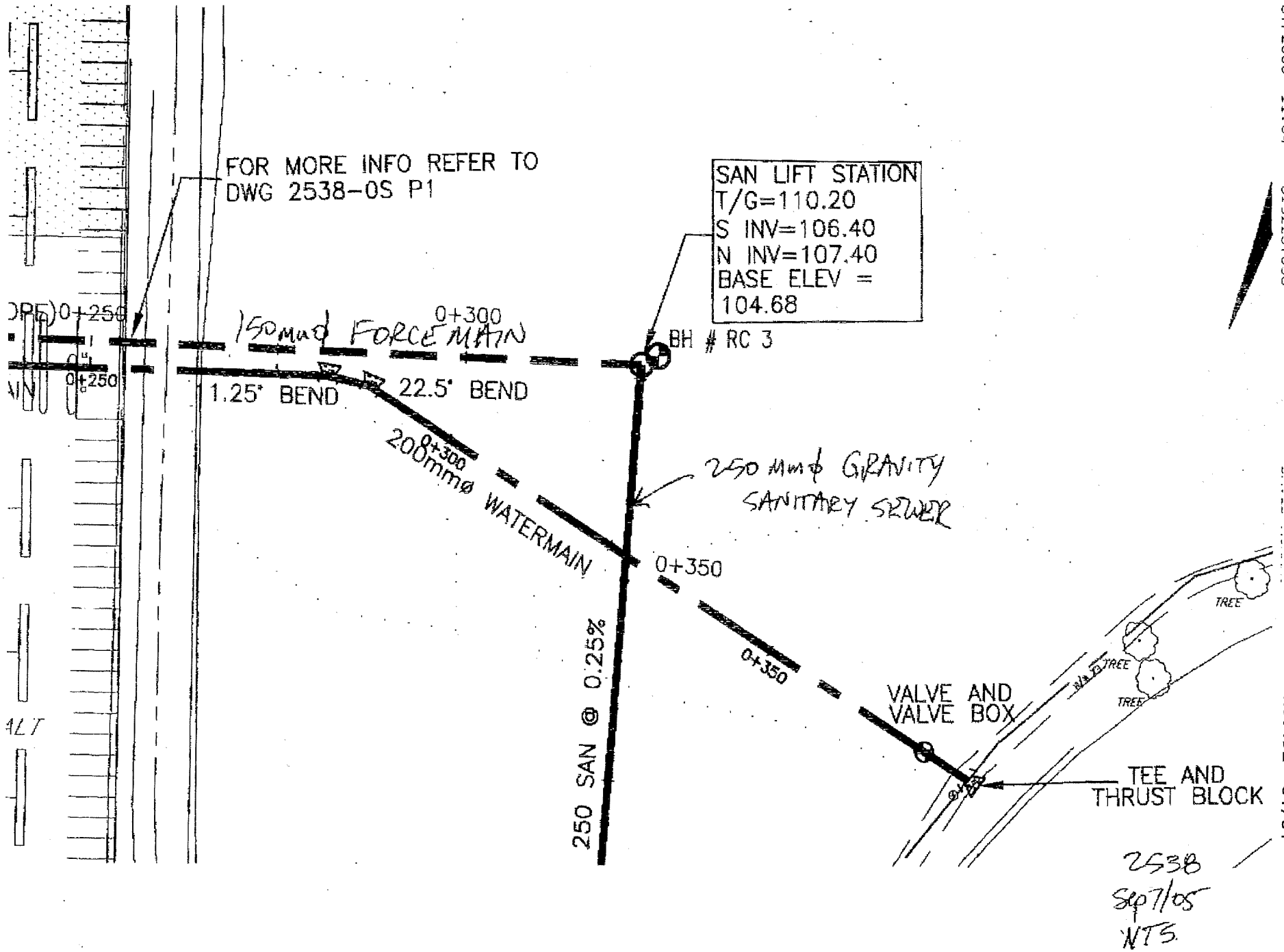
BARSKI INDUSTRIES (1985) LTD.
2378 WESTLAKE RD.
KELOWNA, B.C.
V1Z 2V2

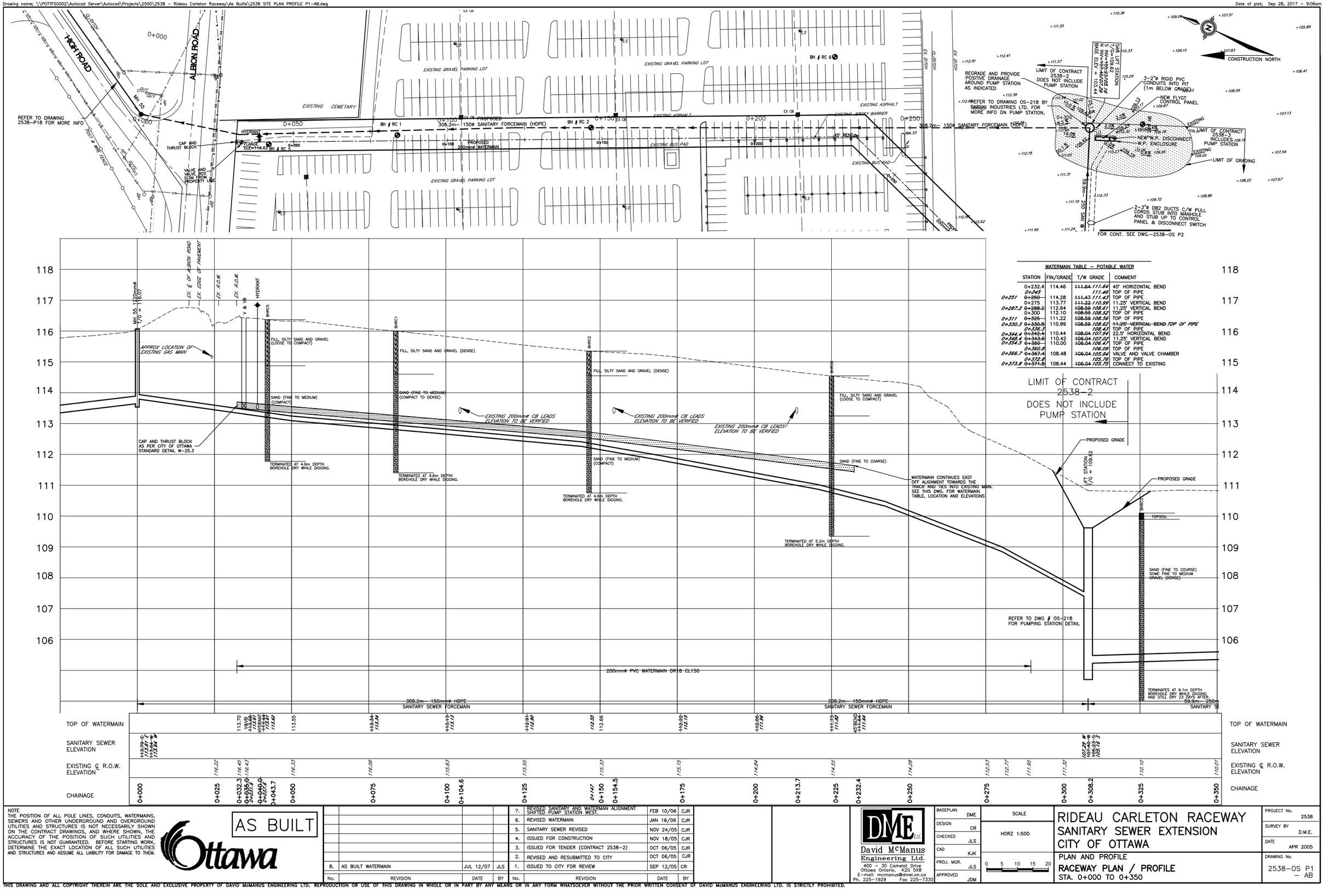
CLIENT	ITT FLYGT CANADA
ENGINEER	DAVID McMANUS ENGINEERING LTD. NEPEAN, ONTARIO
PROJECT	RIDEAU CARLETON RACEWAY SEWAGE PUMP STATION

TITLE

2438.4mm I.D.
RIDEAU CARLETON RACEWAY LIFT STATION

ENG BY:	DATE:	CAD FILE: RideauCarleton	PROJECT:
CAD BY: LMc	DATE: 2005/09/30	SCALE: AS SHOWN	
APP BY:	DATE:	DRAWING NUMBER: 05-218	REV: 3
ISSUED BY:	DATE:		





WATERMAIN TABLE - POTABLE WATER

STATION	FIN/GRADE	T/W GRADE	COMMENT
0+232.4	114.46	~~111.64~~ *111.64*	45° HORIZONTAL BEND
0+245		*111.46*	TOP OF PIPE
0+251 ~~0+250~~	114.28	~~111.47~~ *111.43*	TOP OF PIPE
0+275	113.77	~~111.22~~ *110.99*	11.25° VERTICAL BEND
0+287.2 ~~0+288.2~~	112.64	~~108.59~~ *108.61*	11.25° VERTICAL BEND
0+300	112.10	~~108.59~~ *108.52*	TOP OF PIPE
0+311 ~~0+325~~	111.22	~~108.59~~ *108.56*	TOP OF PIPE
0+330.3 ~~0+330.8~~	110.99	~~108.59~~ *108.62*	~~11.25° VERTICAL BEND~~ *TOP OF PIPE*
0+335.3			*108.43* TOP OF PIPE
0+344.4 ~~0+342.4~~	110.44	~~108.04~~ *107.94*	22.5° HORIZONTAL BEND
0+345.4 ~~0+343.6~~	110.42	~~106.04~~ *107.02*	11.25° VERTICAL BEND
0+354.5 ~~0+350~~	110.00	~~106.04~~ *106.47*	TOP OF PIPE
0+360.0			*106.09* TOP OF PIPE
0+366.7 ~~0+367.4~~	108.48	~~106.04~~ *105.84*	VALVE AND VALVE CHAMBER
0+372.6			*105.75* TOP OF PIPE
0+373.8 ~~0+371.8~~	108.44	~~106.04~~ *105.75*	CONNECT TO EXISTING

NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

AS BUILT

Ottawa

No.	REVISION	DATE	BY
8.	AS BUILT WATERMAIN	JUL 12/07	JLS
7.	REVISED SANITARY AND WATERMAIN ALIGNMENT SHIFTED PUMP STATION WEST.	FEB 10/06	CJR
6.	REVISED WATERMAIN	JAN 16/06	CJR
5.	SANITARY SEWER REVISED	NOV 24/05	CJR
4.	ISSUED FOR CONSTRUCTION	NOV 18/05	CJR
3.	ISSUED FOR TENDER (CONTRACT 2538-2)	OCT 06/05	CJR
2.	REVISED AND RESUBMITTED TO CITY	OCT 06/05	CJR
1.	ISSUED TO CITY FOR REVIEW	SEP 12/05	CR

David McManus Engineering Ltd.
400 - 30 Camelot Drive
Ottawa Ontario, K2G 5X8
E-mail: mcmanus@dmel.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME
DESIGN	CR
CHECKED	JLS
CAD	KJK
PROJ. MGR.	JLS
APPROVED	JDM

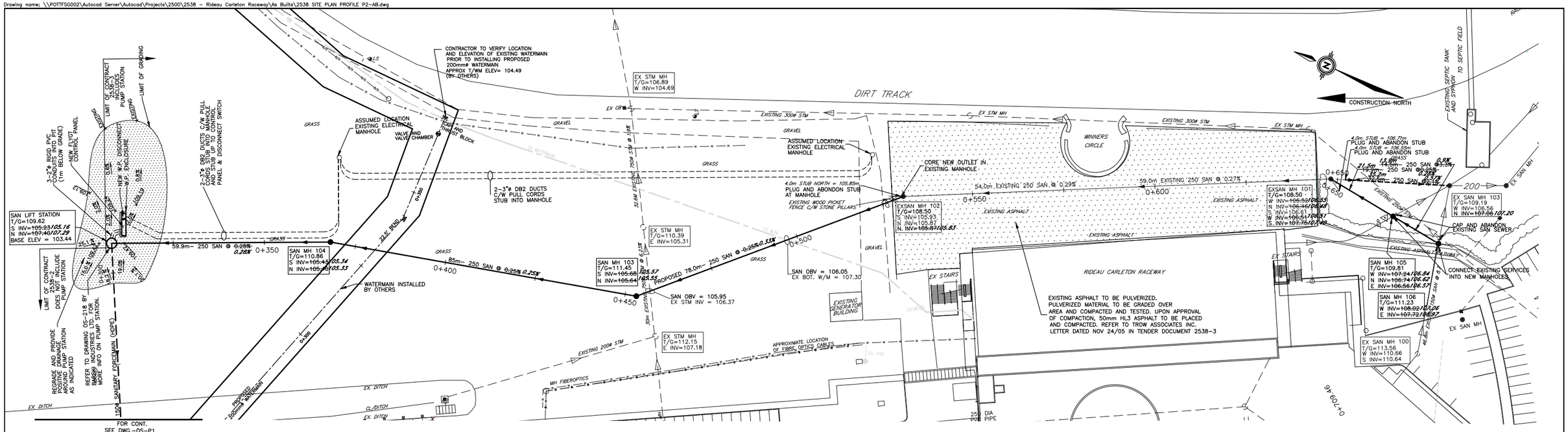
SCALE
HORZ 1:500
0 5 10 15 20

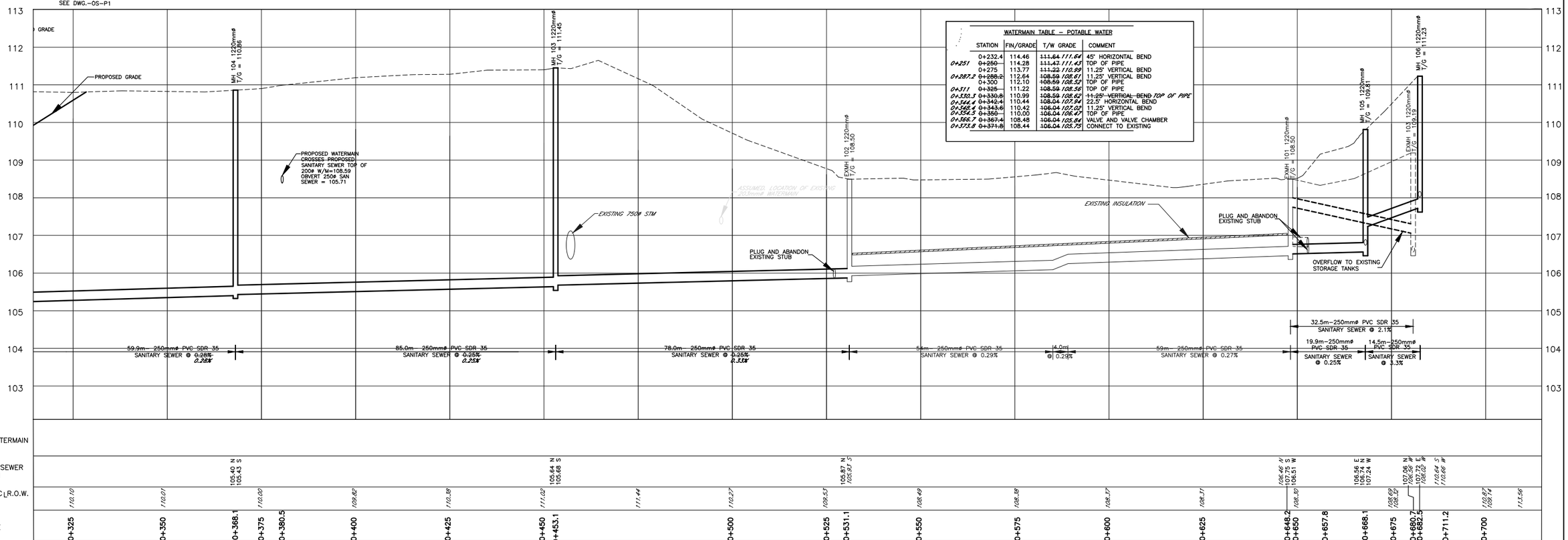
RIDEAU CARLETON RACEWAY
SANITARY SEWER EXTENSION
CITY OF OTTAWA

PLAN AND PROFILE
RACEWAY PLAN / PROFILE
STA. 0+000 TO 0+350

PROJECT No.	2538
SURVEY BY	D.M.E.
DATE	APR 2005
DRAWING No.	2538-OS P1 - AB

Drawing name: \\POTTFSG002\Autocad Server\Autocad\Projects\2500\2538 - Rideau Carleton Raceway\As Builts\2538 SITE PLAN PROFILE P2-AB.dwg





WATERMAIN TABLE - POTABLE WATER

STATION	FIN/GRADE	T/W GRADE	COMMENT
0+232.4	114.46	~~111.64~~ 111.64	45° HORIZONTAL BEND
~~0+250~~ 0+251	114.28	~~111.47~~ 111.43	TOP OF PIPE
0+275	113.77	~~111.22~~ 110.99	11.25° VERTICAL BEND
~~0+286.2~~ 0+287.2	112.64	~~108.59~~ 108.61	11.25° VERTICAL BEND
0+300	112.10	~~108.59~~ 108.52	TOP OF PIPE
~~0+325~~ 0+311	111.22	~~108.59~~ 108.56	TOP OF PIPE
~~0+330.8~~ 0+330.1	110.99	~~108.59~~ 108.63	~~11.25° VERTICAL BEND~~ TOP OF PIPE
~~0+342.4~~ 0+344.4	110.44	~~108.04~~ 107.84	22.5° HORIZONTAL BEND
~~0+343.6~~ 0+348.8	110.42	~~106.04~~ 107.03	11.25° VERTICAL BEND
~~0+350~~ 0+350.5	110.00	~~106.04~~ 106.47	TOP OF PIPE
~~0+367.4~~ 0+366.7	108.48	~~106.04~~ 105.84	VALVE AND VALVE CHAMBER
~~0+371.8~~ 0+373.8	108.44	~~106.04~~ 105.75	CONNECT TO EXISTING

NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

AS BUILT

Ottawa

No.	REVISION	DATE	BY
9.	AS BUILT INVERTS ADDED	OCT 9/07	CJR
8.	ISSUED FOR CONSTRUCTION (CONTRACT 2538-3)	MAY 25/06	CJR
7.	ISSUED FOR TENDER (CONTRACT 2538-3)	APR 12/06	CJR
6.	REVISED SANITARY AND WATERMAN ALIGNMENT SHIFTED PUMP STATION WEST.	FEB 10/06	CJR
5.	SANITARY SEWER REVISED	NOV 24/05	CJR
4.	ELECTRICAL INFO ADDED	NOV 01/05	CJR
3.	ISSUED FOR TENDER (CONTRACT 2538-2)	OCT 06/05	CJR
2.	REVISED AND RESUBMITTED TO CITY	OCT 06/05	CJR
1.	ISSUED TO CITY FOR REVIEW	SEP 12/05	CJR

DME Ltd.
David McManus Engineering Ltd.
400 - 30 Camelot Drive
Ottawa Ontario, K2G 5X8
E-mail: mcmanus@dmei.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME
DESIGN	CR
CHECKED	JLS
CAD	KJK
PROJ. MGR.	JLS
APPROVED	JDM

SCALE
HORZ 1:500
0 5 10 15 20

RIDEAU CARLETON RACEWAY
SANITARY SEWER EXTENSION
CITY OF OTTAWA
PLAN AND PROFILE
RACEWAY PLAN / PROFILE
STA. 0+350 TO 0+702.2

PROJECT No. 2538
SURVEY BY D.M.E.
DATE APR 2005
DRAWING No. 2538-OS P2 - AB


PUMP 1
PUMP 2
MAIN DISCONNECT
MINI CONTROL AND STATUS II
24V AC/DC
LEAKAGE
TEMPERATURE
SUPPLY
DANGER
HAUT VOLTAGE
AVERTISSEMENT
DÉBRANCHER L'ALIMENTATION AVANT D'OUVRIR CETTE PORTE
CAUTION
DISCONNECT MAIN SUPPLY BEFORE OPENING THIS DOOR
CAUTION
INTRINSIC SECURITY CABLES AND NON-INTRINSIC SECURITY CABLES MUST NOT SHARE THE SAME CABLE CONDUITS (WIRING DUCT)
MILLTRONICS
MultiRanger 100
PUMP 1
PUMP 2
SPS
FEED FROM OLD ELECTRICAL ROOM

NOVATECH
Engineers, Planners & Landscape Architects

CCTV Sewer Inspection Review Form

2019-11-14

Project Name Rideau Carleton Raceway – Hard Rock Casino **Report No.**

Novatech Project No. 116111
Owner
General Contractor

Inspection Date
Inspection Conducted By **Veolia**

Comments Verified by Municipality
Yes ☐ No ☐ N/A ☐

Report Received
Inspection Reviewed
Review Done By LKC
Review to Contractor

Sewer Type
☒ Sanitary Sewer
☐ Storm Sewer
☐ Combined Sewer

Video Type
☐ Preliminary Set
☐ Repair Set
☐ Final Set

DVD No.	Street Name	Start MH No.	End MH No.	(Check Applicable Box)			Inspection Length (m)	Problem/Observation	Comment/Action
				Acceptable	Monitor	Repair			
MHSA-.42 MHSA-.41	EARL ARMSTRONG	.42	.41	☒	☐	☐	119.00	Moderate Silt, Pile of Gravel @ 35.7m	Requires Cleaning
MHSA-28 MHSA-29	EARL ARMSTRONG	28	29	☒	☐	☐	72.00	Moderate Grease	Requires Cleaning
MHSA-28A MHSA-28	EARL ARMSTRONG	28A	28	☒	☐	☐	119.50	Moderate Grease	Requires Cleaning
MHSA-28A NORTH	EARL ARMSTRONG	28A	28A	☒	☐	☐	2.00	Significant Silt	Requires Cleaning
MHSA-29 MHSA-30	EARL ARMSTRONG	29	30	☒	☐	☐	0	Significant Gravel, Aborted	Requires Cleaning
MHSA-30 MHSA-29	EARL ARMSTRONG	30	29	☒	☐	☐	118.00	Significant Grease, Silt, Gravel and Rocks	Requires Cleaning
MHSA-31 MHSA-30	EARL ARMSTRONG	31	30	☒	☐	☐	118.50	Moderate Grease	Requires Cleaning
MHSA-32 MHSA-31	EARL ARMSTRONG	32	31	☒	☐	☐	119.50	Moderate Debris @ 61.5m, 99.6m, 103.5m	Requires Cleaning
MHSA-33 MHSA-32	EARL ARMSTRONG	33	32	☒	☐	☐	118.00		
MHSA-33 MHSA-34	EARL ARMSTRONG	33	34	☒	☐	☐	119.00	Mild Grease	Requires Cleaning
MHSA-35 MHSA-34	EARL ARMSTRONG	35	34	☒	☐	☐	52.00		

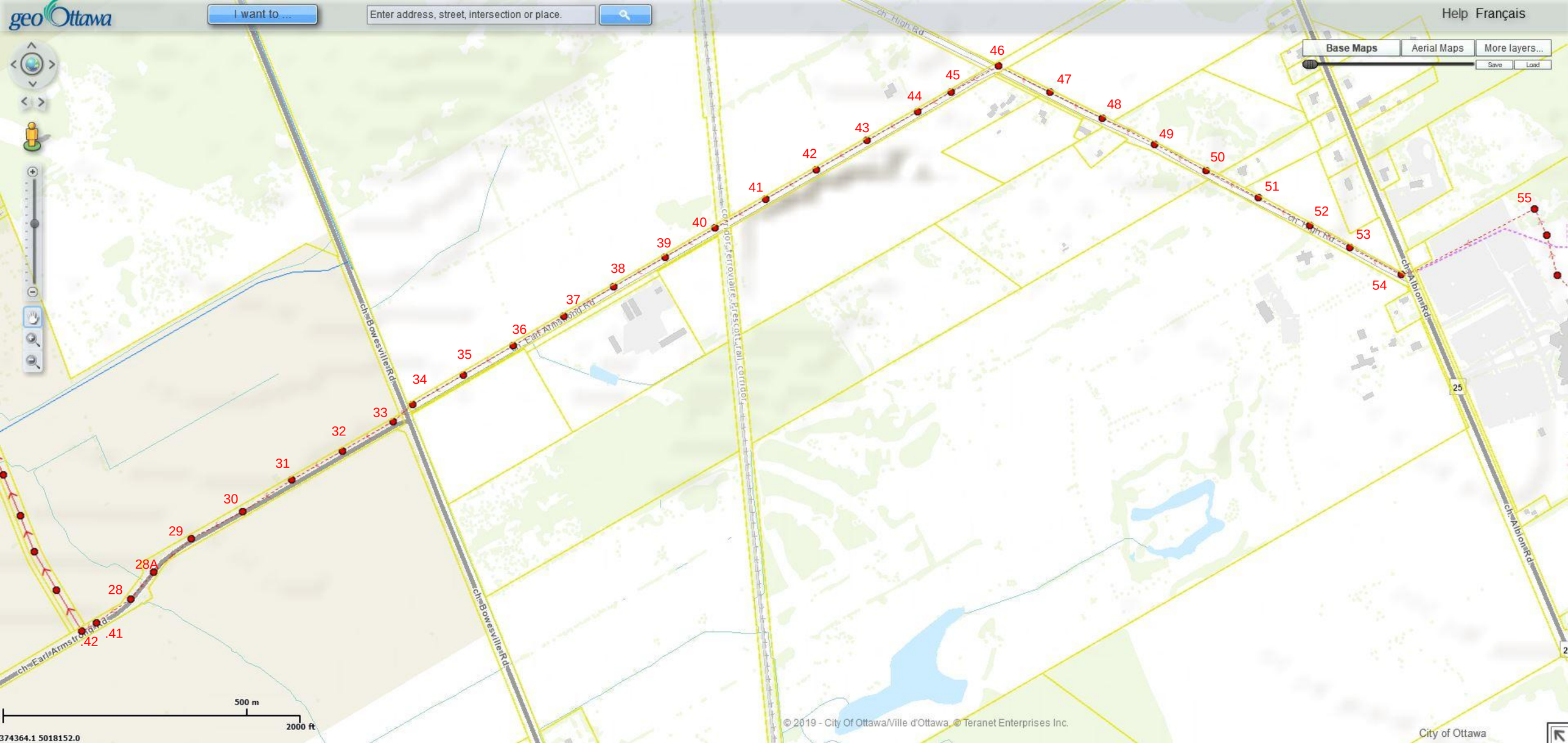
NOVATECH
Engineers, Planners & Landscape Architects

CCTV Sewer Inspection Review Form

2019-11-14

MHSA-36 MHSA-35	EARL ARMSTRONG	36	35	☒	☐	☐	118.50		
MHSA-37 MHSA-36	EARL ARMSTRONG	37	36	☒	☐	☐	119.00		
MHSA-38 MHSA-37	EARL ARMSTRONG	38	37	☒	☐	☐	118.00		
MHSA-39 MHSA-38	EARL ARMSTRONG	39	38	☒	☐	☐	118.00	Mild Grease, Debris @ 99.0	Requires Cleaning
MHSA-40 MHSA-39	EARL ARMSTRONG	40	39	☒	☐	☐	118.50		
MHSA-41 MHSA-40	EARL ARMSTRONG	41	40	☒	☐	☐	118.50		
MHSA-42 MHSA-41	EARL ARMSTRONG	42	41	☒	☐	☐	118.00	Moderate Silt	Requires Cleaning
MHSA-42 MHSA-43	EARL ARMSTRONG	42	43	☒	☐	☐	120.00		
MHSA-43 MHSA-42	EARL ARMSTRONG	43	42	☒	☐	☐	120.00		
MHSA-44 MHSA-43	EARL ARMSTRONG	44	43	☒	☐	☐	119.00		
MHSA-44 MHSA-45	EARL ARMSTRONG	44	45	☒	☐	☐	118.00	Significant Grease, Moderate Silt	Requires Cleaning
MHSA-45A MHSA-44A	EARL ARMSTRONG	45A	44A	☒	☐	☐	118.50	Mild Grease, Silt	Requires Cleaning
MHSA-46 MHSA-45	EARL ARMSTRONG	46	45	☒	☐	☐	77.50	Significant Silt, Rocks	Requires Cleaning
MHSA-47 MHSA-46	EARL ARMSTRONG	47	46	☒	☐	☐	109.00	Moderate Grease and Silt	Requires Cleaning
MHSA-47A MHSA-46A	EARL ARMSTRONG	47A	46A	☒	☐	☐	109.50	Moderate Grease	Requires Cleaning
MHSA-48 MHSA-47	EARL ARMSTRONG	48	47	☒	☐	☐	118.00	Moderate Grease	Requires Cleaning
MHSA-49 MHSA-48	EARL ARMSTRONG	49	48	☒	☐	☐	118.00	Moderate Grease	Requires Cleaning
MHSA-50 MHSA-49	EARL ARMSTRONG	50	49	☒	☐	☐	119.00		
MHSA-51 MHSA-50	EARL ARMSTRONG	51	50	☒	☐	☐	119.00		
MHSA-52 MHSA-51	EARL ARMSTRONG	52	51	☒	☐	☐	118.10		

MHSA-53 MHSA-52	EARL ARMSTRONG	53	52	☒	☐	☐	118.00	Mild Grease	Requires Cleaning
MHSA-54 MHSA-53	EARL ARMSTRONG	54	43	☒	☐	☐	95.00	Mild Grease	Requires Cleaning
MHSA-55 MHSA-54	EARL ARMSTRONG	55	54	☒	☐	☐	118.00		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CCTV inspection report

Hard Rock Ottawa L.P

Sanitary Sewer

EARL ARMSTRONG, HIGH RD

Page

33 items

33 items

Start/End	Inspection direction	Pipe	Road	Page
MHSA-.42 --> MHSA-.41	Direction of flow	MHSA-.42 MHSA-.41	EARL ARMSTRONG	19
MHSA-28 --> MHSA-29	Against flow	MHSA-28 MHSA-29	EARL ARMSTRONG	22
MHSA-28A --> MHSA-28	Against flow	MHSA-28A MHSA-28	EARL ARMSTRONG	24
MHSA-28A --> NORTH	Direction of flow	MHSA-28A NORTH	EARL ARMSTRONG	27
MHSA-29 --> MHSA-30	Against flow	MHSA-29 MHSA-30	EARL ARMSTRONG	29
MHSA-30 --> MHSA-29	Direction of flow	MHSA-30 MHSA-29	EARL ARMSTRONG	31
MHSA-31 --> MHSA-30	Direction of flow	MHSA-31 MHSA-30	EARL ARMSTRONG	33
MHSA-32 --> MHSA-31	Direction of flow	MHSA-32 MHSA-31	EARL ARMSTRONG	35
MHSA-33 --> MHSA-32	Direction of flow	MHSA-33 MHSA-32	EARL ARMSTRONG	37
MHSA-33 --> MHSA-34	Against flow	MHSA-33 MHSA-34	EARL ARMSTRONG	39
MHSA-35 --> MHSA-34	Direction of flow	MHSA-35 MHSA-34	EARL ARMSTRONG	41
MHSA-36 --> MHSA-35	Direction of flow	MHSA-36 MHSA-35	EARL ARMSTRONG	43
MHSA-37. --> MHSA-36.	Direction of flow	MHSA-37. MHSA-36.	EARL ARMSTRONG	45
MHSA-38 --> MHSA-37	Direction of flow	MHSA-38 MHSA-37	EARL ARMSTRONG	47
MHSA-39 --> MHSA-38	Direction of flow	MHSA-39 MHSA-38	EARL ARMSTRONG	49
MHSA-40 --> MHSA-39	Direction of flow	MHSA-40 MHSA-39	EARL ARMSTRONG	52
MHSA-41 --> MHSA-40	Direction of flow	MHSA-41 MHSA-40	EARL ARMSTRONG	54
MHSA-42 --> MHSA-41	Direction of flow	MHSA-42 MHSA-41	EARL ARMSTRONG	56
MHSA-42 --> MHSA-43	Against flow	MHSA-42 MHSA-43	EARL ARMSTRONG	58
MHSA-43 --> MHSA-42	Direction of flow	MHSA-43 MHSA-42	EARL ARMSTRONG	60
MHSA-44 --> MHSA-43	Direction of flow	MHSA-44 MHSA-43	EARL ARMSTRONG	62
MHSA-44 --> MHSA-45	Against flow	MHSA-44 MHSA-45	EARL ARMSTRONG	64
MHSA-44... --> MHSA-45...	Direction of flow	MHSA-45... MHSA-44...	EARL ARMSTRONG	66
MHSA-46. --> MHSA-45.	Direction of flow	MHSA-46. MHSA-45.	EARL ARMSTRONG	69
MHSA-47... --> MHSA-46...	Direction of flow	MHSA-47... MHSA-46...	EARL ARMSTRONG	71
MHSA-48 --> MHSA-47	Direction of flow	MHSA-48 MHSA-47	HIGH RD	73
MHSA-49 --> MHSA-48	Direction of flow	MHSA-49 MHSA-48	HIGH RD	75
MHSA-50 --> MHSA-49	Direction of flow	MHSA-50 MHSA-49	HIGH RD	78
MHSA-51... --> MHSA-50...	Direction of flow	MHSA-51... MHSA-50...	HIGH RD	80
MHSA-52.. --> MHSA-51..	Direction of flow	MHSA-52.. MHSA-51..	HIGH RD	82
MHSA-53 --> MHSA-52	Direction of flow	MHSA-53 MHSA-52	HIGH RD	84
MHSA-54 --> MHSA-53	Direction of flow	MHSA-54 MHSA-53	HIGH RD	86
MHSA-55.. --> MHSA-54..	Direction of flow	MHSA-55.. MHSA-54..	HIGH RD	88

33 items

Road	Pipe	Start/End	Inspection direction	Page
EARL ARMSTRONG	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	19
EARL ARMSTRONG	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	22
EARL ARMSTRONG	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	24
EARL ARMSTRONG	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	27
EARL ARMSTRONG	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	29
EARL ARMSTRONG	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	31
EARL ARMSTRONG	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	33
EARL ARMSTRONG	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	35
EARL ARMSTRONG	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	37
EARL ARMSTRONG	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	39
EARL ARMSTRONG	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	41
EARL ARMSTRONG	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	43
EARL ARMSTRONG	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	45
EARL ARMSTRONG	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	47
EARL ARMSTRONG	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	49
EARL ARMSTRONG	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	52
EARL ARMSTRONG	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	54
EARL ARMSTRONG	MHSA-42 MHSA-41	MHSA-42 --> MHSA-41	Direction of flow	56
EARL ARMSTRONG	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	58
EARL ARMSTRONG	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	60
EARL ARMSTRONG	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	62
EARL ARMSTRONG	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	64
EARL ARMSTRONG	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	66
EARL ARMSTRONG	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	69
EARL ARMSTRONG	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	71
HIGH RD	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	73
HIGH RD	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	75
HIGH RD	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	78
HIGH RD	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	80
HIGH RD	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	82
HIGH RD	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	84
HIGH RD	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	86
HIGH RD	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	88

33 items

1 - Acceptable structural condition (33 of 33 items)

Total	Peak	Pipe	Start/End	Direction	Road	Page
0	0	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	19
0	0	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	22
0	0	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	24
0	0	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG	27
0	0	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	29
0	0	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	31
0	0	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	33
0	0	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG	35
0	0	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG	37
0	0	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG	39
0	0	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG	41
0	0	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG	43
0	0	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG	45
0	0	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG	47
0	0	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	49
0	0	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG	52
0	0	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG	54
0	0	MHSA-42 MHSA-41	MHSA-42 --> MHSA-41	Direction of flow	EARL ARMSTRONG	56
0	0	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG	58
0	0	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG	60
0	0	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG	62
0	0	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	64
0	0	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	66
0	0	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG	69
0	0	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	71
0	0	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	73
0	0	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	75
0	0	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD	78
0	0	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD	80
0	0	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD	82
0	0	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	84
0	0	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD	86
0	0	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD	88

33 items

Grade: 3 (20 of 33 items)

Total	Peak	ICG	Pipe	Start/End	Direction	Road	Page
12	2	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	49
8	2	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	31
8	2	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	66
7	2	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	19
4	2	1	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	22
4	2	1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	24
4	2	1	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	29
4	2	1	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	33
4	2	1	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	64
4	2	1	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	71
4	2	1	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	73
4	2	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	75
4	2	1	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	84
2	2	1	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG	27
2	2	1	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG	35
2	2	1	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG	39
2	2	1	MHSA-42 MHSA-41	MHSA-42 --> MHSA-41	Direction of flow	EARL ARMSTRONG	56
2	2	1	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG	62
2	2	1	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG	69
2	2	1	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD	86

Grade: 1 (13 of 33 items)

Total	Peak	ICG	Pipe	Start/End	Direction	Road	Page
0	0	1	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG	37
0	0	1	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG	41
0	0	1	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG	43
0	0	1	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG	45
0	0	1	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG	47
0	0	1	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG	52
0	0	1	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG	54
0	0	1	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG	58
0	0	1	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG	60
0	0	1	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD	78
0	0	1	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD	80
0	0	1	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD	82
0	0	1	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD	88

80 items

DE - Debris (non-silt / grease) (1 of 80 items)

%	Qty	OPG	ICG	Pipe	Start/End	Direction	Road	Picture	Page
5	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	50	49

DEG - Debris grease (33 of 80 items)

%	Qty	OPG	ICG	Pipe	Start/End	Direction	Road	Picture	Page
15	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	51	49
5	1	3	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	20	19
5	1	3	1	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	23	22
5	1	3	1	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	23	22
5	1	3	1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	25	24
5	1	3	1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	25	24
5	1	3	1	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	30	29
5	1	3	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	32	31
5	1	3	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	32	31
5	1	3	1	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	34	33
5	1	3	1	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	34	33
5	1	3	1	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG	36	35
5	1	3	1	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG	40	39
5	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	50	49
5	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	50	49
5	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	50	49
5	1	3	1	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG	63	62
5	1	3	1	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	65	64
5	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	67	66
5	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	67	66
5	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	67	66
5	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	68	66
5	1	3	1	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	72	71
5	1	3	1	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	72	71
5	1	3	1	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	74	73
5	1	3	1	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	74	73
5	1	3	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	76	75
5	1	3	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	76	75
5	1	3	1	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	85	84
5	1	3	1	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	85	84
5	1	3	1	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD	87	86
0	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG		49
0	1	3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	51	49

DES - Debris silt (9 of 80 items)

%	Qty	OPG	ICG	Pipe	Start/End	Direction	Road	Picture	Page
15	1	3	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	32	31
10	1	3	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	20	19
10	1	3	1	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG	28	27
5	1	3	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	20	19
5	1	3	1	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	30	29
5	1	3	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	32	31
5	1	3	1	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	65	64
5	1	3	1	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG	70	69
0	1	3	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	20	19

WL - Water level (37 of 80 items)

%	Qty	OPG	ICG	Pipe	Start/End	Direction	Road	Picture	Page
15	1	3	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	76	75
10	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	67	66
10	1	3	1	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	72	71
10	1	3	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	76	75
10		3	1	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG		31

WL - Water level (37 of 80 items)

%	Qty	OPG	ICG	Pipe	Start/End	Direction	Road	Picture	Page
10		1	1	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG		52
10		3	1	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG		64
5	1	3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	68	66
5		3	1	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG		19
5		3	1	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG		22
5		3	1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG		24
5		3	1	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG		27
5		3	1	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG		29
5		3	1	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG		33
5		3	1	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG		35
5		1	1	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG		37
5		3	1	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG		39
5		1	1	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG		41
5		1	1	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG		43
5		1	1	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG		45
5		1	1	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG		47
5		3	1	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG		49
5		1	1	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG		54
5		1	1	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG		58
5		1	1	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG		60
5		3	1	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG		62
5		3	1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG		66
5		3	1	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG		69
5		3	1	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG		71
5		3	1	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD		73
5		3	1	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD		75
5		1	1	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD		78
5		1	1	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD		80
5		1	1	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD		82
5		3	1	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD		84
5		3	1	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD		86
5		1	1	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD		88

59 items

MH - Manhole / node (59 of 59 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG		19
	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	20	19
	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	23	22
	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG		22
	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	25	24
	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG		24
	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG		27
	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG		29
	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG		31
	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	34	33
	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG		33
	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG		35
	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG	36	35
	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG		37
	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG	38	37
	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG		39
	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG	40	39
	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG		41
	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG	42	41
	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG		43
	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG	44	43
	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG		45
	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG	46	45
	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG	48	47
	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG		47
	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	51	49
	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG		49
	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG	53	52
	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG		52
	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG	55	54
	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG		54
	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG		58
	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG		60
	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG		62
	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG	63	62
	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	65	64
	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG		64
	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	68	66
	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG		66
	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG		69
	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG	70	69
	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	72	71
	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG		71
	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD		73
	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	74	73
	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	76	75
	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD		75
	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD	79	78
	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD		78
	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD	81	80
	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD		80
	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD		82
	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD	83	82
	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	85	84
	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD		84
	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD	87	86
	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD		86
	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD		88

MH - Manhole / node (59 of 59 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD	89	88

72 items

FH - Finish of Survey (27 of 72 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG	21	19
	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG	23	22
	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	26	24
	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG	34	33
	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG	36	35
	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG	38	37
	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG	40	39
	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG	42	41
	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG	44	43
	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG	46	45
	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG	48	47
	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG	51	49
	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG	53	52
	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG	55	54
	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG	63	62
	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG	65	64
	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	68	66
	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG	70	69
	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG	72	71
	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD	74	73
	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD	77	75
	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD	79	78
	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD	81	80
	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD	83	82
	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD	85	84
	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD	87	86
	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD	89	88

GO - General observation at this point (8 of 72 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	25	24
1	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG	25	24
1	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG	28	27
1	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	30	29
1	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG	44	43
1	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG	59	58
1	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG	61	60
1	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG	67	66

SA - Survey abandoned (5 of 72 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG	28	27
	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG	30	29
	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG	32	31
	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG	59	58
	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG	61	60

ST - Start of Survey (32 of 72 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-.42 MHSA-.41	MHSA-.42 --> MHSA-.41	Direction of flow	EARL ARMSTRONG		19
	MHSA-28 MHSA-29	MHSA-28 --> MHSA-29	Against flow	EARL ARMSTRONG		22
	MHSA-28A MHSA-28	MHSA-28A --> MHSA-28	Against flow	EARL ARMSTRONG		24
	MHSA-28A NORTH	MHSA-28A --> NORTH	Direction of flow	EARL ARMSTRONG		27
	MHSA-29 MHSA-30	MHSA-29 --> MHSA-30	Against flow	EARL ARMSTRONG		29
	MHSA-30 MHSA-29	MHSA-30 --> MHSA-29	Direction of flow	EARL ARMSTRONG		31
	MHSA-31 MHSA-30	MHSA-31 --> MHSA-30	Direction of flow	EARL ARMSTRONG		33
	MHSA-32 MHSA-31	MHSA-32 --> MHSA-31	Direction of flow	EARL ARMSTRONG		35

ST - Start of Survey (32 of 72 items)

Qty	Pipe	Start/End	Direction	Road	Picture	Page
	MHSA-33 MHSA-32	MHSA-33 --> MHSA-32	Direction of flow	EARL ARMSTRONG		37
	MHSA-33 MHSA-34	MHSA-33 --> MHSA-34	Against flow	EARL ARMSTRONG		39
	MHSA-35 MHSA-34	MHSA-35 --> MHSA-34	Direction of flow	EARL ARMSTRONG		41
	MHSA-36 MHSA-35	MHSA-36 --> MHSA-35	Direction of flow	EARL ARMSTRONG		43
	MHSA-37. MHSA-36.	MHSA-37. --> MHSA-36.	Direction of flow	EARL ARMSTRONG		45
	MHSA-38 MHSA-37	MHSA-38 --> MHSA-37	Direction of flow	EARL ARMSTRONG		47
	MHSA-39 MHSA-38	MHSA-39 --> MHSA-38	Direction of flow	EARL ARMSTRONG		49
	MHSA-40 MHSA-39	MHSA-40 --> MHSA-39	Direction of flow	EARL ARMSTRONG		52
	MHSA-41 MHSA-40	MHSA-41 --> MHSA-40	Direction of flow	EARL ARMSTRONG		54
	MHSA-42 MHSA-43	MHSA-42 --> MHSA-43	Against flow	EARL ARMSTRONG		58
	MHSA-43 MHSA-42	MHSA-43 --> MHSA-42	Direction of flow	EARL ARMSTRONG		60
	MHSA-44 MHSA-43	MHSA-44 --> MHSA-43	Direction of flow	EARL ARMSTRONG		62
	MHSA-44 MHSA-45	MHSA-44 --> MHSA-45	Against flow	EARL ARMSTRONG		64
	MHSA-45... MHSA-44...	MHSA-44... --> MHSA-45...	Direction of flow	EARL ARMSTRONG		66
	MHSA-46. MHSA-45.	MHSA-46. --> MHSA-45.	Direction of flow	EARL ARMSTRONG		69
	MHSA-47... MHSA-46...	MHSA-47... --> MHSA-46...	Direction of flow	EARL ARMSTRONG		71
	MHSA-48 MHSA-47	MHSA-48 --> MHSA-47	Direction of flow	HIGH RD		73
	MHSA-49 MHSA-48	MHSA-49 --> MHSA-48	Direction of flow	HIGH RD		75
	MHSA-50 MHSA-49	MHSA-50 --> MHSA-49	Direction of flow	HIGH RD		78
	MHSA-51... MHSA-50...	MHSA-51... --> MHSA-50...	Direction of flow	HIGH RD		80
	MHSA-52.. MHSA-51..	MHSA-52.. --> MHSA-51..	Direction of flow	HIGH RD		82
	MHSA-53 MHSA-52	MHSA-53 --> MHSA-52	Direction of flow	HIGH RD		84
	MHSA-54 MHSA-53	MHSA-54 --> MHSA-53	Direction of flow	HIGH RD		86
	MHSA-55.. MHSA-54..	MHSA-55.. --> MHSA-54..	Direction of flow	HIGH RD		88

Pipe identification

Pipe:	MHSA-.42 MHSA-.41	**Direction of inspection:**	MHSA-.42 --> MHSA-.41
Direction of flow:	MHSA-.42 --> MHSA-.41	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 9:19 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 7
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-.42

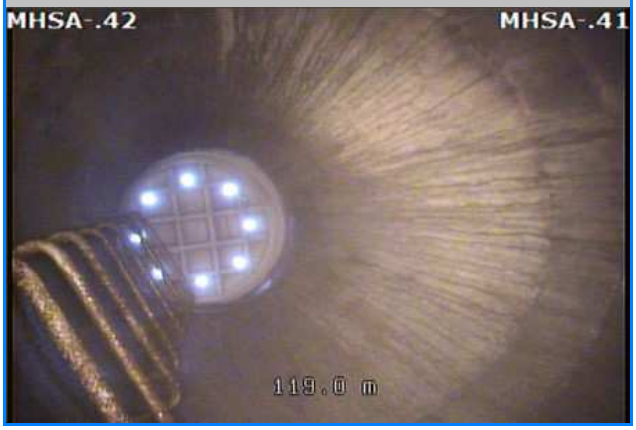
#3 0.00
WL - Water level, 5%

#4 5.90
DEG - Debris grease, from 5 o'clock to 7 o'clock, 5%

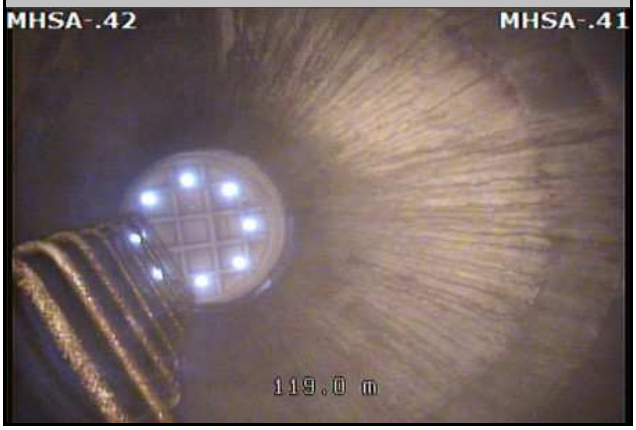
#5 35.70
DES - Debris silt, 10%

#6 35.70
(S1) DES - Debris silt, 5%

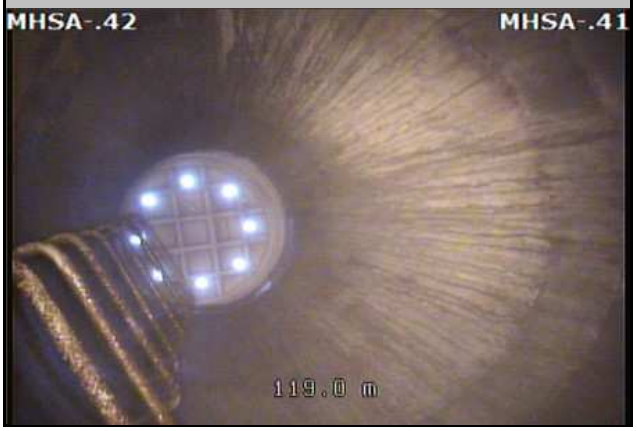
#7 119.00
(F1) DES - Debris silt, 0%



#8 119.00
MH - Manhole / node, MHSA-.41



#9 119.00
FH - Finish of Survey



Pipe identification

Pipe:	MHSA-28 MHSA-29	**Direction of inspection:**	MHSA-28 --> MHSA-29
Direction of flow:	MHSA-29 --> MHSA-28	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	S BEND / POOR ACCESS	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	72.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	07/01/2019 12:07 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	72.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

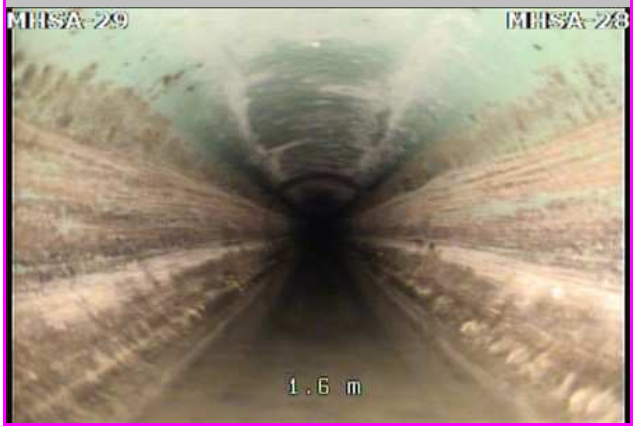
Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-28

#3 0.00
WL - Water level, 5%

#4 1.60
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%



#5 72.00
(F1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#6 72.00
MH - Manhole / node, MHSA-29

#7 72.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-28A MHSA-28	**Direction of inspection:**	MHSA-28A --> MHSA-28
Direction of flow:	MHSA-28 --> MHSA-28A	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.50
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	07/01/2019 11:42 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-28A

#3 0.00
WL - Water level, 5%

#4 0.00
GO - General observation at this point, at 6 o'clock, drop pipe

#5 3.90
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#6 34.00
GO - General observation at this point, from 1 o'clock to 12 o'clock, bured manhole at 34m to the east of 28

#7 119.50
(F1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#8 119.50
MH - Manhole / node, MHSA-28

#9 119.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-28A NORTH	**Direction of inspection:**	MHSA-28A --> NORTH
Direction of flow:	MHSA-28A --> NORTH	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	2.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	07/01/2019 1:05 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	2.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-28A

#3 0.00
WL - Water level, 5%

#4 0.00
DES - Debris silt, 10%

#5 2.00
GO - General observation at this point, PASS SCOPE OF WORK

#6 2.00
SA - Survey abandoned, PASS SCOPE OF WORK

Pipe identification

Pipe:	MHSA-29 MHSA-30	**Direction of inspection:**	MHSA-29 --> MHSA-30
Direction of flow:	MHSA-30 --> MHSA-29	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	3.80
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	07/01/2019 12:31 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	3.80
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-29

#3 0.00
WL - Water level, 5%

#4 2.70
(S1) DEG - Debris grease, from 1 o'clock to 11 o'clock, 5%

#5 3.00
DES - Debris silt, 5%

#6 3.70
GO - General observation at this point,
from 4 o'clock to 8 o'clock, robot stop by drbris amd rocks

#7 3.80
SA - Survey abandoned, reversal not complete due to debris of rocks

Pipe identification

Pipe:	MHSA-30 MHSA-29	**Direction of inspection:**	MHSA-30 --> MHSA-29
Direction of flow:	MHSA-30 --> MHSA-29	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	12/12/2018 9:32 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	95.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 8
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

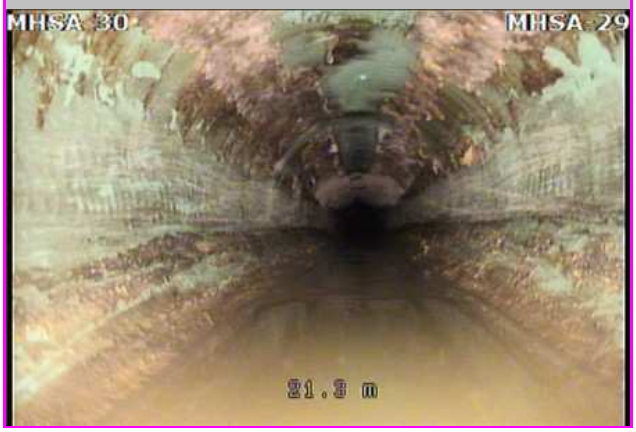
#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-30

#3 0.00
WL - Water level, 10%

#4 1.20
DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#5 21.30
DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%



#6 48.90
DES - Debris silt, 5%, debris underwater

#7 95.00
DES - Debris silt, 15%, debris underwater block robot.

#8 95.00
SA - Survey abandoned, debris underwater block robot.

Pipe identification

Pipe:	MHSA-31 MHSA-30	**Direction of inspection:**	MHSA-31 --> MHSA-30
Direction of flow:	MHSA-31 --> MHSA-30	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.50
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	12/12/2018 9:18 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-31

#3 0.00
WL - Water level, 5%

#4 1.60
(S1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#5 118.50
(F1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#6 118.50
MH - Manhole / node, MHSA-30

#7 118.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-32 MHSA-31	**Direction of inspection:**	MHSA-32 --> MHSA-31
Direction of flow:	MHSA-32 --> MHSA-31	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.50
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 2:54 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-32

#3 0.00
WL - Water level, 5%

#4 16.80
DEG - Debris grease, from 1 o'clock to 12 o'clock, 5%

#5 119.50
MH - Manhole / node, MHSA-31

#6 119.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-33 MHSA-32	**Direction of inspection:**	MHSA-33 --> MHSA-32
Direction of flow:	MHSA-33 --> MHSA-32	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	1ST MH WEST OF BOWESVILLE	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 2:36 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-33

#3 0.00
WL - Water level, 5%

#4 118.00
MH - Manhole / node, MHSA-32

#5 118.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-33 MHSA-34	**Direction of inspection:**	MHSA-33 --> MHSA-34
Direction of flow:	MHSA-34 --> MHSA-33	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	1ST MH WEST OF BOWESVILLE	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 2:09 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-33

#3 0.00
WL - Water level, 5%

#4 106.10
(S1) DEG - Debris grease, from 5 o'clock to 7 o'clock, 5%

#5 119.00
MH - Manhole / node, MHSA-34

#6 119.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-35 MHSA-34	**Direction of inspection:**	MHSA-35 --> MHSA-34
Direction of flow:	MHSA-35 --> MHSA-34	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	BOWESVILLE	**Area:**	
Location:	Main road - Urban	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	52.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 1:24 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	52.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade:	1
Total:	0
Peak:	0

Operational Performance

Grade:	1
Total:	0
Peak:	0

Comments

Other information

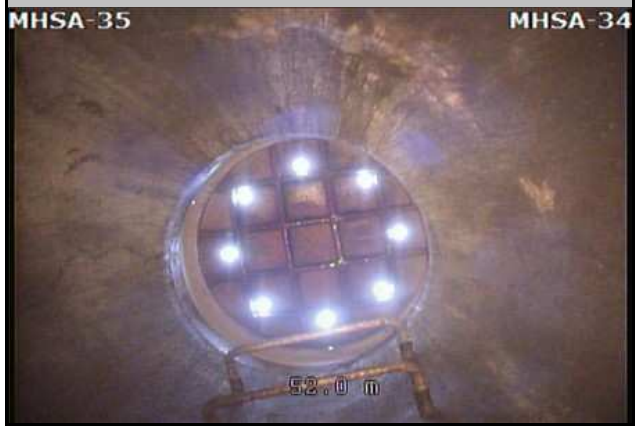
Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

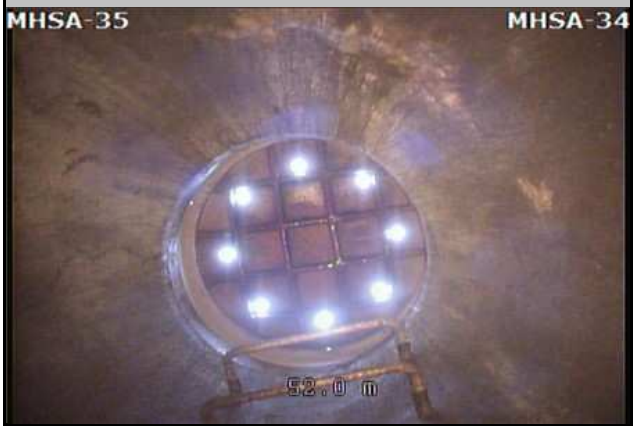
#2 0.00
MH - Manhole / node, MHSA-35

#3 0.00
WL - Water level, 5%

#4 52.00
MH - Manhole / node, MHSA-34



#5 52.00
FH - Finish of Survey



Pipe identification

Pipe:	MHSA-36 MHSA-35	**Direction of inspection:**	MHSA-36 --> MHSA-35
Direction of flow:	MHSA-36 --> MHSA-35	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.50
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 1:04 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-36

#3 0.00
WL - Water level, 5%

#4 118.50
GO - General observation at this point, from 1 o'clock to 12 o'clock, MHSA-35 IS AT BOWESVILLE

#5 118.50
MH - Manhole / node, MHSA-35

#6 118.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-37. MHSA-36.	**Direction of inspection:**	MHSA-37. --> MHSA-36.
Direction of flow:	MHSA-37. --> MHSA-36.	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	12/12/2018 10:55 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

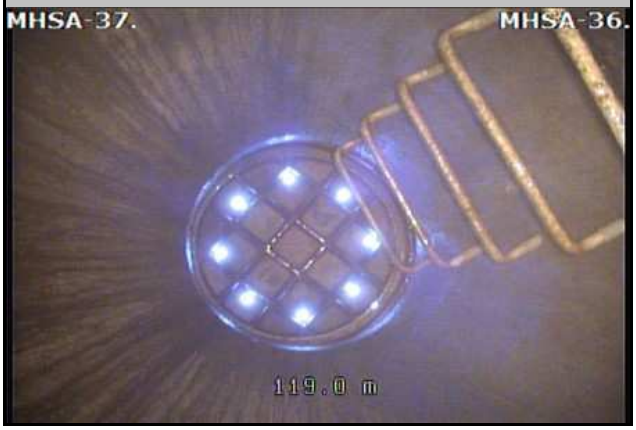
Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

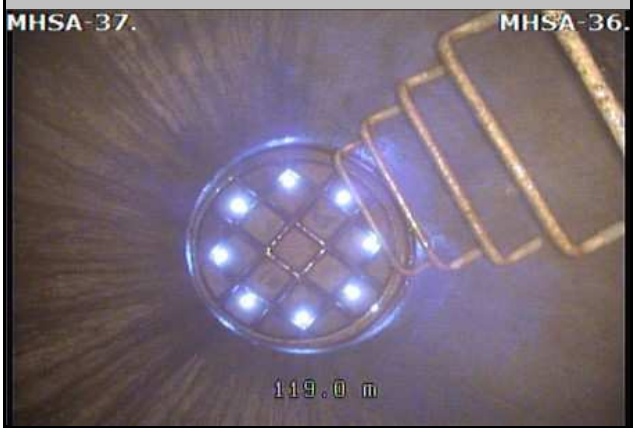
#2 0.00
MH - Manhole / node, MHSA-37.

#3 0.00
WL - Water level, 5%

#4 119.00
MH - Manhole / node, MHSA-36.



#5 119.00
FH - Finish of Survey



Pipe identification

Pipe:	MHSA-38 MHSA-37	**Direction of inspection:**	MHSA-38 --> MHSA-37
Direction of flow:	MHSA-38 --> MHSA-37	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 11:47 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-38

#3 0.00
WL - Water level, 5%

#4 118.00
MH - Manhole / node, MHSA-37

#5 118.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-39 MHSA-38	**Direction of inspection:**	MHSA-39 --> MHSA-38
Direction of flow:	MHSA-39 --> MHSA-38	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	2220 EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 11:25 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade:	1
Total:	0
Peak:	0

Operational Performance

Grade:	3
Total:	12
Peak:	2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-39

#3 0.00
WL - Water level, 5%

#4 70.20
DE - Debris (non-silt / grease), 5%

#5 73.20
DEG - Debris grease, from 11 o'clock to 12 o'clock, 5%

#6 79.30
(S1) DEG - Debris grease, from 11 o'clock to 1 o'clock, 5%

#7 82.00
(F1) DEG - Debris grease, from 11 o'clock to 1 o'clock, 0%

#8 87.00
(S2) DEG - Debris grease, from 11 o'clock to 1 o'clock, 5%

#9 98.90
DEG - Debris grease, from 3 o'clock to 5 o'clock, 15%

#10 118.00
(F2) DEG - Debris grease, from 11 o'clock to 1 o'clock, 0%

#11 118.00
MH - Manhole / node, MHSA-38

#12 118.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-40 MHSA-39	**Direction of inspection:**	MHSA-40 --> MHSA-39
Direction of flow:	MHSA-40 --> MHSA-39	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.50
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 10:50 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade:	1
Total:	0
Peak:	0

Operational Performance

Grade:	1
Total:	0
Peak:	0

Comments

Other information

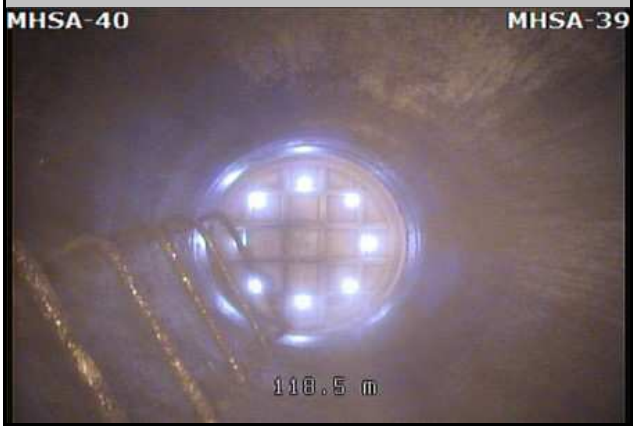
Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-40

#3 0.00
WL - Water level, 10%

#4 118.50
MH - Manhole / node, MHSA-39



#5 118.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-41 MHSA-40	**Direction of inspection:**	MHSA-41 --> MHSA-40
Direction of flow:	MHSA-41 --> MHSA-40	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	AT BICYCLE PATH	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.50
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	11/12/2018 10:29 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-41

#3 0.00
WL - Water level, 5%

#4 118.50
MH - Manhole / node, MHSA-40

#5 118.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-42 MHSA-41	**Direction of inspection:**	MHSA-42 --> MHSA-41
Direction of flow:	MHSA-42 --> MHSA-41	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	06/12/2018 11:01 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	18.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1

Pipe identification

Pipe:	MHSA-42 MHSA-43	**Direction of inspection:**	MHSA-42 --> MHSA-43
Direction of flow:	MHSA-43 --> MHSA-42	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:	HIGH RD	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	120.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	06/12/2018 10:45 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	16.10
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade:	1
Total:	0
Peak:	0

Operational Performance

Grade:	1
Total:	0
Peak:	0

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-42

#3 0.00
WL - Water level, 5%

#4 16.10
GO - General observation at this point, reversal overlap

#5 16.10
SA - Survey abandoned, reversal complete

Pipe identification

Pipe:	MHSA-43 MHSA-42	**Direction of inspection:**	MHSA-43 --> MHSA-42
Direction of flow:	MHSA-43 --> MHSA-42	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	120.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	06/12/2018 8:32 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	106.40
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-43

#3 0.00
WL - Water level, 5%

#4 106.40
SA - Survey abandoned, track spining on grease

#5 106.90
GO - General observation at this point,
from 5 o'clock to 7 o'clock, track spining on grease

Pipe identification

Pipe:	MHSA-44 MHSA-43	**Direction of inspection:**	MHSA-44 --> MHSA-43
Direction of flow:	MHSA-44 --> MHSA-43	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	05/12/2018 11:41 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-44

#3 0.00
WL - Water level, 5%

#4 65.10
(S1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#5 119.00
MH - Manhole / node, MHSA-43

#6 119.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-44 MHSA-45	**Direction of inspection:**	MHSA-44 --> MHSA-45
Direction of flow:	MHSA-45 --> MHSA-44	**Direction:**	Against flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	05/12/2018 11:44 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

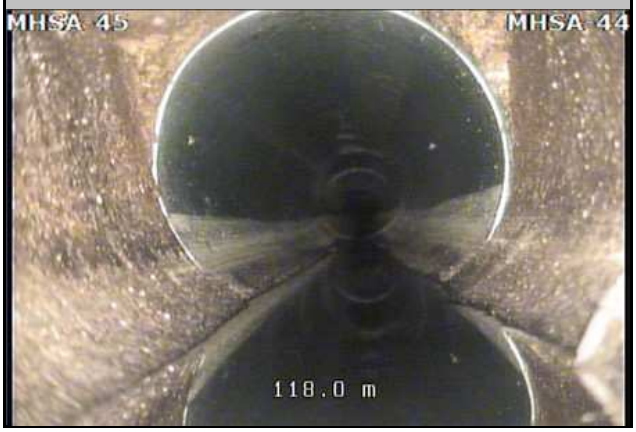
#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-44

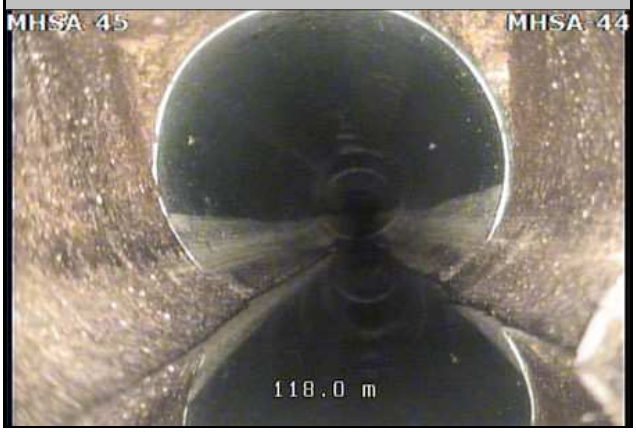
#3 0.00
WL - Water level, 10%

#4 2.30
(S1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#5 118.00
MH - Manhole / node, MHSA-45



#6 118.00
FH - Finish of Survey



#7 120.60
DES - Debris silt, 5%

Pipe identification

Pipe:	MHSA-45... MHSA-44...	**Direction of inspection:**	MHSA-44... --> MHSA-45...
Direction of flow:	MHSA-44... --> MHSA-45...	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.50
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	31/01/2019 1:54 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 8
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-44...

#3 0.00
WL - Water level, 5%

#4 0.00
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#5 0.00
GO - General observation at this point, manhole cover no access

#6 0.00
WL - Water level, 10%

#7 62.00
(S2) DEG - Debris grease, at 12 o'clock, 5%

#8 63.20
(F2) DEG - Debris grease, at 12 o'clock, 5%

#9 97.90
WL - Water level, 5%

#10 118.50
(F1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#11 118.50
MH - Manhole / node, MHSA-45...

#12 118.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-46. MHSA-45.	**Direction of inspection:**	MHSA-46. --> MHSA-45.
Direction of flow:	MHSA-46. --> MHSA-45.	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	77.50
Lining:		**Pipe unit length:**	NA
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	05/12/2018 2:56 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	77.50
Contractor project #:	OTTAWA	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Snow		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-46.

#3 0.00
WL - Water level, 5%

#4 13.20
DES - Debris silt, 5%, ROCK

#5 77.50
MH - Manhole / node, MHSA-45.

#6 77.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-47... MHSA-46...	**Direction of inspection:**	MHSA-47... --> MHSA-46...
Direction of flow:	MHSA-47... --> MHSA-46...	**Direction:**	Direction of flow

Pipe location

Road:	EARL ARMSTRONG	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	109.50
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	31/01/2019 12:41 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	109.50
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-47...

#3 0.00
WL - Water level, 5%

#4 1.50
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#5 68.00
WL - Water level, 10%

#6 109.50
(F1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#7 109.50
MH - Manhole / node, MHSA-46...

#8 109.50
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-48 MHSA-47	**Direction of inspection:**	MHSA-48 --> MHSA-47
Direction of flow:	MHSA-48 --> MHSA-47	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	30/11/2018 12:03 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-48

#3 0.00
WL - Water level, 5%

#4 2.90
(S1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#5 118.00
MH - Manhole / node, MHSA-47

#6 118.00
FH - Finish of Survey

#7 118.30
(F1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

Pipe identification

Pipe:	MHSA-49 MHSA-48	**Direction of inspection:**	MHSA-49 --> MHSA-48
Direction of flow:	MHSA-49 --> MHSA-48	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	30/11/2018 11:47 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-49

#3 0.00
WL - Water level, 5%

#4 5.50
WL - Water level, 15%

#5 10.00
WL - Water level, 10%

#6 74.10
(S1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#7 118.00
(F1) DEG - Debris grease, from 7 o'clock to 5 o'clock, 5%

#8 118.00
MH - Manhole / node, MHSA-48

#9 118.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-50 MHSA-49	**Direction of inspection:**	MHSA-50 --> MHSA-49
Direction of flow:	MHSA-50 --> MHSA-49	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:		**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	30/11/2018 11:22 AM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-50

#3 0.00
WL - Water level, 5%

#4 119.00
MH - Manhole / node, MHSA-49

#5 119.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-51... MHSA-50...	**Direction of inspection:**	MHSA-51... --> MHSA-50...
Direction of flow:	MHSA-51... --> MHSA-50...	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:	HIGH RD	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	119.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	10/01/2019 2:33 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	119.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
Project type:	Video Inspection	**Blocked flow:**	☐
Project supplier:		**Regular CCTV:**	☐
Client:	Hard Rock Ottawa L.P	**Reinspect with ZOOM:**	☐
Purpose:	Assessment of complete remedial or renovation works	**Medium #:**	
Weather:	Dry	**Start position:**	
Operator:	DT	**End position:**	
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-51...

#3 0.00
WL - Water level, 5%

#4 119.00
MH - Manhole / node, MHSA-50...

#5 119.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-52.. MHSA-51..	**Direction of inspection:**	MHSA-52.. --> MHSA-51..
Direction of flow:	MHSA-52.. --> MHSA-51..	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:	HIGH RD	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.10
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	10/01/2019 2:07 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.10
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	DT		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-52..

#3 0.00
WL - Water level, 5%

#4 118.10
MH - Manhole / node, MHSA-51..

#5 118.10
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-53 MHSA-52	**Direction of inspection:**	MHSA-53 --> MHSA-52
Direction of flow:	MHSA-53 --> MHSA-52	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	26/11/2018 2:41 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Rain		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 4
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-53

#3 0.00
WL - Water level, 5%

#4 107.70
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#5 118.00
MH - Manhole / node, MHSA-52

#6 118.00
FH - Finish of Survey

#7 118.80
(F1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

Pipe identification

Pipe:	MHSA-54 MHSA-53	**Direction of inspection:**	MHSA-54 --> MHSA-53
Direction of flow:	MHSA-54 --> MHSA-53	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:	EARL ARMSTRONG	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	95.00
Lining:		**Pipe unit length:**	2.80
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	26/11/2018 2:06 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	95.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Light Rain		
Operator:	RS		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 3
Total: 2
Peak: 2

Comments

Other information

Other 1:	45-5019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-54

#3 0.00
WL - Water level, 5%

#4 6.40
(S1) DEG - Debris grease, from 4 o'clock to 8 o'clock, 5%

#5 95.00
MH - Manhole / node, MHSA-53

#6 95.00
FH - Finish of Survey

Pipe identification

Pipe:	MHSA-55.. MHSA-54..	**Direction of inspection:**	MHSA-55.. --> MHSA-54..
Direction of flow:	MHSA-55.. --> MHSA-54..	**Direction:**	Direction of flow

Pipe location

Road:	HIGH RD	**City:**	Template
Crossroad:	ALBION RD	**Area:**	
Location:	Main road - Suburban/Rural	**Road segment:**	

Pipe characteristics

Category:	Sanitary	**Size:**	250
Shape:	Circular	**Width:**	
Material:	Polyvinyl chloride	**Total length:**	118.00
Lining:		**Pipe unit length:**	4.00
Type:	Main	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Date:	10/01/2019 12:21 PM	**Survey Abandoned:**	
Client project #:	Sanitary Sewer	**Inspected length:**	118.00
Contractor project #:	HARD ROCK CASINO LP	**Pre-cleaning:**	☑
		Blocked flow:	☐
Project type:	Video Inspection	**Regular CCTV:**	☐
Project supplier:		**Reinspect with ZOOM:**	☐
Client:	Hard Rock Ottawa L.P	**Medium #:**	
Purpose:	Assessment of complete remedial or renovation works	**Start position:**	
		End position:	
Weather:	Dry		
Operator:	DT		
Analyst:			

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

Grade: 1
Total: 0
Peak: 0

Comments

Other information

Other 1:	455019	**Other 7:**	
Other 2:		**Other 8:**	
Other 3:		**Other 9:**	
Other 4:		**Other 10:**	
Other 5:		**PI5 (MAMR):**	
Other 6:		**PI6 (MAMR):**	

#1 0.00
ST - Start of Survey

#2 0.00
MH - Manhole / node, MHSA-55..

#3 0.00
WL - Water level, 5%

#4 118.00
MH - Manhole / node, MHSA-54..

#5 118.00
FH - Finish of Survey

Appendix C

Storm Servicing Information

RIDEAU CARLETON RACEWAY
STORMWATER DESIGN

Prepared for:
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6188-555 Richmond Street West
Toronto, ON M5V 3B1

Oliver, Mangione, McCalla & Associates
a division of Trow Consulting Engineers Ltd.

154 Colonnade Road South
Nepean, Ontario K2E 7J5
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Project No. MP13140A
Date: September 3, 1999

Table of Contents

1.0 Introduction

1.1 Background

The Rideau Carleton Raceway is a harness racing facility located in a rural area within the municipal boundaries of the City of Gloucester, Ontario, about 15 kilometres south of downtown Ottawa. The facility, which was built in 1962, consists of a grandstand, 5/8 mile racetrack, horse barns, offices and associated buildings.

The racetrack is currently undergoing expansion and renovation to accommodate a gaming facility. The following report will address the stormwater aspect of the site.

1.2 Terms of Reference

This report was prepared to investigate current hydrological conditions and to make recommendations to improve conditions considering the proposed expansion. Particular concerns have been expressed regarding potential impacts to the Provincially Classified Class I Leitrim Wetland, the southern boundary of which is located about 500 metres to the north of the facility.

1.3 Background Information

The Leitrim Wetland was included in numerous detail reports prepared for the City of Gloucester by Cumming Cockburn Limited (CCL). Two CCL reports that we have referenced are, *"Planning for Leitrim an Integrated Approach, Volume II Master Drainage Plan, August 1991",* and*, "Leitrim Development Area, Stormwater Management Environmental Study Report and Pre-Design, October 1994.* As part of the report, Golder Associates Limited (GAL) prepared a report entitled, *"Hydrogeological and Geotechnical Considerations Pre-Design of Stormwater Management Works Leitrim Development Area, August 1994".* The design procedure and parameters followed are those outlined in the Ministry of Environment (MOE) publication, *"Stormwater Management Practices Planning and Design Manual"*, June 1994 (SWMP).

2.0 Site Description

2.1 Site Location and Description

The Rideau Carleton Raceway is located at 4837 Albion Road in the City of Gloucester, near the intersections of Albion Road with High and Rideau Roads. The site is approximately 4 kilometres southeast of the Macdonald-Cartier International Airport and about 15 kilometres southeast of downtown Ottawa.

The lands owned by the Raceway extend from Albion Road in the west to Bank Street (Hwy 31) in the east, and occupy an area of approximately 130 hectares.

This report will address only the lands which are being redeveloped. This will be approximately 11.83 hectares of land on the west and south side of the property. This land is presently used as a parking area and includes the existing and proposed building. There is an additional 1.91 hectares in the south west corner that may drain to the pond in the future. Therefore the calculations will be based on a total contributing area of 13.74 hectares.

2.2 Topography and Drainage

The Rideau Carleton Raceway site drains northwards into the Findlay Creek Drain and the Leitrim Wetlands. The Leitrim Wetlands have been classified as a Provincially Significant Wetland. This wetland and the implications of development within the watershed which contains this wetland have been studied in detail in connection with the City of Gloucester Official Plan Amendment No. 10 for the Leitrim Urban Community.

The western part of the raceway property, where the redevelopment will take place, is situated on a ridge of higher land which slopes downward towards the north and east. The higher land to the south and west is at an elevation of 113 to 116 metres above sea level, while the land to the north, which includes the Leitrim Wetlands, is at elevations of 95 to 98 m.a.s.l.

The parking area located to the west of the grandstand building is equipped with a private storm sewer system. Water from this system is conveyed to a large (100 m diameter) pond located in the north end of the infield. Currently, the pond water is used for dust control on the racetrack and as a storage reservoir for fire-fighting purposes.

The dominant surficial feature in the area is a deposit of stratified sand which forms a northwest/southeast trending ridge from Greely in the south to the Macdonald-Cartier Airport in the north. The western portion of the racetrack property is located on the stratified glacial deposit.

3.0 Stormwater Management

3.1 Stormwater Management Concerns

The site has been previously developed without the incorporation of stormwater management practices, therefore, there is the opportunity to improve the quality of runoff from the site.

The studies mentioned earlier provide guidance in setting stormwater management objectives for the further development of the Rideau Carleton Raceway site. The following stormwater management objectives are proposed:

- restrict the rate of post-development runoff for events up to the 1:100 year storm to 1:5 year pre-development levels;
- maximize the infiltration of runoff so as to minimize groundwater impacts;
- apply all feasible source controls to maximize the quality of runoff and minimize the runoff volumes requiring treatment;
- treat all runoff from the site;
- augment low flows in downstream water courses;
- mitigate temperature increase arising at any of the stormwater treatment works; and
- integrate an ongoing operation and maintenance plan into the stormwater treatment works to assure continued performance;

The preceding objectives will require aggressive use of source controls, measures to maximize infiltration, and a treatment facility, which may take the form of a constructed wetland or a wet pond. Detention of runoff in the treatment facility will improve the quality of discharged flows, reduce flow rates and erosion downstream of the site, and augment flows after storm events.

3.2 Source Controls

Source controls recommended for this site include:

- erosion and sediment controls during construction, and
- catch basin restrictors in the storm sewers to detain stormwater on the parking lots.

Control of erosion on construction sites and the removal of sediments from construction site runoff is very important if downstream areas are to be protected. During all construction, erosion and sedimentation will be controlled by the following techniques:

i) Limitation of the extent of exposed soils at any given time.
ii) Revegetation of exposed areas as soon as possible.
iii) Minimization of area to be cleared and grubbed.
iv) Silt fences and check dams.

3.3 Conveyance Controls

Three categories of stormwater conveyance controls are:

- pervious pipe systems,
- pervious catch basins, and
- grassed swales.

The existing site is suitable for all three options. Pervious catch-basins and pervious pipe systems will be used throughout the paved parking lots and road entrances. Grass ditches will be used to convey runoff from the gravel parking areas. The grass swales will eventually discharge to the proposed storm sewer network.

The native soil is very pervious and the water table is well below the ground surface in the area of the parking lots. This makes the parking lot site ideal for infiltration practices. The pervious pipe and catch-basin system will incorporate the following design details:

- pre-treatment using oversized sumps,
- filter fabric,
- clear stone, and
- anti-seepage cut walls.

The total area that drains to the catch basins is approximately 6.47 hectares with an runoff coefficient of approximately 0.70. The perforated catch basins will be designed to infiltrate 5 mm (minimum recommended by the MOE SWMP 1994 Manual) of runoff from the impervious area. The required storage volume for infiltration would be:

6.47 ha. x 5 mm x 0.70 = 226 cubic metres

There are 34 catch basins that will be connected to a dry well. Therefore each dry well must be designed to contain 6.7 cubic metres. SK1 shows the proposed dry well design. Ten (10) infiltration chambers will be required at each catch basin. Runoff from the gravel parking area will sheet flow overland towards a grass swale. Pre-treatment of storm runoff will be provided by a grass side slopes, which will reduce the velocity, remove litter, promote infiltration and remove some of the suspended solids before entering the pond.

Appendix A contains the storm drainage calculation sheet. The pipes have been designed to convey the restricted flow rates . Flow from the building roof enters at manhole 108 located at the front entrance of the gaming facility. An allowance has been made for 20 L/s for the 1.97 hectares of land in the south west corner. This is comparable to the release rates for the proposed paved parking lots. Flow from the north west parking lot has been included as the future controlled rate of 60 L/s (3 restrictors).

The existing 200 mm pipe in front of the Grandstand will be used once it is cleaned and inspected. This sewer may become surcharged during a heavy rainstorm. Therefore it must be tv inspected. The video will show if there are any connections to the sewer. If there are any connections then it must be determined what these connections are and where do the lead. The decision will then be made if surcharging is suitable for this segment of pipe. Surcharging could cause water to exit the catch basin manholes located in front of the grandstand possibly causing some erosion at the base of the track. The storm sewer will be installed at the same time as the sanitary force main unless, as discussed above the sewer is not deemed suitable.

Source controls and conveyance controls in themselves will not provide the entire treatment, therefore, end-of-pipe treatment will be necessary.

3.3 End-Of-Pipe SWM Facility
{tc \l 2 "3.3 End-Of-Pipe SWM Facility"}

The MOEE SWMP Planning and Design Manual categorises nine end-of-pipe SWM facilities as follows:

- wet ponds,
- wetlands,
- dry ponds,
- infiltration basins,
- infiltration trenches,
- filter strips,
- buffer strips,
- sand filters, and
- oil/grit separators.

The facilities recommended for use at the Rideau Carleton Raceway are:

- detention ponds or tanks,
- infiltration trenches,
- infiltration basins,
- wetponds, and
- wetland retention facilities.

The recommended end-of-pipe treatment is a combination wet pond and infiltration trench.

The existing pond will be used as the proposed wet pond. A two phase approach will be used

Phase I

Phase I will use the existing outlet from the pond. The existing outlet must be located and cleaned. A new swale will be excavated in order to connect the outlet to the existing swale. The water level in the pond will be monitored in a stilling well with the information stored on a data logger. If there area more than four (4) pond overflows per year then phase II construction will begin. The criteria is based on the calculations that follow and the design criteria of four overflows allowed for a quality control pond tributary to the Rideau River. The calculations that will follow show that a pond overflow is unlikely.

Phase II

Quality Control

Phase II will consist of a new outlet from the pond and a new grass-lined ditch. The capacity of the existing wet pond will be verified based on the development area being 85 percent impervious. The wet pond will consist of an extended detention portion and a permanent pool. The volume of the extended detention and permanent pool are taken from the Ministry of Environment Stormwater Management Practices, Planning and Design Manual, June 1994, which states 40 m^3/ha for extended detention, and 210 m^3/ha for the permanent pool for a development that is 85 percent impervious, and a receiving stream that requires Level 1 (Ministry of Natural Resources) protection. Examples of Level 1 habitat include spawning, rearing and highly protective feeding areas, and groundwater recharge areas in coldwater streams.

The quality portion of the pond is based upon 12.88 hectares. Runoff from the building roof area does not require treatment therefore is not included in the calculations. The required pond volumes are then:

Permanent Pool:

V = 210 m³/ha x 12.88 ha
= 2,705 m³

Extended Detention:

V = 40 m³/ha x 12.88 ha
= 515 m³

The existing pond bottom is at approximately 103.00 metres with a surface diameter of 71 metres. The water surface elevation is at 104.00 metres with a diameter of 91 metres. Available storage volume is calculated as follows:

- = (1/3) x A x d (A = surface area, d = depth of water)
- = (1/3) x (3959 m^2+6504 m^2+(3959 m^2x6504 m^2)$^{1/2}$ m^2)x 1.00 m)
- = 5179 m^3

The permanent pool in the wet pond is approximately 5179 cubic metres which is more than 2 times the required volume. The extended detention will be designed for a maximum depth of 0.3 metres. This will provide approximately 2,350 cubic metres which is more than 5 times the required volume.

Drawing SWM3 shows the pond details. The pond bottom will be at 103.0 metres. The quality control outlet from the pond will be at 104.00 metres.

The quality control orifice diameter is based on the falling head orifice equation:

$t = 2(A_p)(h_1^{.5} - h_2^{.5})/[CA_0(2g)^{.5}]$(sec)
A_p = 7850 m^2
h_1 = .30 m
h_2 = 0 m
C = 0.60
g = 9.81 m/s^2
A_0 = ☎d^2/4
d = m
t = 2(7850 m^2)(0.30 m)$^{.5}$)/[0.60 x ☎d^2/4 x (2 x 9.81 m/s^2)$^{0.5}$]
= 8599/2.087 d^2 (sec)

A pipe diameter of 175 mm:

t = 37 hrs.

To assist in the removal of debris and to prevent access to the sewers, gratings are proposed for the inlet and outlet control structures.

Quantity Control

The allowable release rate from the 13.74 hectare redevelopment must be restricted to 1:5 year pre-development level. The report *"Planning for Leitrim an Integrated Approach, Volume II Master Drainage Plan, August 1991",* gives the 5 year flow as 4515 L/s for an area of 293 hectares. Pro-rating this value our release rate would be 213 L/s. Quantity control from the pond will be provided by an orifice for all storms up to the 100 year event. For events greater, water will flow over a weir set at elevation 105.1 m. Flows through the orifice are based upon the maximum head that will occur. The head is measured to the centerline of the orifice. The orifice equation is as follows:

Where $Q = CA(2gh)^{1/2}$

$C = 0.60$

$A =$ area of orifice (m^2)

$g = 9.81$ m/s

$H =$ head over centerline of orifice

Example:

a) 175 mm orifice at elevation 104.0 metres

$Q = .6x(\text{☎}x(.175m)^2/4)(2x9.81x(105.1m-104.0m+.175m/2))^{1/2}$

$Q = 64$ L/s

b) 300 mm orifice at elevation 104.0 metres

$Q = .6x(\text{☎}x(.300m)^2/4)(2x9.81x(105.1m-104.3m+.300m/2))^{1/2}$

$Q = 151$ L/s

The head over the orifice would be 1.1 metres above the low flow orifice (175mm) and 0.65 metres above the high flow orifice (300mm). The total combined outflow would be 215 L/s. SK2 shows the proposed outlet control manhole if Phase II should be implemented.

Three (3) areas are available for storage of excess stormwater runoff. Table 1 lists the available storage volumes and release rates for the four (4) paved areas.

Table 1. Available parking lot storage and sewer release rates.

Parking Lot Number	Available Storage Volume (m^3)	Release Rate (L/s)
P1	260	40

P2	1063	20
P3	239	40
P4	621	20
Total =	2183	120

Table 2 shows the available storage volumes at the three different areas.

Table 2. Available storage volumes.

Location	Available Storage Volume (m^3)
Pond	7529
Dry wells	223
Parking lots	2183
Total =	9935

The total available storage volume is 9935 m^3. Storage volume requirements can be calculated by various methods (Modified Rational Method, et.). To show that there is ample storage volume available a zero release rate was assumed as the worst case scenario. The total runoff volume is then equal to the total rainfall multiplied by the runoff coefficient by the area. The following calculations illustrate the total runoff from the 100 year storm is less than the available storage volume.

Runoff volume = runoff coefficient x rainfall x area

The 100 year rainfall for a 24 hour storm is 88.6 mm.

$$C = \frac{(0.2 \times 2.32)+(0.6 \times 4.09)+(0.7 \times 6.47)+(0.9 \times 0.86)}{13.74}$$

$$C = 0.60$$

Runoff volume = 0.60 x .0886 m x 137400 m^2

Runoff volume = 7304 m^3

This calculation demonstrates that with a zero release rate from the site there is sufficient storage available for the 100 year storm. The assumptions are made for the current development conditions. If future parking areas are developed the storage volumes in Table 2 will then be amended to reflect the new conditions.

If Phase II work is required the receiving water coarse for the pond outlet will be the existing drain on the northern boundary of the property. A grass lined infiltration trench with approximately 100 m^3 storage will connect the pond with the receiving water coarse. Although the 100 m^3 of storage is not required for quality or quantity control it will permit additional infiltration.

4.0 Summary

This report has outlined a stormwater plan that will treat runoff from the proposed 13.74 hectare redevelopment and expansion area of the Rideau Carleton Raceway.

Flow from this area will be controlled by inlet restrictors in the catch-basins which will minimize peak flows from the parking lot. Dry wells will be attached to each catch basin while final control is by utilizing the existing pond located inside of the race track. This system will treat all runoff from the site. To minimize groundwater impacts the infiltration of runoff has been maximized. This is accomplished by providing pervious catch-basins, pervious pipes, grass-lined swales, and infiltration trench downstream of the pond outlet. This type of design will augment low flows in downstream water courses by increasing the amount of water that is infiltrated into the ground and thereby decreasing the amount of water that enters the pond. Less water too the pond also means that storm water will not have time to heat up. To further avoid temperature increase the outlet from the pond will be from the bottom. Furthermore, it will minimize the runoff volumes requiring treatment in the existing pond

Phase I will consist of cleaning the outlet and connecting to the existing swale. The water levels will be monitored and measured constantly using a stilling well recording the information on a data logger. If there are more than 4 overflows per year phase II construction of the new pond outlet as shown on SWM3 will be implemented.

The system will have an ongoing Operation and Maintenance Plan to assure continued performance. Sumps will be cleaned yearly with copies sent to the City of Gloucester and the SNRCA.

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Manager
Civil, Private Division

Charles B. Warnock, P.Eng.
Senior Water Resources Engineer
Civil, Private Division

cbw/cbw

Appendix A: **Storm Sewer Calculation Sheet**

City of Gloucester
STORM SEWER COMPUTATION FORM
Client: PBK
Project: Rideau Carleton Raceway Redevelopment
Date: September, 1999
Designed by: CBW
Checked by: Charles Warnock

Rational Method:
(IDF curve for Ottawa Airport
5 yr frequency)

Q= 2.78AIR
Tc= Time of Concentration = 15
n= 0.013
R= Runoff coefficient
I = Rainfall Intensity = 30.3 x t ^(-.7270)

Area	From MH	To MH	Roof Flow (L/s)	Roof Area (ha)	AREA (ha) R 0.2	0.6	0.9	Ind. 2.78AR	Accum. 2.78AR	Time of Conc. (min)	Rainfall Intensity (mm/hr) (I)	Flow Restriction (L/s)	Peak Flow Q(L/sec)	Flow in Sewer (L/s)	Type of Pipe	SEWER DATA Diameter (mm) (nom.)	(act.)	Slope (%)	Length (m)	Capacity (L/sec)	Velocity (m/sec)	Time of Flow (min)	REMARKS
								0.00															Page 1 of 1
	114	113					0.06	0.15	0.15	15.0	83.0	20.0	12.5	12.5	Conc.	250	254	0.43	64.5	40.7	0.80	1.34	
	113	109					2.63	6.58	6.73	16.3	78.0	100.0	525.0	112.5	Conc.	375	381	0.43	121.5	119.9	1.05	1.93	
	110	109					1.97	4.93	4.93	15.0	83.0	20.0	409.3	20.0	Conc.	300	305	2.46	26.5	158.2	2.17	0.20	
	108	109	178.6	0.86				0.00	0.00	15.0	83.0	0.0	178.6	178.6	Conc.	375	381	1.00	28.0	182.9	1.60	0.29	
	109	104					0.79	1.98	13.64	18.3	71.9	40.0	981.1	351.0	Conc.	600	610	0.32	22.0	362.4	1.24	0.30	
	105	104			0.41		1.29	3.46	3.46	15.0	83.0	20.0	287.2	20.0	Conc.	300	305	1.32	18.0	115.9	1.59	0.19	
	104	102					0.50	1.25	18.35	15.3	81.9	40.0	1502.2	238.6	Conc.	600	610	1.00	65.0	640.6	2.19	0.49	
	103	102						0.00	0.00	15.0	83.0	0.0	0.0	0.0	Conc.	300	305	1.87	81.0	138.0	1.89	0.71	
	102A	102					3.52	8.81	8.81	15.0	83.0	60.0	731.3	60.0	Conc.	300	305	1.00	59.0	100.9	1.38	0.71	
	102	101						0.00	27.16	15.8	80.0		2173.0	298.6	Conc.	750	762	1.94	92.0	1617.7	3.55	0.43	
	117	116				0.57	1.14	3.80	3.80	15.0	83.0	60.0	315.5	60.0	Conc.	250	254	6.00	93.0	152.0	3.00	0.52	
	116	115						0.00	3.80	15.5	81.0		307.7	60.0	Conc.	200	203	0.80	90.0	30.8	0.94	1.60	
	115	101						0.00	3.80	17.1	75.4		286.5	60.0	Conc.	200	203	0.30	90.0	18.7			
	101	Outlet						0.00	30.96	16.2	78.5	60.0	2429.1	418.6	Conc.	750	762	0.40	72.0	734.5	1.61	0.75	
		Total		0.86	0.41	0.57	11.90																

Shaded area show pipe segments that will surcharge during storms less than 1:5 years.

Recomended Pipe size in front of the grandsatnd.

Area	From MH	To MH	Roof Flow (L/s)	Roof Area (ha)	AREA (ha) R 0.2	0.6	0.9	Ind. 2.78AR	Accum. 2.78AR	Time of Conc. (min)	Rainfall Intensity (mm/hr) (I)	Flow Restriction (L/s)	Peak Flow Q(L/sec)	Flow in Sewer (L/s)	Type of Pipe	SEWER DATA Diameter (mm) (nom.)	(act.)	Slope (%)	Length (m)	Capacity (L/sec)	Velocity (m/sec)	Time of Flow (min)	REMARKS
	117	116				0.63	1.10	3.80	7.60	15.0	83.0	60.0	630.9	60.0	Conc.	250	254	6.00	93.0	152.0	3.00	0.52	
	116	115						0.00	7.60	15.5	81.0		615.5	60.0	Conc.	300	305	0.50	90.0	71.3	0.98	1.53	
	115	101						0.00	7.60	17.1	75.6		574.8	60.0	Conc.	300	305	0.50	90.0	71.3			

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NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	NOV 20/19	CJR

SCALE
1:750
1:750
0 10 20 30

DESIGN	MJH
CHECKED	CJR
DRAWN	MJH
CHECKED	CJR
APPROVED	JLS

FOR REVIEW ONLY

NOVATECH
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Website www.novatech-eng.com

LOCATION
4837 ALBION ROAD, CITY OF OTTAWA
HARD ROCK OTTAWA

DRAWING NAME
STORM SEWER DRAINAGE AREA PLAN

PROJECT No. 116111
REV REV # 1
DRAWING No. 116111-STM

PLANB1.DWG - 1000mmx707mm

Project No. 116111
Project Name: Hard Rock Ottawa
Project Location: 4837 Albion Road

NOVATECH
Engineers, Planners & Landscape Architects

Date: November 2019

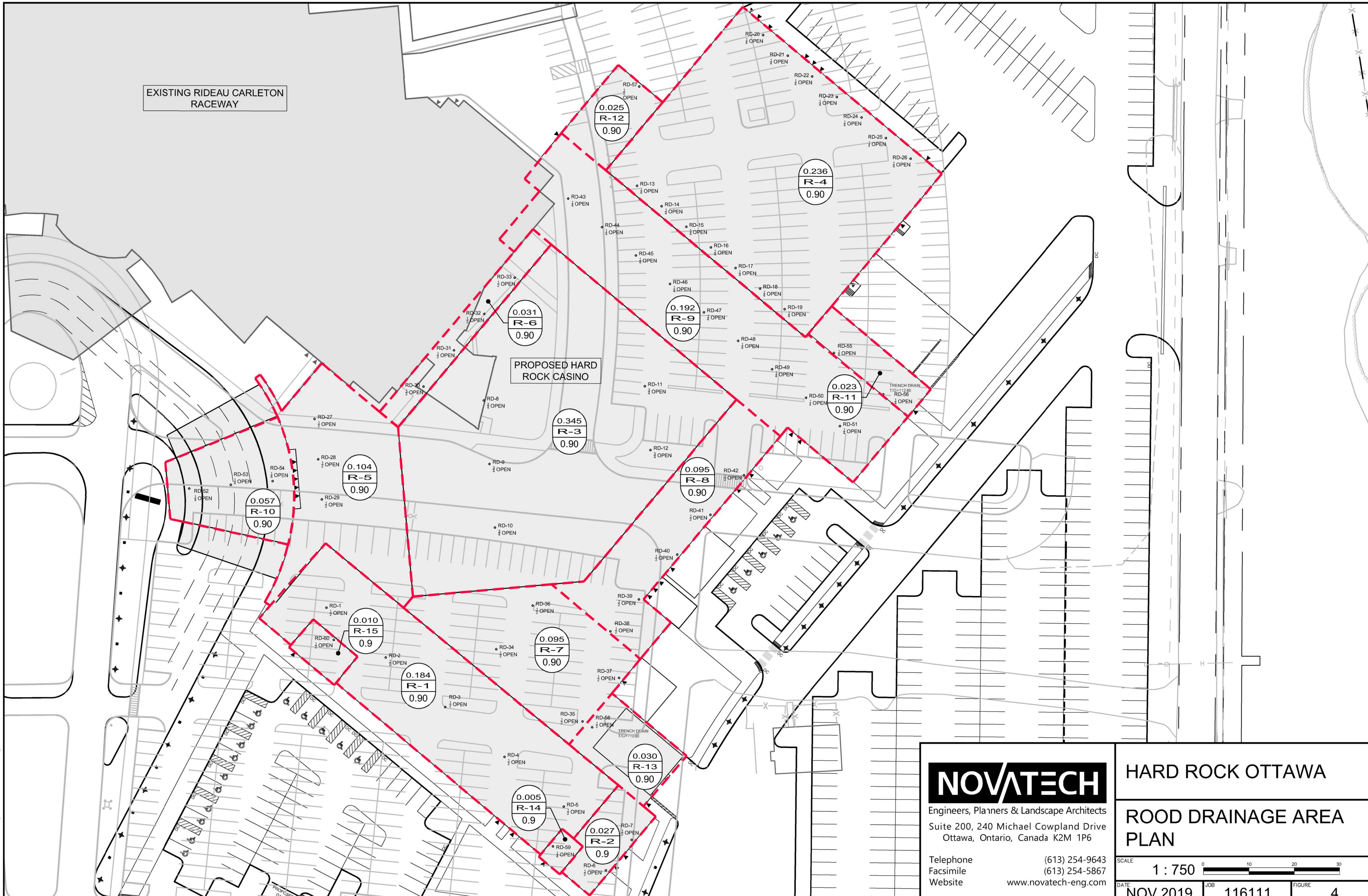
2 Year Storm Sewer Design Sheet

LOCATION			AREA (Ha)				FLOW							PROPOSED SEWER							
AREA ID	FROM	TO	TOTAL AREA (ha)	R= 0.2	R= 0.9	R	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	1999 CONTROLED FLOWS (L/S)	2019 100-year CONTROLED FLOWS (L/S)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
A-01	CB 1	STMMH 100	0.108	0.019	0.089	0.78	0.23	0.23	10.00	76.81	17.91		24.2	304.8	0.50	37.9	71.41	0.98	0.65	53.49	0.25
A-02	STMMH 100	STMMH 101	1.166	0.187	0.979	0.79	2.55	2.79	10.65	74.41	207.36		49.5	457.2	0.30	116.8	163.08	0.99	1.96	-44.28	1.27
A-03	CBMH 108	STMMH 101	0.563	0.000	0.563	0.90	1.41	1.41	10.00	76.81	108.19		9.4	304.8	0.50	42.5	71.41	0.98	0.72	-36.78	1.52
A-04	STMMH 101	STMMH 102	0.109	0.040	0.069	0.64	0.19	4.39	12.61	68.06	298.79		69.0	533.0	0.30	106.0	245.50	1.10	1.61	-53.29	1.22
A-05	EX STMMH 112	STMMH 102	0.710	0.044	0.666	0.86	1.69	1.69	10.00	76.81	129.86		8.6	304.8	0.10	78.9	31.93	0.44	3.01	-97.93	4.07
A-06	STMMH 102	STMMH 103	0.569	0.151	0.418	0.71	1.13	7.21	14.22	63.68	459.21		93.8	610.0	0.30	57.6	351.82	1.20	0.80	-107.39	1.31
A-07	STMMH 103	STRMMH 99	0.108	0.029	0.079	0.71	0.21	7.42	15.01	61.74	458.36	20	103.8	610.0	0.30	32.7	351.82	1.20	0.45	-106.54	1.30
R-01	EXSTMMH 108	STMMH 99	0.864	0.000	0.864	0.90	2.16	2.16	10.00	76.81	166.03	178.6	178.6	381.0	1.00	32.9	183.10	1.60	0.34	17.06	0.91
R-02, A-18	Building Service	STMMH 99	1.457	0.000	1.457	0.90					60.00		46.0	304.8	1.00	32.2	100.98	1.38	0.39	40.98	0.59
A-08	STMMH 99	EX STMMH 104	1.022	0.295	0.727	0.70	1.98	11.57	15.47	60.69	762.11	358.6	350.5	610.0	0.30	86.3	351.82	1.20	1.20	-410.29	2.17
A-09	EX STMMH 105	EX STMMH 104	1.679	0.432	1.247	0.72	3.36	3.36	10.00	76.81	258.08	20	21.9	457.2	0.20	17.8	133.15	0.81	0.37	-124.93	1.94
A-10	EX STMMH 104	EX STMMH 102	0.549	0.019	0.530	0.88	1.34	16.27	16.66	58.10	1005.11	418.6	412.9	610.0	1.30	65.2	732.37	2.50	0.43	-272.74	1.37
A-11	EX STMMH 103	EX STMMH 102	0.050	0.000	0.050	0.90	0.13	0.13	10.00	76.81	9.61		22.3	304.8	1.10	78.2	105.91	1.45	0.90	96.30	0.09
A-12	CBMH 115	STMMH 113	0.461	0.000	0.461	0.90	1.15	1.15	10.00	76.81	88.59		7.3	304.8	1.00	45.1	100.98	1.38	0.54	12.40	0.88
A-13	STMMH 113	STMMH 111	0.802	0.003	0.799	0.90	2.00	3.15	10.54	74.78	235.87		20.9	304.8	0.80	51.0	90.32	1.24	0.69	-145.54	2.61
A-14	STMMH 111	EX STMH 102A	0.973	0.015	0.958	0.89	2.41	5.56	11.23	72.38	402.40		47.4	304.8	1.00	86.3	100.98	1.38	1.04	-301.41	3.98
	EX STMH 102A	EX STM 102	0.000	0.000	0.000	0.00	0.00	5.56	12.27	69.06	383.94	60	47.4	304.8	0.90	59.0	95.80	1.31	0.75	-288.14	4.01
	EX STMMH 102	EX STMMH 101A	0.000	0.000	0.000	0.00	0.00	21.95	17.10	57.22	1316.11	478.6	464.8	762.0	1.60	29.5	1470.57	3.22	0.15	154.45	0.89
A-15	EX STMMH 101A	EX STMMH 101B	1.100	0.191	0.909	0.78	2.38	24.33	17.25	56.92	1444.99	478.6	483.8	762.0	1.40	30.1	1375.59	3.01	0.17	-69.40	1.05
	EX STMMH 101B	EX STMMH 101	0.000	0.000	0.000	0.00	0.00	24.33	17.42	56.60	1437.08	478.6	483.8	762.0	2.30	32.6	1763.15	3.86	0.14	326.07	0.82
A-16	STMMH 117	STMMH 116	0.860	0.000	0.860	0.90	2.15	2.15	10.00	76.81	165.26	60	19.6	304.8	0.80	52.9	90.32	1.24	0.71	-74.94	1.83
R-03, A-17	ROOF	STMMH 116	1.473	0.000	1.473	0.90					30.00		38.9	254.0	2.00	20.3	87.82	1.73	0.20	57.82	0.34
A-19,	STMMH 116	EX STMMH 116	0.240	0.000	0.240	0.90	0.60	2.75	10.71	74.17	234.14	60	68.3	254.0	5.90	93.9	150.84	2.97	0.53	-83.29	1.55
	EX STMMH 116	EX STMMH 115	0.000	0.000	0.000	0.00	0.00	2.75	11.24	72.35	229.13	60	68.2	304.8	0.50	91.3	71.41	0.98	1.56	-157.72	3.21
	EX STMMH 115	EX STMMH 101	0.000	0.000	0.000	0.00	0.00	2.75	12.80	67.51	215.81	60	68.5	304.8	0.50	92.7	71.41	0.98	1.58	-144.40	3.02
A-20	EX STMMH 101	POND	0.741	0.741	0.000	0.20	0.41	27.50	17.56	56.33	1638.69	658.6	659.3	762.0	2.00	80.9	1644.14	3.60	0.37	5.45	1.00

***Note: Storm sewer design sheet flows are peak uncontrolled flows. Flows will be attenuated with ICD's which will increase the excess capacity in the pipes**

Definitions
Q = 2.78 AIR
Q = Peak Flow, in Litres per second (L/s)
A = Area in hectares (ha)
I = 2 YEAR Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Velocity = 0.76 m/sec.
3) 2 Year intensity = $732.951 / (time + 6.199)^{0.810}$



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HARD ROCK OTTAWA

ROOD DRAINAGE AREA PLAN

SCALE	DATE	JOB	FIGURE
1 : 750 (0 10 20 30)	NOV 2019	116111	4

M:\2016\116111\CAD\Design\116111-ROOF.dwg, Roof Drains, Nov 20, 2019 - 11:52am, mhrehoriak

SHT11X17.DWG - 279mmX432mm

TABLE 1A: Post-Development Runoff Coefficient "C" - R1 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.184	Roof	0.184	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 1B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R1 Controlled Roof Area

0.1835 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	50	37.65	17.29	4.0	13.34	40.01
	55	35.12	16.13	4.0	12.18	40.18
	60	**32.94**	**15.12**	**4.0**	**11.17**	**40.23**
	65	31.04	14.25	4.0	10.30	40.18
	70	29.37	13.49	4.0	9.54	40.05

TABLE 1C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R1 Controlled Roof Area

0.1835 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	65	52.65	26.86	5.9	20.96	81.73
	70	49.79	25.40	5.9	19.50	81.90
	75	**47.26**	**24.11**	**5.9**	**18.21**	**81.93**
	80	44.99	22.95	5.9	17.05	81.85
	85	42.95	21.91	5.9	16.01	81.66

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 1D: Roof Drain Flows

Roof Drains		
Roof Area	1835	m²
Qty	5	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 1E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-1	367.0	0.076	9.32	
	RD-2	367.0	0.076	9.32	
	RD-3	367.0	0.076	9.32	
	RD-4	367.0	0.076	9.32	
	RD-5	367.0	0.076	9.32	
			Total	**46.61**	**40.23**
100 Year	RD-1	367.0	0.140	17.09	
	RD-2	367.0	0.140	17.09	
	RD-3	367.0	0.140	17.09	
	RD-4	367.0	0.140	17.09	
	RD-5	367.0	0.140	17.09	
			Total	**85.45**	**81.93**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 2A: Post-Development Runoff Coefficient "C" - R2 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.027	Roof	0.027	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 2B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R2 Controlled Roof Area

0.027 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	70.25	4.75	1.3	3.49	4.18
	25	60.90	4.11	1.3	2.85	4.28
	30	**53.93**	**3.64**	**1.3**	**2.38**	**4.29**
	35	48.52	3.28	1.3	2.02	4.24
	40	44.18	2.98	1.3	1.72	4.14

TABLE 2C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R2 Controlled Roof Area

0.027 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	20	119.95	9.00	2.1	6.90	8.28
	25	103.85	7.79	2.1	5.69	8.54
	30	**91.87**	**6.90**	**2.1**	**4.80**	**8.63**
	35	82.58	6.20	2.1	4.10	8.61
	40	75.15	5.64	2.1	3.54	8.50

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 2D: Roof Drain Flows

Roof Drains		
Roof Area	270	m²
Qty	2	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 2E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-6	135.0	0.051	2.29	-
	RD-7	135.0	0.051	2.29	-
			Total	**4.57**	**4.29**
100 Year	RD-6	135.0	0.114	5.14	-
	RD-7	135.0	0.114	5.14	-
			Total	**10.29**	**8.63**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 3A: Post-Development Runoff Coefficient "C" - R3 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.345	Roof	0.345	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 3B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R3 Controlled Roof Area

0.345 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	80	26.56	22.93	4.9	18.03	86.53
	85	25.37	21.90	4.9	17.00	86.69
	90	**24.29**	**20.97**	**4.9**	**16.07**	**86.75**
	95	23.31	20.12	4.9	15.22	86.74
	100	22.41	19.34	4.9	14.44	86.65

TABLE 3C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R3 Controlled Roof Area

0.345 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	95	39.43	37.82	7.9	29.92	170.55
	100	37.90	36.35	7.9	28.45	170.72
	105	**36.50**	**35.00**	**7.9**	**27.10**	**170.76**
	110	35.20	33.76	7.9	25.86	170.69
	115	34.01	32.61	7.9	24.71	170.53

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 3D: Roof Drain Flows

Roof Drains		
Roof Area	3450	m²
Qty	5	
Type	Accutrol RD-100-A-ADJ	
Setting	3/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.87	L/s (ea)
Design Flow 4" of head	1.10	L/s (ea)
Design Flow 5" of head	1.34	L/s (ea)
Design Flow 6" of head	1.58	L/s (ea)

Table 3E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-8	780.0	0.089	23.11	
	RD-9	510.0	0.089	15.11	
	RD-10	780.0	0.089	23.11	
	RD-11	780.0	0.089	23.11	
	RD-12	600.0	0.089	17.78	
			Total	**102.24**	**86.75**
5 Year	RD-8	780.0	0.152	39.62	
	RD-9	510.0	0.152	25.91	
	RD-10	780.0	0.152	39.62	
	RD-11	780.0	0.152	39.62	
	RD-12	600.0	0.152	30.48	
			Total	**175.26**	**170.76**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 4A: Post-Development Runoff Coefficient "C" - R4 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.263	Roof	0.263	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 4B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R4 Controlled Roof Area

0.263 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	25	60.90	40.07	9.9	30.14	45.20
	30	53.93	35.49	9.9	25.55	45.99
	35	**48.52**	**31.93**	**9.9**	**21.99**	**46.18**
	40	44.18	29.07	9.9	19.14	45.93
	45	40.63	26.73	9.9	16.80	45.36

TABLE 4C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R4 Controlled Roof Area

0.263 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	40	75.15	54.94	12.1	42.84	102.82
	45	69.05	50.49	12.1	38.39	103.64
	50	**63.95**	**46.76**	**12.1**	**34.66**	**103.98**
	55	59.62	43.59	12.1	31.49	103.93
	60	55.89	40.87	12.1	28.77	103.56

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 4D: Roof Drain Flows

Roof Drains		
Roof Area	2630	m^2
Qty	14	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 4E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
5 Year	RD-13	235.0	0.076	5.97	
	RD-14	165.0	0.076	4.19	
	RD-15	170.0	0.076	4.32	
	RD-16	175.0	0.076	4.45	
	RD-17	170.0	0.076	4.32	
	RD-18	165.0	0.076	4.19	
	RD-19	235.0	0.076	5.97	
	RD-20	235.0	0.076	5.97	
	RD-21	165.0	0.076	4.19	
	RD-22	170.0	0.076	4.32	
	RD-23	175.0	0.076	4.45	
	RD-24	170.0	0.076	4.32	
	RD-25	165.0	0.076	4.19	
	RD-26	235.0	0.076	5.97	
			Total	**66.80**	**46.18**

PROJECT #: 116111
PROJECT NAME: HARD ROCK OTTAWA
LOCATION: 4837 ALBION ROAD

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: NOVEMBER 2019

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
100 Year	RD-13	235.0	0.127	9.95	
	RD-14	165.0	0.127	6.99	
	RD-15	170.0	0.127	7.20	
	RD-16	175.0	0.127	7.41	
	RD-17	170.0	0.127	7.20	
	RD-18	165.0	0.127	6.99	
	RD-19	235.0	0.127	9.95	
	RD-20	235.0	0.127	9.95	
	RD-21	165.0	0.127	6.99	
	RD-22	170.0	0.127	7.20	
	RD-23	175.0	0.127	7.41	
	RD-24	170.0	0.127	7.20	
	RD-25	165.0	0.127	6.99	
	RD-26	235.0	0.127	9.95	
			Total	**111.34**	**103.98**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 5A: Post-Development Runoff Coefficient "C" - R5 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.104	Roof	0.104	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 5B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R5 Controlled Roof Area

0.104 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	45	40.63	10.57	2.4	8.17	22.06
	50	37.65	9.80	2.4	7.40	22.19
	55	**35.12**	**9.14**	**2.4**	**6.74**	**22.24**
	60	32.94	8.57	2.4	6.17	22.22
	65	31.04	8.08	2.4	5.68	22.14

TABLE 5C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R5 Controlled Roof Area

0.104 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	60	55.89	16.16	3.5	12.66	45.58
	65	52.65	15.22	3.5	11.72	45.71
	70	**49.79**	**14.40**	**3.5**	**10.90**	**45.76**
	75	47.26	13.66	3.5	10.16	45.73
	80	44.99	13.01	3.5	9.51	45.64

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 5D: Roof Drain Flows

Roof Drains		
Roof Area	1040	m^2
Qty	3	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 5E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
5 Year	RD-27	240.0	0.076	6.10	
	RD-28	225.0	0.076	5.72	
	RD-29	575.0	0.076	14.61	
			Total	**26.42**	**22.24**
100 Year	RD-27	240.0	0.140	11.18	
	RD-28	225.0	0.140	10.48	
	RD-29	575.0	0.140	26.78	
			Total	**48.43**	**45.76**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 6A: Post-Development Runoff Coefficient "C" - R6 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.031	Roof	0.031	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 6B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R6 Controlled Roof Area

0.031 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	5	141.18	10.95	2.5	8.45	2.54
	10	104.19	8.08	2.5	5.58	3.35
	15	**83.56**	**6.48**	**2.5**	**3.98**	**3.58**
	20	70.25	5.45	2.5	2.95	3.54
	25	60.90	4.72	2.5	2.22	3.33

TABLE 6C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R6 Controlled Roof Area

0.031 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	10	178.56	15.39	3.8	11.59	6.95
	15	142.89	12.31	3.8	8.51	7.66
	20	**119.95**	**10.34**	**3.8**	**6.54**	**7.84**
	25	103.85	8.95	3.8	5.15	7.72
	30	91.87	7.92	3.8	4.12	7.41

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 6D: Roof Drain Flows

Roof Drains		
Roof Area	310	m^2
Qty	4	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 6E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
5 Year	RD-30	95.0	0.051	1.61	
	RD-31	60.0	0.051	1.02	
	RD-32	60.0	0.051	1.02	
	RD-33	95.0	0.051	1.61	
			Total	**5.25**	**3.58**
5 Year	RD-30	95.0	0.102	3.22	
	RD-31	60.0	0.102	2.03	
	RD-32	60.0	0.102	2.03	
	RD-33	95.0	0.102	3.22	
			Total	**10.50**	**7.84**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 7A: Post-Development Runoff Coefficient "C" - R7 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.095	Roof	0.095	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 7B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R7 Controlled Roof Area

0.095 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	40	44.18	10.50	2.8	7.70	18.49
	45	40.63	9.66	2.8	6.86	18.51
	50	**37.65**	**8.95**	**2.8**	**6.15**	**18.45**
	55	35.12	8.35	2.8	5.55	18.31
	60	32.94	7.83	2.8	5.03	18.11

TABLE 7C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R7 Controlled Roof Area

0.095 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	40	75.15	19.85	4.4	15.45	37.07
	45	69.05	18.24	4.4	13.84	37.36
	50	**63.95**	**16.89**	**4.4**	**12.49**	**37.47**
	55	59.62	15.75	4.4	11.35	37.44
	60	55.89	14.76	4.4	10.36	37.30

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 7D: Roof Drain Flows

Roof Drains		
Roof Area	950	m^2
Qty	4	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 7E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
5 Year	RD-34	445.0	0.0635	9.42	-
	RD-35	110.0	0.0635	2.33	-
	RD-36	110.0	0.0635	2.33	-
	RD-37	290.0	0.0635	6.14	-
			Total	**20.21**	**18.45**
100 Year	RD-34	445.0	0.1270	18.84	-
	RD-35	110.0	0.1270	4.66	-
	RD-36	110.0	0.1270	4.66	-
	RD-37	290.0	0.1270	12.28	-
			Total	**40.43**	**37.47**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 8A: Post-Development Runoff Coefficient "C" - R8 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.082	Roof	0.082	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 8B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R8 Controlled Roof Area

0.082 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	70.25	14.41	3.6	10.81	12.98
	25	60.90	12.49	3.6	8.89	13.34
	30	**53.93**	**11.06**	**3.6**	**7.46**	**13.44**
	35	48.52	9.95	3.6	6.35	13.34
	40	44.18	9.07	3.6	5.47	13.12

TABLE 8C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R8 Controlled Roof Area

0.082 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	30	91.87	20.94	5.1	15.84	28.52
	35	82.58	18.82	5.1	13.72	28.82
	40	**75.15**	**17.13**	**5.1**	**12.03**	**28.87**
	45	69.05	15.74	5.1	10.64	28.73
	50	63.95	14.58	5.1	9.48	28.44

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 8D: Roof Drain Flows

Roof Drains		
Roof Area	820	m²
Qty	5	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 8E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-38	115.0	0.0635	2.43	
	RD-39	195.0	0.0635	4.13	
	RD-40	145.0	0.0635	3.07	
	RD-41	145.0	0.0635	3.07	
	RD-42	220.0	0.0635	4.66	
			Total	**17.36**	**13.44**
100 Year	RD-38	115.0	0.1143	4.38	
	RD-39	195.0	0.1143	7.43	
	RD-40	145.0	0.1143	5.52	
	RD-41	145.0	0.1143	5.52	
	RD-42	220.0	0.1143	8.38	-
			Total	**31.24**	**28.87**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 9A: Post-Development Runoff Coefficient "C" - R9 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.192	Roof	0.192	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 9B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R9 Controlled Roof Area

0.192 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	30	53.93	25.91	6.0	19.91	35.83
	35	48.52	23.31	6.0	17.31	36.34
	40	**44.18**	**21.23**	**6.0**	**15.23**	**36.54**
	45	40.63	19.52	6.0	13.52	36.50
	50	37.65	18.09	6.0	12.09	36.26

TABLE 9C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R9 Controlled Roof Area

0.192 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	35	82.58	44.08	7.8	36.27	76.17
	40	75.15	40.11	7.8	32.30	77.52
	45	**69.05**	**36.86**	**7.8**	**29.05**	**78.43**
	50	63.95	34.14	7.8	26.33	78.99
	55	59.62	31.82	7.8	24.02	79.26

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 9D: Roof Drain Flows

Roof Drains		
Roof Area	1920	m^2
Qty	9	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 9E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m^3)	Total Volume (m^3) Required
5 Year	RD-43	270.0	0.0635	5.72	
	RD-44	200.0	0.0635	4.23	
	RD-45	200.0	0.0635	4.23	
	RD-46	200.0	0.0635	4.23	
	RD-47	200.0	0.0635	4.23	
	RD-48	190.0	0.0635	4.02	
	RD-49	200.0	0.0635	4.23	
	RD-50	190.0	0.0635	4.02	
	RD-51	270.0	0.0635	5.72	
			Total	**40.64**	**36.54**
100 Year	RD-43	270.0	0.1270	11.43	
	RD-44	200.0	0.1270	8.47	
	RD-45	200.0	0.1270	8.47	
	RD-46	200.0	0.1270	8.47	
	RD-47	200.0	0.1270	8.47	
	RD-48	190.0	0.1270	8.04	
	RD-49	200.0	0.1270	8.47	
	RD-50	190.0	0.1270	8.04	
	RD-51	270.0	0.1270	11.43	
			Total	**81.28**	**78.43**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 10A: Post-Development Runoff Coefficient "C" - R10 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.057	Roof	0.057	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 10B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R10 Controlled Roof Area

0.057 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	25	60.90	8.68	2.0	6.68	10.03
	30	53.93	7.69	2.0	5.69	10.24
	35	**48.52**	**6.92**	**2.0**	**4.92**	**10.33**
	40	44.18	6.30	2.0	4.30	10.32
	45	40.63	5.79	2.0	3.79	10.24

TABLE 10C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R10 Controlled Roof Area

0.057 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	40	75.15	11.91	2.6	9.31	22.33
	45	69.05	10.94	2.6	8.34	22.52
	50	**63.95**	**10.13**	**2.6**	**7.53**	**22.60**
	55	59.62	9.45	2.6	6.85	22.59
	60	55.89	8.86	2.6	6.25	22.52

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 10D: Roof Drain Flows

Roof Drains		
Roof Area	570	m²
Qty	3	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 10E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-52	145.0	0.0635	3.07	
	RD-53	195.0	0.0635	4.13	
	RD-54	230.0	0.0635	4.87	
			Total	**12.07**	**10.33**
100 Year	RD-52	145.0	0.1270	6.14	
	RD-53	195.0	0.1270	8.26	
	RD-54	230.0	0.1270	9.74	
			Total	**24.13**	**22.60**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 11A: Post-Development Runoff Coefficient "C" - R11 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.023	Roof	0.023	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 11B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R11 Controlled Roof Area

0.023 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	15	83.56	4.81	1.3	3.51	3.16
	20	70.25	4.04	1.3	2.74	3.29
	25	**60.90**	**3.50**	**1.3**	**2.20**	**3.31**
	30	53.93	3.10	1.3	1.80	3.25
	35	48.52	2.79	1.3	1.49	3.13

TABLE 11C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R11 Controlled Roof Area

0.023 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	20	119.95	7.67	1.7	5.93	7.12
	25	103.85	6.64	1.7	4.90	7.36
	30	**91.87**	**5.87**	**1.7**	**4.14**	**7.45**
	35	82.58	5.28	1.7	3.55	7.44
	40	75.15	4.80	1.7	3.07	7.37

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 11D: Roof Drain Flows

Roof Drains		
Roof Area	230	m²
Qty	2	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 11E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-55	115.0	0.0635	2.43	
	RD-56	115.0	0.0635	2.43	
			Total	**4.87**	**3.31**
100 Year	RD-55	115.0	0.1270	4.87	
	RD-56	115.0	0.1270	4.87	
			Total	**9.74**	**7.45**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 12A: Post-Development Runoff Coefficient "C" - R12 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.025	Roof	0.025	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 12B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R12 Controlled Roof Area

0.025 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	40	44.18	2.76	0.7	2.06	4.95
	45	40.63	2.54	0.7	1.84	4.97
	50	**37.65**	**2.36**	**0.7**	**1.66**	**4.97**
	55	35.12	2.20	0.7	1.50	4.94
	60	32.94	2.06	0.7	1.36	4.90

TABLE 12C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R12 Controlled Roof Area

0.025 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	20	119.95	8.34	1.1	7.24	8.68
	25	103.85	7.22	1.1	6.12	9.18
	30	**91.87**	**6.38**	**1.1**	**5.28**	**9.51**
	35	82.58	5.74	1.1	4.64	9.74
	40	75.15	5.22	1.1	4.12	9.89

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 12D: Roof Drain Flows

Roof Drains		
Roof Area	250	m²
Qty	1	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 12E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-57	250.0	0.0635	5.29	
			Total	**5.29**	**4.97**
100 Year	RD-57	250.0	0.1270	10.58	
			Total	**10.58**	**9.51**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 13A: Post-Development Runoff Coefficient "C" - R13 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.030	Roof	0.030	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 13B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R13 Controlled Roof Area

0.03 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	40	44.18	3.32	0.8	2.52	6.04
	45	40.63	3.05	0.8	2.25	6.07
	50	**37.65**	**2.83**	**0.8**	**2.03**	**6.08**
	55	35.12	2.64	0.8	1.84	6.06
	60	32.94	2.47	0.8	1.67	6.02

TABLE 13C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R13 Controlled Roof Area

0.03 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	50	63.95	5.33	1.2	4.13	12.40
	55	59.62	4.97	1.2	3.77	12.45
	60	**55.89**	**4.66**	**1.2**	**3.46**	**12.46**
	65	52.65	4.39	1.2	3.19	12.44
	70	49.79	4.15	1.2	2.95	12.40

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 13D: Roof Drain Flows

Roof Drains		
Roof Area	300	m²
Qty	1	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 13E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-58	300.0	0.0762	7.62	
			Total	**7.62**	**6.08**
100 Year	RD-58	300.0	0.1397	13.97	
			Total	**13.97**	**12.46**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 14A: Post-Development Runoff Coefficient "C" - R14 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.005	Roof	0.005	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 14B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R14 Controlled Roof Area

0.005 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	5	141.18	1.77	0.5	1.27	0.38
	10	104.19	1.30	0.5	0.80	0.48
	15	**83.56**	**1.05**	**0.5**	**0.55**	**0.49**
	20	70.25	0.88	0.5	0.38	0.45
	25	60.90	0.76	0.5	0.26	0.39

TABLE 14C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R14 Controlled Roof Area

0.005 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	10	178.56	2.48	0.7	1.77	1.06
	15	142.89	1.99	0.7	1.28	1.15
	20	**119.95**	**1.67**	**0.7**	**0.96**	**1.15**
	25	103.85	1.44	0.7	0.73	1.10
	30	91.87	1.28	0.7	0.57	1.02

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 14D: Roof Drain Flows

Roof Drains		
Roof Area	50	m²
Qty	1	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 14E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-59	50.0	0.0381	0.64	
			Total	**0.64**	**0.49**
100 Year	RD-59	50.0	0.0762	1.27	
			Total	**1.27**	**1.15**

*Note: Ponding volumes calculated using cone equation:

$$V = \frac{Area\ X\ Depth}{3}$$

TABLE 15A: Post-Development Runoff Coefficient "C" - R15 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.010	Roof	0.010	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 15B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R15 Controlled Roof Area

0.01 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	10	104.19	2.61	0.6	2.01	1.20
	15	83.56	2.09	0.6	1.49	1.34
	20	**70.25**	**1.76**	**0.6**	**1.16**	**1.39**
	25	60.90	1.52	0.6	0.92	1.39
	30	53.93	1.35	0.6	0.75	1.35

TABLE 15C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R15 Controlled Roof Area

0.01 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	15	142.89	3.97	1.0	3.02	2.72
	20	119.95	3.33	1.0	2.38	2.86
	25	**103.85**	**2.89**	**1.0**	**1.94**	**2.91**
	30	91.87	2.55	1.0	1.60	2.89
	35	82.58	2.30	1.0	1.35	2.83

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 15D: Roof Drain Flows

Roof Drains		
Roof Area	100	m²
Qty	1	
Type	Accutrol RD-100-A-ADJ	
Setting	1/2 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.79	L/s (ea)
Design Flow 4" of head	0.95	L/s (ea)
Design Flow 5" of head	1.10	L/s (ea)
Design Flow 6" of head	1.26	L/s (ea)

Table 15E: Total Roof Storage

Storm Event	Roof Drain ID	Area Per Roof Drain (m²)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume (m³)	Total Volume (m³) Required
5 Year	RD-60	100.0	0.0508	1.69	
			Total	**1.69**	**1.39**
100 Year	RD-60	100.0	0.1016	3.39	
			Total	**3.39**	**2.91**

*Note: Ponding volumes calculated using cone equation:

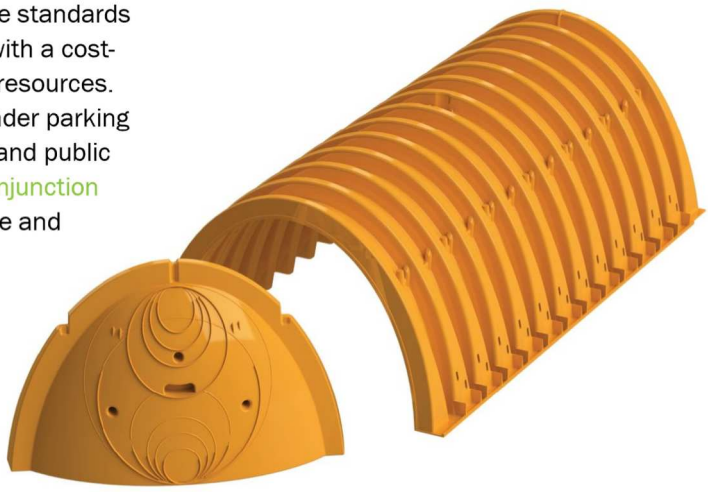
$$V = \frac{Area\ X\ Depth}{3}$$

Table 16: Post-Development Stormwater Management Summary (Roof Only)

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location	5 Year Storm Event				100 Year Storm Event			
					Release (L/s)	Ponding Depth (m)	Required Volumed (cu.m)	Volume Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Required Volume (cu.m)	Volume Provided (cu.m.)
R1	0.184	0.90	1.00	BLDG Service	4.0	0.0762	40.2	46.6	5.9	0.1397	81.9	85.4
R2	0.027	0.90	1.00	BLDG Service	1.3	0.0508	4.3	4.6	2.1	0.1143	8.6	10.3
R3	0.345	0.90	1.00	BLDG Service	4.9	0.0889	86.8	102.2	7.9	0.1524	170.8	175.3
R4	0.263	0.90	1.00	BLDG Service	9.9	0.0762	46.2	66.8	12.1	0.1270	104.0	111.3
R5	0.104	0.90	1.00	BLDG Service	2.4	0.0762	22.2	26.4	3.5	0.1397	45.8	48.4
R6	0.031	0.90	1.00	BLDG Service	2.5	0.0508	3.6	5.2	3.8	0.1016	7.8	10.5
R7	0.095	0.90	1.00	BLDG Service	2.8	0.0635	18.4	20.2	4.4	0.1270	37.5	40.4
R8	0.082	0.90	1.00	BLDG Service	3.6	0.0635	13.4	17.4	5.1	0.1143	28.9	31.2
R9	0.192	0.90	1.00	BLDG Service	6.0	0.0635	36.5	40.6	7.8	0.1270	78.4	81.3
R10	0.057	0.90	1.00	BLDG Service	2.0	0.0635	10.3	12.1	2.6	0.1270	22.6	24.1
R11	0.023	0.90	1.00	BLDG Service	1.3	0.0635	3.3	4.9	1.7	0.1270	7.5	9.7
R12	0.025	0.90	1.00	BLDG Service	0.7	0.0635	5.0	5.3	1.1	0.1270	9.5	10.6
R13	0.030	0.90	1.00	BLDG Service	0.8	0.0762	6.1	7.6	1.2	0.1397	12.5	14.0
R14	0.005	0.90	1.00	BLDG Service	0.5	0.0381	0.5	0.6	0.7	0.0762	1.1	1.3
R15	0.010	0.90	1.00	BLDG Service	0.6	0.0508	1.4	1.7	1.0	0.1016	2.9	3.4
Total					**43.2**				**60.9**			

StormTech SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



StormTech SC-740 Chamber (not to scale)

Nominal Chamber Specifications

Size (Lx W x H)	85.4" x 51.0" x 30.0" (2,170 x 1,295 x 762 mm)
Chamber Storage	45.9 ft³ (1.30 m³)
Min. Installed Storage*	74.9 ft³ (2.12 m³)
Weight	74.0 lbs (33.6 kg)

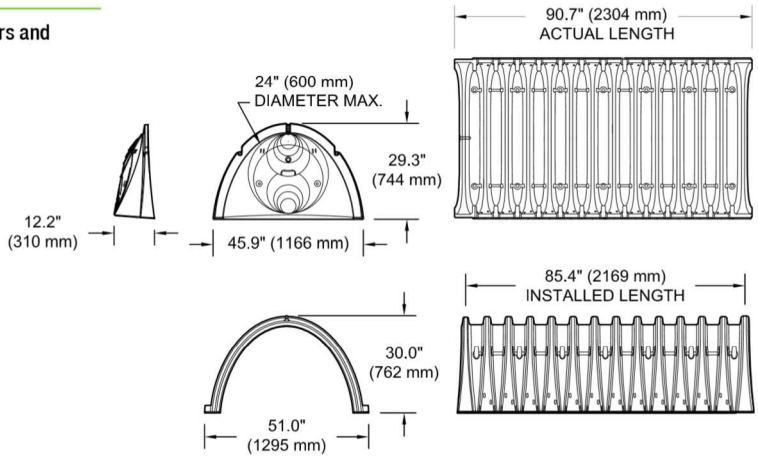
*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.

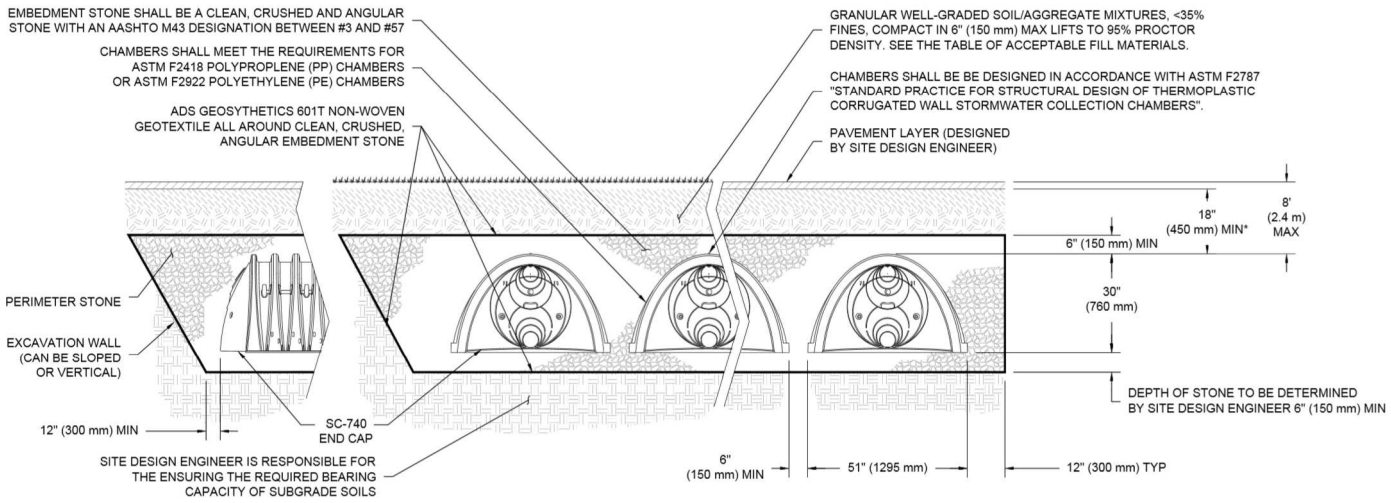
Shipping

30 chambers/pallet

60 end caps/pallet

12 pallets/truck





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

SC-740 CUMLATIVE STORAGE VOLUMES PER CHAMBER

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)	45.90 (1.300)	74.90 (2.121)
41 (1041)	45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone 45.90 (1.300)	72.64 (2.057)
39 (991)	Cover 45.90 (1.300)	71.52 (2.025)
38 (965)	45.90 (1.300)	70.39 (1.993)
37 (940)	45.90 (1.300)	69.26 (1.961)
36 (914)	45.90 (1.300)	68.14 (1.929)
35 (889)	45.85 (1.298)	66.98 (1.897)
34 (864)	45.69 (1.294)	65.75 (1.862)
33 (838)	45.41 (1.286)	64.46 (1.825)
32 (813)	44.81 (1.269)	62.97 (1.783)
31 (787)	44.01 (1.246)	61.36 (1.737)
30 (762)	43.06 (1.219)	59.66 (1.689)
29 (737)	41.98 (1.189)	57.89 (1.639)
28 (711)	40.80 (1.155)	56.05 (1.587)
27 (686)	39.54 (1.120)	54.17 (1.534)
26 (660)	38.18 (1.081)	52.23 (1.479)
25 (635)	36.74 (1.040)	50.23 (1.422)
24 (610)	35.22 (0.977)	48.19 (1.365)
23 (584)	33.64 (0.953)	46.11 (1.306)
22 (559)	31.99 (0.906)	44.00 (1.246)
21 (533)	30.29 (0.858)	1.85 (1.185)
20 (508)	28.54 (0.808)	39.67 (1.123)
19 (483)	26.74 (0.757)	37.47 (1.061)
18 (457)	24.89 (0.705)	35.23 (0.997)
17 (432)	23.00 (0.651)	32.96 (0.939)
16 (406)	21.06 (0.596)	30.68 (0.869)
15 (381)	19.09 (0.541)	28.36 (0.803)
14 (356)	17.08 (0.484)	26.03 (0.737)
13 (330)	15.04 (0.426)	23.68 (0.670)
12 (305)	12.97 (0.367)	21.31 (0.608)
11 (279)	10.87 (0.309)	18.92 (0.535)
10 (254)	8.74 (0.247)	16.51 (0.468)
9 (229)	6.58 (0.186)	14.09 (0.399)
8 (203)	4.41 (0.125)	11.66 (0.330)
7 (178)	2.21 (0.063)	9.21 (0.264)
6 (152)	0 (0)	6.76 (0.191)
5 (127)	0 (0)	5.63 (0.160)
4 (102)	Stone 0 (0)	4.51 (0.128)
3 (76)	Foundation 0 (0)	3.38 (0.096)
2 (51)	0 (0)	2.25 (0.064)
1 (25)	0 (0)	1.13 (0.032)

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-740 Chamber	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6" (150 mm) stone above chambers, 6" (150 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

ENGLISH TONS (yds³)	Stone Foundation Depth		
	6"	12"	16"
SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
METRIC KILOGRAMS (m³)	150 mm	300 mm	450 mm
SC-740	3,450 (2.1)	4,170 (2.5)	4,490 (3.0)

Note: Assumes 6" (150 mm) of stone above and between chambers.

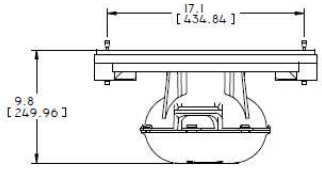
Volume Excavation Per Chamber yd³ (m³)

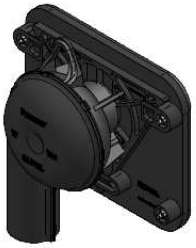
	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

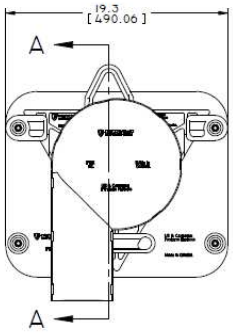
Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. The volume of excavation will vary as depth of cover increases.

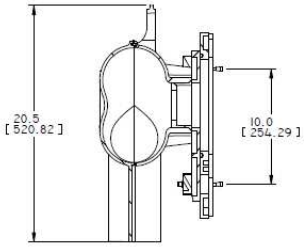
IPEX

<u>Tempest LMF ICD Sq</u> Shop Drawing

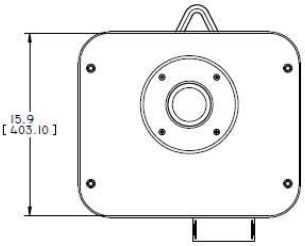








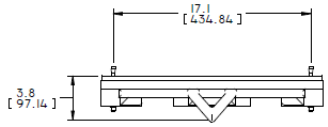
SECTION A-A

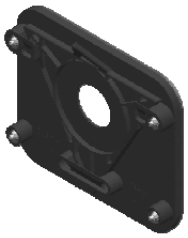


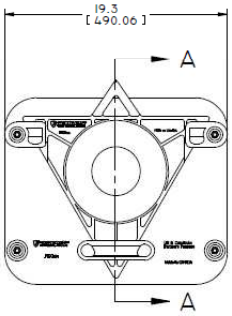
IPEX TECHNOLOGIES INC.			
PROJECTION	UNITS: in (mm)	TITLE: LMF SQUARE CB ASSEMBLY	
DRAWN BY: M. M-MARTIN	DATE: 2011-07-27	SIZE: B	SCALE: 1/8
VERIFIED BY	DATE: 2011-07-27	DRAWING NUMBER: SGM74_FA00IR03	REV: 3

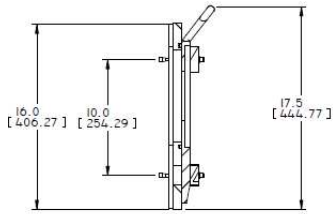
IPEX

Tempest MHF ICD Sq Shop Drawing









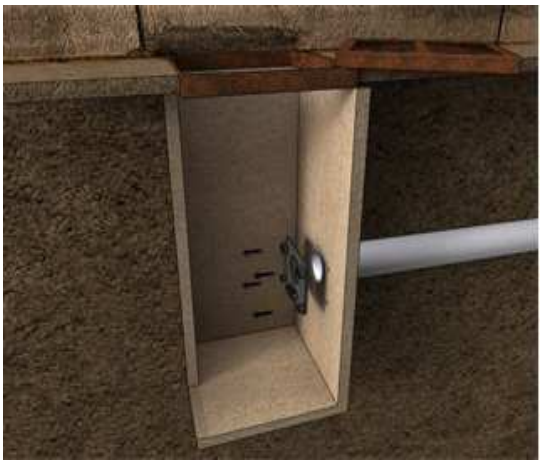
SECTION A-A

TOLERANCES:	IPEX TECHNOLOGIES INC.				
	PROJECTION	UNITS: in (mm)	TITLE: MHF SQUARE CB ASSEMBLY		
	DRAWN BY: H. H-MARTIN	DATE: 2011-07-25	SIZE: B	SCALE(S): 1/8	SHEET: 1 OF 1
	VERIFIED BY:	DATE: 2011-07-25	DRAWING NUMBER: SGM74_FA007R01		REV: 1

IPEX

Square CB Installation Notes:

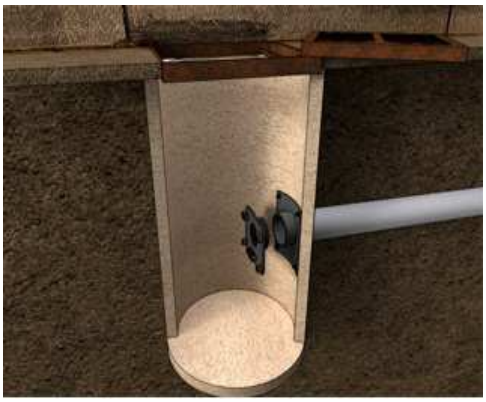
1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.



IPEX

Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.



CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX

IPEX TEMPEST Inlet Control Devices Technical Specification

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

Conrad Stang

From: Rosiu, Cornel <Cornel.Rosiu@ipexna.com>
Sent: Wednesday, November 20, 2019 10:51 AM
To: Conrad Stang
Subject: RE: Hard Rock Ottawa - ICD Sizing Request

Conrad,

See below

Regards,

Cornel Rosiu
IPEX Inc. - *Municipal Estimator, ON*
Cornel.Rosiu@ipexna.com
6810 Invader Crescent, Mississauga, ON, L5T 2B6 T: (905) 670-7676 x200

From: Conrad Stang <c.stang@novatech-eng.com>
Sent: November 20, 2019 10:41 AM
To: Rosiu, Cornel <Cornel.Rosiu@ipexna.com>
Cc: Donnelly, Ryan <Ryan.Donnelly@ipexna.com>; Matthew Hrehoriak <m.hrehoriak@novatech-eng.com>
Subject: Hard Rock Ottawa - ICD Sizing Request

Hi Cornel,

Can I please get the Tempest LMF ICD models for the following structures. This is for Hard Rock Ottawa.

It is our first submission so I don't need the full package. Just a model number that I can add to a table. I anticipate that the ICD's will be modified for our second submission. I will give you a call to discuss.

Structure	100-year		Tempest LMF ICD Model
	Head (m)	Peak Flow (L/s)	
EX-CB117	2.26	8.2	79
EX-CB60	1.77	8.5	86
EX-CB64	2.26	8.2	79
EX-MH112	1.90	8.6	85
PR-CB10	1.42	6.1	77
PR-CB13	1.37	6.2	78
PR-CB14	1.37	4.0	63
PR-CB16/17	1.65	9.7	93
PR-CB18	1.42	6.3	78
PR-CB21	1.42	6.3	78

PR-CB24	1.47	6.4	78
PR-CB29	1.53	9.2	93
PR-CB32	1.71	9.9	93
PR-CBMH104	1.31	10.1	101
PR-CBMH105	1.38	6.0	77
PR-CBMH106	1.40	6.2	78
PR-CBMH107	1.41	6.2	78
PR-CBMH108	1.59	9.4	93
PR-CBMH109	1.85	7.2	78
PR-CBMH110	1.96	7.1	76
PR-CBMH112	1.80	7.1	78
PR-CBMH114	1.89	7.2	78
PR-CBMH115	1.94	7.3	78
PR-CBMH118	1.90	10.4	93
PR-MH100	1.39	14.9	MHF 80
PR-TD01	0.82	12.0	MHF 82
PR-TD02	0.92	12.7	MHF 82

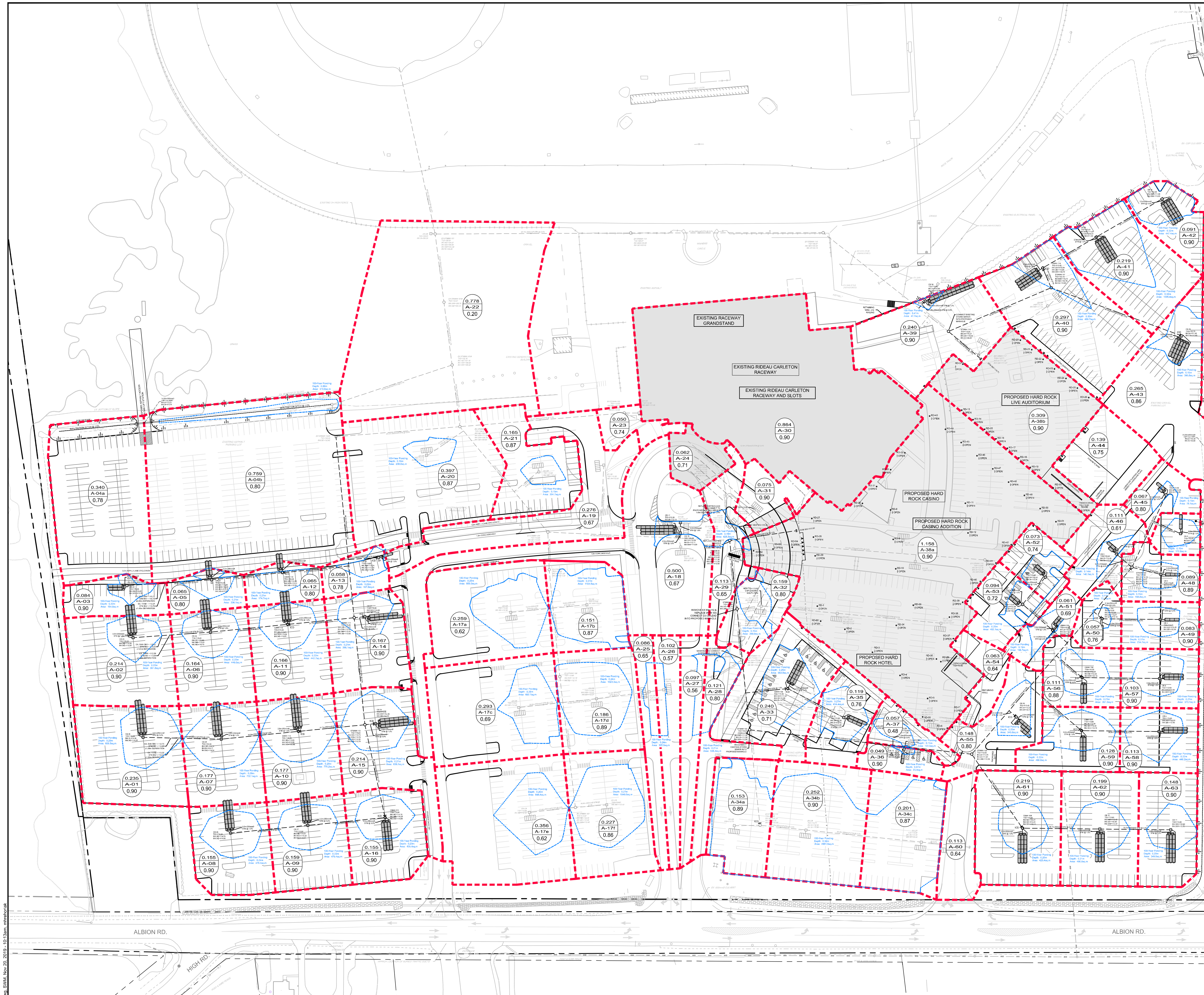
Kind regards,

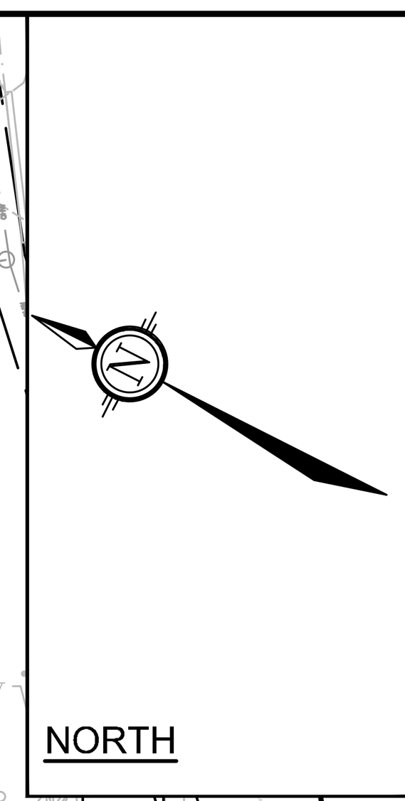
Conrad

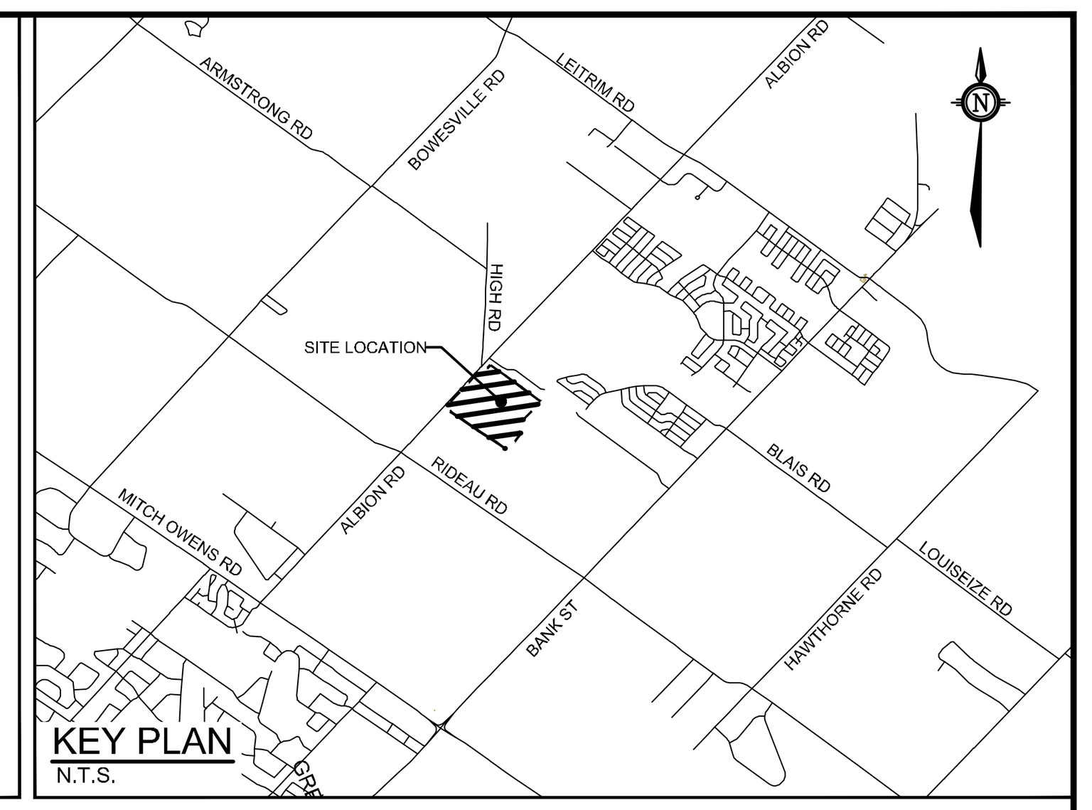
Conrad Stang, M.A.Sc., P.Eng., Project Manager | Water Resources
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x310 | Fax: 613.254.5867
Email: c.stang@novatech-eng.com | Website: www.novatech-eng.com

Appendix D

Stormwater Management Modeling







LEGEND

- PROPERTY LINE
- PROPOSED STORM SEWER AND MANHOLE
- DIRECTION OF FLOW
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- STM MH — *EXISTING STORM MANHOLE & SEWER*
- CB 1 — *EXISTING CATCHBASIN*
- STORM SEWER DRAINAGE AREA BOUNDARY
- 100YR PONDING LIMITS
- 0.085 / A-16 / 0.78 — DRAINAGE AREA (ha) / DRAINAGE AREA ID / RUNOFF COEFFICIENT

WATTS ACCUTROL RD-100-A-ADJ ROOF DRAIN TABLE

ROOF AREA	ROOF DRAIN ID	WEIR SETTING
R-1	RD1 - RD5	1/2 Open
R-2	RD6 - RD7	1/2 Open
R-3	RD8 - RD12	3/4 Open
R-4	RD13 - RD26	1/4 Open
R-5	RD27 - RD29	1/2 Open
R-6	RD30 - RD33	1/2 Open
R-7	RD34 - RD37	1/2 Open
R-8	RD38 - RD42	1/2 Open
R-9	RD43 - RD51	1/4 Open
R-10	RD52 - RD54	1/4 Open
R-11	RD55 - RD56	1/4 Open
R-12	RD57	1/2 Open
R-13	RD58	1/2 Open
R-14	RD59	1/4 Open
R-15	RD60	1/2 Open

TEMPEST INLET CONTROL DEVICE TABLE

STRUCTURE ID	TEMPEST ICD MODEL	100-YR EVENT HEAD (m)	100-YR EVENT FLOW (L/s)
EX-CB117	79	2.26	8.2
EX-CB131	N/A	1.82	111.2
EX-CB137	N/A	2.35	8.4
EX-CB14	N/A	2.60	19.0
EX-CB60	86	1.77	8.5
EX-CB64	79	2.26	8.2
EX-CB72	N/A	1.75	22.5
EX-CB82	N/A	1.92	19.4
EX-CB84	N/A	2.28	22.0
EX-MH105	N/A	2.72	21.9
EX-MH112	85	1.90	8.6
PR-CB10	77	1.42	6.1
PR-CB13	78	1.37	6.2
PR-CB14	63	1.37	4.0
PR-CB16/17	93	1.65	9.7
PR-CB18	78	1.42	6.3
PR-CB21	78	1.42	6.3
PR-CB24	78	1.47	6.4
PR-CB29	93	1.53	9.2
PR-CB32	93	1.71	9.9
PR-CBMH104	101	1.31	10.1
PR-CBMH105	77	1.38	6.0
PR-CBMH106	78	1.40	6.2
PR-CBMH107	78	1.41	6.2
PR-CBMH108	93	1.59	9.4
PR-CBMH109	78	1.85	7.2
PR-CBMH110	76	1.96	7.1
PR-CBMH112	78	1.80	7.1
PR-CBMH114	78	1.89	7.2
PR-CBMH115	78	1.94	7.3
PR-CBMH118	93	1.90	10.4
PR-MH100	MHF 80	1.39	14.9
PR-TD01	MHF 82	0.82	12.0
PR-TD02	MHF 82	0.92	12.7

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	NOV 20/19	CJR

SCALE 1:750

DESIGN MJH | CHECKED CJR | DRAWN MJH | CHECKED CJR | APPROVED JLS

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
4837 ALBION ROAD, CITY OF OTTAWA
HARD ROCK OTTAWA

DRAWING NAME
STORMWATER MANAGEMENT
DRAINAGE AREA PLAN

PROJECT No. 116111
REV # 1
DRAWING No. 116111-SWM

M:\2016\116111\CAD\Design\116111-SWM.dwg, SWM, Nov 20, 2019 - 10:13am, mhrehoriak

PLANB1.DWG - 1000mmx707mm

4837 Albion Road - Hard Rock Ottawa (116111)
Subcatchment Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Impervious (%)	Zero Impervious (%)	Equivalent Width (m)	Flow Length (m)	Average Slope (%)
A-01	0.235	0.90	100	0	76.7	30.6	1.5
A-02	0.214	0.90	100	0	71.7	29.8	1.5
A-03	0.075	0.90	100	0	60.9	12.3	1.5
A-04a	0.349	0.78	82	0	45.7	76.4	1.5
A-04b	0.762	0.80	85	0	100.3	76.0	1.5
A-05	0.065	0.80	86	0	44.0	14.8	1.5
A-06	0.164	0.90	100	0	50.6	32.4	1.5
A-07	0.177	0.90	100	0	59.6	29.7	1.5
A-08	0.155	0.90	100	0	53.7	28.9	1.5
A-09	0.159	0.90	100	0	52.5	30.3	1.5
A-10	0.177	0.90	100	0	58.9	30.1	1.5
A-11	0.166	0.90	100	0	48.3	34.4	1.5
A-12	0.065	0.80	86	0	49.0	13.3	1.5
A-13	0.058	0.78	82	0	34.4	16.9	1.5
A-14	0.167	0.90	100	0	50.6	33.0	1.5
A-15	0.214	0.90	100	0	73.4	29.1	1.5
A-16	0.155	0.90	100	0	51.7	30.0	1.5
A-17a	0.217	0.58	54	0	56.4	38.5	1.5
A-17b	0.191	0.86	95	0	74.9	25.5	1.5
A-17c	0.250	0.65	65	0	61.4	40.7	1.5
A-17d	0.229	0.89	98	0	88.9	25.8	1.5
A-17e	0.303	0.62	60	0	72.3	41.9	1.5
A-17f	0.280	0.86	94	0	112.3	24.9	1.5
A-18	0.526	0.73	75	0	75.0	70.1	1.5
A-19	0.276	0.67	67	0	78.0	35.4	1.5
A-20	0.397	0.87	96	0	128.7	30.8	1.5
A-21	0.165	0.87	95	0	80.9	20.4	1.5
A-22	0.741	0.24	5	0	163.3	45.4	1.5
A-23	0.050	0.74	77	0	49.5	10.1	1.5
A-24	0.057	0.90	100	100	25.0	22.8	1.5
A-25	0.086	0.65	65	0	10.2	84.5	1.5
A-26	0.102	0.57	53	0	12.1	84.4	1.5
A-27	0.097	0.56	52	0	10.9	88.7	1.5
A-28	0.121	0.80	86	0	15.0	80.8	1.5
A-29	0.093	0.65	64	0	30.4	30.7	1.5
A-30	0.864	0.90	100	100	69.1	125.0	1.5
A-31	0.075	0.90	100	0	68.8	10.9	1.5
A-32	0.115	0.80	86	0	77.8	14.8	1.5
A-33	0.240	0.71	73	0	120.2	20.0	1.5
A-34a	0.153	0.89	98	0	70.6	21.7	1.5
A-34b	0.252	0.90	100	0	106.6	23.6	1.5
A-34c	0.201	0.87	95	0	80.8	24.9	1.5
A-35	0.119	0.76	80	0	92.3	12.9	1.5
A-36	0.049	0.90	100	0	43.6	11.2	1.5
A-37	0.057	0.48	39	0	22.5	25.3	1.5
A-38a	1.158	0.90	100	100	176.3	65.7	1.5
A-38b	0.309	0.90	100	100	59.0	52.4	1.5
A-39	0.240	0.90	100	0	65.9	36.4	1.5
A-40	0.297	0.90	100	0	57.2	51.9	1.5
A-41	0.169	0.90	100	0	36.7	46.1	1.5
A-42	0.141	0.90	100	0	40.6	34.7	1.5

4837 Albion Road - Hard Rock Ottawa (116111)
Subcatchment Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Impervious (%)	Zero Impervious (%)	Equivalent Width (m)	Flow Length (m)	Average Slope (%)
A-43	0.266	0.86	94	0	62.3	42.7	1.5
A-44	0.139	0.75	79	0	42.9	32.4	1.5
A-45	0.067	0.80	85	0	45.1	14.9	1.5
A-46	0.111	0.61	59	0	43.3	25.6	1.5
A-47	0.042	0.81	88	0	39.4	10.7	1.5
A-48	0.089	0.89	98	0	73.5	12.1	1.5
A-49	0.083	0.90	100	0	51.6	16.1	1.5
A-50	0.057	0.76	81	0	49.4	11.5	1.5
A-51	0.061	0.69	70	0	30.7	19.9	1.5
A-52	0.073	0.74	78	0	46.0	15.9	1.5
A-53	0.094	0.72	74	0	49.8	18.9	1.5
A-54	0.063	0.64	62	0	31.8	19.8	1.5
A-55	0.148	0.80	86	0	51.5	28.8	1.5
A-56	0.111	0.88	97	0	64.6	17.2	1.5
A-57	0.103	0.90	100	0	80.2	12.8	1.5
A-58	0.113	0.90	100	0	63.6	17.8	1.5
A-59	0.128	0.90	100	0	74.5	17.2	1.5
A-60	0.113	0.64	64	0	40.8	27.7	1.5
A-61	0.219	0.90	100	0	112.5	19.5	1.5
A-62	0.199	0.90	100	0	126.8	15.7	1.5
A-63	0.148	0.90	100	0	99.6	14.9	1.5
Total	**14.40**	**0.80**	**85**	-	-	-	-

4837 Albion Road - Hard Rock Ottawa (116111)
Catchbasin Information

NOVATECH
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CB / CBMH ID	TAG	STM Area ID	Drainage Area (ha)	Invert Elev. (m)	Rim Elev. (m)	Spill Elev. (m)	Ponding Volume (m^3)
EX-CB116	EX-CB	A-31	0.075	112.99	113.50	113.60	6.8
EX-CB117	EX-CB	A-29	0.093	112.09	113.35	113.50	36.7
EX-CB128	EX-CB	A-26	0.102	112.51	113.73	114.00	14.4
EX-CB131	EX-CB	A-22	0.741	105.29	106.91	107.00	0.3
EX-CB137	EX-CB	A-19	0.276	112.00	113.39	113.70	5.0
EX-CB14	EX-CB	A-04b	0.762	111.19	112.33	112.33	0.0
EX-CB28	EX-CB	A-17f	0.280	112.43	113.63	114.05	177.4
EX-CB30	EX-CB	A-17e	0.303	112.50	113.64	114.05	138.0
EX-CB50	EX-CB	A-34b	0.252	112.34	113.71	113.95	104.4
EX-CB52	EX-CB	A-34c	0.201	112.44	113.68	114.05	123.3
EX-CB54	EX-CB	A-60	0.113	112.52	113.81	113.95	19.1
EX-CB58	EX-CB	A-34a	0.153	112.44	113.73	113.95	66.5
EX-CB60	EX-CB	A-28	0.121	112.15	113.69	113.90	26.1
EX-CB62	EX-CB	A-27	0.097	112.64	113.76	113.82	3.2
EX-CB64	EX-CB	A-32	0.115	112.10	113.50	113.60	10.3
EX-CB72	EX-CB	A-23	0.050	111.18	113.66	113.83	0.6
EX-CB82	EX-CB	A-20	0.397	112.62	113.78	113.85	14.4
EX-CB84	EX-CB	A-21	0.165	112.12	113.65	113.85	66.5
EX-CB87	EX-CB	A-17a	0.217	112.50	113.65	114.05	113.2
EX-CB90	EX-CB	A-17b	0.191	112.51	113.62	114.05	155.1
EX-CB92	EX-CB	A-17c	0.250	112.49	113.61	113.90	69.5
EX-CB95	EX-CB	A-25	0.086	112.45	113.65	113.95	16.0
EX-CB96	EX-CB	A-17d	0.229	112.22	113.65	113.85	70.6
PR-CB01	PR-CB	A-45	0.067	112.36	113.40	113.63	46.8
PR-CB02	PR-CB	A-47	0.042	112.40	113.40	113.60	26.0
PR-CB03	PR-CB	A-46	0.111	112.40	113.40	113.65	39.6
PR-CB04	PR-CB	A-48	0.089	112.40	113.40	113.65	65.4
PR-CB05	PR-CB	A-49	0.083	112.45	113.45	113.70	52.4
PR-CB06	PR-CB	A-52	0.073	112.45	113.45	113.60	17.1
PR-CB07	PR-CB	A-53	0.094	112.36	113.45	113.65	24.3
PR-CB08	PR-CB	A-57	0.103	112.50	113.50	113.75	40.9
PR-CB09	PR-CB	A-58	0.113	112.60	113.60	113.85	46.2
PR-CB10	PR-CB	A-55	0.148	112.25	113.45	113.70	50.3
PR-CB11	PR-CB	A-63	0.148	112.60	113.60	113.80	55.0
PR-CB12	PR-CB	A-62	0.199	112.42	113.60	113.87	104.9
PR-CB13	PR-CB	A-36	0.049	112.35	113.55	113.66	1.5
PR-CB14	PR-CB	A-37	0.057	112.35	113.55	113.65	6.8
PR-CB15	PR-CB	A-35	0.119	112.20	113.40	113.60	27.3
PR-CB16/17	PR-CB	A-18	0.526	112.09	113.35	113.65	113.8
PR-CB18	PR-CB	A-13	0.058	113.85	115.05	115.25	3.9
PR-CB19	PR-CB	A-05	0.065	113.65	115.05	115.25	5.7
PR-CB20	PR-CB	A-03	0.075	113.85	115.05	115.25	3.9
PR-CB21	PR-CB	A-14	0.167	114.00	115.20	115.40	23.3
PR-CB22	PR-CB	A-06	0.164	113.80	115.20	115.40	24.3
PR-CB23	PR-CB	A-02	0.214	114.00	115.20	115.40	21.0
PR-CB24	PR-CB	A-15	0.214	114.35	115.55	115.85	76.1
PR-CB25	PR-CB	A-07	0.177	114.14	115.55	115.85	71.9
PR-CB26	PR-CB	A-01	0.235	114.35	115.55	115.85	60.3
PR-CB27	PR-CB	A-09	0.159	114.51	115.90	116.20	75.2
PR-CB28	PR-CB	A-08	0.155	114.70	115.90	116.20	70.6
PR-CB29	PR-CB	A-43	0.266	111.50	112.70	113.00	38.7
PR-CB30	PR-CB	A-42	0.141	111.20	112.40	112.70	5.7
PR-CB31	PR-CB	A-41	0.169	111.01	112.40	112.70	28.4
PR-CB32	PR-CB	A-39	0.240	110.90	112.40	112.55	0.5
PR-CBMH104	PR-CBMH	A-50	0.057	112.30	113.50	113.75	25.5
PR-CBMH105	PR-CBMH	A-51	0.061	112.26	113.45	113.68	29.1
PR-CBMH106	PR-CBMH	A-56	0.111	112.31	113.50	113.80	67.7
PR-CBMH107	PR-CBMH	A-59	0.128	112.41	113.60	113.85	46.9
PR-CBMH108	PR-CBMH	A-61	0.219	112.21	113.60	113.90	116.3
PR-CBMH109	PR-CBMH	A-33	0.240	111.90	113.40	113.60	49.7
PR-CBMH110	PR-CBMH	A-12	0.065	113.30	115.05	115.25	21.7
PR-CBMH112	PR-CBMH	A-11	0.166	113.61	115.20	115.40	24.1
PR-CBMH114	PR-CBMH	A-10	0.177	113.95	115.55	115.85	76.8
PR-CBMH115	PR-CBMH	A-16	0.155	114.19	115.90	116.20	69.3
PR-CBMH118	PR-CBMH	A-40	0.297	110.84	112.40	112.70	13.2

4837 Albion Road - Hard Rock Ottawa (116111)
Summary of Underground and Surface Storage Provided

NOVATECH
Engineers, Planners & Landscape Architects

CB / CBMH ID	STM ID	Drainage Area (ha)	Elevations (m)			Depths (m)			Provided Storage (m^3)			StormTech STC-740 Storage Chambers	
			Invert	RIM	Ponding	CB	Ponding	Total	UG	Surface[1]	Total	Number	Storage (m^3)[2]
EX-CB116	A-31	0.075	112.39	113.50	113.60	1.11	0.10	1.21	6.8	6.8	13.6	EX-10	6.8
EX-CB117	A-29	0.093	111.49	113.35	113.50	1.86	0.15	2.01	6.8	36.7	43.5	EX-10	6.8
EX-CB128	A-26	0.102	111.91	113.73	114.00	1.82	0.27	2.09	6.8	14.4	21.2	EX-10	6.8
EX-CB131	A-22	0.741	105.29	106.91	107.00	1.62	0.09	1.71	0.0	0.3	0.3	0	0.0
EX-CB137	A-19	0.276	111.40	113.39	113.70	1.99	0.31	2.30	6.8	5.0	11.8	EX-10	6.8
EX-CB14	A-04b	0.762	110.59	112.33	112.33	1.74	0.00	1.74	6.8	0.0	6.8	EX-10	6.8
EX-CB28	A-17f	0.280	111.83	113.63	114.05	1.80	0.42	2.22	6.8	177.4	184.2	EX-10	6.8
EX-CB30	A-17e	0.303	111.90	113.64	114.05	1.74	0.41	2.15	6.8	138.0	144.8	EX-10	6.8
EX-CB50	A-34b	0.252	111.74	113.71	113.95	1.97	0.24	2.21	6.8	104.4	111.2	EX-10	6.8
EX-CB52	A-34c	0.201	111.84	113.68	114.05	1.84	0.37	2.21	6.8	123.3	130.1	EX-10	6.8
EX-CB54	A-60	0.113	111.92	113.81	113.95	1.89	0.14	2.03	6.8	19.1	25.9	EX-10	6.8
EX-CB58	A-34a	0.153	111.84	113.73	113.95	1.89	0.22	2.11	6.8	66.5	73.3	EX-10	6.8
EX-CB60	A-28	0.121	112.15	113.69	113.90	1.54	0.21	1.75	0.0	26.1	26.1	0	0.0
EX-CB62	A-27	0.097	112.64	113.76	113.82	1.12	0.06	1.18	0.0	3.2	3.2	0	0.0
EX-CB64	A-32	0.115	111.50	113.50	113.60	2.00	0.10	2.10	6.8	10.3	17.1	EX-10	6.8
EX-CB72	A-23	0.050	111.18	113.66	113.83	2.48	0.17	2.65	0.0	0.6	0.6	0	0.0
EX-CB82	A-20	0.397	112.02	113.78	113.85	1.76	0.07	1.83	6.8	14.4	21.2	EX-10	6.8
EX-CB84	A-21	0.165	111.52	113.65	113.85	2.13	0.20	2.33	6.8	66.5	73.3	EX-10	6.8
EX-CB87	A-17a	0.217	111.90	113.65	114.05	1.75	0.40	2.15	6.8	113.2	120.0	EX-10	6.8
EX-CB90	A-17b	0.191	111.91	113.62	114.05	1.71	0.43	2.14	6.8	155.1	161.9	EX-10	6.8
EX-CB92	A-17c	0.250	111.89	113.61	113.90	1.72	0.29	2.01	6.8	69.5	76.3	EX-10	6.8
EX-CB95	A-25	0.086	111.85	113.65	113.95	1.80	0.30	2.10	6.8	16.0	22.8	EX-10	6.8
EX-CB96	A-17d	0.229	111.62	113.65	113.85	2.03	0.20	2.23	6.8	70.6	77.4	EX-10	6.8

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Summary of Underground and Surface Storage Provided

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CB / CBMH ID	STM ID	Drainage Area (ha)	Elevations (m)			Depths (m)			Provided Storage (m^3)			StormTech STC-740 Storage Chambers	
			Invert	RIM	Ponding	CB	Ponding	Total	UG	Surface[1]	Total	Number	Storage (m^3)[2]
PR-CB01	A-45	0.067	112.36	113.40	113.63	1.04	0.23	1.27	6.3	46.8	53.1	3	6.3
PR-CB02	A-47	0.042	112.40	113.40	113.60	1.00	0.20	1.20	6.3	26.0	32.3	3	6.3
PR-CB03	A-46	0.111	112.40	113.40	113.65	1.00	0.25	1.25	6.3	39.6	45.9	3	6.3
PR-CB04	A-48	0.089	112.40	113.40	113.65	1.00	0.25	1.25	6.3	65.4	71.7	3	6.3
PR-CB05	A-49	0.083	112.45	113.45	113.70	1.00	0.25	1.25	6.3	52.4	58.7	3	6.3
PR-CB06	A-52	0.073	112.45	113.45	113.60	1.00	0.15	1.15	8.4	17.1	25.5	4	8.4
PR-CB07	A-53	0.094	112.36	113.45	113.65	1.09	0.20	1.29	8.4	24.3	32.7	4	8.4
PR-CB08	A-57	0.103	112.50	113.50	113.75	1.00	0.25	1.25	16.9	40.9	57.8	8	16.9
PR-CB09	A-58	0.113	112.60	113.60	113.85	1.00	0.25	1.25	21.2	46.2	67.4	10	21.2
PR-CB10	A-55	0.148	112.25	113.45	113.70	1.20	0.25	1.45	21.2	50.3	71.5	10	21.2
PR-CB11	A-63	0.148	112.60	113.60	113.80	1.00	0.20	1.20	38.1	55.0	93.1	18	38.1
PR-CB12	A-62	0.199	112.42	113.60	113.87	1.18	0.27	1.45	38.1	104.9	143.0	18	38.1
PR-CB13	A-36	0.049	112.35	113.55	113.66	1.20	0.11	1.31	4.2	1.5	5.7	2	4.2
PR-CB14	A-37	0.057	112.35	113.55	113.65	1.20	0.10	1.30	4.2	6.8	11.0	2	4.2
PR-CB15	A-35	0.119	112.20	113.40	113.60	1.20	0.20	1.40	14.8	27.3	42.1	7	14.8
PR-CB16/17	A-18	0.526	112.09	113.35	113.65	1.26	0.30	1.56	106.0	113.8	219.8	50	106.0
PR-CB18	A-13	0.058	113.85	115.05	115.25	1.20	0.20	1.40	4.2	3.9	8.1	2	4.2
PR-CB19	A-05	0.065	113.65	115.05	115.25	1.40	0.20	1.60	12.7	5.7	18.4	6	12.7
PR-CB20	A-03	0.075	113.85	115.05	115.25	1.20	0.20	1.40	12.7	3.9	16.6	6	12.7
PR-CB21	A-14	0.167	114.00	115.20	115.40	1.20	0.20	1.40	27.5	23.3	50.8	13	27.5
PR-CB22	A-06	0.164	113.80	115.20	115.40	1.40	0.20	1.60	38.1	24.3	62.4	18	38.1
PR-CB23	A-02	0.214	114.00	115.20	115.40	1.20	0.20	1.40	38.1	21.0	59.1	18	38.1
PR-CB24	A-15	0.214	114.35	115.55	115.85	1.20	0.30	1.50	40.2	76.1	116.3	19	40.2
PR-CB25	A-07	0.177	114.14	115.55	115.85	1.41	0.30	1.71	42.4	71.9	114.3	20	42.4
PR-CB26	A-01	0.235	114.35	115.55	115.85	1.20	0.30	1.50	42.4	60.3	102.7	20	42.4
PR-CB27	A-09	0.159	114.51	115.90	116.20	1.39	0.30	1.69	38.1	75.2	113.3	18	38.1
PR-CB28	A-08	0.155	114.70	115.90	116.20	1.20	0.30	1.50	38.1	70.6	108.7	18	38.1
PR-CB29	A-43	0.266	111.50	112.70	113.00	1.20	0.30	1.50	48.7	38.7	87.4	23	48.7
PR-CB30	A-42	0.141	111.20	112.40	112.70	1.20	0.30	1.50	42.4	5.7	48.1	20	42.4
PR-CB31	A-41	0.169	111.01	112.40	112.70	1.39	0.30	1.69	42.4	28.4	70.8	20	42.4
PR-CB32	A-39	0.240	110.90	112.40	112.55	1.50	0.15	1.65	42.4	0.5	42.9	20	42.4

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Summary of Underground and Surface Storage Provided

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CB / CBMH ID	STM ID	Drainage Area (ha)	Elevations (m)			Depths (m)			Provided Storage (m^3)			StormTech STC-740 Storage Chambers	
			Invert	RIM	Ponding	CB	Ponding	Total	UG	Surface[1]	Total	Number	Storage (m^3)[2]
PR-CBMH104	A-50	0.057	112.30	113.50	113.75	1.20	0.25	1.45	6.3	25.5	31.8	3	6.3
PR-CBMH105	A-51	0.061	112.26	113.45	113.68	1.19	0.23	1.42	8.4	29.1	37.5	4	8.4
PR-CBMH106	A-56	0.111	112.31	113.50	113.80	1.19	0.30	1.49	16.9	67.7	84.6	8	16.9
PR-CBMH107	A-59	0.128	112.41	113.60	113.85	1.19	0.25	1.44	21.2	46.9	68.1	10	21.2
PR-CBMH108	A-61	0.219	112.21	113.60	113.90	1.39	0.30	1.69	38.1	116.3	154.4	18	38.1
PR-CBMH109	A-33	0.240	111.90	113.40	113.60	1.50	0.20	1.70	31.8	49.7	81.5	15	31.8
PR-CBMH110	A-12	0.065	113.30	115.05	115.25	1.75	0.20	1.95	12.7	21.7	34.4	6	12.7
PR-CBMH112	A-11	0.166	113.61	115.20	115.40	1.59	0.20	1.79	38.1	24.1	62.2	18	38.1
PR-CBMH114	A-10	0.177	113.95	115.55	115.85	1.60	0.30	1.90	42.4	76.8	119.2	20	42.4
PR-CBMH115	A-16	0.155	114.19	115.90	116.20	1.71	0.30	2.01	38.1	69.3	107.4	18	38.1
PR-CBMH118	A-40	0.297	110.84	112.40	112.70	1.56	0.30	1.86	42.4	13.2	55.6	20	42.4
TOTAL		**11.465**		**-**			**-**		**1249.0**	**3005.5**	**4254.5**	**529**	**1249.0**

[1] *Based on Grading Design / Autodesk Civil 3D (refer to drawings 116111-GR & 116111-SWM)*

[2] *Based on StormTech Site Calculator for STC-740*

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Summary of Underground and Surface Storage Provided

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Storage Provided by StormTech STC-740 Chambers		System Length (m)[1]	
Number	Storage (m^3)[1]	1 Row	2 Rows
1	2.1	3.27	3.27
2	4.2	5.44	3.27
3	6.3	7.61	5.44
4	8.4	9.78	5.44
5	10.6	11.95	7.61
6	12.7	14.12	7.61
7	14.8	16.29	9.78
8	16.9	18.46	9.78
9	19.0	20.63	11.95
10	21.2	22.80	11.95
11	23.3	24.97	14.12
12	25.4	27.14	14.12
13	27.5	29.31	16.29
14	29.6	31.48	16.29
15	31.8	33.65	18.46
16	33.9	35.82	18.46
17	36.0	37.99	20.63
18	38.1	40.16	20.63
19	40.2	42.33	22.80
20	42.4	44.50	22.80
21	44.5	46.67	24.97
22	46.6	48.84	24.97
23	48.7	51.01	27.14
24	50.8	53.18	27.14
25	53.0	55.35	29.31
26	55.1	57.52	29.31
27	57.2	59.69	31.48
28	59.3	61.86	31.48
30	63.6	66.20	33.65
40	84.8	87.90	44.50
50	106.0	109.60	55.35
EX-10	6.8	-	-

[1] *Based on Stormtech site calculator for SC-740 chambers*
- 150mm stone above chambers
- 40% void ratio for surrounding stone
- 1 row; Width = 1.90m
- 2 rows; Width = 3.35m
- Includes end caps

Date: 11/20/2019
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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB116	**A-31**	**6.8**	**6.8**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.11	0.00	0.0	6.9
1.21	136.00	6.8	13.7
1.22	0.00	0.7	14.4
2.11	0.00	0.0	14.4

EX-10x Infiltration Storage Chambers (6.8 m3)
0.1m Static Ponding Depth (6.8 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB117	**A-29**	**6.8**	**36.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.86	0.00	0.0	6.9
2.01	489.33	36.7	43.6
2.02	0.00	2.4	46.0
2.86	0.00	0.0	46.0

EX-10x Infiltration Storage Chambers (6.8 m3)
0.15m Static Ponding Depth (36.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB128	**A-26**	**6.8**	**14.4**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.82	0.00	0.0	6.9
2.09	106.67	14.4	21.3
2.10	0.00	0.5	21.8
2.82	0.00	0.0	21.8

EX-10x Infiltration Storage Chambers (6.8 m3)
0.27m Static Ponding Depth (14.4 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB131	A-22	0.0	0.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	0.00	0.0	0.0
0.77	0.00	0.0	0.0
1.62	0.00	0.0	0.0
1.71	6.67	0.3	0.3
1.72	0.00	0.0	0.3
2.62	0.00	0.0	0.3

0x Infiltration Storage Chambers (0 m3)
0.09m Static Ponding Depth (0.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB137	A-19	6.8	5.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.99	0.00	0.0	6.9
2.30	32.26	5.0	11.9
2.31	0.00	0.2	12.1
2.99	0.00	0.0	12.1

EX-10x Infiltration Storage Chambers (6.8 m3)
0.31m Static Ponding Depth (5 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB14	A-04b	6.8	0.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.74	0.00	0.0	6.9
1.74	#DIV/0!	0.0	6.9
1.75	0.00	#DIV/0!	#DIV/0!
2.74	0.00	0.0	#DIV/0!

EX-10x Infiltration Storage Chambers (6.8 m3)
0m Static Ponding Depth (0 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB28	A-17f	6.8	177.4
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.80	0.00	0.0	6.9
2.22	844.76	177.4	184.3
2.23	0.00	4.2	188.5
2.80	0.00	0.0	188.5

EX-10x Infiltration Storage Chambers (6.8 m3)
0.42m Static Ponding Depth (177.4 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB30	A-17e	6.8	138.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.74	0.00	0.0	6.9
2.15	673.17	138.0	144.9
2.16	0.00	3.4	148.3
2.74	0.00	0.0	148.3

EX-10x Infiltration Storage Chambers (6.8 m3)
0.41m Static Ponding Depth (138 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB50	A-34b	6.8	104.4
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.97	0.00	0.0	6.9
2.21	870.00	104.4	111.3
2.22	0.00	4.3	115.6
2.97	0.00	0.0	115.6

EX-10x Infiltration Storage Chambers (6.8 m3)
0.24m Static Ponding Depth (104.4 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB52	A-34c	6.8	123.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.84	0.00	0.0	6.9
2.21	666.49	123.3	130.2
2.22	0.00	3.3	133.5
2.84	0.00	0.0	133.5

EX-10x Infiltration Storage Chambers (6.8 m3)
0.37m Static Ponding Depth (123.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB54	A-60	6.8	19.1
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.89	0.00	0.0	6.9
2.03	272.86	19.1	26.0
2.04	0.00	1.4	27.4
2.89	0.00	0.0	27.4

EX-10x Infiltration Storage Chambers (6.8 m3)
0.14m Static Ponding Depth (19.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB58	A-34a	6.8	66.5
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.89	0.00	0.0	6.9
2.11	604.55	66.5	73.4
2.12	0.00	3.0	76.4
2.89	0.00	0.0	76.4

EX-10x Infiltration Storage Chambers (6.8 m3)
0.22m Static Ponding Depth (66.5 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB60	A-28	0.0	26.1
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	0.00	0.0	0.0
0.77	0.00	0.0	0.0
1.54	0.00	0.0	0.0
1.75	248.57	26.1	26.1
1.76	0.00	1.2	27.3
2.54	0.00	0.0	27.3

0x Infiltration Storage Chambers (0 m3)
0.21m Static Ponding Depth (26.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB62	A-27	0.0	3.2
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	0.00	0.0	0.0
0.77	0.00	0.0	0.0
1.12	0.00	0.0	0.0
1.18	106.67	3.2	3.2
1.19	0.00	0.5	3.7
2.12	0.00	0.0	3.7

0x Infiltration Storage Chambers (0 m3)
0.06m Static Ponding Depth (3.2 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB64	A-32	6.8	10.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
2.00	0.00	0.0	6.9
2.10	206.00	10.3	17.2
2.11	0.00	1.0	18.2
3.00	0.00	0.0	18.2

EX-10x Infiltration Storage Chambers (6.8 m3)
0.1m Static Ponding Depth (10.3 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB72	A-23	0.0	0.6
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	0.00	0.0	0.0
0.77	0.00	0.0	0.0
2.48	0.00	0.0	0.0
2.65	7.06	0.6	0.6
2.66	0.00	0.0	0.6
3.48	0.00	0.0	0.6

0x Infiltration Storage Chambers (0 m3)
0.17m Static Ponding Depth (0.6 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB82	A-20	6.8	14.4
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.76	0.00	0.0	6.9
1.83	411.43	14.4	21.3
1.84	0.00	2.1	23.3
2.76	0.00	0.0	23.3

EX-10x Infiltration Storage Chambers (6.8 m3)
0.07m Static Ponding Depth (14.4 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB84	A-21	6.8	66.5
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
2.13	0.00	0.0	6.9
2.33	665.00	66.5	73.4
2.34	0.00	3.3	76.7
3.13	0.00	0.0	76.7

EX-10x Infiltration Storage Chambers (6.8 m3)
0.2m Static Ponding Depth (66.5 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB87	A-17a	6.8	113.2
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.75	0.00	0.0	6.9
2.15	566.00	113.2	120.1
2.16	0.00	2.8	122.9
2.75	0.00	0.0	122.9

EX-10x Infiltration Storage Chambers (6.8 m3)
0.4m Static Ponding Depth (113.2 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB90	A-17b	6.8	155.1
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.71	0.00	0.0	6.9
2.14	721.40	155.1	162.0
2.15	0.00	3.6	165.6
2.71	0.00	0.0	165.6

EX-10x Infiltration Storage Chambers (6.8 m3)
0.43m Static Ponding Depth (155.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB92	A-17c	6.8	69.5
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.72	0.00	0.0	6.9
2.01	479.31	69.5	76.4
2.02	0.00	2.4	78.8
2.72	0.00	0.0	78.8

EX-10x Infiltration Storage Chambers (6.8 m3)
0.29m Static Ponding Depth (69.5 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB95	A-25	6.8	16.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
1.80	0.00	0.0	6.9
2.10	106.67	16.0	22.9
2.11	0.00	0.5	23.4
2.80	0.00	0.0	23.4

EX-10x Infiltration Storage Chambers (6.8 m3)
0.3m Static Ponding Depth (16 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
EX-CB96	A-17d	6.8	70.6
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	17.89	6.8	6.8
0.77	0.00	0.1	6.9
2.03	0.00	0.0	6.9
2.23	706.00	70.6	77.5
2.24	0.00	3.5	81.0
3.03	0.00	0.0	81.0

EX-10x Infiltration Storage Chambers (6.8 m3)
0.2m Static Ponding Depth (70.6 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB01	A-45	6.3	46.8
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.04	0.00	0.0	6.4
1.27	406.96	46.8	53.2
1.28	0.00	2.0	55.2
2.04	0.00	0.0	55.2

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.23m Static Ponding Depth (46.8 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB02	A-47	6.3	26.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.00	0.00	0.0	6.4
1.20	260.00	26.0	32.4
1.21	0.00	1.3	33.7
2.00	0.00	0.0	33.7

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.2m Static Ponding Depth (26 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB03	A-46	6.3	39.6
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.00	0.00	0.0	6.4
1.25	316.80	39.6	46.0
1.26	0.00	1.6	47.6
2.00	0.00	0.0	47.6

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.25m Static Ponding Depth (39.6 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB04	A-48	6.3	65.4
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.00	0.00	0.0	6.4
1.25	523.20	65.4	71.8
1.26	0.00	2.6	74.4
2.00	0.00	0.0	74.4

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.25m Static Ponding Depth (65.4 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB05	A-49	6.3	52.4
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.00	0.00	0.0	6.4
1.25	419.20	52.4	58.8
1.26	0.00	2.1	60.9
2.00	0.00	0.0	60.9

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.25m Static Ponding Depth (52.4 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB06	A-52	8.4	17.1
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	22.11	8.4	8.4
0.77	0.00	0.1	8.5
1.00	0.00	0.0	8.5
1.15	228.00	17.1	25.6
1.16	0.00	1.1	26.8
2.00	0.00	0.0	26.8

4x Stormtech STC-740 Storage Chambers (8.4 m3)
0.15m Static Ponding Depth (17.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB07	A-53	8.4	24.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	22.11	8.4	8.4
0.77	0.00	0.1	8.5
1.09	0.00	0.0	8.5
1.29	243.00	24.3	32.8
1.30	0.00	1.2	34.0
2.09	0.00	0.0	34.0

4x Stormtech STC-740 Storage Chambers (8.4 m3)
0.2m Static Ponding Depth (24.3 m3)

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STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB08	A-57	16.9	40.9
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	44.47	16.9	16.9
0.77	0.00	0.2	17.1
1.00	0.00	0.0	17.1
1.25	327.20	40.9	58.0
1.26	0.00	1.6	59.7
2.00	0.00	0.0	59.7

8x Stormtech STC-740 Storage Chambers (16.9 m3)
0.25m Static Ponding Depth (40.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB09	A-58	21.2	46.2
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	55.79	21.2	21.2
0.77	0.00	0.3	21.5
1.00	0.00	0.0	21.5
1.25	369.60	46.2	67.7
1.26	0.00	1.8	69.5
2.00	0.00	0.0	69.5

10x Stormtech STC-740 Storage Chambers (21.2 m3)
0.25m Static Ponding Depth (46.2 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB10	A-55	21.2	50.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	55.79	21.2	21.2
0.77	0.00	0.3	21.5
1.20	0.00	0.0	21.5
1.45	402.40	50.3	71.8
1.46	0.00	2.0	73.8
2.20	0.00	0.0	73.8

10x Stormtech STC-740 Storage Chambers (21.2 m3)
0.25m Static Ponding Depth (50.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB11	A-63	38.1	55.0
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.00	0.00	0.0	38.6
1.20	550.00	55.0	93.6
1.21	0.00	2.8	96.4
2.00	0.00	0.0	96.4

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.2m Static Ponding Depth (55 m3)

STM ID	CB ID	Provided Storage

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STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB12	A-62	38.1	104.9
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.18	0.00	0.0	38.6
1.45	777.04	104.9	143.5
1.46	0.00	3.9	147.4
2.18	0.00	0.0	147.4

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.27m Static Ponding Depth (104.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB13	A-36	4.2	1.5
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	11.05	4.2	4.2
0.77	0.00	0.1	4.3
1.20	0.00	0.0	4.3
1.31	27.27	1.5	5.8
1.32	0.00	0.1	5.9
2.20	0.00	0.0	5.9

2x Stormtech STC-740 Storage Chambers (4.2 m3)
0.11m Static Ponding Depth (1.5 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB14	A-37	4.2	6.8
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	11.05	4.2	4.2
0.77	0.00	0.1	4.3
1.20	0.00	0.0	4.3
1.30	136.00	6.8	11.1
1.31	0.00	0.7	11.7
2.20	0.00	0.0	11.7

2x Stormtech STC-740 Storage Chambers (4.2 m3)
0.1m Static Ponding Depth (6.8 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB15	A-35	14.8	27.3
Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	38.95	14.8	14.8
0.77	0.00	0.2	15.0
1.20	0.00	0.0	15.0
1.40	273.00	27.3	42.3
1.41	0.00	1.4	43.7
2.20	0.00	0.0	43.7

7x Stormtech STC-740 Storage Chambers (14.8 m3)
0.2m Static Ponding Depth (27.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB16/17	A-18	106.0	113.8

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	278.95	106.0	106.0
0.77	0.00	1.4	107.4
1.26	0.00	0.0	107.4
1.56	758.67	113.8	221.2
1.57	0.00	3.8	225.0
2.26	0.00	0.0	225.0

50x Stormtech STC-740 Storage Chambers (106 m3)
0.3m Static Ponding Depth (113.8 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB18	**A-13**	**4.2**	**3.9**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	11.05	4.2	4.2
0.77	0.00	0.1	4.3
1.20	0.00	0.0	4.3
1.40	39.00	3.9	8.2
1.41	0.00	0.2	8.4
2.20	0.00	0.0	8.4

2x Stormtech STC-740 Storage Chambers (4.2 m3)
0.2m Static Ponding Depth (3.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB19	**A-05**	**12.7**	**5.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	33.42	12.7	12.7
0.77	0.00	0.2	12.9
1.40	0.00	0.0	12.9
1.60	57.00	5.7	18.6
1.61	0.00	0.3	18.9
2.40	0.00	0.0	18.9

6x Stormtech STC-740 Storage Chambers (12.7 m3)
0.2m Static Ponding Depth (5.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB20	**A-03**	**12.7**	**3.9**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	33.42	12.7	12.7
0.77	0.00	0.2	12.9
1.20	0.00	0.0	12.9
1.40	39.00	3.9	16.8
1.41	0.00	0.2	17.0
2.20	0.00	0.0	17.0

6x Stormtech STC-740 Storage Chambers (12.7 m3)
0.2m Static Ponding Depth (3.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB21	**A-14**	**27.5**	**23.3**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	72.37	27.5	27.5
0.77	0.00	0.4	27.9
1.20	0.00	0.0	27.9
1.40	233.00	23.3	51.2
1.41	0.00	1.2	52.3
2.20	0.00	0.0	52.3

13x Stormtech STC-740 Storage Chambers (27.5 m3)
0.2m Static Ponding Depth (23.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB22	**A-06**	**38.1**	**24.3**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.40	0.00	0.0	38.6
1.60	243.00	24.3	62.9
1.61	0.00	1.2	64.1
2.40	0.00	0.0	64.1

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.2m Static Ponding Depth (24.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB23	**A-02**	**38.1**	**21.0**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.20	0.00	0.0	38.6
1.40	210.00	21.0	59.6
1.41	0.00	1.1	60.7
2.20	0.00	0.0	60.7

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.2m Static Ponding Depth (21 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB24	**A-15**	**40.2**	**76.1**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	105.79	40.2	40.2
0.77	0.00	0.5	40.7
1.20	0.00	0.0	40.7
1.50	507.33	76.1	116.8
1.51	0.00	2.5	119.4
2.20	0.00	0.0	119.4

19x Stormtech STC-740 Storage Chambers (40.2 m3)
0.3m Static Ponding Depth (76.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB25	**A-07**	**42.4**	**71.9**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.41	0.00	0.0	43.0
1.71	479.33	71.9	114.9
1.72	0.00	2.4	117.3
2.41	0.00	0.0	117.3

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (71.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB26	**A-01**	**42.4**	**60.3**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.20	0.00	0.0	43.0
1.50	402.00	60.3	103.3
1.51	0.00	2.0	105.3
2.20	0.00	0.0	105.3

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (60.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB27	**A-09**	**38.1**	**75.2**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.39	0.00	0.0	38.6
1.69	501.33	75.2	113.8
1.70	0.00	2.5	116.3
2.39	0.00	0.0	116.3

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.3m Static Ponding Depth (75.2 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB28	**A-08**	**38.1**	**70.6**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.20	0.00	0.0	38.6
1.50	470.67	70.6	109.2
1.51	0.00	2.4	111.6
2.20	0.00	0.0	111.6

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.3m Static Ponding Depth (70.6 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB29	**A-43**	**48.7**	**38.7**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	128.16	48.7	48.7
0.77	0.00	0.6	49.3
1.20	0.00	0.0	49.3
1.50	258.00	38.7	88.0
1.51	0.00	1.3	89.3
2.20	0.00	0.0	89.3

23x Stormtech STC-740 Storage Chambers (48.7 m3)
0.3m Static Ponding Depth (38.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB30	**A-42**	**42.4**	**5.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.20	0.00	0.0	43.0
1.50	38.00	5.7	48.7
1.51	0.00	0.2	48.8
2.20	0.00	0.0	48.8

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (5.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB31	**A-41**	**42.4**	**28.4**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.39	0.00	0.0	43.0
1.69	189.33	28.4	71.4
1.70	0.00	0.9	72.3
2.39	0.00	0.0	72.3

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (28.4 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CB32	**A-39**	**42.4**	**0.5**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.50	0.00	0.0	43.0
1.65	6.67	0.5	43.5
1.66	0.00	0.0	43.5
2.50	0.00	0.0	43.5

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.15m Static Ponding Depth (0.5 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH104	**A-50**	**6.3**	**25.5**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	16.58	6.3	6.3
0.77	0.00	0.1	6.4
1.20	0.00	0.0	6.4
1.45	204.00	25.5	31.9
1.46	0.00	1.0	32.9
2.20	0.00	0.0	32.9

3x Stormtech STC-740 Storage Chambers (6.3 m3)
0.25m Static Ponding Depth (25.5 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH105	**A-51**	**8.4**	**29.1**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	22.11	8.4	8.4
0.77	0.00	0.1	8.5
1.19	0.00	0.0	8.5
1.42	253.04	29.1	37.6
1.43	0.00	1.3	38.9
2.19	0.00	0.0	38.9

4x Stormtech STC-740 Storage Chambers (8.4 m3)
0.23m Static Ponding Depth (29.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH106	**A-56**	**16.9**	**67.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	44.47	16.9	16.9
0.77	0.00	0.2	17.1
1.19	0.00	0.0	17.1
1.49	451.33	67.7	84.8
1.50	0.00	2.3	87.1
2.19	0.00	0.0	87.1

8x Stormtech STC-740 Storage Chambers (16.9 m3)
0.3m Static Ponding Depth (67.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH107	**A-59**	**21.2**	**46.9**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	55.79	21.2	21.2
0.77	0.00	0.3	21.5
1.19	0.00	0.0	21.5
1.44	375.20	46.9	68.4
1.45	0.00	1.9	70.3
2.19	0.00	0.0	70.3

10x Stormtech STC-740 Storage Chambers (21.2 m3)
0.25m Static Ponding Depth (46.9 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH108	**A-61**	**38.1**	**116.3**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.39	0.00	0.0	38.6
1.69	775.33	116.3	154.9
1.70	0.00	3.9	158.8
2.39	0.00	0.0	158.8

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.3m Static Ponding Depth (116.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH109	**A-33**	**31.8**	**49.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	83.68	31.8	31.8
0.77	0.00	0.4	32.2
1.50	0.00	0.0	32.2
1.70	497.00	49.7	81.9
1.71	0.00	2.5	84.4
2.50	0.00	0.0	84.4

15x Stormtech STC-740 Storage Chambers (31.8 m3)
0.2m Static Ponding Depth (49.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH110	**A-12**	**12.7**	**21.7**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	33.42	12.7	12.7
0.77	0.00	0.2	12.9
1.75	0.00	0.0	12.9
1.95	217.00	21.7	34.6
1.96	0.00	1.1	35.7
2.75	0.00	0.0	35.7

6x Stormtech STC-740 Storage Chambers (12.7 m3)
0.2m Static Ponding Depth (21.7 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH112	**A-11**	**38.1**	**24.1**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.59	0.00	0.0	38.6
1.79	241.00	24.1	62.7
1.80	0.00	1.2	63.9
2.59	0.00	0.0	63.9

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.2m Static Ponding Depth (24.1 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH114	**A-10**	**42.4**	**76.8**

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Depth (m)	Equivalent Area (m^2)	Incremental Volume (m^3)	Total Volume (m^3)
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.60	0.00	0.0	43.0
1.90	512.00	76.8	119.8
1.91	0.00	2.6	122.3
2.60	0.00	0.0	122.3

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (76.8 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH115	**A-16**	**38.1**	**69.3**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	100.26	38.1	38.1
0.77	0.00	0.5	38.6
1.71	0.00	0.0	38.6
2.01	462.00	69.3	107.9
2.02	0.00	2.3	110.2
2.71	0.00	0.0	110.2

18x Stormtech STC-740 Storage Chambers (38.1 m3)
0.3m Static Ponding Depth (69.3 m3)

STM ID	CB ID	Provided Storage	
		Underground	Surface
PR-CBMH118	**A-40**	**42.4**	**13.2**
Depth (m)	**Equivalent Area (m^2)**	**Incremental Volume (m^3)**	**Total Volume (m^3)**
0.00	0.00	0.0	0.0
0.76	111.58	42.4	42.4
0.77	0.00	0.6	43.0
1.56	0.00	0.0	43.0
1.86	88.00	13.2	56.2
1.87	0.00	0.4	56.6
2.56	0.00	0.0	56.6

20x Stormtech STC-740 Storage Chambers (42.4 m3)
0.3m Static Ponding Depth (13.2 m3)

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (ICD Sizes and Release Rates)

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Structure	ICD Size & Release Rates*									
	Tempest LMF ICD Model	Theoretical ICD Size in Model (m)	T/G Elev. (m)	Orifice Invert Elev. (m)	2-year		5-year		100-year	
					Head (m)	Peak Flow (L/s)	Head (m)	Peak Flow (L/s)	Head (m)	Peak Flow (L/s)
EX-CB117	79	0.055	114.35	112.09	1.92	7.3	2.02	7.6	2.26	8.2
EX-CB131	N/A	0.200	107.91	105.29	0.78	70.1	1.72	108.0	1.82	111.2
EX-CB137	N/A	0.055	114.39	112.00	2.26	8.2	2.27	8.2	2.35	8.4
EX-CB14	N/A	0.080	113.33	111.19	2.34	17.7	2.56	18.8	2.60	19.0
EX-CB60	86	0.055	114.69	112.15	1.66	8.2	1.72	8.4	1.77	8.5
EX-CB64	79	0.055	114.50	112.10	2.06	7.7	2.10	7.8	2.26	8.2
EX-CB72	N/A	0.090	114.66	111.18	0.28	8.3	0.57	12.4	1.75	22.5
EX-CB82	N/A	0.090	114.78	112.62	1.87	19.0	1.88	19.1	1.92	19.4
EX-CB84	N/A	0.090	114.65	112.12	2.18	21.3	2.21	21.5	2.28	22.0
EX-MH105	N/A	0.080	114.92	111.28	2.49	20.9	2.55	21.2	2.72	21.9
EX-MH112	85	0.055	114.88	112.15	1.71	8.2	1.75	8.3	1.90	8.6
PR-CB10	77	0.050	114.45	112.25	0.74	4.3	1.29	5.8	1.42	6.1
PR-CB13	78	0.050	114.55	112.35	0.75	4.5	1.27	5.9	1.37	6.2
PR-CB14	63	0.040	114.55	112.35	0.49	2.3	0.70	2.8	1.37	4.0
PR-CB16/17	93	0.060	114.35	112.09	0.86	7.0	1.43	9.0	1.65	9.7
PR-CB18	78	0.050	116.05	113.85	0.74	4.5	1.29	6.0	1.42	6.3
PR-CB21	78	0.050	116.20	114.00	0.99	5.2	1.33	6.1	1.42	6.3
PR-CB24	78	0.050	116.55	114.35	1.15	5.6	1.33	6.1	1.47	6.4
PR-CB29	93	0.060	113.70	111.50	0.72	6.2	1.36	8.7	1.53	9.2
PR-CB32	93	0.060	113.40	110.90	0.75	6.5	1.67	9.8	1.71	9.9
PR-CBMH104	101	0.065	114.50	112.30	0.87	8.2	1.22	9.8	1.31	10.1
PR-CBMH105	77	0.050	114.45	112.26	0.92	4.9	1.27	5.8	1.38	6.0
PR-CBMH106	78	0.050	114.50	112.31	0.95	5.1	1.28	6.0	1.40	6.2
PR-CBMH107	78	0.050	114.60	112.41	0.93	5.0	1.29	6.0	1.41	6.2
PR-CBMH108	93	0.060	114.60	112.21	1.11	7.8	1.48	9.1	1.59	9.4
PR-CBMH109	78	0.050	114.40	111.90	0.68	4.3	0.81	4.7	1.85	7.2
PR-CBMH110	76	0.050	116.05	113.30	0.97	4.9	1.29	5.7	1.96	7.1
PR-CBMH112	78	0.050	116.20	113.61	1.14	5.6	1.73	6.9	1.80	7.1
PR-CBMH114	78	0.050	116.55	113.95	1.15	5.6	1.73	6.9	1.89	7.2
PR-CBMH115	78	0.050	116.90	114.19	1.07	5.4	1.78	7.0	1.94	7.3
PR-CBMH118	93	0.060	113.40	110.84	1.06	7.8	1.81	10.2	1.90	10.4
PR-MH100	MHF 80	0.080	114.66	112.16	0.97	12.2	1.30	14.4	1.39	14.9
PR-TD01	MHF 82	0.080	113.80	112.65	0.25	6.2	0.39	8.0	0.82	12.0
PR-TD02	MHF 82	0.080	113.80	112.65	0.48	9.0	0.61	10.3	0.92	12.7

**From PCSWMM model (3-hour Chicago Storm).*

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Infiltration)

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CB ID	Drainage Area (ha)	Percent Imperv. (%)	MOE Treatment Criteria (m^3/ha)	MOE Treatment Volume (m^3)	Subcatchment Runoff Volume (m^3)		Node Depth (m)		Provided Storage Volume (m^3)
					5mm	15mm	5mm	15mm	
EX-CB116	0.075	100.0	44.2	3.3	2.7	2.7	0.48	0.64	6.7
EX-CB117	0.093	64.3	33.4	3.1	2.1	2.1	0.42	0.74	6.7
EX-CB128	0.102	52.8	30.0	3.1	1.9	1.9	0.40	1.06	6.7
EX-CB131	0.741	5.0	25.0	18.5	1.4	1.4	0.02	0.05	-
EX-CB137	0.276	67.4	34.4	9.5	6.6	6.6	0.63	2.09	6.7
EX-CB14	1.111	84.4	39.5	43.9	32.6	127.2	0.86	1.95	121.2
EX-CB28	0.280	93.7	42.3	11.8	9.3	9.3	0.65	1.14	6.7
EX-CB30	0.303	60.2	32.2	9.8	6.4	6.4	0.62	1.07	6.7
EX-CB50	0.252	100.0	44.2	11.1	8.9	8.9	0.65	1.99	6.7
EX-CB52	0.201	95.2	42.7	8.6	6.8	6.8	0.62	1.89	6.7
EX-CB54	0.113	63.5	33.2	3.7	2.6	2.6	0.46	1.82	6.7
EX-CB58	0.153	98.3	43.7	6.7	5.3	5.3	0.61	1.89	6.7
EX-CB60	0.121	85.6	39.8	4.8	3.6	3.6	0.13	1.55	-
EX-CB62	0.097	51.8	29.7	2.9	1.8	1.8	0.03	1.07	-
EX-CB64	0.115	85.7	39.9	4.6	3.5	3.5	0.55	0.76	6.7
EX-CB72	0.050	76.8	37.2	1.9	1.4	1.4	0.04	0.09	-
EX-CB82	0.397	95.6	42.9	17.0	13.3	13.3	0.68	1.80	6.7
EX-CB84	0.165	95.3	42.8	7.1	5.6	5.6	0.61	1.11	6.7
EX-CB87	0.217	54.2	30.4	6.6	4.2	4.2	0.59	1.07	6.7
EX-CB90	0.191	94.6	42.6	8.1	6.4	6.4	0.61	1.06	6.7
EX-CB92	0.250	64.5	33.5	8.4	5.7	5.7	0.61	1.08	6.7
EX-CB95	0.086	64.8	33.6	2.9	1.9	1.9	0.40	1.12	6.7
EX-CB96	0.229	98.4	43.7	10.0	7.9	7.9	0.63	1.35	6.7

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Infiltration)

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CB ID	Drainage Area (ha)	Percent Imperv. (%)	MOE Treatment Criteria (m^3/ha)	MOE Treatment Volume (m^3)	Subcatchment Runoff Volume (m^3)		Node Depth (m)		Provided Storage Volume (m^3)
					5mm	15mm	5mm	15mm	
PR-CB01	0.067	85.2	39.7	2.7	2.0	2.0	0.03	0.35	3.2
PR-CB02	0.042	87.6	40.4	1.7	1.3	1.3	0.03	0.32	3.2
PR-CB03	0.111	58.9	31.8	3.5	2.3	2.3	0.04	0.31	3.2
PR-CB04	0.089	98.2	43.6	3.9	3.1	3.1	0.04	0.31	3.2
PR-CB05	0.083	100.0	44.2	3.7	3.0	3.0	0.04	0.28	3.2
PR-CB06	0.073	77.5	37.4	2.7	2.0	2.0	0.03	0.31	4.1
PR-CB07	0.094	73.9	36.3	3.4	2.5	2.5	0.08	0.40	4.1
PR-CB08	0.103	100.0	44.2	4.6	3.7	3.7	0.04	0.32	7.7
PR-CB09	0.113	100.0	44.2	5.0	4.0	4.0	0.04	0.32	9.5
PR-CB10	0.148	86.3	40.0	5.9	4.5	4.5	0.12	0.42	9.5
PR-CB11	0.148	100.0	44.2	6.5	5.3	5.3	0.05	0.23	16.8
PR-CB12	0.199	100.0	44.2	8.8	7.1	7.1	0.07	0.41	16.8
PR-CB13	0.049	100.0	44.2	2.2	1.8	1.8	0.08	0.38	2.3
PR-CB14	0.057	39.4	25.9	1.5	0.8	0.8	0.05	0.23	2.3
PR-CB15	0.119	80.2	38.2	4.5	3.4	3.4	0.03	0.17	6.8
PR-CB16/17	0.583	77.4	37.4	21.8	15.2	15.2	0.16	0.43	45.8
PR-CB18	0.058	82.2	38.8	2.3	1.7	1.7	0.08	0.36	2.3
PR-CB19	0.065	86.1	40.0	2.6	2.0	2.0	0.04	0.21	5.9
PR-CB20	0.075	100.0	44.2	3.3	2.7	2.7	0.04	0.07	5.9
PR-CB21	0.167	100.0	44.2	7.4	5.9	5.9	0.14	0.44	12.3
PR-CB22	0.164	100.0	44.2	7.2	5.8	5.8	0.08	0.43	16.8
PR-CB23	0.214	100.0	44.2	9.5	7.5	7.5	0.05	0.23	16.8
PR-CB24	0.214	100.0	44.2	9.5	7.5	7.5	0.16	0.45	17.7
PR-CB25	0.177	100.0	44.2	7.8	6.2	6.2	0.09	0.43	18.6
PR-CB26	0.235	100.0	44.2	10.4	8.2	8.2	0.06	0.22	18.6
PR-CB27	0.159	100.0	44.2	7.0	5.6	5.6	0.06	0.31	16.8
PR-CB28	0.155	100.0	44.2	6.8	5.5	5.5	0.05	0.12	16.8
PR-CB29	0.266	94.3	42.5	11.3	8.8	8.8	0.13	0.42	21.3
PR-CB30	0.141	100.0	44.2	6.2	4.9	4.9	0.04	0.23	18.6
PR-CB31	0.169	100.0	44.2	7.5	5.9	5.9	0.08	0.42	18.6
PR-CB32	0.240	100.0	44.2	10.6	8.4	8.4	0.13	0.43	18.6

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Infiltration)

NOVATECH
Engineers, Planners & Landscape Architects

CB ID	Drainage Area (ha)	Percent Imperv. (%)	MOE Treatment Criteria (m^3/ha)	MOE Treatment Volume (m^3)	Subcatchment Runoff Volume (m^3)		Node Depth (m)		Provided Storage Volume (m^3)
					5mm	15mm	5mm	15mm	
PR-CBMH104	0.057	80.6	38.3	2.2	1.7	1.7	0.12	0.43	3.2
PR-CBMH105	0.061	70.0	35.1	2.1	1.5	1.5	0.18	0.50	4.1
PR-CBMH106	0.111	97.2	43.3	4.8	3.8	3.8	0.19	0.51	7.7
PR-CBMH107	0.128	100.0	44.2	5.7	4.6	4.6	0.20	0.51	9.5
PR-CBMH108	0.219	100.0	44.2	9.7	7.8	7.8	0.28	0.61	16.8
PR-CBMH109	0.240	72.6	35.9	8.6	6.2	6.2	0.20	0.47	14.1
PR-CBMH110	0.065	86.2	40.0	2.6	2.0	2.0	0.20	0.56	5.9
PR-CBMH112	0.166	100.0	44.2	7.3	5.8	5.8	0.27	0.62	16.8
PR-CBMH114	0.177	100.0	44.2	7.8	6.2	6.2	0.28	0.62	18.6
PR-CBMH115	0.155	100.0	44.2	6.8	5.4	5.4	0.27	0.63	16.8
PR-CBMH118	0.297	100.0	44.2	13.1	10.4	10.4	0.25	0.59	18.6
TOTAL	**11.871**	**82.8**	**39.6**	**469.8**	**346.0**	**440.6**	**-**	**-**	**740.9**

[*] *4-hour Chicago Storm.*

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Ponding)

NOVATECH
Engineers, Planners & Landscape Architects

CB / CBMH ID	Invert Elev. (m)	Rim Elev. (m)	Spill Elev. (m)	Ponding Depth (m)	HGL Elev. (m)[1]				Ponding Depth (m)				Spill Depth (m)			
					2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)
EX-CB116	112.39	113.50	113.60	0.10	113.43	113.51	113.78	113.82	0.00	0.01	0.28	0.32	0.00	0.00	0.18	0.22
EX-CB117	111.49	113.35	113.50	0.15	113.41	113.51	113.75	113.81	0.06	0.16	0.40	0.46	0.00	0.01	0.25	0.31
EX-CB128	111.91	113.73	114.00	0.27	113.78	113.83	114.01	114.04	0.05	0.10	0.28	0.31	0.00	0.00	0.01	0.04
EX-CB131	105.29	106.91	107.00	0.09	106.07	107.01	107.11	107.18	0.00	0.10	0.20	0.27	0.00	0.01	0.11	0.18
EX-CB137	111.40	113.39	113.70	0.31	113.66	113.67	113.75	113.87	0.27	0.28	0.36	0.48	0.00	0.00	0.05	0.17
EX-CB14	110.59	112.33	112.33	0.00	112.93	113.15	113.19	113.23	0.60	0.82	0.86	0.90	0.60	0.82	0.86	0.90
EX-CB28	111.83	113.63	114.05	0.42	113.78	113.84	114.00	114.03	0.15	0.21	0.37	0.40	0.00	0.00	0.00	0.00
EX-CB30	111.90	113.64	114.05	0.41	113.78	113.84	114.00	114.03	0.14	0.20	0.36	0.39	0.00	0.00	0.00	0.00
EX-CB50	111.74	113.71	113.95	0.24	113.86	113.90	114.07	114.08	0.15	0.19	0.36	0.37	0.00	0.00	0.12	0.13
EX-CB52	111.84	113.68	114.05	0.37	113.86	113.90	114.05	114.06	0.18	0.22	0.37	0.38	0.00	0.00	0.00	0.01
EX-CB54	111.92	113.81	113.95	0.14	113.86	113.90	114.05	114.06	0.05	0.09	0.24	0.25	0.00	0.00	0.10	0.11
EX-CB58	111.84	113.73	113.95	0.22	113.86	113.90	114.09	114.09	0.13	0.17	0.36	0.36	0.00	0.00	0.14	0.14
EX-CB60	112.15	113.69	113.90	0.21	113.81	113.87	113.92	113.96	0.12	0.18	0.23	0.27	0.00	0.00	0.02	0.06
EX-CB62	112.64	113.76	113.82	0.06	113.81	113.87	113.93	113.96	0.05	0.11	0.17	0.20	0.00	0.05	0.11	0.14
EX-CB64	111.50	113.50	113.60	0.10	113.56	113.60	113.76	113.81	0.06	0.10	0.26	0.31	0.00	0.00	0.16	0.21
EX-CB72	111.18	113.66	113.83	0.17	111.46	111.75	112.93	113.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
EX-CB82	112.02	113.78	113.85	0.07	113.89	113.90	113.94	113.97	0.11	0.12	0.16	0.19	0.04	0.05	0.09	0.12
EX-CB84	111.52	113.65	113.85	0.20	113.70	113.73	113.80	113.82	0.05	0.08	0.15	0.17	0.00	0.00	0.00	0.00
EX-CB87	111.90	113.65	114.05	0.40	113.77	113.83	114.00	114.01	0.12	0.18	0.35	0.36	0.00	0.00	0.00	0.00
EX-CB90	111.91	113.62	114.05	0.43	113.77	113.83	114.00	114.01	0.15	0.21	0.38	0.39	0.00	0.00	0.00	0.00
EX-CB92	111.89	113.61	113.90	0.29	113.78	113.83	114.01	114.04	0.17	0.22	0.40	0.43	0.00	0.00	0.11	0.14
EX-CB95	111.85	113.65	113.95	0.30	113.78	113.83	114.02	114.05	0.13	0.18	0.37	0.40	0.00	0.00	0.07	0.10
EX-CB96	111.62	113.65	113.85	0.20	113.78	113.83	114.01	114.04	0.13	0.18	0.36	0.39	0.00	0.00	0.16	0.19

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Ponding)

NOVATECH
Engineers, Planners & Landscape Architects

CB / CBMH ID	Invert Elev. (m)	Rim Elev. (m)	Spill Elev. (m)	Ponding Depth (m)	HGL Elev. (m)[1]				Ponding Depth (m)				Spill Depth (m)			
					2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)
PR-CB01	112.36	113.40	113.63	0.23	113.13	113.46	113.55	113.59	0.00	0.06	0.15	0.19	0.00	0.00	0.00	0.00
PR-CB02	112.40	113.40	113.60	0.20	113.13	113.46	113.55	113.59	0.00	0.06	0.15	0.19	0.00	0.00	0.00	0.00
PR-CB03	112.40	113.40	113.65	0.25	113.13	113.46	113.55	113.60	0.00	0.06	0.15	0.20	0.00	0.00	0.00	0.00
PR-CB04	112.40	113.40	113.65	0.25	113.13	113.46	113.55	113.59	0.00	0.06	0.15	0.19	0.00	0.00	0.00	0.00
PR-CB05	112.45	113.45	113.70	0.25	113.17	113.52	113.62	113.65	0.00	0.07	0.17	0.20	0.00	0.00	0.00	0.00
PR-CB06	112.45	113.45	113.60	0.15	113.18	113.53	113.67	113.72	0.00	0.08	0.22	0.27	0.00	0.00	0.07	0.12
PR-CB07	112.36	113.45	113.65	0.20	113.18	113.53	113.64	113.71	0.00	0.08	0.19	0.26	0.00	0.00	0.00	0.06
PR-CB08	112.50	113.50	113.75	0.25	113.26	113.59	113.71	113.75	0.00	0.09	0.21	0.25	0.00	0.00	0.00	0.00
PR-CB09	112.60	113.60	113.85	0.25	113.34	113.70	113.82	113.85	0.00	0.10	0.22	0.25	0.00	0.00	0.00	0.00
PR-CB10	112.25	113.45	113.70	0.25	112.99	113.54	113.67	113.70	0.00	0.09	0.22	0.25	0.00	0.00	0.00	0.00
PR-CB11	112.60	113.60	113.80	0.20	113.32	113.70	113.80	113.81	0.00	0.10	0.20	0.21	0.00	0.00	0.00	0.01
PR-CB12	112.42	113.60	113.87	0.27	113.32	113.70	113.81	113.83	0.00	0.10	0.21	0.23	0.00	0.00	0.00	0.00
PR-CB13	112.35	113.55	113.66	0.11	113.10	113.62	113.72	113.80	0.00	0.07	0.17	0.25	0.00	0.00	0.06	0.14
PR-CB14	112.35	113.55	113.65	0.10	112.84	113.05	113.72	113.79	0.00	0.00	0.17	0.24	0.00	0.00	0.07	0.14
PR-CB15	112.20	113.40	113.60	0.20	112.58	112.71	113.72	113.79	0.00	0.00	0.32	0.39	0.00	0.00	0.12	0.19
PR-CB16/17	112.09	113.35	113.65	0.30	112.95	113.52	113.74	113.81	0.00	0.17	0.39	0.46	0.00	0.00	0.09	0.16
PR-CB18	113.85	115.05	115.25	0.20	114.59	115.14	115.27	115.29	0.00	0.09	0.22	0.24	0.00	0.00	0.02	0.04
PR-CB19	113.65	115.05	115.25	0.20	114.27	114.59	115.26	115.28	0.00	0.00	0.21	0.23	0.00	0.00	0.01	0.03
PR-CB20	113.85	115.05	115.25	0.20	114.27	114.59	115.27	115.29	0.00	0.00	0.22	0.24	0.00	0.00	0.02	0.04
PR-CB21	114.00	115.20	115.40	0.20	114.99	115.33	115.42	115.43	0.00	0.13	0.22	0.23	0.00	0.00	0.02	0.03
PR-CB22	113.80	115.20	115.40	0.20	114.75	115.35	115.42	115.44	0.00	0.15	0.22	0.24	0.00	0.00	0.02	0.04
PR-CB23	114.00	115.20	115.40	0.20	114.75	115.35	115.42	115.44	0.00	0.15	0.22	0.24	0.00	0.00	0.02	0.04
PR-CB24	114.35	115.55	115.85	0.30	115.50	115.68	115.82	115.85	0.00	0.13	0.27	0.30	0.00	0.00	0.00	0.00
PR-CB25	114.14	115.55	115.85	0.30	115.10	115.68	115.84	115.85	0.00	0.13	0.29	0.30	0.00	0.00	0.00	0.00
PR-CB26	114.35	115.55	115.85	0.30	115.10	115.68	115.84	115.85	0.00	0.13	0.29	0.30	0.00	0.00	0.00	0.00
PR-CB27	114.51	115.90	116.20	0.30	115.26	115.97	116.13	116.19	0.00	0.07	0.23	0.29	0.00	0.00	0.00	0.00
PR-CB28	114.70	115.90	116.20	0.30	115.26	115.97	116.14	116.19	0.00	0.07	0.24	0.29	0.00	0.00	0.00	0.00
PR-CB29	111.50	112.70	113.00	0.30	112.22	112.86	113.03	113.06	0.00	0.16	0.33	0.36	0.00	0.00	0.03	0.06
PR-CB30	111.20	112.40	112.70	0.30	111.91	112.65	112.72	112.73	0.00	0.25	0.32	0.33	0.00	0.00	0.02	0.03
PR-CB31	111.01	112.40	112.70	0.30	111.91	112.65	112.73	112.74	0.00	0.25	0.33	0.34	0.00	0.00	0.03	0.04
PR-CB32	110.90	112.40	112.55	0.15	111.65	112.57	112.61	112.62	0.00	0.17	0.21	0.22	0.00	0.02	0.06	0.07

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Results (Ponding)

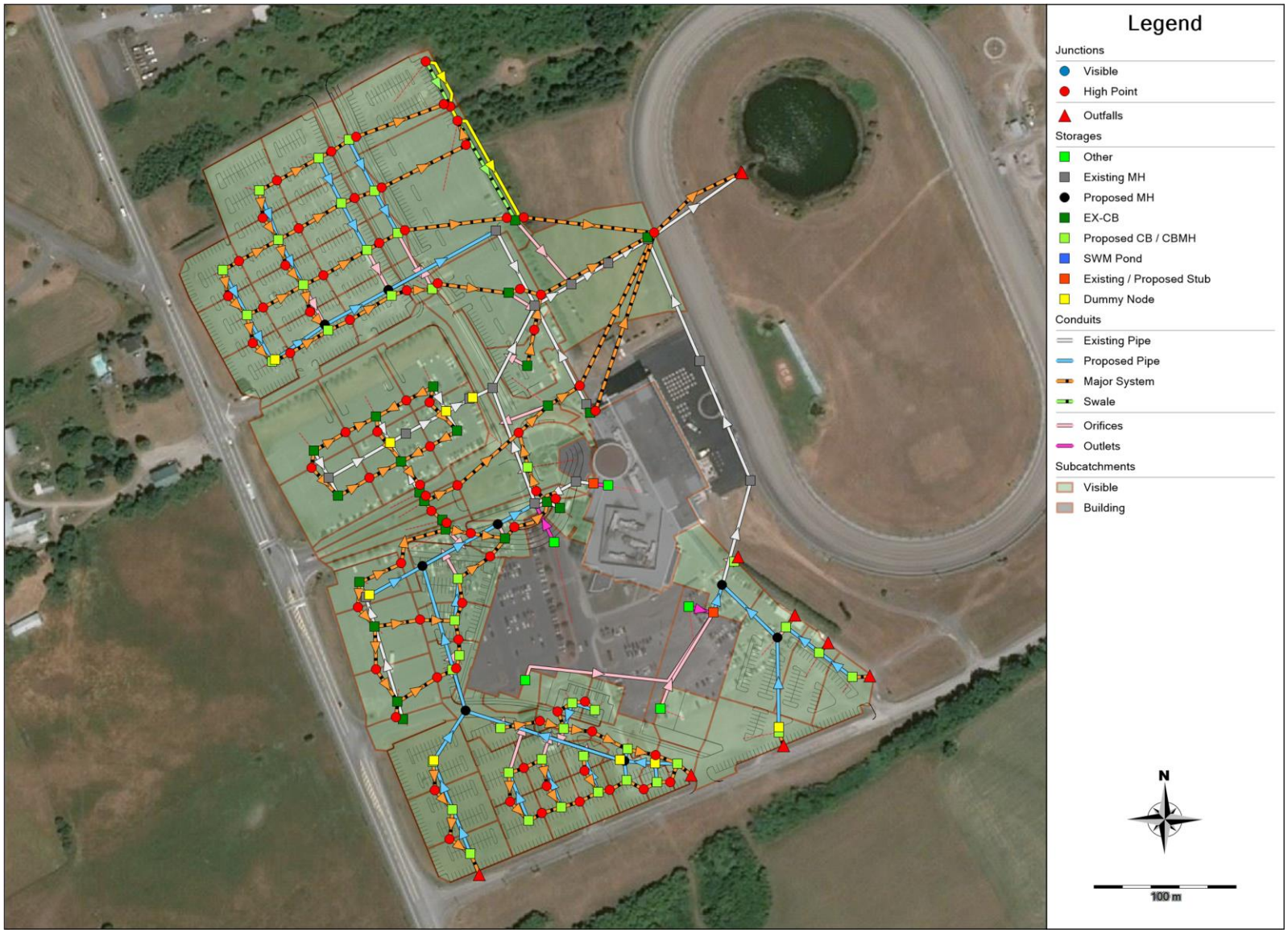
NOVATECH
Engineers, Planners & Landscape Architects

CB / CBMH ID	Invert Elev. (m)	Rim Elev. (m)	Spill Elev. (m)	Ponding Depth (m)	HGL Elev. (m)[1]				Ponding Depth (m)				Spill Depth (m)			
					2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)	2-yr	5-yr	100-yr	100-yr (+20%)
PR-CBMH104	112.30	113.50	113.75	0.25	113.17	113.52	113.61	113.65	0.00	0.02	0.11	0.15	0.00	0.00	0.00	0.00
PR-CBMH105	112.26	113.45	113.68	0.23	113.18	113.53	113.64	113.70	0.00	0.08	0.19	0.25	0.00	0.00	0.00	0.02
PR-CBMH106	112.31	113.50	113.80	0.30	113.26	113.59	113.71	113.75	0.00	0.09	0.21	0.25	0.00	0.00	0.00	0.00
PR-CBMH107	112.41	113.60	113.85	0.25	113.34	113.70	113.82	113.85	0.00	0.10	0.22	0.25	0.00	0.00	0.00	0.00
PR-CBMH108	112.21	113.60	113.90	0.30	113.32	113.69	113.80	113.83	0.00	0.09	0.20	0.23	0.00	0.00	0.00	0.00
PR-CBMH109	111.90	113.40	113.60	0.20	112.58	112.71	113.75	113.81	0.00	0.00	0.35	0.41	0.00	0.00	0.15	0.21
PR-CBMH110	113.30	115.05	115.25	0.20	114.27	114.59	115.26	115.29	0.00	0.00	0.21	0.24	0.00	0.00	0.01	0.04
PR-CBMH112	113.61	115.20	115.40	0.20	114.75	115.34	115.41	115.43	0.00	0.14	0.21	0.23	0.00	0.00	0.01	0.03
PR-CBMH114	113.95	115.55	115.85	0.30	115.10	115.68	115.84	115.85	0.00	0.13	0.29	0.30	0.00	0.00	0.00	0.00
PR-CBMH115	114.19	115.90	116.20	0.30	115.26	115.97	116.13	116.18	0.00	0.07	0.23	0.28	0.00	0.00	0.00	0.00
PR-CBMH118	110.84	112.40	112.70	0.30	111.90	112.65	112.74	112.74	0.00	0.25	0.34	0.34	0.00	0.00	0.04	0.04

[1] *3-hour Chicago Storm.*

4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Schematics

Overall Model Schematic



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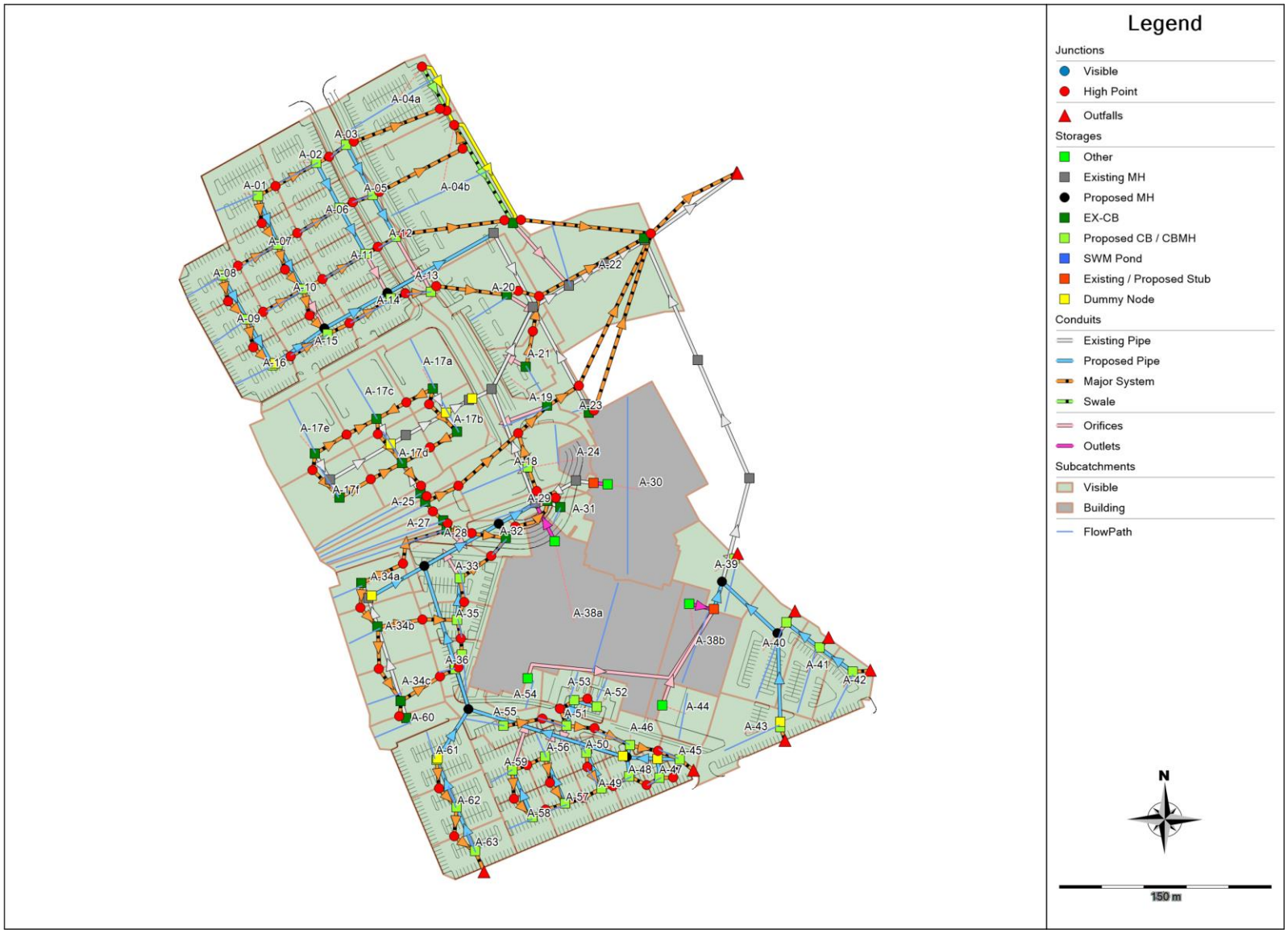
4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Schematics

Subcatchments and Flow Paths



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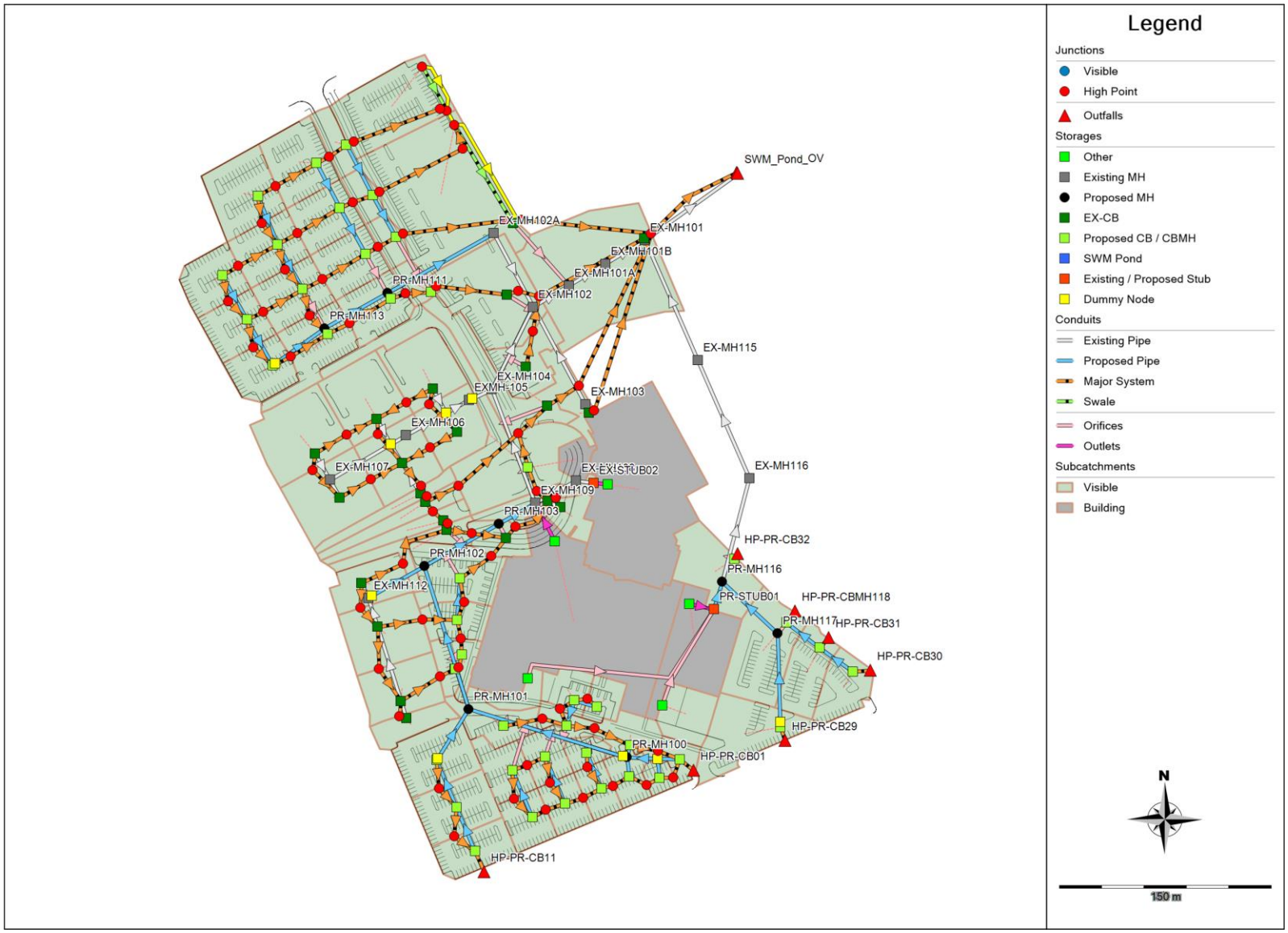
4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Schematics

Manholes and Outfalls



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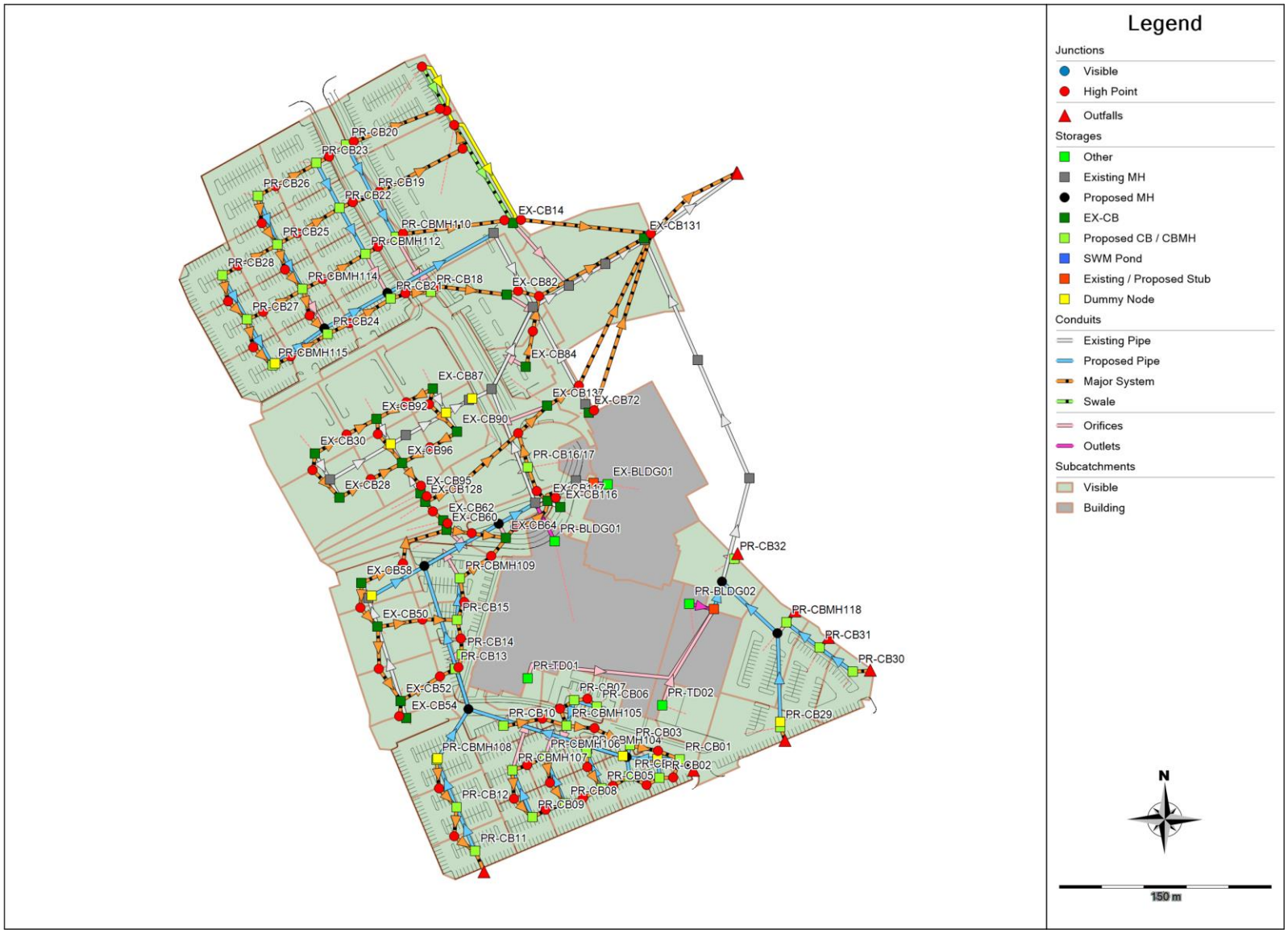
4837 Albion Road - Hard Rock Ottawa (116111)
PCSWMM Model Schematics

Catchbasins



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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
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WARNING 08: elevation drop exceeds length for Conduit C134
WARNING 08: elevation drop exceeds length for Conduit C135
WARNING 08: elevation drop exceeds length for Conduit C136
WARNING 08: elevation drop exceeds length for Conduit C85

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 72
Number of nodes ........... 189
Number of links ........... 258
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------
Design_Storms        C3hr-2yr                    INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------
A-01                        0.23     76.70    100.00    1.5000 Design_Storms        PR-CB26
A-02                        0.21     71.73    100.00    1.5000 Design_Storms        PR-CB23
A-03                        0.07     60.92    100.00    1.5000 Design_Storms        PR-CB20
A-04a                       0.35     45.70     82.40    1.5000 Design_Storms        SWALE01
A-04b                       0.76    100.29     85.30    1.5000 Design_Storms        SWALE03
A-05                        0.07     43.97     86.10    1.5000 Design_Storms        PR-CB19
A-06                        0.16     50.64    100.00    1.5000 Design_Storms        PR-CB22
A-07                        0.18     59.63    100.00    1.5000 Design_Storms        PR-CB25
A-08                        0.15     53.71    100.00    1.5000 Design_Storms        PR-CB28
A-09                        0.16     52.47    100.00    1.5000 Design_Storms        PR-CB27
A-10                        0.18     58.88    100.00    1.5000 Design_Storms        PR-CBMH114
A-11                        0.17     48.29    100.00    1.5000 Design_Storms        PR-CBMH112
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A-12                        0.07     48.98     86.20    1.5000 Design_Storms        PR-CBMH110
A-13                        0.06     34.39     82.20    1.5000 Design_Storms        PR-CB18
A-14                        0.17     50.57    100.00    1.5000 Design_Storms        PR-CB21
A-15                        0.21     73.44    100.00    1.5000 Design_Storms        PR-CB24
A-16                        0.15     51.71    100.00    1.5000 Design_Storms        PR-CBMH115
A-17a                       0.22     56.40     54.20    1.5000 Design_Storms        EX-CB87
A-17b                       0.19     74.86     94.60    1.5000 Design_Storms        EX-CB90
A-17c                       0.25     61.38     64.50    1.5000 Design_Storms        EX-CB92
A-17d                       0.23     88.92     98.40    1.5000 Design_Storms        EX-CB96
A-17e                       0.30     72.25     60.20    1.5000 Design_Storms        EX-CB30
A-17f                       0.28    112.29     93.70    1.5000 Design_Storms        EX-CB28
A-18                        0.53     75.00     75.00    1.5000 Design_Storms        PR-CB16/17
A-19                        0.28     78.03     67.40    1.5000 Design_Storms        EX-CB137
A-20                        0.40    128.72     95.60    1.5000 Design_Storms        EX-CB82
A-21                        0.17     80.91     95.30    1.5000 Design_Storms        EX-CB84
A-22                        0.74    163.32      5.00    1.5000 Design_Storms        EX-CB131
A-23                        0.05     49.54     76.80    1.5000 Design_Storms        EX-CB72
A-24                        0.06     25.00    100.00    1.5000 Design_Storms        PR-CB16/17
A-25                        0.09     10.18     64.80    1.5000 Design_Storms        EX-CB95
A-26                        0.10     12.08     52.80    1.5000 Design_Storms        EX-CB128
A-27                        0.10     10.94     51.80    1.5000 Design_Storms        EX-CB62
A-28                        0.12     14.97     85.60    1.5000 Design_Storms        EX-CB60
A-29                        0.09     30.39     64.30    1.5000 Design_Storms        EX-CB117
A-30                        0.86     69.11    100.00    1.5000 Design_Storms        EX-BLDG01
A-31                        0.07     68.77    100.00    1.5000 Design_Storms        EX-CB116
A-32                        0.12     77.79     85.70    1.5000 Design_Storms        EX-CB64
A-33                        0.24    120.16     72.60    1.5000 Design_Storms        PR-CBMH109
A-34a                       0.15     70.62     98.30    1.5000 Design_Storms        EX-CB58
A-34b                       0.25    106.62    100.00    1.5000 Design_Storms        EX-CB50
A-34c                       0.20     80.84     95.20    1.5000 Design_Storms        EX-CB52
A-35                        0.12     92.27     80.20    1.5000 Design_Storms        PR-CB15
A-36                        0.05     43.63    100.00    1.5000 Design_Storms        PR-CB13
A-37                        0.06     22.53     39.40    1.5000 Design_Storms        PR-CB14
A-38a                       1.16    176.30    100.00    1.5000 Design_Storms        PR-BLDG01
A-38b                       0.31     58.98    100.00    1.5000 Design_Storms        PR-BLDG02
A-39                        0.24     65.90    100.00    1.5000 Design_Storms        PR-CB32
A-40                        0.30     57.23    100.00    1.5000 Design_Storms        PR-CBMH118
A-41                        0.17     36.68    100.00    1.5000 Design_Storms        PR-CB31
A-42                        0.14     40.60    100.00    1.5000 Design_Storms        PR-CB30
A-43                        0.27     62.34     94.30    1.5000 Design_Storms        PR-CB29
A-44                        0.14     42.87     78.90    1.5000 Design_Storms        PR-TD02
A-45                        0.07     45.11     85.20    1.5000 Design_Storms        PR-CB01
A-46                        0.11     43.34     58.90    1.5000 Design_Storms        PR-CB03
A-47                        0.04     39.35     87.60    1.5000 Design_Storms        PR-CB02
A-48                        0.09     73.50     98.20    1.5000 Design_Storms        PR-CB04
A-49                        0.08     51.59    100.00    1.5000 Design_Storms        PR-CB05
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A-50	0.06	49.35	80.60	1.5000	Design_Storms	PR-CBMH104
A-51	0.06	30.69	70.00	1.5000	Design_Storms	PR-CBMH105
A-52	0.07	46.01	77.50	1.5000	Design_Storms	PR-CB06
A-53	0.09	49.85	73.90	1.5000	Design_Storms	PR-CB07
A-54	0.06	31.84	62.20	1.5000	Design_Storms	PR-TD01
A-55	0.15	51.45	86.30	1.5000	Design_Storms	PR-CB10
A-56	0.11	64.62	97.20	1.5000	Design_Storms	PR-CBMH106
A-57	0.10	80.22	100.00	1.5000	Design_Storms	PR-CB08
A-58	0.11	63.58	100.00	1.5000	Design_Storms	PR-CB09
A-59	0.13	74.47	100.00	1.5000	Design_Storms	PR-CBMH107
A-60	0.11	40.77	63.50	1.5000	Design_Storms	EX-CB54
A-61	0.22	112.45	100.00	1.5000	Design_Storms	PR-CBMH108
A-62	0.20	126.81	100.00	1.5000	Design_Storms	PR-CB12
A-63	0.15	99.64	100.00	1.5000	Design_Storms	PR-CB11

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HP-01	JUNCTION	114.00	1.00	0.0	
HP-02	JUNCTION	114.05	1.00	0.0	
HP-03	JUNCTION	114.10	1.00	0.0	
HP-05	JUNCTION	113.75	1.00	0.0	
HP-EX-CB116	JUNCTION	113.60	1.00	0.0	
HP-EX-CB117	JUNCTION	113.50	1.00	0.0	
HP-EX-CB128	JUNCTION	114.00	1.00	0.0	
HP-EX-CB131	JUNCTION	107.00	1.00	0.0	
HP-EX-CB137	JUNCTION	113.70	1.00	0.0	
HP-EX-CB14	JUNCTION	113.15	1.00	0.0	
HP-EX-CB28	JUNCTION	114.05	1.00	0.0	
HP-EX-CB30a	JUNCTION	113.90	1.00	0.0	
HP-EX-CB30b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB50a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB50b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB52	JUNCTION	114.05	1.00	0.0	
HP-EX-CB54	JUNCTION	113.95	1.00	0.0	
HP-EX-CB58a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB58b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB60	JUNCTION	113.90	1.00	0.0	
HP-EX-CB62	JUNCTION	113.82	1.00	0.0	
HP-EX-CB64	JUNCTION	113.60	1.00	0.0	
HP-EX-CB72	JUNCTION	113.83	1.00	0.0	
HP-EX-CB82	JUNCTION	113.85	1.00	0.0	
HP-EX-CB84	JUNCTION	113.85	1.00	0.0	
HP-EX-CB87a	JUNCTION	114.05	1.00	0.0	
HP-EX-CB87b	JUNCTION	113.90	1.00	0.0	
HP-EX-CB90	JUNCTION	114.05	1.00	0.0	
HP-EX-CB92	JUNCTION	113.90	1.00	0.0	
HP-EX-CB95a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB95b	JUNCTION	114.00	1.00	0.0	
HP-EX-CB96	JUNCTION	113.85	1.00	0.0	
HP-PR-CB02	JUNCTION	113.60	1.00	0.0	
HP-PR-CB03	JUNCTION	113.65	1.00	0.0	
HP-PR-CB04	JUNCTION	113.65	1.00	0.0	
HP-PR-CB05	JUNCTION	113.70	1.00	0.0	
HP-PR-CB06	JUNCTION	113.60	1.00	0.0	
HP-PR-CB07	JUNCTION	113.65	1.00	0.0	
HP-PR-CB08	JUNCTION	113.75	1.00	0.0	
HP-PR-CB09	JUNCTION	113.85	1.00	0.0	
HP-PR-CB10	JUNCTION	113.70	1.00	0.0	
HP-PR-CB12	JUNCTION	113.87	1.00	0.0	
HP-PR-CB13	JUNCTION	113.66	1.00	0.0	
HP-PR-CB14	JUNCTION	113.65	1.00	0.0	
HP-PR-CB15	JUNCTION	113.60	1.00	0.0	
HP-PR-CB16/17	JUNCTION	113.65	1.00	0.0	
HP-PR-CB18	JUNCTION	115.25	1.00	0.0	
HP-PR-CB19	JUNCTION	115.25	1.00	0.0	
HP-PR-CB20	JUNCTION	115.25	1.00	0.0	
HP-PR-CB21	JUNCTION	115.40	1.00	0.0	
HP-PR-CB22	JUNCTION	115.40	1.00	0.0	
HP-PR-CB23	JUNCTION	115.40	1.00	0.0	
HP-PR-CB24	JUNCTION	115.85	1.00	0.0	
HP-PR-CB25a	JUNCTION	115.85	1.00	0.0	
HP-PR-CB25b	JUNCTION	115.85	1.00	0.0	
HP-PR-CB26a	JUNCTION	115.85	1.00	0.0	
HP-PR-CB26b	JUNCTION	115.85	1.00	0.0	
HP-PR-CB27a	JUNCTION	116.20	1.00	0.0	
HP-PR-CB27b	JUNCTION	116.20	1.00	0.0	
HP-PR-CB28a	JUNCTION	116.20	1.00	0.0	
HP-PR-CB28b	JUNCTION	116.20	1.00	0.0	
HP-PR-CBMH104	JUNCTION	113.75	1.00	0.0	
HP-PR-CBMH105	JUNCTION	113.68	1.00	0.0	
HP-PR-CBMH106	JUNCTION	113.80	1.00	0.0	
HP-PR-CBMH107a	JUNCTION	113.85	1.00	0.0	
HP-PR-CBMH107b	JUNCTION	113.85	1.00	0.0	
HP-PR-CBMH108	JUNCTION	113.90	1.00	0.0	
HP-PR-CBMH109	JUNCTION	113.60	1.00	0.0	
HP-PR-CBMH110	JUNCTION	115.25	1.00	0.0	
HP-PR-CBMH112	JUNCTION	115.40	1.00	0.0	

HP-PR-CBMH114a	JUNCTION	115.85	1.00	0.0
HP-PR-CBMH114b	JUNCTION	115.85	1.00	0.0
HP-PR-CBMH115	JUNCTION	116.20	1.00	0.0
SWALE01	JUNCTION	113.60	1.00	0.0
SWALE02	JUNCTION	113.26	1.00	0.0
SWALE03	JUNCTION	113.15	1.00	0.0
HP-PR-CB01	OUTFALL	113.63	1.00	0.0
HP-PR-CB11	OUTFALL	113.80	1.00	0.0
HP-PR-CB29	OUTFALL	113.00	1.00	0.0
HP-PR-CB30	OUTFALL	112.70	1.00	0.0
HP-PR-CB31	OUTFALL	112.70	1.00	0.0
HP-PR-CB32	OUTFALL	112.55	1.00	0.0
HP-PR-CBMH118	OUTFALL	112.70	1.00	0.0
SWM_Pond	OUTFALL	102.95	0.75	0.0
SWM_Pond_OV	OUTFALL	106.00	1.00	0.0
EX-BLDG01	STORAGE	120.00	1.00	0.0
EX-CB116	STORAGE	112.39	2.11	0.0
EX-CB117	STORAGE	111.49	2.86	0.0
EX-CB128	STORAGE	111.91	2.82	0.0
EX-CB131	STORAGE	105.29	2.62	0.0
EX-CB137	STORAGE	111.40	2.99	0.0
EX-CB14	STORAGE	110.59	2.74	0.0
EX-CB28	STORAGE	111.83	2.80	0.0
EX-CB30	STORAGE	111.90	2.74	0.0
EX-CB50	STORAGE	111.74	2.97	0.0
EX-CB52	STORAGE	111.84	2.84	0.0
EX-CB54	STORAGE	111.92	2.89	0.0
EX-CB58	STORAGE	111.84	2.89	0.0
EX-CB60	STORAGE	112.15	2.54	0.0
EX-CB62	STORAGE	112.64	2.12	0.0
EX-CB64	STORAGE	111.50	3.00	0.0
EX-CB72	STORAGE	111.18	3.48	0.0
EX-CB82	STORAGE	112.02	2.76	0.0
EX-CB84	STORAGE	111.52	3.13	0.0
EX-CB87	STORAGE	111.90	2.75	0.0
EX-CB90	STORAGE	111.91	2.71	0.0
EX-CB92	STORAGE	111.89	2.72	0.0
EX-CB95	STORAGE	111.85	2.80	0.0
EX-CB96	STORAGE	111.62	3.03	0.0
EX-MH101	STORAGE	104.57	2.34	0.0
EX-MH101A	STORAGE	107.18	4.98	0.0
EX-MH101B	STORAGE	105.33	5.08	0.0
EX-MH102	STORAGE	109.38	4.65	0.0
EX-MH102A	STORAGE	112.42	1.78	0.0
EX-MH103	STORAGE	110.71	2.29	0.0
EX-MH104	STORAGE	110.65	3.21	0.0
EXMH-105	STORAGE	111.28	3.64	0.0
EXMH-105a	STORAGE	111.28	2.64	0.0
EX-MH106	STORAGE	112.15	2.70	0.0
EX-MH106a	STORAGE	111.71	3.14	0.0
EX-MH107	STORAGE	112.35	2.47	0.0
EX-MH107a	STORAGE	112.19	2.63	0.0
EX-MH108	STORAGE	111.32	2.34	0.0
EX-MH109	STORAGE	110.98	2.55	0.0
EX-MH112	STORAGE	112.15	2.73	0.0
EX-MH112a	STORAGE	112.15	1.73	0.0
EX-MH115	STORAGE	105.05	1.82	0.0
EX-MH116	STORAGE	105.50	1.37	0.0
EX-STUB02	STORAGE	111.38	2.28	0.0
PR-BLDG01	STORAGE	120.00	1.00	0.0
PR-BLDG02	STORAGE	120.00	1.00	0.0
PR-CB01	STORAGE	112.36	2.04	0.0
PR-CB02	STORAGE	112.40	2.00	0.0
PR-CB02a	STORAGE	112.28	2.12	0.0
PR-CB03	STORAGE	112.40	2.00	0.0
PR-CB04	STORAGE	112.40	2.00	0.0
PR-CB05	STORAGE	112.45	2.00	0.0
PR-CB06	STORAGE	112.45	2.00	0.0
PR-CB07	STORAGE	112.36	2.09	0.0
PR-CB08	STORAGE	112.50	2.00	0.0
PR-CB09	STORAGE	112.60	2.00	0.0
PR-CB10	STORAGE	112.25	2.20	0.0
PR-CB11	STORAGE	112.60	2.00	0.0
PR-CB12	STORAGE	112.42	2.18	0.0
PR-CB13	STORAGE	112.35	2.20	0.0
PR-CB14	STORAGE	112.35	2.20	0.0
PR-CB15	STORAGE	112.20	2.20	0.0
PR-CB16/17	STORAGE	112.09	2.26	0.0
PR-CB18	STORAGE	113.85	2.20	0.0
PR-CB19	STORAGE	113.65	2.40	0.0
PR-CB20	STORAGE	113.85	2.20	0.0
PR-CB21	STORAGE	114.00	2.20	0.0
PR-CB22	STORAGE	113.80	2.40	0.0
PR-CB23	STORAGE	114.00	2.20	0.0
PR-CB24	STORAGE	114.35	2.20	0.0
PR-CB25	STORAGE	114.14	2.41	0.0
PR-CB26	STORAGE	114.35	2.20	0.0
PR-CB27	STORAGE	114.51	2.39	0.0
PR-CB28	STORAGE	114.70	2.20	0.0
PR-CB29	STORAGE	111.50	2.20	0.0
PR-CB29a	STORAGE	111.50	2.20	0.0
PR-CB30	STORAGE	111.20	2.20	0.0

PR-CB31	STORAGE	111.01	2.39	0.0
PR-CB32	STORAGE	110.90	2.50	0.0
PR-CBMH104	STORAGE	112.30	2.20	0.0
PR-CBMH105	STORAGE	112.26	2.19	0.0
PR-CBMH106	STORAGE	112.31	2.19	0.0
PR-CBMH107	STORAGE	112.41	2.19	0.0
PR-CBMH108	STORAGE	112.21	2.39	0.0
PR-CBMH108a	STORAGE	112.21	2.39	0.0
PR-CBMH109	STORAGE	111.90	2.50	0.0
PR-CBMH110	STORAGE	113.30	2.75	0.0
PR-CBMH112	STORAGE	113.61	2.59	0.0
PR-CBMH114	STORAGE	113.95	2.60	0.0
PR-CBMH115	STORAGE	114.19	2.71	0.0
PR-CBMH115a	STORAGE	114.19	2.71	0.0
PR-CBMH118	STORAGE	110.84	2.56	0.0
PR-MH100	STORAGE	112.16	2.50	0.0
PR-MH100a	STORAGE	112.16	2.50	0.0
PR-MH101	STORAGE	111.70	2.21	0.0
PR-MH102	STORAGE	111.28	2.29	0.0
PR-MH103	STORAGE	111.10	2.58	0.0
PR-MH111	STORAGE	113.30	1.98	0.0
PR-MH113	STORAGE	113.73	1.87	0.0
PR-MH116	STORAGE	110.27	2.63	0.0
PR-MH117	STORAGE	110.73	2.97	0.0
PR-STUB01	STORAGE	110.71	2.19	0.0
PR-TD01	STORAGE	112.65	1.15	0.0
PR-TD02	STORAGE	112.65	1.15	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
102_(CB)	PR-CB07	PR-CBMH105	CONDUIT	18.8	0.4780	0.0130
104_(CB)	PR-CB06	PR-CB07	CONDUIT	16.8	0.4762	0.0130
108_(CB)	PR-CB03	PR-MH100	CONDUIT	9.1	0.5495	0.0130
115_(CB)	PR-CB19	PR-CBMH110	CONDUIT	33.8	1.0063	0.0130
121_(CB)	PR-CB20	PR-CB19	CONDUIT	40.3	0.4968	0.0130
126_(STM)	PR-CB30	PR-CB31	CONDUIT	35.6	0.5059	0.0130
138_(CB)	PR-CB01	PR-CB02a	CONDUIT	15.8	0.5073	0.0130
14_(STM)	EX-MH112a	PR-MH102	CONDUIT	45.5	0.1976	0.0130
142_(STM)	PR-CB04	PR-MH100	CONDUIT	13.5	0.5170	0.0130
145_(CB)	PR-CB09	PR-CBMH107	CONDUIT	36.3	0.4963	0.0130
150_(STM)_2	PR-CB29a	PR-MH117	CONDUIT	65.4	0.9933	0.0130
154_(CB)	PR-CB31	PR-CBMH118	CONDUIT	29.3	0.5111	0.0130
156_(STM)_1	PR-CB02	PR-CB02a	CONDUIT	14.0	0.5727	0.0130
156_(STM)_2	PR-CB02a	PR-MH100	CONDUIT	22.1	0.4980	0.0130
17_(1)_(STM)_4	PR-MH117	PR-MH116	CONDUIT	86.5	0.4973	0.0130
18_(STM)	PR-MH116	EX-MH116	CONDUIT	75.7	6.0090	0.0130
20_(STM)	PR-STUB01	PR-MH116	CONDUIT	20.3	2.0161	0.0130
28_(STM)	PR-MH111	EX-MH102A	CONDUIT	86.3	0.9848	0.0130
30_(STM)	PR-MH113	PR-MH111	CONDUIT	51.0	0.8032	0.0130
32_(STM)	PR-CBMH115a	PR-MH113	CONDUIT	45.1	0.9981	0.0130
34_(1)_(STM)	PR-CB28	PR-CB27	CONDUIT	35.7	0.5036	0.0130
34_(STM)	PR-CB27	PR-CBMH115	CONDUIT	37.3	0.6965	0.0130
36_(1)_(STM)	PR-CB25	PR-CBMH114	CONDUIT	36.3	0.4963	0.0130
42_(1)_(STM)	PR-CB23	PR-CB22	CONDUIT	35.8	0.5315	0.0130
42_(2)_(STM)	PR-CB22	PR-CBMH112	CONDUIT	37.3	0.4822	0.0130
49_(STM)	PR-CB26	PR-CB25	CONDUIT	37.1	0.4854	0.0130
5_(STM)	PR-MH100a	PR-MH101	CONDUIT	116.8	0.2997	0.0130
57_(STM)	PR-CBMH108a	PR-MH101	CONDUIT	42.5	0.4935	0.0130
59_(STM)	PR-CB12	PR-CBMH108	CONDUIT	36.2	0.4972	0.0130
61_(STM)	PR-CB11	PR-CB12	CONDUIT	33.7	0.5051	0.0130
64_(CB)	PR-CB15	PR-CBMH109	CONDUIT	29.4	0.9864	0.0130
7_(STM)	PR-MH101	PR-MH102	CONDUIT	106.0	0.3018	0.0130
86_(CB)	PR-CB08	PR-CBMH106	CONDUIT	36.3	0.4963	0.0130
9_(1)_(STM)	PR-MH103	EX-MH109	CONDUIT	32.7	0.3055	0.0130
9_(STM)_2	PR-MH102	PR-MH103	CONDUIT	57.6	0.2949	0.0130
94_(CB)	PR-CB05	PR-CBMH104	CONDUIT	27.0	0.4810	0.0130
C1	EX-CB116	EX-CB117	CONDUIT	10.7	2.1500	0.0130
C10	PR-CB26	HP-PR-CB26a	CONDUIT	3.0	-10.0504	0.0150
C100	EX-CB72	HP-EX-CB72	CONDUIT	3.0	-5.6758	0.0130
C101	EX-CB30	HP-EX-CB30b	CONDUIT	3.0	-13.7961	0.0150
C102	HP-EX-CB30b	EX-CB92	CONDUIT	3.0	14.8270	0.0150
C103	HP-EX-CB87a	EX-CB92	CONDUIT	3.0	14.8270	0.0150
C104	EX-CB87	HP-EX-CB87a	CONDUIT	3.0	-13.4535	0.0150
C105	EX-CB30	HP-EX-CB30a	CONDUIT	3.0	-8.6994	0.0150
C106	HP-EX-CB30a	EX-CB28	CONDUIT	3.0	9.0367	0.0150
C107	EX-CB28	HP-EX-CB28	CONDUIT	3.0	-14.1393	0.0150
C108	HP-EX-CB28	EX-CB96	CONDUIT	3.0	13.4535	0.0150
C109	HP-EX-CB90	EX-CB96	CONDUIT	3.0	13.4535	0.0150
C11	HP-PR-CB26a	PR-CB25	CONDUIT	3.0	10.0504	0.0150
C110	EX-CB90	HP-EX-CB90	CONDUIT	3.0	-14.4829	0.0150
C111	EX-CB92	HP-EX-CB92	CONDUIT	3.0	-9.7122	0.0150
C112	HP-EX-CB92	EX-CB96	CONDUIT	3.0	8.3624	0.0150
C113	HP-EX-CB87b	EX-CB90	CONDUIT	3.0	9.3743	0.0150
C114	EX-CB54	HP-EX-CB54	CONDUIT	3.0	-4.6718	0.0150
C115	HP-EX-CB54	EX-CB52	CONDUIT	3.0	9.0367	0.0150
C116	HP-EX-CB50a	EX-CB52	CONDUIT	3.0	9.0367	0.0150
C117	EX-CB50	HP-EX-CB50a	CONDUIT	3.0	-8.0257	0.0150
C118	HP-EX-CB58a	EX-CB50	CONDUIT	3.0	8.0257	0.0150

C119	EX-CB58	HP-EX-CB58a	CONDUIT	3.0	-7.3531	0.0150
C12	PR-CB25	HP-PR-CB25a	CONDUIT	3.0	-10.0504	0.0150
C120	EX-CB96	HP-EX-CB96	CONDUIT	3.0	-6.6815	0.0150
C121	HP-EX-CB96	EX-CB95	CONDUIT	3.0	6.6815	0.0150
C122	EX-CB95	HP-EX-CB95a	CONDUIT	3.0	-10.0504	0.0150
C123	HP-EX-CB95a	EX-CB128	CONDUIT	3.0	7.3531	0.0150
C124	EX-CB128	HP-EX-CB128	CONDUIT	3.0	-9.0367	0.0150
C125	HP-EX-CB128	EX-CB62	CONDUIT	3.0	8.0257	0.0150
C126	EX-CB52	HP-EX-CB52	CONDUIT	3.0	-12.4282	0.0150
C127	HP-EX-CB52	PR-CB13	CONDUIT	3.0	16.9031	0.0150
C128	PR-CB13	HP-PR-CB13	CONDUIT	3.0	-3.6691	0.0150
C129	HP-PR-CB13	PR-CB14	CONDUIT	3.0	3.6691	0.0150
C13	HP-PR-CB25a	PR-CBMH114	CONDUIT	3.0	10.0504	0.0150
C130	EX-CB50	HP-EX-CB50b	CONDUIT	3.0	-11.4068	0.0150
C131	HP-EX-CB50b	PR-CB15	CONDUIT	3.0	22.1939	0.0150
C132	EX-CB58	HP-EX-CB58b	CONDUIT	3.0	-10.7279	0.0150
C133	HP-EX-CB58b	EX-CB60	CONDUIT	3.0	12.0873	0.0150
C134	HP-EX-CB14	HP-EX-CB131	CONDUIT	3.0	205.0000	0.0350
C135	HP-EX-CB137	HP-EX-CB131	CONDUIT	3.0	223.3333	0.0350
C136	HP-EX-CB72	HP-EX-CB131	CONDUIT	3.0	227.6667	0.0350
C137	HP-EX-CB131	SWM_Pond_OV	CONDUIT	3.0	35.3553	0.0350
C138	EX-CB128	HP-EX-CB95b	CONDUIT	3.0	-9.0367	0.0150
C139	HP-EX-CB95b	HP-PR-CB16/17	CONDUIT	3.0	11.7469	0.0150
C14	PR-CBMH114	HP-PR-CBMH114a	CONDUIT	3.0	-10.0504	0.0150
C140	SWALE03	EX-CB14	CONDUIT	82.0	1.0001	0.0400
C141	SWALE01	SWALE02	CONDUIT	33.5	1.0150	0.0400
C15	HP-PR-CBMH114a	PR-CB24	CONDUIT	3.0	10.0504	0.0150
C16	PR-CBMH115	HP-PR-CBMH115	CONDUIT	3.0	-10.0504	0.0150
C17	HP-PR-CBMH115	PR-CB24	CONDUIT	3.0	22.1939	0.0150
C18	PR-CB26	HP-PR-CB26b	CONDUIT	3.0	-10.0504	0.0150
C19	HP-PR-CB26b	PR-CB23	CONDUIT	3.0	22.1939	0.0150
C2	PR-CB28	HP-PR-CB28a	CONDUIT	3.0	-10.0504	0.0150
C20	HP-PR-CB25b	PR-CB22	CONDUIT	3.0	22.1939	0.0150
C21	HP-PR-CBMH114b	PR-CBMH112	CONDUIT	3.0	22.1939	0.0150
C22	HP-PR-CB24	PR-CB21	CONDUIT	3.0	22.1939	0.0150
C23	HP-PR-CB23	PR-CB20	CONDUIT	3.0	11.7469	0.0150
C24	HP-PR-CB22	PR-CB19	CONDUIT	3.0	11.7469	0.0150
C25	HP-PR-CBMH112	PR-CBMH110	CONDUIT	3.0	11.7469	0.0150
C26	PR-CB30	HP-PR-CB30	CONDUIT	3.0	-10.0504	0.0150
C27	EX-CB137	HP-EX-CB137	CONDUIT	3.0	-10.3889	0.0150
C28	PR-CB31	HP-PR-CB31	CONDUIT	3.0	-10.0504	0.0150
C29	HP-PR-CB16/17	EX-CB137	CONDUIT	3.0	8.6994	0.0150
C3	HP-PR-CB28a	PR-CB27	CONDUIT	3.0	10.0504	0.0150
C30	PR-CB29	HP-PR-CB29	CONDUIT	3.0	-10.0504	0.0150
C31	PR-CB16/17	HP-PR-CB16/17	CONDUIT	3.0	-10.0504	0.0150
C32	PR-CBMH118	HP-PR-CBMH118	CONDUIT	3.0	-10.0504	0.0150
C33	EX-CB116	HP-EX-CB116	CONDUIT	3.0	-3.3352	0.0150
C34	PR-CBMH108	HP-PR-CBMH108	CONDUIT	3.0	-10.0504	0.0150
C35	HP-PR-CBMH108	PR-CB12	CONDUIT	3.0	10.0504	0.0150
C36	PR-CB12	HP-PR-CB12	CONDUIT	3.0	-9.0367	0.0150
C37	HP-PR-CB12	PR-CB11	CONDUIT	3.0	9.0367	0.0150
C38	PR-CB11	HP-PR-CB11	CONDUIT	3.0	-6.6815	0.0150
C39	PR-CBMH107	HP-PR-CBMH107a	CONDUIT	3.0	-8.3624	0.0150
C4	PR-CB27	HP-PR-CB27a	CONDUIT	3.0	-10.0504	0.0150
C40	HP-PR-CBMH107a	PR-CB09	CONDUIT	3.0	8.3624	0.0150
C41	PR-CBMH107	HP-PR-CBMH107b	CONDUIT	3.0	-8.3624	0.0150
C42	HP-PR-CBMH107b	PR-CBMH106	CONDUIT	3.0	11.7469	0.0150
C43	PR-CB09	HP-PR-CB09	CONDUIT	3.0	-8.3624	0.0150
C44	HP-PR-CB09	PR-CB08	CONDUIT	3.0	11.7469	0.0150
C45	PR-CBMH106	HP-PR-CBMH106	CONDUIT	3.0	-10.0504	0.0150
C46	HP-PR-CBMH106	PR-CB08	CONDUIT	3.0	10.0504	0.0150
C47	PR-CB08	HP-PR-CB08	CONDUIT	3.0	-8.3624	0.0150
C48	HP-PR-CB08	PR-CB05	CONDUIT	3.0	10.0504	0.0150
C49	PR-CBMH104	HP-PR-CBMH104	CONDUIT	3.0	-8.3624	0.0150
C5	HP-PR-CB27a	PR-CBMH115	CONDUIT	3.0	10.0504	0.0150
C50	HP-PR-CBMH104	PR-CB05	CONDUIT	3.0	10.0504	0.0150
C51	PR-CB05	HP-PR-CB05	CONDUIT	3.0	-8.3624	0.0150
C52	HP-PR-CB05	PR-CB04	CONDUIT	3.0	10.0504	0.0150
C53	PR-CB01	HP-PR-CB01	CONDUIT	3.0	-7.6893	0.0150
C53_1	PR-CB04	HP-PR-CB04	CONDUIT	3.0	-8.3624	0.0150
C53_2	HP-PR-CB04	PR-CB02	CONDUIT	3.0	8.3624	0.0150
C54	PR-CB14	HP-PR-CB14	CONDUIT	3.0	-3.3352	0.0150
C54_1	PR-CB02	HP-PR-CB02	CONDUIT	3.0	-6.6815	0.0150
C54_2	HP-PR-CB02	PR-CB01	CONDUIT	3.0	6.6815	0.0150
C55	PR-CB03	HP-PR-CB03	CONDUIT	3.0	-8.3624	0.0150
C56	HP-PR-CB03	PR-CB01	CONDUIT	3.0	8.3624	0.0150
C57	PR-CBMH105	HP-PR-CBMH105	CONDUIT	3.0	-7.6893	0.0150
C58	HP-PR-CBMH105	PR-CB03	CONDUIT	3.0	9.3743	0.0150
C59	PR-CB06	HP-PR-CB06	CONDUIT	3.0	-5.0063	0.0150
C6	PR-CB28	HP-PR-CB28b	CONDUIT	3.0	-10.0504	0.0150
C60	HP-PR-CB06	PR-CB07	CONDUIT	3.0	5.0063	0.0150
C61	PR-CB07	HP-PR-CB07	CONDUIT	3.0	-6.6815	0.0150
C62	HP-PR-CB07	PR-CBMH105	CONDUIT	3.0	6.6815	0.0150
C63	PR-CB10	HP-PR-CB10	CONDUIT	3.0	-8.3624	0.0150
C64	HP-PR-CB10	PR-CBMH105	CONDUIT	3.0	8.3624	0.0150
C65	HP-PR-CB14	PR-CB15	CONDUIT	3.0	8.3624	0.0150
C66	PR-CB15	HP-PR-CB15	CONDUIT	3.0	-6.6815	0.0150
C67	HP-PR-CB15	PR-CBMH109	CONDUIT	3.0	6.6815	0.0150
C68	PR-CB21	HP-PR-CB21	CONDUIT	3.0	-6.6815	0.0150
C69	HP-PR-CB21	PR-CB18	CONDUIT	3.0	11.7469	0.0150
C7	HP-PR-CB28b	PR-CB25	CONDUIT	3.0	22.1939	0.0150
C70	SWALE01	SWALE02	CONDUIT	33.5	1.0150	0.0350

C71	PR-CB20	HP-PR-CB20	CONDUIT	3.0	-6.6815	0.0150
C72	SWALE03	EX-CB14	CONDUIT	82.0	1.0001	0.0350
C73	PR-CB19	HP-PR-CB19	CONDUIT	3.0	-6.6815	0.0150
C74	PR-CBMH110	HP-PR-CBMH110	CONDUIT	3.0	-6.6815	0.0150
C75	PR-CB18	HP-PR-CB18	CONDUIT	3.0	-6.6815	0.0150
C76	HP-PR-CB18	EX-CB82	CONDUIT	3.0	56.2106	0.0150
C77	HP-PR-CB20	HP-03	CONDUIT	3.0	41.5038	0.0150
C78	HP-03	SWALE02	CONDUIT	3.0	29.1667	0.0150
C79	HP-PR-CB19	HP-02	CONDUIT	3.0	43.6436	0.0150
C8	PR-CB27	HP-PR-CB27b	CONDUIT	3.0	-10.0504	0.0150
C80	HP-02	SWALE03	CONDUIT	3.0	31.4485	0.0150
C81	HP-PR-CBMH110	HP-01	CONDUIT	3.0	45.8349	0.0150
C82	HP-01	EX-CB14	CONDUIT	3.0	67.0089	0.0150
C83	EX-CB14	HP-EX-CB14	CONDUIT	3.0	-28.4154	0.0350
C84	EX-CB84	HP-EX-CB84	CONDUIT	3.0	-6.6815	0.0150
C84_1	EX-CB82	HP-EX-CB82	CONDUIT	3.0	-2.3340	0.0150
C84_2	HP-EX-CB82	HP-05	CONDUIT	3.0	3.3352	0.0150
C85	HP-05	EX-CB131	CONDUIT	3.0	228.0000	0.0350
C86	EX-CB131	HP-EX-CB131	CONDUIT	3.0	-3.0014	0.0350
C87	HP-EX-CB84	HP-05	CONDUIT	3.0	3.3352	0.0150
C88	PR-CB32	HP-PR-CB32	CONDUIT	3.0	-5.0063	0.0150
C89	HP-EX-CB116	EX-CB117	CONDUIT	3.0	8.3624	0.0150
C9	HP-PR-CB27b	PR-CBMH114	CONDUIT	3.0	22.1939	0.0150
C90	EX-CB117	HP-EX-CB117	CONDUIT	3.0	-5.0063	0.0150
C91	HP-EX-CB117	PR-CB16/17	CONDUIT	3.0	5.0063	0.0150
C92	EX-CB64	HP-EX-CB64	CONDUIT	3.0	-3.3352	0.0150
C93	HP-EX-CB64	EX-CB117	CONDUIT	3.0	8.3624	0.0150
C94	PR-CBMH109	HP-PR-CBMH109	CONDUIT	3.0	-6.6815	0.0150
C95	HP-PR-CBMH109	EX-CB64	CONDUIT	3.0	3.3352	0.0150
C96	EX-CB62	HP-EX-CB62	CONDUIT	3.0	-2.0004	0.0150
C97	HP-EX-CB62	EX-CB60	CONDUIT	3.0	4.3374	0.0150
C98	EX-CB60	HP-EX-CB60	CONDUIT	3.0	-7.0172	0.0150
C99	HP-EX-CB60	EX-CB64	CONDUIT	3.0	13.4535	0.0150
C-CB22	PR-CB22	HP-PR-CB22	CONDUIT	3.0	-6.6815	0.0150
C-CB23	PR-CB23	HP-PR-CB23	CONDUIT	3.0	-6.6815	0.0150
C-CB24	PR-CB24	HP-PR-CB24	CONDUIT	3.0	-10.0504	0.0150
C-CB25	PR-CB25	HP-PR-CB25b	CONDUIT	3.0	-10.0504	0.0150
C-CB87	EX-CB87	HP-EX-CB87b	CONDUIT	3.0	-8.3624	0.0150
C-CBMH112	PR-CBMH112	HP-PR-CBMH112	CONDUIT	3.0	-6.6815	0.0150
C-CBMH114	PR-CBMH114	HP-PR-CBMH114b	CONDUIT	3.0	-10.0504	0.0150
CULV-4	SWALE02	SWALE03	CONDUIT	13.4	0.8222	0.0240
X-CB-129_(X-CB)	EX-CB128	EX-CB95	CONDUIT	7.0	0.7184	0.0130
X-CB-89_(X-CB)	EX-CB87	EX-MH106a	CONDUIT	19.6	4.0236	0.0130
X-CB-91_(X-CB)	EX-CB90	EX-MH106a	CONDUIT	15.6	5.1284	0.0130
X-CB-94_(X-CB)	EX-CB92	EX-MH107a	CONDUIT	20.5	1.4600	0.0130
X-CB-97_(X-CB)	EX-CB95	EX-CB96	CONDUIT	25.2	0.7140	0.0130
X-CB-98_(X-CB)	EX-CB96	EX-MH107a	CONDUIT	15.5	0.1933	0.0130
X-STM-13_(1)_(X-STM)	EX-MH101A	EX-MH101B	CONDUIT	30.1	1.3969	0.0130
X-STM-13_(X-STM)	EX-MH101B	EX-MH101	CONDUIT	32.6	2.2684	0.0130
X-STM-17_(X-STM)	EX-MH102	EX-MH101A	CONDUIT	29.5	1.5590	0.0130
X-STM-19_(X-STM)	EX-MH102A	EX-MH102	CONDUIT	59.0	0.8817	0.0130
X-STM-2_(X-STM)	EX-MH101	SWM_Pond	CONDUIT	81.0	2.0016	0.0130
X-STM-21_(X-STM)	EX-MH104	EX-MH102	CONDUIT	65.2	1.3195	0.0130
X-STM-23_(X-STM)	EXMH-105a	EX-MH104	CONDUIT	17.8	0.1685	0.0130
X-STM-25_(X-STM)_1	EX-MH106	EX-MH106a	CONDUIT	26.4	1.6650	0.0130
X-STM-25_(X-STM)_2	EX-MH106a	EXMH-105	CONDUIT	24.6	1.6649	0.0130
X-STM-27_(X-STM)_1	EX-MH107	EX-MH107a	CONDUIT	58.5	0.2736	0.0130
X-STM-27_(X-STM)_2	EX-MH107a	EX-MH106	CONDUIT	4.0	0.2500	0.0130
X-STM-29_(X-STM)	EX-CB28	EX-MH107	CONDUIT	14.4	0.0695	0.0130
X-STM-31_(X-STM)	EX-CB30	EX-MH107	CONDUIT	21.4	0.4671	0.0130
X-STM-33_(X-STM)	EX-MH109	EX-MH104	CONDUIT	86.3	0.3359	0.0130
X-STM-5_(X-STM)	EX-MH115	EX-MH101	CONDUIT	92.8	0.4960	0.0130
X-STM-51_(X-STM)	EX-CB50	EX-MH112	CONDUIT	21.4	0.0935	0.0130
X-STM-53_(X-STM)	EX-CB52	EX-CB50	CONDUIT	55.0	0.1818	0.0130
X-STM-55_(X-STM)	EX-CB54	EX-CB52	CONDUIT	12.8	0.6275	0.0130
X-STM-59_(X-STM)	EX-CB58	EX-MH112	CONDUIT	11.7	1.0275	0.0130
X-STM-63_(X-STM)	EX-CB62	EX-CB60	CONDUIT	6.9	0.5814	0.0130
X-STM-7_(X-STM)	EX-MH116	EX-MH115	CONDUIT	91.3	0.4929	0.0130
X-STM-71_(X-STM)	EX-MH103	EX-MH102	CONDUIT	78.2	1.0992	0.0130
X-STM-75_(X-STM)	EX-MH108	EX-MH109	CONDUIT	32.9	1.0325	0.0130
X-STM-77_(X-STM)	EX-STUB02	EX-MH108	CONDUIT	12.4	0.4851	0.0130
102_(5)_(CB)	PR-CBMH105	PR-MH100a	ORIFICE			
114_(CB)	PR-CBMH110	PR-MH111	ORIFICE			
124_(CB)	PR-CB18	PR-MH111	ORIFICE			
131_(CB)	PR-CBMH118	PR-MH117	ORIFICE			
147_(CB)	PR-CBMH107	PR-MH100a	ORIFICE			
151_(STM)	PR-CB29	PR-CB29a	ORIFICE			
36_(STM)	PR-CB24	PR-MH113	ORIFICE			
42_(STM)	PR-CBMH112	PR-MH111	ORIFICE			
46_(STM)	PR-CBMH114	PR-MH113	ORIFICE			
54_(STM)	PR-CB21	PR-MH111	ORIFICE			
66_(CB)	PR-CBMH109	PR-MH102	ORIFICE			
69_(CB)	EX-CB117	EX-MH109	ORIFICE			
78_(CB)	PR-CB13	PR-MH101	ORIFICE			
81_(CB)	PR-CB14	PR-MH101	ORIFICE			
88_(CB)	PR-CBMH106	PR-MH100a	ORIFICE			
91_(CB)	PR-CB10	PR-MH100a	ORIFICE			
96_(CB)	PR-CBMH104	PR-MH100a	ORIFICE			
OR1	PR-CB32	PR-MH116	ORIFICE			
OR10	PR-TD02	PR-STUB01	ORIFICE			
OR11	EX-MH112	EX-MH112a	ORIFICE			
OR2	PR-CBMH115	PR-CBMH115a	ORIFICE			

OR3	EX-CB60	PR-MH102	ORIFICE
OR4	PR-CBMH108	PR-CBMH108a	ORIFICE
OR5	PR-MH100	PR-MH100a	ORIFICE
OR6	PR-CB16/17	EX-MH109	ORIFICE
OR7	EXMH-105	EXMH-105a	ORIFICE
OR8	EX-CB64	PR-MH103	ORIFICE
OR9	PR-TD01	PR-STUB01	ORIFICE
X-CB-135_(X-CB)	EX-CB137	EX-MH109	ORIFICE
X-CB-83_(X-CB)	EX-CB82	EX-MH104	ORIFICE
X-CB-86_(X-CB)	EX-CB84	EX-MH104	ORIFICE
X-STM-130_(X-STM)	EX-CB131	EX-MH101	ORIFICE
X-STM-15_(X-STM)	EX-CB14	EX-MH101A	ORIFICE
X-STM-73_(X-STM)	EX-CB72	EX-MH103	ORIFICE
EX-BLDG01-OUT	EX-BLDG01	EX-STUB02	OUTLET
PR-BLDG01-OUT	PR-BLDG01	EX-MH109	OUTLET
PR-BLDG02-OUT	PR-BLDG02	PR-STUB01	OUTLET

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
102_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.12
104_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
108_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	44.08
115_(CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	97.01
121_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.92
126_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.30
138_(CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.88
14_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	42.99
142_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.76
145_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
150_(STM)_2	CIRCULAR	0.25	0.05	0.06	0.25	1	59.27
154_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.52
156_(STM)_1	CIRCULAR	0.25	0.05	0.06	0.25	1	45.00
156_(STM)_2	CIRCULAR	0.30	0.07	0.07	0.30	1	68.24
17_(1)_(STM)_4	CIRCULAR	0.30	0.07	0.07	0.30	1	68.20
18_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	145.78
20_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	84.44
28_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	95.97
30_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	86.67
32_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	96.61
34_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.21
34_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	49.63
36_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
42_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	43.36
42_(2)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.30
49_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.44
5_(STM)	CIRCULAR	0.45	0.16	0.11	0.45	1	156.08
57_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	67.94
59_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.94
61_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.26
64_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	59.07
7_(STM)	CIRCULAR	0.53	0.22	0.13	0.53	1	236.29
86_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
9_(1)_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	339.41
9_(STM)_2	CIRCULAR	0.60	0.28	0.15	0.60	1	333.45
94_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.24
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	48.10
C10	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C100	RECT_OPEN	1.00	3.00	0.60	3.00	1	39112.71
C101	RECT_OPEN	1.00	3.00	0.60	3.00	1	52848.83
C102	RECT_OPEN	1.00	3.00	0.60	3.00	1	54787.78
C103	RECT_OPEN	1.00	3.00	0.60	3.00	1	54787.78
C104	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C105	RECT_OPEN	1.00	3.00	0.60	3.00	1	41966.39
C106	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C107	RECT_OPEN	1.00	3.00	0.60	3.00	1	53502.02
C108	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C109	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C11	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C110	RECT_OPEN	1.00	3.00	0.60	3.00	1	54148.25
C111	RECT_OPEN	1.00	3.00	0.60	3.00	1	44341.94
C112	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C113	RECT_OPEN	1.00	3.00	0.60	3.00	1	43563.76
C114	RECT_OPEN	1.00	3.00	0.60	3.00	1	30753.68
C115	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C116	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C117	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C118	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C119	RECT_OPEN	1.00	3.00	0.60	3.00	1	38582.75
C12	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C120	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C121	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C122	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C123	RECT_OPEN	1.00	3.00	0.60	3.00	1	38582.75
C124	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C125	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C126	RECT_OPEN	1.00	3.00	0.60	3.00	1	50160.45
C127	RECT_OPEN	1.00	3.00	0.60	3.00	1	58497.86

C128	RECT_OPEN	1.00	3.00	0.60	3.00	1 27254.53
C129	RECT_OPEN	1.00	3.00	0.60	3.00	1 27254.53
C13	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C130	RECT_OPEN	1.00	3.00	0.60	3.00	1 48055.09
C131	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C132	RECT_OPEN	1.00	3.00	0.60	3.00	1 46602.99
C133	RECT_OPEN	1.00	3.00	0.60	3.00	1 49467.78
C134	RECT_OPEN	1.00	3.00	0.60	3.00	1 87308.62
C135	RECT_OPEN	1.00	3.00	0.60	3.00	1 91129.08
C136	RECT_OPEN	1.00	3.00	0.60	3.00	1 92008.92
C137	RECT_OPEN	1.00	3.00	0.60	3.00	1 36258.32
C138	RECT_OPEN	1.00	3.00	0.60	3.00	1 42772.17
C139	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C14	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C140	RECT_CLOSED	1.00	1.20	0.27	1.20	1 1261.76
C141	RECT_CLOSED	1.00	0.48	0.16	0.48	1 359.53
C15	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C16	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C17	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C18	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C19	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C2	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C20	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C21	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C22	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C23	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C24	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C25	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C26	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C27	RECT_OPEN	1.00	3.00	0.60	3.00	1 45860.92
C28	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C29	RECT_OPEN	1.00	3.00	0.60	3.00	1 41966.39
C3	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C30	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C31	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C32	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C33	RECT_OPEN	1.00	3.00	0.60	3.00	1 25984.66
C34	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C35	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C36	RECT_OPEN	1.00	3.00	0.60	3.00	1 42772.17
C37	RECT_OPEN	1.00	3.00	0.60	3.00	1 42772.17
C38	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C39	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C4	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C40	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C41	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C42	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C43	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C44	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C45	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C46	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C47	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C48	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C49	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C5	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C50	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C51	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C52	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C53	RECT_OPEN	1.00	3.00	0.60	3.00	1 39454.84
C53_1	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C53_2	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C54	RECT_OPEN	1.00	3.00	0.60	3.00	1 25984.66
C54_1	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C54_2	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C55	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C56	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C57	RECT_OPEN	1.00	3.00	0.60	3.00	1 39454.84
C58	RECT_OPEN	1.00	3.00	0.60	3.00	1 43563.76
C59	RECT_OPEN	1.00	3.00	0.60	3.00	1 31835.65
C6	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44
C60	RECT_OPEN	1.00	3.00	0.60	3.00	1 31835.65
C61	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C62	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C63	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C64	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C65	RECT_OPEN	1.00	3.00	0.60	3.00	1 41145.56
C66	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C67	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C68	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C69	RECT_OPEN	1.00	3.00	0.60	3.00	1 48766.13
C7	RECT_OPEN	1.00	3.00	0.60	3.00	1 67030.66
C70	TRAPEZOIDAL	1.00	4.20	0.56	7.20	1 8196.24
C71	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C72	TRAPEZOIDAL	1.00	8.00	0.61	13.00	1 16372.41
C73	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C74	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C75	RECT_OPEN	1.00	3.00	0.60	3.00	1 36778.58
C76	RECT_OPEN	1.00	3.00	0.60	3.00	1 106675.80
C77	RECT_OPEN	1.00	3.00	0.60	3.00	1 91664.45
C78	RECT_OPEN	1.00	3.00	0.60	3.00	1 76842.30
C79	RECT_OPEN	1.00	3.00	0.60	3.00	1 93997.68
C8	RECT_OPEN	1.00	3.00	0.60	3.00	1 45107.44

C80	RECT_OPEN	1.00	3.00	0.60	3.00	1	79791.62
C81	RECT_OPEN	1.00	3.00	0.60	3.00	1	96328.60
C82	RECT_OPEN	1.00	3.00	0.60	3.00	1	116472.42
C83	RECT_OPEN	1.00	3.00	0.60	3.00	1	32505.52
C84	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C84_1	RECT_OPEN	1.00	3.00	0.60	3.00	1	21737.24
C84_2	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C85	RECT_OPEN	1.00	3.00	0.60	3.00	1	92076.25
C86	RECT_OPEN	1.00	3.00	0.60	3.00	1	10564.25
C87	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C88	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C89	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C9	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C90	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C91	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C92	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C93	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C94	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C95	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C96	RECT_OPEN	1.00	3.00	0.60	3.00	1	20124.05
C97	RECT_OPEN	1.00	3.00	0.60	3.00	1	29632.76
C98	RECT_OPEN	1.00	3.00	0.60	3.00	1	37691.14
C99	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C-CB22	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CB23	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CB24	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C-CB25	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C-CB87	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C-CBMH112	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CBMH114	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
CULV-4	CIRCULAR	0.40	0.13	0.10	0.40	1	102.29
X-CB-129_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	27.80
X-CB-89_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	65.79
X-CB-91_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	74.28
X-CB-94_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	39.63
X-CB-97_(X-CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	81.72
X-CB-98_(X-CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	42.52
X-STM-13_(1)_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1315.86
X-STM-13_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1676.84
X-STM-17_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1390.11
X-STM-19_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	90.81
X-STM-2_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1575.15
X-STM-21_(X-STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	705.36
X-STM-23_(X-STM)	CIRCULAR	0.45	0.16	0.11	0.45	1	117.05
X-STM-25_(X-STM)_1	CIRCULAR	0.45	0.16	0.11	0.45	1	367.91
X-STM-25_(X-STM)_2	CIRCULAR	0.45	0.16	0.11	0.45	1	367.89

X-STM-27_(X-STM)_1	CIRCULAR	0.30	0.07	0.07	0.30	1	50.59
X-STM-27_(X-STM)_2	CIRCULAR	0.30	0.07	0.07	0.30	1	48.35
X-STM-29_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	25.50
X-STM-31_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	22.42
X-STM-33_(X-STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	355.90
X-STM-5_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.11
X-STM-51_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	29.58
X-STM-53_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	41.23
X-STM-55_(X-STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	47.11
X-STM-59_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	33.25
X-STM-63_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	25.01
X-STM-7_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	67.89
X-STM-71_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	101.39
X-STM-75_(X-STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	178.17
X-STM-77_(X-STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	122.12

```
**********************************************************
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 ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 10/24/2019 00:00:00
Ending Date ..... 10/25/2019 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 ..... 2.00 sec
```

```
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.459	31.857
Evaporation Loss	0.000	0.000
Infiltration Loss	0.067	4.634
Surface Runoff	0.380	26.357
Final Storage	0.016	1.082
Continuity Error (%)	-0.681	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.380	3.796
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.371	3.714
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	0.008	0.081
Continuity Error (%)	0.040	

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*************************
Highest Continuity Errors
*************************
Node SWALE03 (1.37%)
Node EX-CB14 (-1.22%)
Node EX-CB54 (-1.20%)
Node EX-CB96 (1.03%)

****************************
Time-Step Critical Elements
****************************
Link X-STM-27_(X-STM)_2 (1.13%)
Link C85 (1.09%)

*******************************
Highest Flow Instability Indexes
*******************************
Link EX-BLDG01-OUT (16)
Link OR5 (10)
Link 114_(CB) (1)

*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     1.98 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :    -0.00
Average Iterations per Step :     2.01
Percent Not Converging      :     0.04

****************************
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 LPS	Runoff Coeff
A-01	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.07	50.01	0.959
A-02	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.07	45.55	0.959
A-03	31.86	0.00	0.00	0.00	30.45	0.00	30.45	0.02	16.00	0.956
A-04a	31.86	0.00	0.00	5.60	25.19	0.01	25.20	0.09	60.04	0.791
A-04b	31.86	0.00	0.00	4.68	26.07	0.01	26.09	0.20	135.46	0.819
A-05	31.86	0.00	0.00	4.40	26.22	0.06	26.28	0.02	12.07	0.825
A-06	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	34.88	0.959
A-07	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	37.68	0.959
A-08	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	33.00	0.959
A-09	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	33.84	0.959
A-10	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	37.67	0.959
A-11	31.86	0.00	0.00	0.00	30.56	0.00	30.56	0.05	35.28	0.959
A-12	31.86	0.00	0.00	4.37	26.24	0.06	26.31	0.02	12.09	0.826
A-13	31.86	0.00	0.00	5.65	25.04	0.05	25.10	0.01	10.27	0.788

A-14	31.86	0.00	0.00	0.00	30.56	0.00	30.56	0.05	35.51	0.959
A-15	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.07	45.56	0.959
A-16	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.05	32.99	0.959
A-17a	31.86	0.00	0.00	14.58	16.54	0.03	16.56	0.04	25.26	0.520
A-17b	31.86	0.00	0.00	1.71	28.88	0.03	28.91	0.06	38.72	0.908
A-17c	31.86	0.00	0.00	11.30	19.70	0.02	19.72	0.05	34.55	0.619
A-17d	31.86	0.00	0.00	0.51	30.05	0.02	30.07	0.07	48.21	0.944
A-17e	31.86	0.00	0.00	12.67	18.38	0.02	18.41	0.06	39.10	0.578
A-17f	31.86	0.00	0.00	1.99	28.60	0.03	28.64	0.08	56.24	0.899
A-18	31.86	0.00	0.00	7.96	22.93	0.01	22.94	0.12	83.15	0.720
A-19	31.86	0.00	0.00	10.37	20.58	0.03	20.60	0.06	39.89	0.647
A-20	31.86	0.00	0.00	1.39	29.20	0.03	29.23	0.12	81.15	0.918
A-21	31.86	0.00	0.00	1.48	29.07	0.04	29.11	0.05	33.75	0.914
A-22	31.86	0.00	0.00	30.25	1.52	0.02	1.54	0.01	8.42	0.048
A-23	31.86	0.00	0.00	7.35	23.36	0.09	23.45	0.01	8.34	0.736
A-24	31.86	0.00	0.00	0.00	32.07	0.00	32.07	0.02	12.15	1.007
A-25	31.86	0.00	0.00	11.21	19.81	0.01	19.82	0.02	11.72	0.622
A-26	31.86	0.00	0.00	15.03	16.14	0.01	16.15	0.02	11.42	0.507
A-27	31.86	0.00	0.00	15.35	15.83	0.01	15.85	0.02	10.65	0.497
A-28	31.86	0.00	0.00	4.58	26.16	0.01	26.18	0.03	21.49	0.822
A-29	31.86	0.00	0.00	11.36	19.62	0.03	19.65	0.02	12.88	0.617
A-30	31.86	0.00	0.00	0.00	32.08	0.00	32.08	0.28	167.11	1.007
A-31	31.86	0.00	0.00	0.00	30.44	0.00	30.44	0.02	15.95	0.956
A-32	31.86	0.00	0.00	4.53	26.10	0.06	26.16	0.03	21.31	0.821
A-33	31.86	0.00	0.00	8.71	22.12	0.05	22.17	0.05	37.54	0.696
A-34a	31.86	0.00	0.00	0.54	30.00	0.03	30.03	0.05	32.21	0.943
A-34b	31.86	0.00	0.00	0.00	30.53	0.00	30.53	0.08	53.72	0.958
A-34c	31.86	0.00	0.00	1.52	29.06	0.03	29.10	0.06	41.01	0.913
A-35	31.86	0.00	0.00	6.28	24.41	0.07	24.48	0.03	20.63	0.768
A-36	31.86	0.00	0.00	0.00	30.44	0.00	30.44	0.01	10.45	0.956
A-37	31.86	0.00	0.00	19.29	11.99	0.04	12.03	0.01	4.86	0.378
A-38a	31.86	0.00	0.00	0.00	32.11	0.00	32.11	0.37	240.65	1.008
A-38b	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.10	64.96	1.008
A-39	31.86	0.00	0.00	0.00	30.56	0.00	30.56	0.07	50.96	0.959
A-40	31.86	0.00	0.00	0.00	30.57	0.00	30.57	0.09	62.46	0.960
A-41	31.86	0.00	0.00	0.00	30.57	0.00	30.57	0.05	35.69	0.960
A-42	31.86	0.00	0.00	0.00	30.56	0.00	30.56	0.04	29.96	0.959
A-43	31.86	0.00	0.00	1.81	28.82	0.02	28.84	0.08	53.34	0.905
A-44	31.86	0.00	0.00	6.71	24.09	0.03	24.12	0.03	23.50	0.757
A-45	31.86	0.00	0.00	4.69	25.95	0.06	26.01	0.02	12.31	0.816
A-46	31.86	0.00	0.00	13.07	17.95	0.04	17.99	0.02	14.08	0.565
A-47	31.86	0.00	0.00	3.92	26.66	0.08	26.73	0.01	7.96	0.839
A-48	31.86	0.00	0.00	0.57	29.90	0.04	29.94	0.03	18.76	0.940
A-49	31.86	0.00	0.00	0.00	30.48	0.00	30.48	0.03	17.71	0.957
A-50	31.86	0.00	0.00	6.15	24.53	0.08	24.60	0.01	9.95	0.772
A-51	31.86	0.00	0.00	9.53	21.33	0.05	21.37	0.01	9.20	0.671
A-52	31.86	0.00	0.00	7.14	23.60	0.06	23.66	0.02	12.21	0.743
A-53	31.86	0.00	0.00	8.29	22.52	0.05	22.57	0.02	14.97	0.708
A-54	31.86	0.00	0.00	12.02	18.94	0.05	18.99	0.01	8.46	0.596
A-55	31.86	0.00	0.00	4.35	26.35	0.03	26.38	0.04	27.38	0.828
A-56	31.86	0.00	0.00	0.88	29.64	0.04	29.67	0.03	23.16	0.931
A-57	31.86	0.00	0.00	0.00	30.46	0.00	30.46	0.03	21.98	0.956
A-58	31.86	0.00	0.00	0.00	30.50	0.00	30.50	0.03	24.10	0.957
A-59	31.86	0.00	0.00	0.00	30.49	0.00	30.49	0.04	27.30	0.957
A-60	31.86	0.00	0.00	11.61	19.36	0.04	19.40	0.02	15.43	0.609
A-61	31.86	0.00	0.00	0.00	30.51	0.00	30.51	0.07	46.71	0.958
A-62	31.86	0.00	0.00	0.00	30.48	0.00	30.48	0.06	42.45	0.957
A-63	31.86	0.00	0.00	0.00	30.48	0.00	30.48	0.05	31.57	0.957

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
HP-01	JUNCTION	0.00	0.00	114.00	0 00:00	0.00
HP-02	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-03	JUNCTION	0.00	0.00	114.10	0 00:00	0.00
HP-05	JUNCTION	0.00	0.01	113.76	0 01:10	0.01
HP-EX-CB116	JUNCTION	0.00	0.00	113.60	0 00:00	0.00
HP-EX-CB117	JUNCTION	0.00	0.00	113.50	0 00:00	0.00
HP-EX-CB128	JUNCTION	0.00	0.00	114.00	0 00:00	0.00
HP-EX-CB131	JUNCTION	0.00	0.00	107.00	0 00:00	0.00
HP-EX-CB137	JUNCTION	0.00	0.00	113.70	0 00:00	0.00
HP-EX-CB14	JUNCTION	0.00	0.00	113.15	0 00:00	0.00
HP-EX-CB28	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB30a	JUNCTION	0.00	0.00	113.90	0 00:00	0.00
HP-EX-CB30b	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB50a	JUNCTION	0.00	0.00	113.95	0 00:00	0.00
HP-EX-CB50b	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB52	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB54	JUNCTION	0.00	0.00	113.95	0 00:00	0.00
HP-EX-CB58a	JUNCTION	0.00	0.00	113.95	0 00:00	0.00
HP-EX-CB58b	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB60	JUNCTION	0.00	0.00	113.90	0 00:00	0.00
HP-EX-CB62	JUNCTION	0.00	0.00	113.82	0 00:00	0.00
HP-EX-CB64	JUNCTION	0.00	0.00	113.60	0 00:00	0.00
HP-EX-CB72	JUNCTION	0.00	0.00	113.83	0 00:00	0.00

HP-EX-CB82	JUNCTION	0.00	0.02	113.87	0	01:07	0.02
HP-EX-CB84	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-EX-CB87a	JUNCTION	0.00	0.00	114.05	0	00:00	0.00
HP-EX-CB87b	JUNCTION	0.00	0.00	113.90	0	00:00	0.00
HP-EX-CB90	JUNCTION	0.00	0.00	114.05	0	00:00	0.00
HP-EX-CB92	JUNCTION	0.00	0.00	113.90	0	00:00	0.00
HP-EX-CB95a	JUNCTION	0.00	0.00	113.95	0	00:00	0.00
HP-EX-CB95b	JUNCTION	0.00	0.00	114.00	0	00:00	0.00
HP-EX-CB96	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CB02	JUNCTION	0.00	0.00	113.60	0	00:00	0.00
HP-PR-CB03	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB04	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB05	JUNCTION	0.00	0.00	113.70	0	00:00	0.00
HP-PR-CB06	JUNCTION	0.00	0.00	113.60	0	00:00	0.00
HP-PR-CB07	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB08	JUNCTION	0.00	0.00	113.75	0	00:00	0.00
HP-PR-CB09	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CB10	JUNCTION	0.00	0.00	113.70	0	00:00	0.00
HP-PR-CB12	JUNCTION	0.00	0.00	113.87	0	00:00	0.00
HP-PR-CB13	JUNCTION	0.00	0.00	113.66	0	00:00	0.00
HP-PR-CB14	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB15	JUNCTION	0.00	0.00	113.60	0	00:00	0.00
HP-PR-CB16/17	JUNCTION	0.00	0.01	113.66	0	01:10	0.01
HP-PR-CB18	JUNCTION	0.00	0.00	115.25	0	00:00	0.00
HP-PR-CB19	JUNCTION	0.00	0.00	115.25	0	00:00	0.00
HP-PR-CB20	JUNCTION	0.00	0.00	115.25	0	00:00	0.00
HP-PR-CB21	JUNCTION	0.00	0.00	115.40	0	00:00	0.00
HP-PR-CB22	JUNCTION	0.00	0.00	115.40	0	00:00	0.00
HP-PR-CB23	JUNCTION	0.00	0.00	115.40	0	00:00	0.00
HP-PR-CB24	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB25a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB25b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB26a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB26b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB27a	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB27b	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB28a	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB28b	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CBMH104	JUNCTION	0.00	0.00	113.75	0	00:00	0.00
HP-PR-CBMH105	JUNCTION	0.00	0.00	113.68	0	00:00	0.00
HP-PR-CBMH106	JUNCTION	0.00	0.00	113.80	0	00:00	0.00
HP-PR-CBMH107a	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CBMH107b	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CBMH108	JUNCTION	0.00	0.00	113.90	0	00:00	0.00
HP-PR-CBMH109	JUNCTION	0.00	0.00	113.60	0	00:00	0.00
HP-PR-CBMH110	JUNCTION	0.00	0.00	115.25	0	00:00	0.00
HP-PR-CBMH112	JUNCTION	0.00	0.00	115.40	0	00:00	0.00
HP-PR-CBMH114a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CBMH114b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CBMH115	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
SWALE01	JUNCTION	0.00	0.07	113.67	0	01:10	0.07
SWALE02	JUNCTION	0.01	0.24	113.50	0	01:11	0.24
SWALE03	JUNCTION	0.00	0.08	113.23	0	01:10	0.08
HP-PR-CB01	OUTFALL	0.00	0.00	113.63	0	00:00	0.00
HP-PR-CB11	OUTFALL	0.00	0.00	113.80	0	00:00	0.00
HP-PR-CB29	OUTFALL	0.00	0.00	113.00	0	00:00	0.00
HP-PR-CB30	OUTFALL	0.00	0.00	112.70	0	00:00	0.00
HP-PR-CB31	OUTFALL	0.00	0.00	112.70	0	00:00	0.00
HP-PR-CB32	OUTFALL	0.00	0.00	112.55	0	00:00	0.00
HP-PR-CBMH118	OUTFALL	0.00	0.00	112.70	0	00:00	0.00
SWM_Pond	OUTFALL	0.05	0.26	103.21	0	01:12	0.26
SWM_Pond_OV	OUTFALL	0.00	0.00	106.00	0	00:00	0.00
EX-BLDG01	STORAGE	0.00	0.06	120.06	0	01:14	0.06
EX-CB116	STORAGE	0.59	1.04	113.43	0	01:09	1.02
EX-CB117	STORAGE	0.64	1.92	113.41	0	01:22	1.92
EX-CB128	STORAGE	0.77	1.87	113.78	0	01:53	1.87
EX-CB131	STORAGE	0.01	0.78	106.07	0	01:10	0.78
EX-CB137	STORAGE	0.66	2.26	113.66	0	01:10	2.26
EX-CB14	STORAGE	0.89	2.34	112.93	0	01:54	2.34
EX-CB28	STORAGE	0.80	1.95	113.78	0	01:50	1.95
EX-CB30	STORAGE	0.78	1.88	113.78	0	01:44	1.88
EX-CB50	STORAGE	0.95	2.12	113.86	0	02:08	2.12
EX-CB52	STORAGE	0.92	2.02	113.86	0	02:07	2.02
EX-CB54	STORAGE	0.89	1.94	113.86	0	02:07	1.94
EX-CB58	STORAGE	0.92	2.02	113.86	0	02:10	2.02
EX-CB60	STORAGE	0.10	1.66	113.81	0	01:23	1.66
EX-CB62	STORAGE	0.07	1.17	113.81	0	01:23	1.17
EX-CB64	STORAGE	0.63	2.06	113.56	0	01:14	2.06
EX-CB72	STORAGE	0.01	0.28	111.46	0	01:10	0.28
EX-CB82	STORAGE	0.64	1.87	113.89	0	01:10	1.87
EX-CB84	STORAGE	0.62	2.18	113.70	0	01:12	2.18
EX-CB87	STORAGE	0.78	1.87	113.77	0	01:53	1.87
EX-CB90	STORAGE	0.78	1.86	113.77	0	01:53	1.86
EX-CB92	STORAGE	0.78	1.89	113.78	0	01:53	1.89
EX-CB95	STORAGE	0.78	1.93	113.78	0	01:53	1.93
EX-CB96	STORAGE	0.84	2.16	113.78	0	01:52	2.16
EX-MH101	STORAGE	0.05	0.26	104.83	0	01:11	0.26
EX-MH101A	STORAGE	0.05	0.26	107.44	0	01:19	0.26
EX-MH101B	STORAGE	0.05	0.23	105.56	0	01:19	0.23
EX-MH102	STORAGE	0.05	0.25	109.63	0	01:19	0.25
EX-MH102A	STORAGE	0.04	0.14	112.56	0	01:35	0.14
EX-MH103	STORAGE	0.00	0.06	110.77	0	01:10	0.06

EX-MH104	STORAGE	0.04	0.27	110.92	0	01:18	0.27
EXMH-105	STORAGE	0.46	2.49	113.77	0	01:52	2.49
EXMH-105a	STORAGE	0.03	0.13	111.41	0	01:53	0.13
EX-MH106	STORAGE	0.27	1.62	113.77	0	01:52	1.62
EX-MH106a	STORAGE	0.36	2.06	113.77	0	01:52	2.06
EX-MH107	STORAGE	0.23	1.43	113.78	0	01:50	1.43
EX-MH107a	STORAGE	0.26	1.58	113.77	0	01:52	1.58
EX-MH108	STORAGE	0.01	0.21	111.53	0	01:14	0.21
EX-MH109	STORAGE	0.06	0.36	111.34	0	01:18	0.36
EX-MH112	STORAGE	0.43	1.71	113.86	0	02:09	1.71
EX-MH112a	STORAGE	0.03	0.09	112.24	0	02:10	0.09
EX-MH115	STORAGE	0.04	0.18	105.23	0	01:18	0.18
EX-MH116	STORAGE	0.03	0.18	105.68	0	01:16	0.18
EX-STUB02	STORAGE	0.02	0.25	111.63	0	01:14	0.25
PR-BLDG01	STORAGE	0.01	0.10	120.10	0	01:39	0.10
PR-BLDG02	STORAGE	0.01	0.09	120.09	0	01:30	0.09
PR-CB01	STORAGE	0.04	0.77	113.13	0	01:22	0.77
PR-CB02	STORAGE	0.04	0.73	113.13	0	01:22	0.73
PR-CB02a	STORAGE	0.05	0.85	113.13	0	01:22	0.85
PR-CB03	STORAGE	0.04	0.73	113.13	0	01:23	0.73
PR-CB04	STORAGE	0.04	0.73	113.13	0	01:22	0.73
PR-CB05	STORAGE	0.03	0.72	113.17	0	01:20	0.72
PR-CB06	STORAGE	0.07	0.73	113.18	0	01:32	0.73
PR-CB07	STORAGE	0.08	0.82	113.18	0	01:32	0.82
PR-CB08	STORAGE	0.08	0.76	113.26	0	01:36	0.76
PR-CB09	STORAGE	0.09	0.74	113.34	0	01:42	0.74
PR-CB10	STORAGE	0.07	0.74	112.99	0	01:30	0.74
PR-CB11	STORAGE	0.12	0.72	113.32	0	02:01	0.72
PR-CB12	STORAGE	0.17	0.90	113.32	0	02:00	0.90
PR-CB13	STORAGE	0.02	0.75	113.10	0	01:14	0.75
PR-CB14	STORAGE	0.01	0.49	112.84	0	01:13	0.49
PR-CB15	STORAGE	0.06	0.38	112.58	0	01:53	0.38
PR-CB16/17	STORAGE	0.18	0.86	112.95	0	01:58	0.86
PR-CB18	STORAGE	0.02	0.74	114.59	0	01:14	0.74
PR-CB19	STORAGE	0.06	0.62	114.27	0	01:34	0.62
PR-CB20	STORAGE	0.03	0.42	114.27	0	01:33	0.42
PR-CB21	STORAGE	0.09	0.99	114.99	0	01:32	0.99
PR-CB22	STORAGE	0.24	0.95	114.75	0	02:22	0.95
PR-CB23	STORAGE	0.16	0.75	114.75	0	02:21	0.75
PR-CB24	STORAGE	0.11	1.15	115.50	0	01:34	1.15
PR-CB25	STORAGE	0.26	0.96	115.10	0	02:26	0.96
PR-CB26	STORAGE	0.16	0.75	115.10	0	02:27	0.75
PR-CB27	STORAGE	0.16	0.75	115.26	0	02:13	0.75
PR-CB28	STORAGE	0.10	0.56	115.26	0	02:13	0.56
PR-CB29	STORAGE	0.09	0.72	112.22	0	01:39	0.72
PR-CB29a	STORAGE	0.01	0.06	111.56	0	01:40	0.06
PR-CB30	STORAGE	0.12	0.71	111.91	0	02:08	0.71
PR-CB31	STORAGE	0.19	0.90	111.91	0	02:07	0.90
PR-CB32	STORAGE	0.09	0.75	111.65	0	01:34	0.75
PR-CBMH104	STORAGE	0.04	0.87	113.17	0	01:20	0.87
PR-CBMH105	STORAGE	0.09	0.92	113.18	0	01:32	0.91
PR-CBMH106	STORAGE	0.12	0.95	113.26	0	01:35	0.95
PR-CBMH107	STORAGE	0.13	0.93	113.34	0	01:42	0.93
PR-CBMH108	STORAGE	0.24	1.11	113.32	0	02:00	1.11
PR-CBMH108a	STORAGE	0.02	0.07	112.28	0	02:00	0.07
PR-CBMH109	STORAGE	0.14	0.68	112.58	0	01:52	0.68
PR-CBMH110	STORAGE	0.14	0.97	114.27	0	01:33	0.97
PR-CBMH112	STORAGE	0.32	1.14	114.75	0	02:20	1.14
PR-CBMH114	STORAGE	0.35	1.15	115.10	0	02:26	1.15
PR-CBMH115	STORAGE	0.28	1.07	115.26	0	02:12	1.07
PR-CBMH115a	STORAGE	0.02	0.05	114.24	0	02:12	0.05
PR-CBMH118	STORAGE	0.25	1.06	111.90	0	02:06	1.06
PR-MH100	STORAGE	0.07	0.97	113.13	0	01:22	0.97
PR-MH100a	STORAGE	0.02	0.16	112.32	0	01:25	0.16
PR-MH101	STORAGE	0.03	0.18	111.88	0	01:25	0.18
PR-MH102	STORAGE	0.04	0.19	111.47	0	01:26	0.19
PR-MH103	STORAGE	0.05	0.27	111.37	0	01:19	0.27
PR-MH111	STORAGE	0.04	0.13	113.43	0	01:35	0.13
PR-MH113	STORAGE	0.03	0.09	113.82	0	01:37	0.09
PR-MH116	STORAGE	0.02	0.10	110.37	0	01:16	0.10
PR-MH117	STORAGE	0.03	0.09	110.82	0	01:56	0.09
PR-STUB01	STORAGE	0.01	0.09	110.80	0	01:14	0.09
PR-TD01	STORAGE	0.01	0.25	112.90	0	01:12	0.25
PR-TD02	STORAGE	0.02	0.48	113.13	0	01:14	0.48

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
HP-01	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-02	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-03	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-05	JUNCTION	0.00	62.06	0 01:10	0	0.0251	-0.250
HP-EX-CB116	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-EX-CB117	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr

HP-EX-CB128	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB131	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB137	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB14	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB28	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB30a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB30b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB50a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB50b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB52	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB54	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB58a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB58b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB60	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB62	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB64	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB72	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB82	JUNCTION	0.00	62.07	0	01:10	0	0.0251	0.003	
HP-EX-CB84	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB87a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB87b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB90	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB92	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB95a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB95b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB96	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB02	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB03	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB04	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB05	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB06	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB13	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB14	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB15	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB16/17	JUNCTION	0.00	31.64	0	01:10	0	0.0142	-0.026	
HP-PR-CB18	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB19	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB20	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB21	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB22	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB23	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB24	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB25a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB25b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB26a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB26b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB27a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB27b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB28a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB28b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH104	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH105	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH106	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH107a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH107b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH108	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH109	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH110	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH112	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH114a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH114b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH115	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
SWALE01	JUNCTION	60.04	60.04	0	01:10	0.0879	0.0879	-0.110	
SWALE02	JUNCTION	0.00	59.32	0	01:10	0	0.088	0.163	
SWALE03	JUNCTION	135.46	189.52	0	01:09	0.199	0.287	1.394	
HP-PR-CB01	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB11	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB29	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB30	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB31	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB32	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH118	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
SWM_Pond	OUTFALL	0.00	404.99	0	01:12	0	3.71	0.000	
SWM_Pond_OV	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
EX-BLDG01	STORAGE	167.11	167.11	0	01:10	0.277	0.277	-0.041	
EX-CB116	STORAGE	15.95	33.47	0	01:07	0.0228	0.0233	0.299	
EX-CB117	STORAGE	12.88	34.29	0	01:09	0.0183	0.0373	-0.060	
EX-CB128	STORAGE	11.42	78.70	0	01:06	0.0165	0.0199	-0.812	
EX-CB131	STORAGE	8.42	70.43	0	01:10	0.0114	0.0366	0.015	
EX-CB137	STORAGE	39.89	39.89	0	01:10	0.0569	0.0569	-0.034	
EX-CB14	STORAGE	0.00	180.07	0	01:10	0	0.283	-1.205	
EX-CB28	STORAGE	56.24	56.24	0	01:10	0.0802	0.0805	0.564	
EX-CB30	STORAGE	39.10	39.10	0	01:10	0.0558	0.0559	0.210	
EX-CB50	STORAGE	53.72	76.12	0	01:05	0.0769	0.154	0.135	
EX-CB52	STORAGE	41.01	92.63	0	01:04	0.0585	0.0843	0.565	
EX-CB54	STORAGE	15.43	70.44	0	01:03	0.0219	0.0251	-1.190	
EX-CB58	STORAGE	32.21	32.21	0	01:10	0.0459	0.047	0.103	

EX-CB60	STORAGE	21.49	29.08	0	01:06	0.0317	0.047	0.054
EX-CB62	STORAGE	10.65	10.65	0	01:10	0.0154	0.0154	0.020
EX-CB64	STORAGE	21.31	21.31	0	01:10	0.0302	0.0302	-0.356
EX-CB72	STORAGE	8.34	8.34	0	01:10	0.0117	0.0117	0.000
EX-CB82	STORAGE	81.15	81.15	0	01:10	0.116	0.116	-0.024
EX-CB84	STORAGE	33.75	33.75	0	01:10	0.048	0.048	0.114
EX-CB87	STORAGE	25.26	38.87	0	01:05	0.0359	0.0365	-0.022
EX-CB90	STORAGE	38.72	48.69	0	01:08	0.0552	0.0557	-0.080
EX-CB92	STORAGE	34.55	43.16	0	01:09	0.0493	0.053	-0.239
EX-CB95	STORAGE	11.72	85.55	0	01:05	0.017	0.0405	-0.907
EX-CB96	STORAGE	48.21	87.81	0	01:05	0.0689	0.105	1.039
EX-MH101	STORAGE	0.00	404.97	0	01:11	0	3.71	-0.014
EX-MH101A	STORAGE	0.00	341.20	0	01:19	0	3.2	-0.000
EX-MH101B	STORAGE	0.00	341.21	0	01:19	0	3.2	0.005
EX-MH102	STORAGE	0.00	324.07	0	01:19	0	2.92	-0.000
EX-MH102A	STORAGE	0.00	35.14	0	01:35	0	0.678	-0.000
EX-MH103	STORAGE	0.00	8.30	0	01:10	0	0.0117	-0.002
EX-MH104	STORAGE	0.00	288.69	0	01:18	0	2.23	-0.000
EXMH-105	STORAGE	0.00	51.98	0	01:03	0	0.345	-0.002
EXMH-105a	STORAGE	0.00	20.90	0	01:52	0	0.344	-0.001
EX-MH106	STORAGE	0.00	91.38	0	01:03	0	0.262	-0.083
EX-MH106a	STORAGE	0.00	110.57	0	01:03	0	0.346	0.028
EX-MH107	STORAGE	0.00	82.09	0	01:05	0	0.127	-0.365
EX-MH107a	STORAGE	0.00	112.25	0	01:07	0	0.268	0.001
EX-MH108	STORAGE	0.00	101.58	0	01:14	0	0.277	-0.018
EX-MH109	STORAGE	0.00	228.14	0	01:17	0	1.75	0.011
EX-MH112	STORAGE	0.00	32.15	0	01:05	0	0.188	-0.057
EX-MH112a	STORAGE	0.00	8.15	0	02:09	0	0.186	-0.000
EX-MH115	STORAGE	0.00	43.95	0	01:16	0	0.48	0.076
EX-MH116	STORAGE	0.00	43.92	0	01:16	0	0.48	-0.005
EX-STUB02	STORAGE	0.00	101.57	0	01:14	0	0.277	0.038
PR-BLDG01	STORAGE	240.65	240.65	0	01:10	0.372	0.372	0.001
PR-BLDG02	STORAGE	64.96	64.96	0	01:10	0.0992	0.0992	0.001
PR-CB01	STORAGE	12.31	12.31	0	01:10	0.0174	0.0174	-0.021
PR-CB02	STORAGE	7.96	9.48	0	01:08	0.0112	0.0118	0.076
PR-CB02a	STORAGE	0.00	5.07	0	01:35	0	0.0302	-0.042
PR-CB03	STORAGE	14.08	14.08	0	01:10	0.02	0.02	0.080
PR-CB04	STORAGE	18.76	18.76	0	01:10	0.0266	0.0266	0.090
PR-CB05	STORAGE	17.71	17.71	0	01:10	0.0253	0.0254	-0.021
PR-CB06	STORAGE	12.21	12.21	0	01:10	0.0173	0.0176	0.002
PR-CB07	STORAGE	14.97	18.59	0	01:05	0.0212	0.039	0.000
PR-CB08	STORAGE	21.98	26.43	0	01:13	0.0314	0.033	-0.076
PR-CB09	STORAGE	24.10	24.10	0	01:10	0.0345	0.0362	-0.080
PR-CB10	STORAGE	27.38	27.38	0	01:10	0.039	0.039	0.006
PR-CB11	STORAGE	31.57	33.04	0	01:12	0.0451	0.054	-0.026
PR-CB12	STORAGE	42.45	82.02	0	01:11	0.0607	0.124	0.016
PR-CB13	STORAGE	10.45	10.45	0	01:10	0.0149	0.0149	0.007
PR-CB14	STORAGE	4.86	4.86	0	01:10	0.00686	0.00686	0.007
PR-CB15	STORAGE	20.63	31.64	0	01:10	0.0291	0.0368	-0.048
PR-CB16/17	STORAGE	95.30	126.92	0	01:10	0.139	0.153	0.008
PR-CB18	STORAGE	10.27	10.27	0	01:10	0.0146	0.0146	0.007
PR-CB19	STORAGE	12.07	32.30	0	01:11	0.0171	0.0412	0.009
PR-CB20	STORAGE	16.00	16.00	0	01:10	0.0228	0.0229	-0.249
PR-CB21	STORAGE	35.51	35.51	0	01:10	0.051	0.051	0.006
PR-CB22	STORAGE	34.88	67.52	0	01:13	0.0501	0.126	-0.070
PR-CB23	STORAGE	45.55	45.55	0	01:10	0.0654	0.0705	0.018
PR-CB24	STORAGE	45.56	45.56	0	01:10	0.0654	0.0654	0.007
PR-CB25	STORAGE	37.68	70.32	0	01:13	0.0541	0.137	-0.200
PR-CB26	STORAGE	50.01	50.01	0	01:10	0.0718	0.0774	0.253
PR-CB27	STORAGE	33.84	65.71	0	01:12	0.0486	0.102	-0.005
PR-CB28	STORAGE	33.00	33.00	0	01:10	0.0473	0.0486	0.030
PR-CB29	STORAGE	53.34	53.34	0	01:10	0.0767	0.0767	0.007
PR-CB29a	STORAGE	0.00	6.24	0	01:39	0	0.0767	0.000
PR-CB30	STORAGE	29.96	29.96	0	01:10	0.0431	0.0538	-0.021
PR-CB31	STORAGE	35.69	58.86	0	01:13	0.0517	0.119	-0.007
PR-CB32	STORAGE	50.96	50.96	0	01:10	0.0733	0.0733	0.006
PR-CBMH104	STORAGE	9.95	18.55	0	01:10	0.014	0.0394	0.013
PR-CBMH105	STORAGE	9.20	16.60	0	01:05	0.013	0.0517	0.015
PR-CBMH106	STORAGE	23.16	28.49	0	01:05	0.0329	0.0659	0.028
PR-CBMH107	STORAGE	27.30	32.69	0	01:05	0.039	0.0753	0.047
PR-CBMH108	STORAGE	46.71	59.65	0	01:06	0.0668	0.182	-0.013
PR-CBMH108a	STORAGE	0.00	7.80	0	02:00	0	0.173	-0.000
PR-CBMH109	STORAGE	37.54	37.54	0	01:10	0.0532	0.09	0.034
PR-CBMH110	STORAGE	12.09	26.79	0	01:07	0.0171	0.0582	0.047
PR-CBMH112	STORAGE	35.28	52.84	0	01:10	0.0507	0.172	0.013
PR-CBMH114	STORAGE	37.67	56.76	0	01:10	0.0541	0.186	0.010
PR-CBMH115	STORAGE	32.99	54.53	0	01:06	0.0473	0.148	-0.070
PR-CBMH115a	STORAGE	0.00	5.35	0	02:12	0	0.143	0.013
PR-CBMH118	STORAGE	62.46	62.46	0	01:10	0.0908	0.199	-0.002
PR-MH100	STORAGE	0.00	14.83	0	01:05	0	0.0763	0.043
PR-MH100a	STORAGE	0.00	39.40	0	01:23	0	0.343	-0.018
PR-MH101	STORAGE	0.00	53.07	0	01:24	0	0.537	-0.002
PR-MH102	STORAGE	0.00	73.55	0	01:26	0	0.853	0.095
PR-MH103	STORAGE	0.00	81.21	0	01:26	0	0.878	-0.022
PR-MH111	STORAGE	0.00	35.21	0	01:33	0	0.678	0.025
PR-MH113	STORAGE	0.00	16.29	0	01:36	0	0.389	-0.050
PR-MH116	STORAGE	0.00	43.92	0	01:16	0	0.48	-0.004
PR-MH117	STORAGE	0.00	13.95	0	01:53	0	0.262	-0.001
PR-STUB01	STORAGE	0.00	25.19	0	01:14	0	0.145	0.019
PR-TD01	STORAGE	8.46	8.46	0	01:10	0.012	0.012	0.005
PR-TD02	STORAGE	23.50	23.50	0	01:10	0.0335	0.0335	0.007

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Node Surcharge Summary
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No nodes were surcharged.

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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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 LPS
EX-BLDG01	0.001	0	0	0	0.047	1	0	01:14	101.57
EX-CB116	0.004	29	0	0	0.007	48	0	01:08	21.47
EX-CB117	0.004	10	0	0	0.012	26	0	01:22	24.09
EX-CB128	0.005	21	0	0	0.007	33	0	01:53	12.25
EX-CB131	0.000	0	0	0	0.000	0	0	00:00	70.14
EX-CB137	0.004	37	0	0	0.011	89	0	01:10	39.85
EX-CB14	0.005	68	0	0	0.007	100	0	01:00	17.73
EX-CB28	0.007	4	0	0	0.029	16	0	01:50	49.66
EX-CB30	0.006	4	0	0	0.023	16	0	01:44	32.56
EX-CB50	0.010	9	0	0	0.046	40	0	02:08	35.81
EX-CB52	0.009	7	0	0	0.035	26	0	02:07	57.78
EX-CB54	0.005	18	0	0	0.009	33	0	02:07	27.60
EX-CB58	0.008	10	0	0	0.029	38	0	02:10	23.54
EX-CB60	0.000	1	0	0	0.009	33	0	01:23	8.21
EX-CB62	0.000	2	0	0	0.003	69	0	01:23	11.76
EX-CB64	0.004	24	0	0	0.011	61	0	01:14	7.69
EX-CB72	0.000	0	0	0	0.000	0	0	00:00	8.30
EX-CB82	0.005	21	0	0	0.023	100	0	01:07	81.09
EX-CB84	0.004	6	0	0	0.011	15	0	01:12	21.31
EX-CB87	0.006	4	0	0	0.018	14	0	01:53	25.71
EX-CB90	0.006	4	0	0	0.027	16	0	01:53	32.86
EX-CB92	0.007	9	0	0	0.030	38	0	01:53	32.00
EX-CB95	0.005	21	0	0	0.010	41	0	01:53	68.10
EX-CB96	0.007	9	0	0	0.035	43	0	01:52	75.12
EX-MH101	0.000	2	0	0	0.000	11	0	01:11	404.99
EX-MH101A	0.000	1	0	0	0.000	5	0	01:19	341.21
EX-MH101B	0.000	1	0	0	0.000	5	0	01:19	341.21
EX-MH102	0.000	1	0	0	0.000	5	0	01:19	324.08
EX-MH102A	0.000	2	0	0	0.000	8	0	01:35	35.12
EX-MH103	0.000	0	0	0	0.000	3	0	01:10	8.23
EX-MH104	0.000	1	0	0	0.000	9	0	01:18	288.69
EXMH-105	0.000	13	0	0	0.000	68	0	01:52	20.90
EXMH-105a	0.000	1	0	0	0.000	5	0	01:53	20.90
EX-MH106	0.000	10	0	0	0.000	60	0	01:52	73.73
EX-MH106a	0.000	11	0	0	0.000	66	0	01:52	51.98
EX-MH107	0.000	9	0	0	0.000	58	0	01:50	60.29
EX-MH107a	0.000	10	0	0	0.000	60	0	01:52	91.38
EX-MH108	0.000	1	0	0	0.000	9	0	01:14	101.67
EX-MH109	0.000	2	0	0	0.000	14	0	01:18	227.95
EX-MH112	0.000	16	0	0	0.000	62	0	02:09	27.94
EX-MH112a	0.000	2	0	0	0.000	5	0	02:10	8.15
EX-MH115	0.000	2	0	0	0.000	10	0	01:18	43.87
EX-MH116	0.000	3	0	0	0.000	13	0	01:16	43.95
EX-STUB02	0.000	1	0	0	0.000	11	0	01:14	101.58
PR-BLDG01	0.023	0	0	0	0.215	3	0	01:39	30.01
PR-BLDG02	0.004	0	0	0	0.051	3	0	01:30	11.09
PR-CB01	0.000	0	0	0	0.006	12	0	01:22	3.19
PR-CB02	0.000	1	0	0	0.006	17	0	01:22	2.24
PR-CB02a	0.000	2	0	0	0.000	40	0	01:22	5.33
PR-CB03	0.000	0	0	0	0.006	12	0	01:23	5.16
PR-CB04	0.000	0	0	0	0.006	8	0	01:22	9.67
PR-CB05	0.000	0	0	0	0.006	9	0	01:20	8.61
PR-CB06	0.001	2	0	0	0.008	29	0	01:32	3.88
PR-CB07	0.001	2	0	0	0.009	25	0	01:21	8.37
PR-CB08	0.001	2	0	0	0.017	28	0	01:36	5.77
PR-CB09	0.002	3	0	0	0.020	29	0	01:42	5.80
PR-CB10	0.001	2	0	0	0.020	27	0	01:30	4.33
PR-CB11	0.004	4	0	0	0.035	36	0	02:01	14.60
PR-CB12	0.007	4	0	0	0.039	26	0	01:23	14.32
PR-CB13	0.000	2	0	0	0.004	70	0	01:14	4.52
PR-CB14	0.000	0	0	0	0.002	15	0	01:13	2.32
PR-CB15	0.003	1	0	0	0.027	12	0	01:53	6.02
PR-CB16/17	0.019	9	0	0	0.107	48	0	01:53	6.95
PR-CB18	0.000	1	0	0	0.004	47	0	01:14	4.48
PR-CB19	0.001	3	0	0	0.008	45	0	01:34	14.81
PR-CB20	0.000	1	0	0	0.004	23	0	01:33	15.89
PR-CB21	0.002	5	0	0	0.028	53	0	01:27	5.23
PR-CB22	0.009	14	0	0	0.039	60	0	01:24	18.58

PR-CB23	0.005	9	0	0	0.037	62	0	02:21	24.47
PR-CB24	0.004	4	0	0	0.039	33	0	01:29	5.63
PR-CB25	0.011	9	0	0	0.043	37	0	01:25	20.08
PR-CB26	0.006	6	0	0	0.041	39	0	02:27	26.80
PR-CB27	0.006	5	0	0	0.037	32	0	02:13	22.68
PR-CB28	0.003	2	0	0	0.020	18	0	02:13	26.22
PR-CB29	0.004	5	0	0	0.044	49	0	01:39	6.24
PR-CB29a	0.000	0	0	0	0.000	3	0	01:40	6.24
PR-CB30	0.005	9	0	0	0.037	75	0	02:08	15.96
PR-CB31	0.008	11	0	0	0.043	59	0	01:27	14.07
PR-CB32	0.004	9	0	0	0.041	94	0	01:34	6.47
PR-CBMH104	0.000	1	0	0	0.006	19	0	01:11	11.68
PR-CBMH105	0.001	2	0	0	0.009	22	0	01:12	10.26
PR-CBMH106	0.002	2	0	0	0.017	20	0	01:13	19.56
PR-CBMH107	0.003	4	0	0	0.021	31	0	01:14	14.69
PR-CBMH108	0.009	6	0	0	0.039	24	0	01:10	50.17
PR-CBMH108a	0.000	1	0	0	0.000	3	0	02:00	7.80
PR-CBMH109	0.004	5	0	0	0.025	30	0	01:52	15.29
PR-CBMH110	0.002	4	0	0	0.013	36	0	01:11	19.84
PR-CBMH112	0.012	19	0	0	0.039	60	0	01:12	36.45
PR-CBMH114	0.015	12	0	0	0.043	35	0	01:13	37.13
PR-CBMH115	0.011	10	0	0	0.039	35	0	01:12	36.29
PR-CBMH115a	0.000	1	0	0	0.000	2	0	02:12	5.35
PR-CBMH118	0.011	19	0	0	0.043	76	0	01:13	45.27
PR-MH100	0.000	3	0	0	0.000	39	0	01:22	12.49
PR-MH100a	0.000	1	0	0	0.000	6	0	01:25	39.34
PR-MH101	0.000	2	0	0	0.000	8	0	01:25	52.98
PR-MH102	0.000	2	0	0	0.000	8	0	01:26	73.55
PR-MH103	0.000	2	0	0	0.000	11	0	01:19	82.04
PR-MH111	0.000	2	0	0	0.000	7	0	01:35	35.14
PR-MH113	0.000	2	0	0	0.000	5	0	01:37	16.28
PR-MH116	0.000	1	0	0	0.000	4	0	01:16	43.92
PR-MH117	0.000	1	0	0	0.000	3	0	01:56	13.95
PR-STUB01	0.000	0	0	0	0.000	4	0	01:14	25.19
PR-TD01	0.000	0	0	0	0.002	11	0	01:12	6.20
PR-TD02	0.000	0	0	0	0.010	16	0	01:14	9.04

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
HP-PR-CB01	0.00	0.00	0.00	0.000
HP-PR-CB11	0.00	0.00	0.00	0.000
HP-PR-CB29	0.00	0.00	0.00	0.000
HP-PR-CB30	0.00	0.00	0.00	0.000
HP-PR-CB31	0.00	0.00	0.00	0.000
HP-PR-CB32	0.00	0.00	0.00	0.000
HP-PR-CBMH118	0.00	0.00	0.00	0.000
SWM_Pond	62.05	72.12	404.99	3.714
SWM_Pond_OV	0.00	0.00	0.00	0.000
System	6.89	72.12	0.00	3.714

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
102_(CB)	CONDUIT	7.55	0	01:05	0.27	0.18	1.00
104_(CB)	CONDUIT	3.88	0	01:05	0.33	0.09	1.00
108_(CB)	CONDUIT	5.16	0	01:05	0.46	0.12	1.00
115_(CB)	CONDUIT	15.43	0	01:11	0.27	0.16	1.00
121_(CB)	CONDUIT	15.89	0	01:07	0.65	0.38	1.00
126_(STM)	CONDUIT	15.96	0	01:03	0.50	0.38	1.00
138_(CB)	CONDUIT	3.19	0	01:21	0.30	0.05	1.00
14_(STM)	CONDUIT	8.15	0	02:10	0.53	0.19	0.27
142_(STM)	CONDUIT	9.67	0	01:05	0.50	0.23	1.00
145_(CB)	CONDUIT	10.05	0	01:15	0.22	0.24	1.00
150_(STM)_2	CONDUIT	6.24	0	01:40	0.78	0.11	0.22
154_(CB)	CONDUIT	37.96	0	01:13	0.77	0.89	1.00
156_(STM)_1	CONDUIT	2.24	0	01:36	0.37	0.05	1.00
156_(STM)_2	CONDUIT	5.33	0	01:35	0.17	0.08	1.00
17_(1)_(STM)_4	CONDUIT	13.95	0	01:56	0.76	0.20	0.30
18_(STM)	CONDUIT	43.92	0	01:16	2.58	0.30	0.38
20_(STM)	CONDUIT	25.19	0	01:14	1.50	0.30	0.37
28_(STM)	CONDUIT	35.14	0	01:35	1.22	0.37	0.43
30_(STM)	CONDUIT	16.28	0	01:37	0.88	0.19	0.33
32_(STM)	CONDUIT	5.35	0	02:12	0.57	0.06	0.21
34_(1)_(STM)	CONDUIT	26.22	0	01:05	0.64	0.62	1.00
34_(STM)	CONDUIT	31.20	0	01:12	0.64	0.63	1.00
36_(1)_(STM)	CONDUIT	32.11	0	01:13	0.65	0.77	1.00

42_(1)_(STM)	CONDUIT	24.47	0	01:03	0.61	0.56	1.00
42_(2)_(STM)	CONDUIT	31.41	0	01:13	0.64	0.76	1.00
49_(STM)	CONDUIT	26.80	0	01:03	0.70	0.65	1.00
5_(STM)	CONDUIT	39.34	0	01:26	0.86	0.25	0.33
57_(STM)	CONDUIT	7.80	0	02:00	0.65	0.11	0.23
59_(STM)	CONDUIT	42.71	0	01:11	0.87	1.02	1.00
61_(STM)	CONDUIT	14.60	0	01:02	0.49	0.35	1.00
64_(CB)	CONDUIT	11.30	0	01:10	0.23	0.19	1.00
7_(STM)	CONDUIT	52.98	0	01:26	0.91	0.22	0.32
86_(CB)	CONDUIT	14.87	0	01:13	0.30	0.35	1.00
9_(1)_(STM)	CONDUIT	82.04	0	01:27	0.72	0.24	0.51
9_(STM)_2	CONDUIT	73.55	0	01:26	0.86	0.22	0.38
94_(CB)	CONDUIT	8.61	0	01:10	0.31	0.21	1.00
C1	CONDUIT	21.47	0	01:09	1.36	0.45	1.00
C10	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C100	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C101	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C102	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C103	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C104	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C105	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C106	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C107	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C108	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C109	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C11	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C110	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C111	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C112	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C113	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C114	CONDUIT	0.00	0	00:00	0.00	0.00	0.02
C115	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C116	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C117	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C118	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C119	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C12	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C120	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C121	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C122	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C123	CONDUIT	0.00	0	00:00	0.00	0.00	0.02
C124	CONDUIT	0.00	0	00:00	0.00	0.00	0.02
C125	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C126	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C127	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C128	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C129	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C13	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C130	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C131	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C132	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C133	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C134	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C135	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C136	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C137	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C138	CONDUIT	0.00	0	00:00	0.00	0.00	0.02
C139	CONDUIT	0.00	0	00:00	0.00	0.00	0.01
C14	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C140	CONDUIT	42.20	0	01:10	0.35	0.03	0.31
C141	CONDUIT	12.82	0	01:10	0.20	0.04	0.15
C15	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C17	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C18	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C19	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C2	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C20	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C21	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C22	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C23	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C24	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C25	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C26	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C27	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C28	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C29	CONDUIT	31.64	0	01:10	0.07	0.00	0.14
C3	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C30	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C31	CONDUIT	31.63	0	01:10	1.01	0.00	0.01
C32	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C33	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C34	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C35	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C36	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C37	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C38	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C39	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C4	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C40	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C41	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C42	CONDUIT	0.00	0	00:00	0.00	0.00	0.00

C43	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C44	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C45	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C46	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C47	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C48	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C49	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C5	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C50	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C51	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C52	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C53	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C53_1	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C53_2	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C54	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C54_1	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C54_2	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C55	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C56	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C57	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C58	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C59	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C6	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C60	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C61	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C62	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C63	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C64	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C65	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C66	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C67	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C68	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C69	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C7	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C70	CONDUIT	46.50	0	01:10	0.22	0.01	0.15
C71	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C72	CONDUIT	137.87	0	01:10	0.41	0.01	0.31
C73	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C74	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C75	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C76	CONDUIT	0.00	0	00:00	0.00	0.00	0.05
C77	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C78	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C79	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C80	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
C81	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C82	CONDUIT	0.00	0	00:00	0.00	0.00	0.30
C83	CONDUIT	0.00	0	00:00	0.00	0.00	0.30
C84	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C84_1	CONDUIT	62.07	0	01:10	0.31	0.00	0.07
C84_2	CONDUIT	62.06	0	01:10	1.24	0.00	0.02
C85	CONDUIT	62.06	0	01:10	2.02	0.00	0.01
C86	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C87	CONDUIT	0.00	0	00:00	0.00	0.00	0.01
C88	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C89	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C9	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C90	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C91	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C92	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C93	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C94	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C95	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C96	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C97	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C98	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C99	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C-CB22	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C-CB23	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C-CB24	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C-CB25	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C-CB87	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C-CBMH112	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C-CBMH114	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
CULV-4	CONDUIT	56.69	0	01:09	1.37	0.55	0.40
X-CB-129_(X-CB)	CONDUIT	68.10	0	01:06	2.17	2.45	1.00
X-CB-89_(X-CB)	CONDUIT	25.71	0	01:05	0.82	0.39	1.00
X-CB-91_(X-CB)	CONDUIT	32.86	0	01:06	1.33	0.44	1.00
X-CB-94_(X-CB)	CONDUIT	32.00	0	01:05	1.02	0.81	1.00
X-CB-97_(X-CB)	CONDUIT	75.12	0	01:05	1.07	0.92	1.00
X-CB-98_(X-CB)	CONDUIT	47.03	0	01:07	0.67	1.11	1.00
X-STM-13_(1)_(X-STM)	CONDUIT	341.21	0	01:19	2.50	0.26	0.35
X-STM-13_(X-STM)	CONDUIT	341.21	0	01:19	2.92	0.20	0.31
X-STM-17_(X-STM)	CONDUIT	324.08	0	01:19	2.56	0.23	0.33
X-STM-19_(X-STM)	CONDUIT	35.12	0	01:35	1.16	0.39	0.44
X-STM-2_(X-STM)	CONDUIT	404.99	0	01:12	2.99	0.26	0.35
X-STM-21_(X-STM)	CONDUIT	288.69	0	01:19	2.33	0.41	0.45
X-STM-23_(X-STM)	CONDUIT	20.90	0	01:53	0.68	0.18	0.25
X-STM-25_(X-STM)_1	CONDUIT	73.73	0	01:03	1.23	0.20	1.00
X-STM-25_(X-STM)_2	CONDUIT	51.98	0	01:03	0.75	0.14	1.00
X-STM-27_(X-STM)_1	CONDUIT	60.29	0	01:05	0.85	1.19	1.00

X-STM-27_(X-STM)_2	CONDUIT	91.38	0	01:03	1.44	1.89	1.00
X-STM-29_(X-STM)	CONDUIT	49.66	0	01:06	0.75	1.95	1.00
X-STM-31_(X-STM)	CONDUIT	32.56	0	01:05	1.04	1.45	1.00
X-STM-33_(X-STM)	CONDUIT	227.95	0	01:18	1.40	0.64	0.56
X-STM-5_(X-STM)	CONDUIT	43.87	0	01:18	0.87	0.64	0.69
X-STM-51_(X-STM)	CONDUIT	23.37	0	01:02	0.41	0.79	1.00
X-STM-53_(X-STM)	CONDUIT	35.81	0	01:04	0.51	0.87	1.00
X-STM-55_(X-STM)	CONDUIT	57.78	0	01:03	1.25	1.23	1.00
X-STM-59_(X-STM)	CONDUIT	23.54	0	01:03	0.75	0.71	1.00
X-STM-63_(X-STM)	CONDUIT	11.76	0	01:04	0.49	0.47	1.00
X-STM-7_(X-STM)	CONDUIT	43.95	0	01:16	1.03	0.65	0.58
X-STM-71_(X-STM)	CONDUIT	8.23	0	01:10	0.85	0.08	0.19
X-STM-75_(X-STM)	CONDUIT	101.67	0	01:14	1.14	0.57	0.76
X-STM-77_(X-STM)	CONDUIT	101.58	0	01:14	1.45	0.83	0.61
102_(5)_(CB)	ORIFICE	4.91	0	01:32			1.00
114_(CB)	ORIFICE	4.87	0	01:31			1.00
124_(CB)	ORIFICE	4.48	0	01:14			1.00
131_(CB)	ORIFICE	7.77	0	02:06			1.00
147_(CB)	ORIFICE	5.04	0	01:42			1.00
151_(STM)	ORIFICE	6.24	0	01:39			1.00
36_(STM)	ORIFICE	5.63	0	01:34			1.00
42_(STM)	ORIFICE	5.61	0	02:20			1.00
46_(STM)	ORIFICE	5.62	0	02:26			1.00
54_(STM)	ORIFICE	5.23	0	01:32			1.00
66_(CB)	ORIFICE	4.29	0	01:52			1.00
69_(CB)	ORIFICE	7.29	0	01:22			1.00
78_(CB)	ORIFICE	4.52	0	01:14			1.00
81_(CB)	ORIFICE	2.32	0	01:13			1.00
88_(CB)	ORIFICE	5.10	0	01:35			1.00
91_(CB)	ORIFICE	4.33	0	01:31			1.00
96_(CB)	ORIFICE	8.19	0	01:20			1.00
OR1	ORIFICE	6.47	0	01:34			1.00
OR10	ORIFICE	9.04	0	01:14			1.00
OR11	ORIFICE	8.15	0	02:09			1.00
OR2	ORIFICE	5.35	0	02:12			1.00
OR3	ORIFICE	8.21	0	01:23			1.00
OR4	ORIFICE	7.80	0	02:00			1.00
OR5	ORIFICE	12.19	0	01:22			1.00
OR6	ORIFICE	6.95	0	01:58			1.00
OR7	ORIFICE	20.90	0	01:52			1.00
OR8	ORIFICE	7.69	0	01:14			1.00
OR9	ORIFICE	6.20	0	01:12			1.00
X-CB-135_(X-CB)	ORIFICE	8.21	0	01:10			1.00
X-CB-83_(X-CB)	ORIFICE	19.02	0	01:10			1.00
X-CB-86_(X-CB)	ORIFICE	21.31	0	01:12			1.00
X-STM-130_(X-STM)	ORIFICE	70.14	0	01:10			1.00
X-STM-15_(X-STM)	ORIFICE	17.73	0	01:54			1.00
X-STM-73_(X-STM)	ORIFICE	8.30	0	01:10			1.00
EX-BLDG01-OUT	DUMMY	101.57	0	01:14			
PR-BLDG01-OUT	DUMMY	30.01	0	01:39			
PR-BLDG02-OUT	DUMMY	11.09	0	01:30			

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Flow Classification Summary
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	Adjusted	Fraction of Time in Flow Class								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
102_(CB)	1.00	0.02	0.00	0.00	0.17	0.00	0.00	0.81	0.01	0.00
104_(CB)	1.00	0.02	0.00	0.00	0.16	0.00	0.00	0.82	0.01	0.00
108_(CB)	1.00	0.02	0.00	0.00	0.09	0.00	0.00	0.88	0.00	0.00
115_(CB)	1.00	0.02	0.03	0.00	0.48	0.00	0.00	0.46	0.38	0.00
121_(CB)	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.56	0.00
126_(STM)	1.00	0.02	0.00	0.00	0.35	0.00	0.00	0.62	0.05	0.00
138_(CB)	1.00	0.02	0.01	0.00	0.97	0.00	0.00	0.00	0.87	0.00
14_(STM)	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
142_(STM)	1.00	0.02	0.00	0.00	0.09	0.00	0.00	0.88	0.01	0.00
145_(CB)	1.00	0.02	0.00	0.00	0.24	0.00	0.00	0.74	0.03	0.00
150_(STM)_2	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
154_(CB)	1.00	0.02	0.00	0.00	0.37	0.00	0.00	0.60	0.03	0.00
156_(STM)_1	1.00	0.02	0.00	0.00	0.09	0.00	0.00	0.88	0.01	0.00
156_(STM)_2	1.00	0.02	0.00	0.00	0.25	0.00	0.00	0.73	0.16	0.00
17_(1)_(STM)_4	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
18_(STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
20_(STM)	1.00	0.01	0.00	0.00	0.14	0.02	0.00	0.83	0.15	0.00
28_(STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
30_(STM)	1.00	0.02	0.00	0.00	0.04	0.12	0.00	0.81	0.16	0.00
32_(STM)	1.00	0.02	0.00	0.00	0.51	0.00	0.00	0.47	0.52	0.00
34_(1)_(STM)	1.00	0.02	0.00	0.00	0.36	0.00	0.00	0.62	0.07	0.00
34_(STM)	1.00	0.02	0.00	0.00	0.40	0.00	0.00	0.58	0.05	0.00
36_(1)_(STM)	1.00	0.02	0.00	0.00	0.51	0.00	0.00	0.47	0.04	0.00
42_(1)_(STM)	1.00	0.02	0.00	0.00	0.44	0.00	0.00	0.54	0.09	0.00
42_(2)_(STM)	1.00	0.02	0.00	0.00	0.47	0.00	0.00	0.50	0.04	0.00
49_(STM)	1.00	0.02	0.00	0.00	0.46	0.00	0.00	0.51	0.08	0.00
5_(STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
57_(STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
59_(STM)	1.00	0.02	0.00	0.00	0.35	0.00	0.00	0.63	0.03	0.00
61_(STM)	1.00	0.02	0.00	0.00	0.33	0.00	0.00	0.65	0.05	0.00

64_(CB)	1.00	0.02	0.00	0.00	0.28	0.00	0.00	0.69	0.13	0.00
7_(STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
86_(CB)	1.00	0.02	0.00	0.00	0.20	0.00	0.00	0.77	0.03	0.00
9_(1)_(STM)	1.00	0.01	0.01	0.00	0.36	0.00	0.00	0.61	0.01	0.00
9_(STM)_2	1.00	0.02	0.00	0.00	0.35	0.00	0.00	0.62	0.09	0.00
94_(CB)	1.00	0.02	0.00	0.00	0.11	0.00	0.00	0.86	0.04	0.00
C1	1.00	0.04	0.00	0.00	0.04	0.00	0.00	0.91	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C100	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C101	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C102	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C103	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C104	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C105	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C106	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C107	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C108	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C109	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C110	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C111	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C112	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C113	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C114	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C115	1.00	0.77	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C116	1.00	0.77	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C117	1.00	0.78	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C118	1.00	0.78	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C119	1.00	0.78	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C120	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C121	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C122	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C123	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C124	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C125	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C126	1.00	0.77	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C127	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C128	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C129	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C130	1.00	0.78	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C131	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C132	1.00	0.78	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C133	1.00	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C134	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C135	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C136	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C137	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C138	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C139	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C140	1.00	0.02	0.00	0.00	0.20	0.00	0.00	0.78	0.19	0.00
C141	1.00	0.02	0.01	0.00	0.96	0.00	0.00	0.00	0.97	0.00
C15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C20	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C21	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C24	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C25	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C26	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C27	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C28	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C29	1.00	0.96	0.02	0.00	0.02	0.00	0.00	0.00	0.94	0.00
C3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C30	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C31	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C32	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C33	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C34	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C37	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C42	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C43	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C44	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C45	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C46	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C47	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C48	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C49	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C50	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C51	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C52	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53_1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53_2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54_1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54_2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C55	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C57	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C58	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C59	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C60	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C61	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C62	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C63	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C64	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C65	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C66	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C67	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C68	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C69	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C70	1.00	0.02	0.01	0.00	0.96	0.00	0.00	0.00	0.97	0.00
C71	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C72	1.00	0.02	0.00	0.00	0.20	0.00	0.00	0.78	0.19	0.00
C73	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C74	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C75	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C76	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C77	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C78	1.00	0.03	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C79	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C80	1.00	0.02	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C81	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C82	1.00	0.80	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C83	1.00	0.80	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C84	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C84_1	1.00	0.96	0.02	0.00	0.02	0.00	0.00	0.00	0.94	0.00
C84_2	1.00	0.98	0.00	0.00	0.00	0.02	0.00	0.00	0.94	0.00
C85	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00

C86	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C87	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C88	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C89	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C90	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C91	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C92	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C93	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C94	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C95	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C96	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C97	1.00	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C98	1.00	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C99	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB24	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB25	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB87	1.00	0.86	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CBMH112	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CBMH114	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULV-4	1.00	0.02	0.00	0.00	0.80	0.17	0.00	0.00	0.00	0.10
X-CB-129_(X-CB)	1.00	0.05	0.00	0.00	0.19	0.00	0.00	0.76	0.01	0.00
X-CB-89_(X-CB)	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.77	0.00
X-CB-91_(X-CB)	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.78	0.00
X-CB-94_(X-CB)	1.00	0.04	0.03	0.00	0.93	0.00	0.00	0.00	0.78	0.00
X-CB-97_(X-CB)	1.00	0.04	0.00	0.00	0.20	0.00	0.00	0.75	0.01	0.00
X-CB-98_(X-CB)	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.76	0.00
X-STM-13_(1)_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-13_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.05	0.00	0.94	0.04	0.00
X-STM-17_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-19_(X-STM)	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
X-STM-2_(X-STM)	1.00	0.01	0.00	0.00	0.45	0.54	0.00	0.00	0.70	0.00
X-STM-21_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-23_(X-STM)	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
X-STM-25_(X-STM)_1	1.00	0.04	0.00	0.00	0.93	0.03	0.00	0.00	0.76	0.00
X-STM-25_(X-STM)_2	1.00	0.04	0.00	0.00	0.22	0.00	0.00	0.74	0.01	0.00
X-STM-27_(X-STM)_1	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.77	0.00
X-STM-27_(X-STM)_2	1.00	0.04	0.00	0.00	0.20	0.00	0.00	0.76	0.00	0.00
X-STM-29_(X-STM)	1.00	0.04	0.00	0.00	0.19	0.00	0.00	0.77	0.00	0.00
X-STM-31_(X-STM)	1.00	0.04	0.00	0.00	0.20	0.00	0.00	0.76	0.01	0.00
X-STM-33_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-5_(X-STM)	1.00	0.01	0.00	0.00	0.39	0.00	0.00	0.60	0.34	0.00
X-STM-51_(X-STM)	1.00	0.04	0.00	0.00	0.31	0.00	0.00	0.66	0.00	0.00
X-STM-53_(X-STM)	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.67	0.00

X-STM-55_(X-STM)	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.69	0.00
X-STM-59_(X-STM)	1.00	0.04	0.00	0.00	0.31	0.00	0.00	0.65	0.01	0.00
X-STM-63_(X-STM)	1.00	0.02	0.00	0.00	0.07	0.00	0.00	0.91	0.00	0.00
X-STM-7_(X-STM)	1.00	0.01	0.00	0.00	0.97	0.02	0.00	0.00	0.90	0.00
X-STM-71_(X-STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
X-STM-75_(X-STM)	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
X-STM-77_(X-STM)	1.00	0.01	0.00	0.00	0.85	0.14	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
102_(CB)	2.88	2.88	3.18	0.01	0.01
104_(CB)	2.61	2.61	2.85	0.01	0.01
108_(CB)	1.43	1.43	1.52	0.01	0.01
115_(CB)	2.29	2.29	3.57	0.01	0.01
121_(CB)	1.43	1.43	2.52	0.01	0.01
126_(STM)	5.18	5.18	6.75	0.01	0.01
138_(CB)	1.41	1.41	1.56	0.01	0.01
142_(STM)	1.43	1.43	1.56	0.01	0.01
145_(CB)	3.69	3.69	4.54	0.01	0.01
154_(CB)	6.82	6.82	7.78	0.01	0.01
156_(STM)_1	1.43	1.43	1.57	0.01	0.01
156_(STM)_2	1.56	1.56	1.82	0.01	0.01
34_(1)_(STM)	4.30	4.30	6.33	0.01	0.01
34_(STM)	6.43	6.43	8.35	0.01	0.01
36_(1)_(STM)	9.23	9.23	10.77	0.01	0.01
42_(1)_(STM)	6.31	6.31	8.41	0.01	0.01
42_(2)_(STM)	8.51	8.51	9.94	0.01	0.01
49_(STM)	6.68	6.68	8.92	0.01	0.01
59_(STM)	6.18	6.18	7.26	0.01	0.01
61_(STM)	4.73	4.73	6.11	0.01	0.01
64_(CB)	3.20	3.20	5.54	0.01	0.01
86_(CB)	3.21	3.21	3.93	0.01	0.01
94_(CB)	1.04	1.04	1.25	0.01	0.01
C1	0.71	0.71	0.90	0.01	0.01
X-CB-129_(X-CB)	3.93	3.93	3.99	0.01	0.01
X-CB-89_(X-CB)	3.95	3.95	4.90	0.01	0.01
X-CB-91_(X-CB)	3.95	3.95	4.90	0.01	0.01
X-CB-94_(X-CB)	3.97	3.97	4.58	0.01	0.01
X-CB-97_(X-CB)	3.92	3.92	4.24	0.01	0.01
X-CB-98_(X-CB)	4.39	4.39	4.45	0.01	0.02
X-STM-25_(X-STM)_1	4.15	4.15	4.77	0.01	0.01
X-STM-25_(X-STM)_2	4.77	4.77	5.00	0.01	0.01
X-STM-27_(X-STM)_1	4.03	4.03	4.45	0.04	0.03
X-STM-27_(X-STM)_2	4.45	4.45	4.46	0.04	0.03
X-STM-29_(X-STM)	3.95	3.95	3.96	0.09	0.07
X-STM-31_(X-STM)	3.98	3.98	4.16	0.05	0.06
X-STM-51_(X-STM)	6.03	6.03	6.08	0.01	0.01
X-STM-53_(X-STM)	5.88	5.88	6.03	0.01	0.01
X-STM-55_(X-STM)	5.84	5.84	5.92	0.01	0.01
X-STM-59_(X-STM)	6.03	6.03	6.60	0.01	0.01
X-STM-63_(X-STM)	1.34	1.34	1.36	0.01	0.01

Analysis begun on: Tue Nov 19 13:34:27 2019
Analysis ended on: Tue Nov 19 13:34:33 2019
Total elapsed time: 00:00:06

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
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WARNING 08: elevation drop exceeds length for Conduit C134
WARNING 08: elevation drop exceeds length for Conduit C135
WARNING 08: elevation drop exceeds length for Conduit C136
WARNING 08: elevation drop exceeds length for Conduit C85

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 72
Number of nodes ........... 189
Number of links ........... 258
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------
Design_Storms        C3hr-100yr                  INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------
A-01                        0.23     76.70    100.00    1.5000 Design_Storms        PR-CB26
A-02                        0.21     71.73    100.00    1.5000 Design_Storms        PR-CB23
A-03                        0.07     60.92    100.00    1.5000 Design_Storms        PR-CB20
A-04a                       0.35     45.70     82.40    1.5000 Design_Storms        SWALE01
A-04b                       0.76    100.29     85.30    1.5000 Design_Storms        SWALE03
A-05                        0.07     43.97     86.10    1.5000 Design_Storms        PR-CB19
A-06                        0.16     50.64    100.00    1.5000 Design_Storms        PR-CB22
A-07                        0.18     59.63    100.00    1.5000 Design_Storms        PR-CB25
A-08                        0.15     53.71    100.00    1.5000 Design_Storms        PR-CB28
A-09                        0.16     52.47    100.00    1.5000 Design_Storms        PR-CB27
A-10                        0.18     58.88    100.00    1.5000 Design_Storms        PR-CBMH114
A-11                        0.17     48.29    100.00    1.5000 Design_Storms        PR-CBMH112
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A-12                        0.07     48.98     86.20    1.5000 Design_Storms        PR-CBMH110
A-13                        0.06     34.39     82.20    1.5000 Design_Storms        PR-CB18
A-14                        0.17     50.57    100.00    1.5000 Design_Storms        PR-CB21
A-15                        0.21     73.44    100.00    1.5000 Design_Storms        PR-CB24
A-16                        0.15     51.71    100.00    1.5000 Design_Storms        PR-CBMH115
A-17a                       0.22     56.40     54.20    1.5000 Design_Storms        EX-CB87
A-17b                       0.19     74.86     94.60    1.5000 Design_Storms        EX-CB90
A-17c                       0.25     61.38     64.50    1.5000 Design_Storms        EX-CB92
A-17d                       0.23     88.92     98.40    1.5000 Design_Storms        EX-CB96
A-17e                       0.30     72.25     60.20    1.5000 Design_Storms        EX-CB30
A-17f                       0.28    112.29     93.70    1.5000 Design_Storms        EX-CB28
A-18                        0.53     75.00     75.00    1.5000 Design_Storms        PR-CB16/17
A-19                        0.28     78.03     67.40    1.5000 Design_Storms        EX-CB137
A-20                        0.40    128.72     95.60    1.5000 Design_Storms        EX-CB82
A-21                        0.17     80.91     95.30    1.5000 Design_Storms        EX-CB84
A-22                        0.74    163.32      5.00    1.5000 Design_Storms        EX-CB131
A-23                        0.05     49.54     76.80    1.5000 Design_Storms        EX-CB72
A-24                        0.06     25.00    100.00    1.5000 Design_Storms        PR-CB16/17
A-25                        0.09     10.18     64.80    1.5000 Design_Storms        EX-CB95
A-26                        0.10     12.08     52.80    1.5000 Design_Storms        EX-CB128
A-27                        0.10     10.94     51.80    1.5000 Design_Storms        EX-CB62
A-28                        0.12     14.97     85.60    1.5000 Design_Storms        EX-CB60
A-29                        0.09     30.39     64.30    1.5000 Design_Storms        EX-CB117
A-30                        0.86     69.11    100.00    1.5000 Design_Storms        EX-BLDG01
A-31                        0.07     68.77    100.00    1.5000 Design_Storms        EX-CB116
A-32                        0.12     77.79     85.70    1.5000 Design_Storms        EX-CB64
A-33                        0.24    120.16     72.60    1.5000 Design_Storms        PR-CBMH109
A-34a                       0.15     70.62     98.30    1.5000 Design_Storms        EX-CB58
A-34b                       0.25    106.62    100.00    1.5000 Design_Storms        EX-CB50
A-34c                       0.20     80.84     95.20    1.5000 Design_Storms        EX-CB52
A-35                        0.12     92.27     80.20    1.5000 Design_Storms        PR-CB15
A-36                        0.05     43.63    100.00    1.5000 Design_Storms        PR-CB13
A-37                        0.06     22.53     39.40    1.5000 Design_Storms        PR-CB14
A-38a                       1.16    176.30    100.00    1.5000 Design_Storms        PR-BLDG01
A-38b                       0.31     58.98    100.00    1.5000 Design_Storms        PR-BLDG02
A-39                        0.24     65.90    100.00    1.5000 Design_Storms        PR-CB32
A-40                        0.30     57.23    100.00    1.5000 Design_Storms        PR-CBMH118
A-41                        0.17     36.68    100.00    1.5000 Design_Storms        PR-CB31
A-42                        0.14     40.60    100.00    1.5000 Design_Storms        PR-CB30
A-43                        0.27     62.34     94.30    1.5000 Design_Storms        PR-CB29
A-44                        0.14     42.87     78.90    1.5000 Design_Storms        PR-TD02
A-45                        0.07     45.11     85.20    1.5000 Design_Storms        PR-CB01
A-46                        0.11     43.34     58.90    1.5000 Design_Storms        PR-CB03
A-47                        0.04     39.35     87.60    1.5000 Design_Storms        PR-CB02
A-48                        0.09     73.50     98.20    1.5000 Design_Storms        PR-CB04
A-49                        0.08     51.59    100.00    1.5000 Design_Storms        PR-CB05
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A-50	0.06	49.35	80.60	1.5000	Design_Storms	PR-CBMH104
A-51	0.06	30.69	70.00	1.5000	Design_Storms	PR-CBMH105
A-52	0.07	46.01	77.50	1.5000	Design_Storms	PR-CB06
A-53	0.09	49.85	73.90	1.5000	Design_Storms	PR-CB07
A-54	0.06	31.84	62.20	1.5000	Design_Storms	PR-TD01
A-55	0.15	51.45	86.30	1.5000	Design_Storms	PR-CB10
A-56	0.11	64.62	97.20	1.5000	Design_Storms	PR-CBMH106
A-57	0.10	80.22	100.00	1.5000	Design_Storms	PR-CB08
A-58	0.11	63.58	100.00	1.5000	Design_Storms	PR-CB09
A-59	0.13	74.47	100.00	1.5000	Design_Storms	PR-CBMH107
A-60	0.11	40.77	63.50	1.5000	Design_Storms	EX-CB54
A-61	0.22	112.45	100.00	1.5000	Design_Storms	PR-CBMH108
A-62	0.20	126.81	100.00	1.5000	Design_Storms	PR-CB12
A-63	0.15	99.64	100.00	1.5000	Design_Storms	PR-CB11

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HP-01	JUNCTION	114.00	1.00	0.0	
HP-02	JUNCTION	114.05	1.00	0.0	
HP-03	JUNCTION	114.10	1.00	0.0	
HP-05	JUNCTION	113.75	1.00	0.0	
HP-EX-CB116	JUNCTION	113.60	1.00	0.0	
HP-EX-CB117	JUNCTION	113.50	1.00	0.0	
HP-EX-CB128	JUNCTION	114.00	1.00	0.0	
HP-EX-CB131	JUNCTION	107.00	1.00	0.0	
HP-EX-CB137	JUNCTION	113.70	1.00	0.0	
HP-EX-CB14	JUNCTION	113.15	1.00	0.0	
HP-EX-CB28	JUNCTION	114.05	1.00	0.0	
HP-EX-CB30a	JUNCTION	113.90	1.00	0.0	
HP-EX-CB30b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB50a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB50b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB52	JUNCTION	114.05	1.00	0.0	
HP-EX-CB54	JUNCTION	113.95	1.00	0.0	
HP-EX-CB58a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB58b	JUNCTION	114.05	1.00	0.0	
HP-EX-CB60	JUNCTION	113.90	1.00	0.0	
HP-EX-CB62	JUNCTION	113.82	1.00	0.0	
HP-EX-CB64	JUNCTION	113.60	1.00	0.0	
HP-EX-CB72	JUNCTION	113.83	1.00	0.0	
HP-EX-CB82	JUNCTION	113.85	1.00	0.0	
HP-EX-CB84	JUNCTION	113.85	1.00	0.0	
HP-EX-CB87a	JUNCTION	114.05	1.00	0.0	
HP-EX-CB87b	JUNCTION	113.90	1.00	0.0	
HP-EX-CB90	JUNCTION	114.05	1.00	0.0	
HP-EX-CB92	JUNCTION	113.90	1.00	0.0	
HP-EX-CB95a	JUNCTION	113.95	1.00	0.0	
HP-EX-CB95b	JUNCTION	114.00	1.00	0.0	
HP-EX-CB96	JUNCTION	113.85	1.00	0.0	
HP-PR-CB02	JUNCTION	113.60	1.00	0.0	
HP-PR-CB03	JUNCTION	113.65	1.00	0.0	
HP-PR-CB04	JUNCTION	113.65	1.00	0.0	
HP-PR-CB05	JUNCTION	113.70	1.00	0.0	
HP-PR-CB06	JUNCTION	113.60	1.00	0.0	
HP-PR-CB07	JUNCTION	113.65	1.00	0.0	
HP-PR-CB08	JUNCTION	113.75	1.00	0.0	
HP-PR-CB09	JUNCTION	113.85	1.00	0.0	
HP-PR-CB10	JUNCTION	113.70	1.00	0.0	
HP-PR-CB12	JUNCTION	113.87	1.00	0.0	
HP-PR-CB13	JUNCTION	113.66	1.00	0.0	
HP-PR-CB14	JUNCTION	113.65	1.00	0.0	
HP-PR-CB15	JUNCTION	113.60	1.00	0.0	
HP-PR-CB16/17	JUNCTION	113.65	1.00	0.0	
HP-PR-CB18	JUNCTION	115.25	1.00	0.0	
HP-PR-CB19	JUNCTION	115.25	1.00	0.0	
HP-PR-CB20	JUNCTION	115.25	1.00	0.0	
HP-PR-CB21	JUNCTION	115.40	1.00	0.0	
HP-PR-CB22	JUNCTION	115.40	1.00	0.0	
HP-PR-CB23	JUNCTION	115.40	1.00	0.0	
HP-PR-CB24	JUNCTION	115.85	1.00	0.0	
HP-PR-CB25a	JUNCTION	115.85	1.00	0.0	
HP-PR-CB25b	JUNCTION	115.85	1.00	0.0	
HP-PR-CB26a	JUNCTION	115.85	1.00	0.0	
HP-PR-CB26b	JUNCTION	115.85	1.00	0.0	
HP-PR-CB27a	JUNCTION	116.20	1.00	0.0	
HP-PR-CB27b	JUNCTION	116.20	1.00	0.0	
HP-PR-CB28a	JUNCTION	116.20	1.00	0.0	
HP-PR-CB28b	JUNCTION	116.20	1.00	0.0	
HP-PR-CBMH104	JUNCTION	113.75	1.00	0.0	
HP-PR-CBMH105	JUNCTION	113.68	1.00	0.0	
HP-PR-CBMH106	JUNCTION	113.80	1.00	0.0	
HP-PR-CBMH107a	JUNCTION	113.85	1.00	0.0	
HP-PR-CBMH107b	JUNCTION	113.85	1.00	0.0	
HP-PR-CBMH108	JUNCTION	113.90	1.00	0.0	
HP-PR-CBMH109	JUNCTION	113.60	1.00	0.0	
HP-PR-CBMH110	JUNCTION	115.25	1.00	0.0	
HP-PR-CBMH112	JUNCTION	115.40	1.00	0.0	

HP-PR-CBMH114a	JUNCTION	115.85	1.00	0.0
HP-PR-CBMH114b	JUNCTION	115.85	1.00	0.0
HP-PR-CBMH115	JUNCTION	116.20	1.00	0.0
SWALE01	JUNCTION	113.60	1.00	0.0
SWALE02	JUNCTION	113.26	1.00	0.0
SWALE03	JUNCTION	113.15	1.00	0.0
HP-PR-CB01	OUTFALL	113.63	1.00	0.0
HP-PR-CB11	OUTFALL	113.80	1.00	0.0
HP-PR-CB29	OUTFALL	113.00	1.00	0.0
HP-PR-CB30	OUTFALL	112.70	1.00	0.0
HP-PR-CB31	OUTFALL	112.70	1.00	0.0
HP-PR-CB32	OUTFALL	112.55	1.00	0.0
HP-PR-CBMH118	OUTFALL	112.70	1.00	0.0
SWM_Pond	OUTFALL	102.95	0.75	0.0
SWM_Pond_OV	OUTFALL	106.00	1.00	0.0
EX-BLDG01	STORAGE	120.00	1.00	0.0
EX-CB116	STORAGE	112.39	2.11	0.0
EX-CB117	STORAGE	111.49	2.86	0.0
EX-CB128	STORAGE	111.91	2.82	0.0
EX-CB131	STORAGE	105.29	2.62	0.0
EX-CB137	STORAGE	111.40	2.99	0.0
EX-CB14	STORAGE	110.59	2.74	0.0
EX-CB28	STORAGE	111.83	2.80	0.0
EX-CB30	STORAGE	111.90	2.74	0.0
EX-CB50	STORAGE	111.74	2.97	0.0
EX-CB52	STORAGE	111.84	2.84	0.0
EX-CB54	STORAGE	111.92	2.89	0.0
EX-CB58	STORAGE	111.84	2.89	0.0
EX-CB60	STORAGE	112.15	2.54	0.0
EX-CB62	STORAGE	112.64	2.12	0.0
EX-CB64	STORAGE	111.50	3.00	0.0
EX-CB72	STORAGE	111.18	3.48	0.0
EX-CB82	STORAGE	112.02	2.76	0.0
EX-CB84	STORAGE	111.52	3.13	0.0
EX-CB87	STORAGE	111.90	2.75	0.0
EX-CB90	STORAGE	111.91	2.71	0.0
EX-CB92	STORAGE	111.89	2.72	0.0
EX-CB95	STORAGE	111.85	2.80	0.0
EX-CB96	STORAGE	111.62	3.03	0.0
EX-MH101	STORAGE	104.57	2.34	0.0
EX-MH101A	STORAGE	107.18	4.98	0.0
EX-MH101B	STORAGE	105.33	5.08	0.0
EX-MH102	STORAGE	109.38	4.65	0.0
EX-MH102A	STORAGE	112.42	1.78	0.0
EX-MH103	STORAGE	110.71	2.29	0.0
EX-MH104	STORAGE	110.65	3.21	0.0
EXMH-105	STORAGE	111.28	3.64	0.0
EXMH-105a	STORAGE	111.28	2.64	0.0
EX-MH106	STORAGE	112.15	2.70	0.0
EX-MH106a	STORAGE	111.71	3.14	0.0
EX-MH107	STORAGE	112.35	2.47	0.0
EX-MH107a	STORAGE	112.19	2.63	0.0
EX-MH108	STORAGE	111.32	2.34	0.0
EX-MH109	STORAGE	110.98	2.55	0.0
EX-MH112	STORAGE	112.15	2.73	0.0
EX-MH112a	STORAGE	112.15	1.73	0.0
EX-MH115	STORAGE	105.05	1.82	0.0
EX-MH116	STORAGE	105.50	1.37	0.0
EX-STUB02	STORAGE	111.38	2.28	0.0
PR-BLDG01	STORAGE	120.00	1.00	0.0
PR-BLDG02	STORAGE	120.00	1.00	0.0
PR-CB01	STORAGE	112.36	2.04	0.0
PR-CB02	STORAGE	112.40	2.00	0.0
PR-CB02a	STORAGE	112.28	2.12	0.0
PR-CB03	STORAGE	112.40	2.00	0.0
PR-CB04	STORAGE	112.40	2.00	0.0
PR-CB05	STORAGE	112.45	2.00	0.0
PR-CB06	STORAGE	112.45	2.00	0.0
PR-CB07	STORAGE	112.36	2.09	0.0
PR-CB08	STORAGE	112.50	2.00	0.0
PR-CB09	STORAGE	112.60	2.00	0.0
PR-CB10	STORAGE	112.25	2.20	0.0
PR-CB11	STORAGE	112.60	2.00	0.0
PR-CB12	STORAGE	112.42	2.18	0.0
PR-CB13	STORAGE	112.35	2.20	0.0
PR-CB14	STORAGE	112.35	2.20	0.0
PR-CB15	STORAGE	112.20	2.20	0.0
PR-CB16/17	STORAGE	112.09	2.26	0.0
PR-CB18	STORAGE	113.85	2.20	0.0
PR-CB19	STORAGE	113.65	2.40	0.0
PR-CB20	STORAGE	113.85	2.20	0.0
PR-CB21	STORAGE	114.00	2.20	0.0
PR-CB22	STORAGE	113.80	2.40	0.0
PR-CB23	STORAGE	114.00	2.20	0.0
PR-CB24	STORAGE	114.35	2.20	0.0
PR-CB25	STORAGE	114.14	2.41	0.0
PR-CB26	STORAGE	114.35	2.20	0.0
PR-CB27	STORAGE	114.51	2.39	0.0
PR-CB28	STORAGE	114.70	2.20	0.0
PR-CB29	STORAGE	111.50	2.20	0.0
PR-CB29a	STORAGE	111.50	2.20	0.0
PR-CB30	STORAGE	111.20	2.20	0.0

PR-CB31	STORAGE	111.01	2.39	0.0
PR-CB32	STORAGE	110.90	2.50	0.0
PR-CBMH104	STORAGE	112.30	2.20	0.0
PR-CBMH105	STORAGE	112.26	2.19	0.0
PR-CBMH106	STORAGE	112.31	2.19	0.0
PR-CBMH107	STORAGE	112.41	2.19	0.0
PR-CBMH108	STORAGE	112.21	2.39	0.0
PR-CBMH108a	STORAGE	112.21	2.39	0.0
PR-CBMH109	STORAGE	111.90	2.50	0.0
PR-CBMH110	STORAGE	113.30	2.75	0.0
PR-CBMH112	STORAGE	113.61	2.59	0.0
PR-CBMH114	STORAGE	113.95	2.60	0.0
PR-CBMH115	STORAGE	114.19	2.71	0.0
PR-CBMH115a	STORAGE	114.19	2.71	0.0
PR-CBMH118	STORAGE	110.84	2.56	0.0
PR-MH100	STORAGE	112.16	2.50	0.0
PR-MH100a	STORAGE	112.16	2.50	0.0
PR-MH101	STORAGE	111.70	2.21	0.0
PR-MH102	STORAGE	111.28	2.29	0.0
PR-MH103	STORAGE	111.10	2.58	0.0
PR-MH111	STORAGE	113.30	1.98	0.0
PR-MH113	STORAGE	113.73	1.87	0.0
PR-MH116	STORAGE	110.27	2.63	0.0
PR-MH117	STORAGE	110.73	2.97	0.0
PR-STUB01	STORAGE	110.71	2.19	0.0
PR-TD01	STORAGE	112.65	1.15	0.0
PR-TD02	STORAGE	112.65	1.15	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
102_(CB)	PR-CB07	PR-CBMH105	CONDUIT	18.8	0.4780	0.0130
104_(CB)	PR-CB06	PR-CB07	CONDUIT	16.8	0.4762	0.0130
108_(CB)	PR-CB03	PR-MH100	CONDUIT	9.1	0.5495	0.0130
115_(CB)	PR-CB19	PR-CBMH110	CONDUIT	33.8	1.0063	0.0130
121_(CB)	PR-CB20	PR-CB19	CONDUIT	40.3	0.4968	0.0130
126_(STM)	PR-CB30	PR-CB31	CONDUIT	35.6	0.5059	0.0130
138_(CB)	PR-CB01	PR-CB02a	CONDUIT	15.8	0.5073	0.0130
14_(STM)	EX-MH112a	PR-MH102	CONDUIT	45.5	0.1976	0.0130
142_(STM)	PR-CB04	PR-MH100	CONDUIT	13.5	0.5170	0.0130
145_(CB)	PR-CB09	PR-CBMH107	CONDUIT	36.3	0.4963	0.0130
150_(STM)_2	PR-CB29a	PR-MH117	CONDUIT	65.4	0.9933	0.0130
154_(CB)	PR-CB31	PR-CBMH118	CONDUIT	29.3	0.5111	0.0130
156_(STM)_1	PR-CB02	PR-CB02a	CONDUIT	14.0	0.5727	0.0130
156_(STM)_2	PR-CB02a	PR-MH100	CONDUIT	22.1	0.4980	0.0130
17_(1)_(STM)_4	PR-MH117	PR-MH116	CONDUIT	86.5	0.4973	0.0130
18_(STM)	PR-MH116	EX-MH116	CONDUIT	75.7	6.0090	0.0130
20_(STM)	PR-STUB01	PR-MH116	CONDUIT	20.3	2.0161	0.0130
28_(STM)	PR-MH111	EX-MH102A	CONDUIT	86.3	0.9848	0.0130
30_(STM)	PR-MH113	PR-MH111	CONDUIT	51.0	0.8032	0.0130
32_(STM)	PR-CBMH115a	PR-MH113	CONDUIT	45.1	0.9981	0.0130
34_(1)_(STM)	PR-CB28	PR-CB27	CONDUIT	35.7	0.5036	0.0130
34_(STM)	PR-CB27	PR-CBMH115	CONDUIT	37.3	0.6965	0.0130
36_(1)_(STM)	PR-CB25	PR-CBMH114	CONDUIT	36.3	0.4963	0.0130
42_(1)_(STM)	PR-CB23	PR-CB22	CONDUIT	35.8	0.5315	0.0130
42_(2)_(STM)	PR-CB22	PR-CBMH112	CONDUIT	37.3	0.4822	0.0130
49_(STM)	PR-CB26	PR-CB25	CONDUIT	37.1	0.4854	0.0130
5_(STM)	PR-MH100a	PR-MH101	CONDUIT	116.8	0.2997	0.0130
57_(STM)	PR-CBMH108a	PR-MH101	CONDUIT	42.5	0.4935	0.0130
59_(STM)	PR-CB12	PR-CBMH108	CONDUIT	36.2	0.4972	0.0130
61_(STM)	PR-CB11	PR-CB12	CONDUIT	33.7	0.5051	0.0130
64_(CB)	PR-CB15	PR-CBMH109	CONDUIT	29.4	0.9864	0.0130
7_(STM)	PR-MH101	PR-MH102	CONDUIT	106.0	0.3018	0.0130
86_(CB)	PR-CB08	PR-CBMH106	CONDUIT	36.3	0.4963	0.0130
9_(1)_(STM)	PR-MH103	EX-MH109	CONDUIT	32.7	0.3055	0.0130
9_(STM)_2	PR-MH102	PR-MH103	CONDUIT	57.6	0.2949	0.0130
94_(CB)	PR-CB05	PR-CBMH104	CONDUIT	27.0	0.4810	0.0130
C1	EX-CB116	EX-CB117	CONDUIT	10.7	2.1500	0.0130
C10	PR-CB26	HP-PR-CB26a	CONDUIT	3.0	-10.0504	0.0150
C100	EX-CB72	HP-EX-CB72	CONDUIT	3.0	-5.6758	0.0130
C101	EX-CB30	HP-EX-CB30b	CONDUIT	3.0	-13.7961	0.0150
C102	HP-EX-CB30b	EX-CB92	CONDUIT	3.0	14.8270	0.0150
C103	HP-EX-CB87a	EX-CB92	CONDUIT	3.0	14.8270	0.0150
C104	EX-CB87	HP-EX-CB87a	CONDUIT	3.0	-13.4535	0.0150
C105	EX-CB30	HP-EX-CB30a	CONDUIT	3.0	-8.6994	0.0150
C106	HP-EX-CB30a	EX-CB28	CONDUIT	3.0	9.0367	0.0150
C107	EX-CB28	HP-EX-CB28	CONDUIT	3.0	-14.1393	0.0150
C108	HP-EX-CB28	EX-CB96	CONDUIT	3.0	13.4535	0.0150
C109	HP-EX-CB90	EX-CB96	CONDUIT	3.0	13.4535	0.0150
C11	HP-PR-CB26a	PR-CB25	CONDUIT	3.0	10.0504	0.0150
C110	EX-CB90	HP-EX-CB90	CONDUIT	3.0	-14.4829	0.0150
C111	EX-CB92	HP-EX-CB92	CONDUIT	3.0	-9.7122	0.0150
C112	HP-EX-CB92	EX-CB96	CONDUIT	3.0	8.3624	0.0150
C113	HP-EX-CB87b	EX-CB90	CONDUIT	3.0	9.3743	0.0150
C114	EX-CB54	HP-EX-CB54	CONDUIT	3.0	-4.6718	0.0150
C115	HP-EX-CB54	EX-CB52	CONDUIT	3.0	9.0367	0.0150
C116	HP-EX-CB50a	EX-CB52	CONDUIT	3.0	9.0367	0.0150
C117	EX-CB50	HP-EX-CB50a	CONDUIT	3.0	-8.0257	0.0150
C118	HP-EX-CB58a	EX-CB50	CONDUIT	3.0	8.0257	0.0150

C119	EX-CB58	HP-EX-CB58a	CONDUIT	3.0	-7.3531	0.0150
C12	PR-CB25	HP-PR-CB25a	CONDUIT	3.0	-10.0504	0.0150
C120	EX-CB96	HP-EX-CB96	CONDUIT	3.0	-6.6815	0.0150
C121	HP-EX-CB96	EX-CB95	CONDUIT	3.0	6.6815	0.0150
C122	EX-CB95	HP-EX-CB95a	CONDUIT	3.0	-10.0504	0.0150
C123	HP-EX-CB95a	EX-CB128	CONDUIT	3.0	7.3531	0.0150
C124	EX-CB128	HP-EX-CB128	CONDUIT	3.0	-9.0367	0.0150
C125	HP-EX-CB128	EX-CB62	CONDUIT	3.0	8.0257	0.0150
C126	EX-CB52	HP-EX-CB52	CONDUIT	3.0	-12.4282	0.0150
C127	HP-EX-CB52	PR-CB13	CONDUIT	3.0	16.9031	0.0150
C128	PR-CB13	HP-PR-CB13	CONDUIT	3.0	-3.6691	0.0150
C129	HP-PR-CB13	PR-CB14	CONDUIT	3.0	3.6691	0.0150
C13	HP-PR-CB25a	PR-CBMH114	CONDUIT	3.0	10.0504	0.0150
C130	EX-CB50	HP-EX-CB50b	CONDUIT	3.0	-11.4068	0.0150
C131	HP-EX-CB50b	PR-CB15	CONDUIT	3.0	22.1939	0.0150
C132	EX-CB58	HP-EX-CB58b	CONDUIT	3.0	-10.7279	0.0150
C133	HP-EX-CB58b	EX-CB60	CONDUIT	3.0	12.0873	0.0150
C134	HP-EX-CB14	HP-EX-CB131	CONDUIT	3.0	205.0000	0.0350
C135	HP-EX-CB137	HP-EX-CB131	CONDUIT	3.0	223.3333	0.0350
C136	HP-EX-CB72	HP-EX-CB131	CONDUIT	3.0	227.6667	0.0350
C137	HP-EX-CB131	SWM_Pond_OV	CONDUIT	3.0	35.3553	0.0350
C138	EX-CB128	HP-EX-CB95b	CONDUIT	3.0	-9.0367	0.0150
C139	HP-EX-CB95b	HP-PR-CB16/17	CONDUIT	3.0	11.7469	0.0150
C14	PR-CBMH114	HP-PR-CBMH114a	CONDUIT	3.0	-10.0504	0.0150
C140	SWALE03	EX-CB14	CONDUIT	82.0	1.0001	0.0400
C141	SWALE01	SWALE02	CONDUIT	33.5	1.0150	0.0400
C15	HP-PR-CBMH114a	PR-CB24	CONDUIT	3.0	10.0504	0.0150
C16	PR-CBMH115	HP-PR-CBMH115	CONDUIT	3.0	-10.0504	0.0150
C17	HP-PR-CBMH115	PR-CB24	CONDUIT	3.0	22.1939	0.0150
C18	PR-CB26	HP-PR-CB26b	CONDUIT	3.0	-10.0504	0.0150
C19	HP-PR-CB26b	PR-CB23	CONDUIT	3.0	22.1939	0.0150
C2	PR-CB28	HP-PR-CB28a	CONDUIT	3.0	-10.0504	0.0150
C20	HP-PR-CB25b	PR-CB22	CONDUIT	3.0	22.1939	0.0150
C21	HP-PR-CBMH114b	PR-CBMH112	CONDUIT	3.0	22.1939	0.0150
C22	HP-PR-CB24	PR-CB21	CONDUIT	3.0	22.1939	0.0150
C23	HP-PR-CB23	PR-CB20	CONDUIT	3.0	11.7469	0.0150
C24	HP-PR-CB22	PR-CB19	CONDUIT	3.0	11.7469	0.0150
C25	HP-PR-CBMH112	PR-CBMH110	CONDUIT	3.0	11.7469	0.0150
C26	PR-CB30	HP-PR-CB30	CONDUIT	3.0	-10.0504	0.0150
C27	EX-CB137	HP-EX-CB137	CONDUIT	3.0	-10.3889	0.0150
C28	PR-CB31	HP-PR-CB31	CONDUIT	3.0	-10.0504	0.0150
C29	HP-PR-CB16/17	EX-CB137	CONDUIT	3.0	8.6994	0.0150
C3	HP-PR-CB28a	PR-CB27	CONDUIT	3.0	10.0504	0.0150
C30	PR-CB29	HP-PR-CB29	CONDUIT	3.0	-10.0504	0.0150
C31	PR-CB16/17	HP-PR-CB16/17	CONDUIT	3.0	-10.0504	0.0150
C32	PR-CBMH118	HP-PR-CBMH118	CONDUIT	3.0	-10.0504	0.0150
C33	EX-CB116	HP-EX-CB116	CONDUIT	3.0	-3.3352	0.0150
C34	PR-CBMH108	HP-PR-CBMH108	CONDUIT	3.0	-10.0504	0.0150
C35	HP-PR-CBMH108	PR-CB12	CONDUIT	3.0	10.0504	0.0150
C36	PR-CB12	HP-PR-CB12	CONDUIT	3.0	-9.0367	0.0150
C37	HP-PR-CB12	PR-CB11	CONDUIT	3.0	9.0367	0.0150
C38	PR-CB11	HP-PR-CB11	CONDUIT	3.0	-6.6815	0.0150
C39	PR-CBMH107	HP-PR-CBMH107a	CONDUIT	3.0	-8.3624	0.0150
C4	PR-CB27	HP-PR-CB27a	CONDUIT	3.0	-10.0504	0.0150
C40	HP-PR-CBMH107a	PR-CB09	CONDUIT	3.0	8.3624	0.0150
C41	PR-CBMH107	HP-PR-CBMH107b	CONDUIT	3.0	-8.3624	0.0150
C42	HP-PR-CBMH107b	PR-CBMH106	CONDUIT	3.0	11.7469	0.0150
C43	PR-CB09	HP-PR-CB09	CONDUIT	3.0	-8.3624	0.0150
C44	HP-PR-CB09	PR-CB08	CONDUIT	3.0	11.7469	0.0150
C45	PR-CBMH106	HP-PR-CBMH106	CONDUIT	3.0	-10.0504	0.0150
C46	HP-PR-CBMH106	PR-CB08	CONDUIT	3.0	10.0504	0.0150
C47	PR-CB08	HP-PR-CB08	CONDUIT	3.0	-8.3624	0.0150
C48	HP-PR-CB08	PR-CB05	CONDUIT	3.0	10.0504	0.0150
C49	PR-CBMH104	HP-PR-CBMH104	CONDUIT	3.0	-8.3624	0.0150
C5	HP-PR-CB27a	PR-CBMH115	CONDUIT	3.0	10.0504	0.0150
C50	HP-PR-CBMH104	PR-CB05	CONDUIT	3.0	10.0504	0.0150
C51	PR-CB05	HP-PR-CB05	CONDUIT	3.0	-8.3624	0.0150
C52	HP-PR-CB05	PR-CB04	CONDUIT	3.0	10.0504	0.0150
C53	PR-CB01	HP-PR-CB01	CONDUIT	3.0	-7.6893	0.0150
C53_1	PR-CB04	HP-PR-CB04	CONDUIT	3.0	-8.3624	0.0150
C53_2	HP-PR-CB04	PR-CB02	CONDUIT	3.0	8.3624	0.0150
C54	PR-CB14	HP-PR-CB14	CONDUIT	3.0	-3.3352	0.0150
C54_1	PR-CB02	HP-PR-CB02	CONDUIT	3.0	-6.6815	0.0150
C54_2	HP-PR-CB02	PR-CB01	CONDUIT	3.0	6.6815	0.0150
C55	PR-CB03	HP-PR-CB03	CONDUIT	3.0	-8.3624	0.0150
C56	HP-PR-CB03	PR-CB01	CONDUIT	3.0	8.3624	0.0150
C57	PR-CBMH105	HP-PR-CBMH105	CONDUIT	3.0	-7.6893	0.0150
C58	HP-PR-CBMH105	PR-CB03	CONDUIT	3.0	9.3743	0.0150
C59	PR-CB06	HP-PR-CB06	CONDUIT	3.0	-5.0063	0.0150
C6	PR-CB28	HP-PR-CB28b	CONDUIT	3.0	-10.0504	0.0150
C60	HP-PR-CB06	PR-CB07	CONDUIT	3.0	5.0063	0.0150
C61	PR-CB07	HP-PR-CB07	CONDUIT	3.0	-6.6815	0.0150
C62	HP-PR-CB07	PR-CBMH105	CONDUIT	3.0	6.6815	0.0150
C63	PR-CB10	HP-PR-CB10	CONDUIT	3.0	-8.3624	0.0150
C64	HP-PR-CB10	PR-CBMH105	CONDUIT	3.0	8.3624	0.0150
C65	HP-PR-CB14	PR-CB15	CONDUIT	3.0	8.3624	0.0150
C66	PR-CB15	HP-PR-CB15	CONDUIT	3.0	-6.6815	0.0150
C67	HP-PR-CB15	PR-CBMH109	CONDUIT	3.0	6.6815	0.0150
C68	PR-CB21	HP-PR-CB21	CONDUIT	3.0	-6.6815	0.0150
C69	HP-PR-CB21	PR-CB18	CONDUIT	3.0	11.7469	0.0150
C7	HP-PR-CB28b	PR-CB25	CONDUIT	3.0	22.1939	0.0150
C70	SWALE01	SWALE02	CONDUIT	33.5	1.0150	0.0350

C71	PR-CB20	HP-PR-CB20	CONDUIT	3.0	-6.6815	0.0150
C72	SWALE03	EX-CB14	CONDUIT	82.0	1.0001	0.0350
C73	PR-CB19	HP-PR-CB19	CONDUIT	3.0	-6.6815	0.0150
C74	PR-CBMH110	HP-PR-CBMH110	CONDUIT	3.0	-6.6815	0.0150
C75	PR-CB18	HP-PR-CB18	CONDUIT	3.0	-6.6815	0.0150
C76	HP-PR-CB18	EX-CB82	CONDUIT	3.0	56.2106	0.0150
C77	HP-PR-CB20	HP-03	CONDUIT	3.0	41.5038	0.0150
C78	HP-03	SWALE02	CONDUIT	3.0	29.1667	0.0150
C79	HP-PR-CB19	HP-02	CONDUIT	3.0	43.6436	0.0150
C8	PR-CB27	HP-PR-CB27b	CONDUIT	3.0	-10.0504	0.0150
C80	HP-02	SWALE03	CONDUIT	3.0	31.4485	0.0150
C81	HP-PR-CBMH110	HP-01	CONDUIT	3.0	45.8349	0.0150
C82	HP-01	EX-CB14	CONDUIT	3.0	67.0089	0.0150
C83	EX-CB14	HP-EX-CB14	CONDUIT	3.0	-28.4154	0.0350
C84	EX-CB84	HP-EX-CB84	CONDUIT	3.0	-6.6815	0.0150
C84_1	EX-CB82	HP-EX-CB82	CONDUIT	3.0	-2.3340	0.0150
C84_2	HP-EX-CB82	HP-05	CONDUIT	3.0	3.3352	0.0150
C85	HP-05	EX-CB131	CONDUIT	3.0	228.0000	0.0350
C86	EX-CB131	HP-EX-CB131	CONDUIT	3.0	-3.0014	0.0350
C87	HP-EX-CB84	HP-05	CONDUIT	3.0	3.3352	0.0150
C88	PR-CB32	HP-PR-CB32	CONDUIT	3.0	-5.0063	0.0150
C89	HP-EX-CB116	EX-CB117	CONDUIT	3.0	8.3624	0.0150
C9	HP-PR-CB27b	PR-CBMH114	CONDUIT	3.0	22.1939	0.0150
C90	EX-CB117	HP-EX-CB117	CONDUIT	3.0	-5.0063	0.0150
C91	HP-EX-CB117	PR-CB16/17	CONDUIT	3.0	5.0063	0.0150
C92	EX-CB64	HP-EX-CB64	CONDUIT	3.0	-3.3352	0.0150
C93	HP-EX-CB64	EX-CB117	CONDUIT	3.0	8.3624	0.0150
C94	PR-CBMH109	HP-PR-CBMH109	CONDUIT	3.0	-6.6815	0.0150
C95	HP-PR-CBMH109	EX-CB64	CONDUIT	3.0	3.3352	0.0150
C96	EX-CB62	HP-EX-CB62	CONDUIT	3.0	-2.0004	0.0150
C97	HP-EX-CB62	EX-CB60	CONDUIT	3.0	4.3374	0.0150
C98	EX-CB60	HP-EX-CB60	CONDUIT	3.0	-7.0172	0.0150
C99	HP-EX-CB60	EX-CB64	CONDUIT	3.0	13.4535	0.0150
C-CB22	PR-CB22	HP-PR-CB22	CONDUIT	3.0	-6.6815	0.0150
C-CB23	PR-CB23	HP-PR-CB23	CONDUIT	3.0	-6.6815	0.0150
C-CB24	PR-CB24	HP-PR-CB24	CONDUIT	3.0	-10.0504	0.0150
C-CB25	PR-CB25	HP-PR-CB25b	CONDUIT	3.0	-10.0504	0.0150
C-CB87	EX-CB87	HP-EX-CB87b	CONDUIT	3.0	-8.3624	0.0150
C-CBMH112	PR-CBMH112	HP-PR-CBMH112	CONDUIT	3.0	-6.6815	0.0150
C-CBMH114	PR-CBMH114	HP-PR-CBMH114b	CONDUIT	3.0	-10.0504	0.0150
CULV-4	SWALE02	SWALE03	CONDUIT	13.4	0.8222	0.0240
X-CB-129_(X-CB)	EX-CB128	EX-CB95	CONDUIT	7.0	0.7184	0.0130
X-CB-89_(X-CB)	EX-CB87	EX-MH106a	CONDUIT	19.6	4.0236	0.0130
X-CB-91_(X-CB)	EX-CB90	EX-MH106a	CONDUIT	15.6	5.1284	0.0130
X-CB-94_(X-CB)	EX-CB92	EX-MH107a	CONDUIT	20.5	1.4600	0.0130
X-CB-97_(X-CB)	EX-CB95	EX-CB96	CONDUIT	25.2	0.7140	0.0130
X-CB-98_(X-CB)	EX-CB96	EX-MH107a	CONDUIT	15.5	0.1933	0.0130
X-STM-13_(1)_(X-STM)	EX-MH101A	EX-MH101B	CONDUIT	30.1	1.3969	0.0130
X-STM-13_(X-STM)	EX-MH101B	EX-MH101	CONDUIT	32.6	2.2684	0.0130
X-STM-17_(X-STM)	EX-MH102	EX-MH101A	CONDUIT	29.5	1.5590	0.0130
X-STM-19_(X-STM)	EX-MH102A	EX-MH102	CONDUIT	59.0	0.8817	0.0130
X-STM-2_(X-STM)	EX-MH101	SWM_Pond	CONDUIT	81.0	2.0016	0.0130
X-STM-21_(X-STM)	EX-MH104	EX-MH102	CONDUIT	65.2	1.3195	0.0130
X-STM-23_(X-STM)	EXMH-105a	EX-MH104	CONDUIT	17.8	0.1685	0.0130
X-STM-25_(X-STM)_1	EX-MH106	EX-MH106a	CONDUIT	26.4	1.6650	0.0130
X-STM-25_(X-STM)_2	EX-MH106a	EXMH-105	CONDUIT	24.6	1.6649	0.0130
X-STM-27_(X-STM)_1	EX-MH107	EX-MH107a	CONDUIT	58.5	0.2736	0.0130
X-STM-27_(X-STM)_2	EX-MH107a	EX-MH106	CONDUIT	4.0	0.2500	0.0130
X-STM-29_(X-STM)	EX-CB28	EX-MH107	CONDUIT	14.4	0.0695	0.0130
X-STM-31_(X-STM)	EX-CB30	EX-MH107	CONDUIT	21.4	0.4671	0.0130
X-STM-33_(X-STM)	EX-MH109	EX-MH104	CONDUIT	86.3	0.3359	0.0130
X-STM-5_(X-STM)	EX-MH115	EX-MH101	CONDUIT	92.8	0.4960	0.0130
X-STM-51_(X-STM)	EX-CB50	EX-MH112	CONDUIT	21.4	0.0935	0.0130
X-STM-53_(X-STM)	EX-CB52	EX-CB50	CONDUIT	55.0	0.1818	0.0130
X-STM-55_(X-STM)	EX-CB54	EX-CB52	CONDUIT	12.8	0.6275	0.0130
X-STM-59_(X-STM)	EX-CB58	EX-MH112	CONDUIT	11.7	1.0275	0.0130
X-STM-63_(X-STM)	EX-CB62	EX-CB60	CONDUIT	6.9	0.5814	0.0130
X-STM-7_(X-STM)	EX-MH116	EX-MH115	CONDUIT	91.3	0.4929	0.0130
X-STM-71_(X-STM)	EX-MH103	EX-MH102	CONDUIT	78.2	1.0992	0.0130
X-STM-75_(X-STM)	EX-MH108	EX-MH109	CONDUIT	32.9	1.0325	0.0130
X-STM-77_(X-STM)	EX-STUB02	EX-MH108	CONDUIT	12.4	0.4851	0.0130
102_(5)_(CB)	PR-CBMH105	PR-MH100a	ORIFICE			
114_(CB)	PR-CBMH110	PR-MH111	ORIFICE			
124_(CB)	PR-CB18	PR-MH111	ORIFICE			
131_(CB)	PR-CBMH118	PR-MH117	ORIFICE			
147_(CB)	PR-CBMH107	PR-MH100a	ORIFICE			
151_(STM)	PR-CB29	PR-CB29a	ORIFICE			
36_(STM)	PR-CB24	PR-MH113	ORIFICE			
42_(STM)	PR-CBMH112	PR-MH111	ORIFICE			
46_(STM)	PR-CBMH114	PR-MH113	ORIFICE			
54_(STM)	PR-CB21	PR-MH111	ORIFICE			
66_(CB)	PR-CBMH109	PR-MH102	ORIFICE			
69_(CB)	EX-CB117	EX-MH109	ORIFICE			
78_(CB)	PR-CB13	PR-MH101	ORIFICE			
81_(CB)	PR-CB14	PR-MH101	ORIFICE			
88_(CB)	PR-CBMH106	PR-MH100a	ORIFICE			
91_(CB)	PR-CB10	PR-MH100a	ORIFICE			
96_(CB)	PR-CBMH104	PR-MH100a	ORIFICE			
OR1	PR-CB32	PR-MH116	ORIFICE			
OR10	PR-TD02	PR-STUB01	ORIFICE			
OR11	EX-MH112	EX-MH112a	ORIFICE			
OR2	PR-CBMH115	PR-CBMH115a	ORIFICE			

OR3	EX-CB60	PR-MH102	ORIFICE
OR4	PR-CBMH108	PR-CBMH108a	ORIFICE
OR5	PR-MH100	PR-MH100a	ORIFICE
OR6	PR-CB16/17	EX-MH109	ORIFICE
OR7	EXMH-105	EXMH-105a	ORIFICE
OR8	EX-CB64	PR-MH103	ORIFICE
OR9	PR-TD01	PR-STUB01	ORIFICE
X-CB-135_(X-CB)	EX-CB137	EX-MH109	ORIFICE
X-CB-83_(X-CB)	EX-CB82	EX-MH104	ORIFICE
X-CB-86_(X-CB)	EX-CB84	EX-MH104	ORIFICE
X-STM-130_(X-STM)	EX-CB131	EX-MH101	ORIFICE
X-STM-15_(X-STM)	EX-CB14	EX-MH101A	ORIFICE
X-STM-73_(X-STM)	EX-CB72	EX-MH103	ORIFICE
EX-BLDG01-OUT	EX-BLDG01	EX-STUB02	OUTLET
PR-BLDG01-OUT	PR-BLDG01	EX-MH109	OUTLET
PR-BLDG02-OUT	PR-BLDG02	PR-STUB01	OUTLET

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
102_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.12
104_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
108_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	44.08
115_(CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	97.01
121_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.92
126_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.30
138_(CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.88
14_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	42.99
142_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.76
145_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
150_(STM)_2	CIRCULAR	0.25	0.05	0.06	0.25	1	59.27
154_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.52
156_(STM)_1	CIRCULAR	0.25	0.05	0.06	0.25	1	45.00
156_(STM)_2	CIRCULAR	0.30	0.07	0.07	0.30	1	68.24
17_(1)_(STM)_4	CIRCULAR	0.30	0.07	0.07	0.30	1	68.20
18_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	145.78
20_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	84.44
28_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	95.97
30_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	86.67
32_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	96.61
34_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.21
34_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	49.63
36_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
42_(1)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	43.36
42_(2)_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.30
49_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.44
5_(STM)	CIRCULAR	0.45	0.16	0.11	0.45	1	156.08
57_(STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	67.94
59_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.94
61_(STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	42.26
64_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	59.07
7_(STM)	CIRCULAR	0.53	0.22	0.13	0.53	1	236.29
86_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.90
9_(1)_(STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	339.41
9_(STM)_2	CIRCULAR	0.60	0.28	0.15	0.60	1	333.45
94_(CB)	CIRCULAR	0.25	0.05	0.06	0.25	1	41.24
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	48.10
C10	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C100	RECT_OPEN	1.00	3.00	0.60	3.00	1	39112.71
C101	RECT_OPEN	1.00	3.00	0.60	3.00	1	52848.83
C102	RECT_OPEN	1.00	3.00	0.60	3.00	1	54787.78
C103	RECT_OPEN	1.00	3.00	0.60	3.00	1	54787.78
C104	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C105	RECT_OPEN	1.00	3.00	0.60	3.00	1	41966.39
C106	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C107	RECT_OPEN	1.00	3.00	0.60	3.00	1	53502.02
C108	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C109	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C11	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C110	RECT_OPEN	1.00	3.00	0.60	3.00	1	54148.25
C111	RECT_OPEN	1.00	3.00	0.60	3.00	1	44341.94
C112	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C113	RECT_OPEN	1.00	3.00	0.60	3.00	1	43563.76
C114	RECT_OPEN	1.00	3.00	0.60	3.00	1	30753.68
C115	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C116	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C117	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C118	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C119	RECT_OPEN	1.00	3.00	0.60	3.00	1	38582.75
C12	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C120	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C121	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C122	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C123	RECT_OPEN	1.00	3.00	0.60	3.00	1	38582.75
C124	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C125	RECT_OPEN	1.00	3.00	0.60	3.00	1	40308.73
C126	RECT_OPEN	1.00	3.00	0.60	3.00	1	50160.45
C127	RECT_OPEN	1.00	3.00	0.60	3.00	1	58497.86

C128	RECT_OPEN	1.00	3.00	0.60	3.00	1	27254.53
C129	RECT_OPEN	1.00	3.00	0.60	3.00	1	27254.53
C13	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C130	RECT_OPEN	1.00	3.00	0.60	3.00	1	48055.09
C131	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C132	RECT_OPEN	1.00	3.00	0.60	3.00	1	46602.99
C133	RECT_OPEN	1.00	3.00	0.60	3.00	1	49467.78
C134	RECT_OPEN	1.00	3.00	0.60	3.00	1	87308.62
C135	RECT_OPEN	1.00	3.00	0.60	3.00	1	91129.08
C136	RECT_OPEN	1.00	3.00	0.60	3.00	1	92008.92
C137	RECT_OPEN	1.00	3.00	0.60	3.00	1	36258.32
C138	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C139	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C14	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C140	RECT_CLOSED	1.00	1.20	0.27	1.20	1	1261.76
C141	RECT_CLOSED	1.00	0.48	0.16	0.48	1	359.53
C15	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C16	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C17	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C18	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C19	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C2	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C20	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C21	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C22	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C23	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C24	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C25	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C26	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C27	RECT_OPEN	1.00	3.00	0.60	3.00	1	45860.92
C28	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C29	RECT_OPEN	1.00	3.00	0.60	3.00	1	41966.39
C3	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C30	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C31	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C32	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C33	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C34	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C35	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C36	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C37	RECT_OPEN	1.00	3.00	0.60	3.00	1	42772.17
C38	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C39	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C4	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C40	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C41	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C42	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C43	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C44	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C45	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C46	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C47	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C48	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C49	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C5	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C50	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C51	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C52	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C53	RECT_OPEN	1.00	3.00	0.60	3.00	1	39454.84
C53_1	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C53_2	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C54	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C54_1	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C54_2	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C55	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C56	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C57	RECT_OPEN	1.00	3.00	0.60	3.00	1	39454.84
C58	RECT_OPEN	1.00	3.00	0.60	3.00	1	43563.76
C59	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C6	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C60	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C61	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C62	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C63	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C64	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C65	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C66	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C67	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C68	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C69	RECT_OPEN	1.00	3.00	0.60	3.00	1	48766.13
C7	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C70	TRAPEZOIDAL	1.00	4.20	0.56	7.20	1	8196.24
C71	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C72	TRAPEZOIDAL	1.00	8.00	0.61	13.00	1	16372.41
C73	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C74	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C75	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C76	RECT_OPEN	1.00	3.00	0.60	3.00	1	106675.80
C77	RECT_OPEN	1.00	3.00	0.60	3.00	1	91664.45
C78	RECT_OPEN	1.00	3.00	0.60	3.00	1	76842.30
C79	RECT_OPEN	1.00	3.00	0.60	3.00	1	93997.68
C8	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44

C80	RECT_OPEN	1.00	3.00	0.60	3.00	1	79791.62
C81	RECT_OPEN	1.00	3.00	0.60	3.00	1	96328.60
C82	RECT_OPEN	1.00	3.00	0.60	3.00	1	116472.42
C83	RECT_OPEN	1.00	3.00	0.60	3.00	1	32505.52
C84	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C84_1	RECT_OPEN	1.00	3.00	0.60	3.00	1	21737.24
C84_2	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C85	RECT_OPEN	1.00	3.00	0.60	3.00	1	92076.25
C86	RECT_OPEN	1.00	3.00	0.60	3.00	1	10564.25
C87	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C88	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C89	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C9	RECT_OPEN	1.00	3.00	0.60	3.00	1	67030.66
C90	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C91	RECT_OPEN	1.00	3.00	0.60	3.00	1	31835.65
C92	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C93	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C94	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C95	RECT_OPEN	1.00	3.00	0.60	3.00	1	25984.66
C96	RECT_OPEN	1.00	3.00	0.60	3.00	1	20124.05
C97	RECT_OPEN	1.00	3.00	0.60	3.00	1	29632.76
C98	RECT_OPEN	1.00	3.00	0.60	3.00	1	37691.14
C99	RECT_OPEN	1.00	3.00	0.60	3.00	1	52188.39
C-CB22	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CB23	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CB24	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C-CB25	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
C-CB87	RECT_OPEN	1.00	3.00	0.60	3.00	1	41145.56
C-CBMH112	RECT_OPEN	1.00	3.00	0.60	3.00	1	36778.58
C-CBMH114	RECT_OPEN	1.00	3.00	0.60	3.00	1	45107.44
CULV-4	CIRCULAR	0.40	0.13	0.10	0.40	1	102.29
X-CB-129_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	27.80
X-CB-89_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	65.79
X-CB-91_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	74.28
X-CB-94_(X-CB)	CIRCULAR	0.20	0.03	0.05	0.20	1	39.63
X-CB-97_(X-CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	81.72
X-CB-98_(X-CB)	CIRCULAR	0.30	0.07	0.07	0.30	1	42.52
X-STM-13_(1)_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1315.86
X-STM-13_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1676.84
X-STM-17_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1390.11
X-STM-19_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	90.81
X-STM-2_(X-STM)	CIRCULAR	0.75	0.44	0.19	0.75	1	1575.15
X-STM-21_(X-STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	705.36
X-STM-23_(X-STM)	CIRCULAR	0.45	0.16	0.11	0.45	1	117.05
X-STM-25_(X-STM)_1	CIRCULAR	0.45	0.16	0.11	0.45	1	367.91
X-STM-25_(X-STM)_2	CIRCULAR	0.45	0.16	0.11	0.45	1	367.89

X-STM-27_(X-STM)_1	CIRCULAR	0.30	0.07	0.07	0.30	1	50.59
X-STM-27_(X-STM)_2	CIRCULAR	0.30	0.07	0.07	0.30	1	48.35
X-STM-29_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	25.50
X-STM-31_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	22.42
X-STM-33_(X-STM)	CIRCULAR	0.60	0.28	0.15	0.60	1	355.90
X-STM-5_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	68.11
X-STM-51_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	29.58
X-STM-53_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	41.23
X-STM-55_(X-STM)	CIRCULAR	0.25	0.05	0.06	0.25	1	47.11
X-STM-59_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	33.25
X-STM-63_(X-STM)	CIRCULAR	0.20	0.03	0.05	0.20	1	25.01
X-STM-7_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	67.89
X-STM-71_(X-STM)	CIRCULAR	0.30	0.07	0.07	0.30	1	101.39
X-STM-75_(X-STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	178.17
X-STM-77_(X-STM)	CIRCULAR	0.38	0.11	0.09	0.38	1	122.12

```
***********************************************************
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 ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 10/24/2019 00:00:00
Ending Date ..... 10/25/2019 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 ..... 2.00 sec
```

```
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	1.032	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.097	6.710
Surface Runoff	0.928	64.416
Final Storage	0.016	1.082
Continuity Error (%)	-0.755	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.928	9.275
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.011	0.111
External Outflow	0.932	9.321
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	0.008	0.083
Continuity Error (%)	-0.184	

```
*************************
Highest Continuity Errors
*************************
Node PR-CB16/17 (-2.63%)

***************************
Time-Step Critical Elements
***************************
Link C116 (4.51%)
Link C67 (3.06%)
Link C83 (2.92%)
Link C117 (2.18%)
Link C134 (1.89%)

*******************************
Highest Flow Instability Indexes
*******************************
Link OR5 (16)
Link EX-BLDG01-OUT (15)
Link 114_(CB) (15)
Link C59 (4)
Link C117 (3)

*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.21 sec
Average Time Step           :     1.87 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :    -0.00
Average Iterations per Step :     2.06
Percent Not Converging      :     0.14

***************************
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 LPS	Runoff Coeff
A-01	71.67	0.00	0.00	0.00	70.52	0.00	70.52	0.17	116.53	0.984
A-02	71.67	0.00	0.00	0.00	70.52	0.00	70.52	0.15	106.12	0.984
A-03	71.67	0.00	0.00	0.00	70.26	0.00	70.26	0.05	37.20	0.980
A-04a	71.67	0.00	0.00	7.95	58.26	4.86	63.12	0.22	159.63	0.881
A-04b	71.67	0.00	0.00	6.61	60.31	4.12	64.43	0.49	355.68	0.899
A-05	71.67	0.00	0.00	6.11	60.50	4.36	64.87	0.04	31.55	0.905
A-06	71.67	0.00	0.00	0.00	70.54	0.00	70.54	0.12	81.32	0.984
A-07	71.67	0.00	0.00	0.00	70.51	0.00	70.51	0.12	87.77	0.984
A-08	71.67	0.00	0.00	0.00	70.50	0.00	70.50	0.11	76.87	0.984
A-09	71.67	0.00	0.00	0.00	70.52	0.00	70.52	0.11	78.85	0.984
A-10	71.67	0.00	0.00	0.00	70.52	0.00	70.52	0.12	87.77	0.984
A-11	71.67	0.00	0.00	0.00	70.56	0.00	70.56	0.12	82.30	0.985

A-12	71.67	0.00	0.00	6.06	60.56	4.36	64.92	0.04	31.57	0.906
A-13	71.67	0.00	0.00	7.84	57.78	5.46	63.24	0.04	27.92	0.882
A-14	71.67	0.00	0.00	0.00	70.55	0.00	70.55	0.12	82.80	0.984
A-15	71.67	0.00	0.00	0.00	70.51	0.00	70.51	0.15	106.13	0.984
A-16	71.67	0.00	0.00	0.00	70.52	0.00	70.52	0.11	76.86	0.984
A-17a	71.67	0.00	0.00	20.90	38.16	12.35	50.51	0.11	83.20	0.705
A-17b	71.67	0.00	0.00	2.37	66.64	1.73	68.37	0.13	93.97	0.954
A-17c	71.67	0.00	0.00	16.08	45.46	9.74	55.20	0.14	104.62	0.770
A-17d	71.67	0.00	0.00	0.70	69.33	0.52	69.86	0.16	113.31	0.975
A-17e	71.67	0.00	0.00	18.12	42.42	10.79	53.21	0.16	121.55	0.742
A-17f	71.67	0.00	0.00	2.76	66.00	2.01	68.01	0.19	137.57	0.949
A-18	71.67	0.00	0.00	11.40	53.00	6.75	59.75	0.31	228.17	0.834
A-19	71.67	0.00	0.00	14.67	47.48	9.11	56.59	0.16	119.98	0.790
A-20	71.67	0.00	0.00	1.93	67.41	1.41	68.82	0.27	195.59	0.960
A-21	71.67	0.00	0.00	2.06	67.07	1.52	68.60	0.11	81.27	0.957
A-22	71.67	0.00	0.00	45.47	3.51	23.04	26.55	0.20	114.42	0.370
A-23	71.67	0.00	0.00	10.20	53.91	7.23	61.14	0.03	23.90	0.853
A-24	71.67	0.00	0.00	0.00	71.99	0.00	71.99	0.04	28.27	1.004
A-25	71.67	0.00	0.00	16.46	45.80	8.98	54.78	0.05	33.00	0.764
A-26	71.67	0.00	0.00	22.47	37.30	11.58	48.88	0.05	33.66	0.682
A-27	71.67	0.00	0.00	23.05	36.59	11.71	48.30	0.05	31.31	0.674
A-28	71.67	0.00	0.00	6.48	60.53	4.02	64.55	0.08	56.39	0.901
A-29	71.67	0.00	0.00	16.04	45.26	10.02	55.27	0.05	40.20	0.771
A-30	71.67	0.00	0.00	0.00	72.28	0.00	72.28	0.62	414.77	1.009
A-31	71.67	0.00	0.00	0.00	70.24	0.00	70.24	0.05	37.08	0.980
A-32	71.67	0.00	0.00	6.28	60.22	4.48	64.70	0.07	55.95	0.903
A-33	71.67	0.00	0.00	12.15	51.04	8.07	59.11	0.14	111.76	0.825
A-34a	71.67	0.00	0.00	0.74	69.21	0.56	69.76	0.11	75.70	0.973
A-34b	71.67	0.00	0.00	0.00	70.44	0.00	70.44	0.18	124.99	0.983
A-34c	71.67	0.00	0.00	2.10	67.06	1.55	68.61	0.14	98.98	0.957
A-35	71.67	0.00	0.00	8.71	56.33	6.14	62.46	0.07	57.17	0.872
A-36	71.67	0.00	0.00	0.00	70.25	0.00	70.25	0.03	24.30	0.980
A-37	71.67	0.00	0.00	27.51	27.67	16.55	44.22	0.03	20.45	0.617
A-38a	71.67	0.00	0.00	0.00	72.27	0.00	72.27	0.84	571.23	1.008
A-38b	71.67	0.00	0.00	0.00	72.23	0.00	72.23	0.22	152.89	1.008
A-39	71.67	0.00	0.00	0.00	70.58	0.00	70.58	0.17	118.98	0.985
A-40	71.67	0.00	0.00	0.00	70.67	0.00	70.67	0.21	146.96	0.986
A-41	71.67	0.00	0.00	0.00	70.64	0.00	70.64	0.12	83.70	0.986
A-42	71.67	0.00	0.00	0.00	70.56	0.00	70.56	0.10	69.91	0.985
A-43	71.67	0.00	0.00	2.51	66.58	1.77	68.35	0.18	130.65	0.954
A-44	71.67	0.00	0.00	9.39	55.60	6.12	61.72	0.09	65.16	0.861
A-45	71.67	0.00	0.00	6.50	59.87	4.63	64.50	0.04	32.47	0.900
A-46	71.67	0.00	0.00	18.45	41.41	11.57	52.98	0.06	47.01	0.739
A-47	71.67	0.00	0.00	5.44	61.51	3.98	65.49	0.03	20.45	0.914
A-48	71.67	0.00	0.00	0.79	68.99	0.59	69.58	0.06	44.03	0.971
A-49	71.67	0.00	0.00	0.00	70.33	0.00	70.33	0.06	41.17	0.981
A-50	71.67	0.00	0.00	8.53	56.60	6.06	62.66	0.04	27.42	0.874
A-51	71.67	0.00	0.00	13.32	49.20	8.79	57.99	0.04	28.11	0.809
A-52	71.67	0.00	0.00	9.93	54.46	6.82	61.28	0.04	34.77	0.855
A-53	71.67	0.00	0.00	11.55	51.95	7.74	59.69	0.06	44.08	0.833
A-54	71.67	0.00	0.00	16.84	43.70	10.90	54.61	0.03	27.97	0.762
A-55	71.67	0.00	0.00	6.05	60.80	4.13	64.93	0.10	71.54	0.906
A-56	71.67	0.00	0.00	1.22	68.37	0.92	69.28	0.08	54.83	0.967
A-57	71.67	0.00	0.00	0.00	70.27	0.00	70.27	0.07	51.09	0.981
A-58	71.67	0.00	0.00	0.00	70.35	0.00	70.35	0.08	56.05	0.982
A-59	71.67	0.00	0.00	0.00	70.34	0.00	70.34	0.09	63.49	0.982
A-60	71.67	0.00	0.00	16.37	44.67	10.30	54.97	0.06	48.98	0.767
A-61	71.67	0.00	0.00	0.00	70.38	0.00	70.38	0.15	108.62	0.982
A-62	71.67	0.00	0.00	0.00	70.32	0.00	70.32	0.14	98.70	0.981
A-63	71.67	0.00	0.00	0.00	70.31	0.00	70.31	0.10	73.41	0.981

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
HP-01	JUNCTION	0.00	0.01	114.01	0 01:18	0.01
HP-02	JUNCTION	0.00	0.01	114.06	0 01:20	0.01
HP-03	JUNCTION	0.00	0.01	114.11	0 01:12	0.01
HP-05	JUNCTION	0.00	0.02	113.77	0 01:12	0.02
HP-EX-CB116	JUNCTION	0.01	0.12	113.72	0 01:12	0.12
HP-EX-CB117	JUNCTION	0.03	0.24	113.74	0 01:23	0.22
HP-EX-CB128	JUNCTION	0.00	0.01	114.01	0 01:21	0.01
HP-EX-CB131	JUNCTION	0.00	0.06	107.06	0 01:13	0.06
HP-EX-CB137	JUNCTION	0.00	0.02	113.72	0 01:24	0.01
HP-EX-CB14	JUNCTION	0.00	0.03	113.18	0 01:14	0.03
HP-EX-CB28	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB30a	JUNCTION	0.02	0.10	114.00	0 02:41	0.10
HP-EX-CB30b	JUNCTION	0.00	0.00	114.05	0 00:00	0.00
HP-EX-CB50a	JUNCTION	0.01	0.11	114.06	0 01:47	0.10
HP-EX-CB50b	JUNCTION	0.00	0.01	114.06	0 01:51	0.01
HP-EX-CB52	JUNCTION	0.00	0.00	114.05	0 03:10	0.00
HP-EX-CB54	JUNCTION	0.01	0.10	114.05	0 03:10	0.10
HP-EX-CB58a	JUNCTION	0.01	0.10	114.05	0 03:10	0.10
HP-EX-CB58b	JUNCTION	0.00	0.02	114.07	0 01:51	0.01
HP-EX-CB60	JUNCTION	0.00	0.02	113.92	0 01:10	0.02
HP-EX-CB62	JUNCTION	0.01	0.10	113.92	0 01:10	0.10

HP-EX-CB64	JUNCTION	0.01	0.15	113.75	0	01:23	0.14
HP-EX-CB72	JUNCTION	0.00	0.00	113.83	0	00:00	0.00
HP-EX-CB82	JUNCTION	0.00	0.05	113.90	0	01:12	0.05
HP-EX-CB84	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-EX-CB87a	JUNCTION	0.00	0.00	114.05	0	00:00	0.00
HP-EX-CB87b	JUNCTION	0.02	0.10	114.00	0	02:41	0.10
HP-EX-CB90	JUNCTION	0.00	0.00	114.05	0	00:00	0.00
HP-EX-CB92	JUNCTION	0.02	0.11	114.01	0	01:21	0.11
HP-EX-CB95a	JUNCTION	0.01	0.07	114.02	0	01:22	0.06
HP-EX-CB95b	JUNCTION	0.00	0.01	114.01	0	01:21	0.01
HP-EX-CB96	JUNCTION	0.03	0.16	114.01	0	01:21	0.15
HP-PR-CB02	JUNCTION	0.00	0.00	113.60	0	00:00	0.00
HP-PR-CB03	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB04	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB05	JUNCTION	0.00	0.00	113.70	0	00:00	0.00
HP-PR-CB06	JUNCTION	0.00	0.07	113.67	0	01:51	0.07
HP-PR-CB07	JUNCTION	0.00	0.00	113.65	0	00:00	0.00
HP-PR-CB08	JUNCTION	0.00	0.00	113.75	0	00:00	0.00
HP-PR-CB09	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CB10	JUNCTION	0.00	0.00	113.70	0	00:00	0.00
HP-PR-CB12	JUNCTION	0.00	0.00	113.87	0	00:00	0.00
HP-PR-CB13	JUNCTION	0.00	0.06	113.72	0	01:26	0.06
HP-PR-CB14	JUNCTION	0.00	0.07	113.72	0	01:26	0.07
HP-PR-CB15	JUNCTION	0.01	0.16	113.76	0	01:22	0.14
HP-PR-CB16/17	JUNCTION	0.00	0.10	113.75	0	01:23	0.07
HP-PR-CB18	JUNCTION	0.00	0.01	115.26	0	01:11	0.01
HP-PR-CB19	JUNCTION	0.00	0.01	115.26	0	01:20	0.01
HP-PR-CB20	JUNCTION	0.00	0.01	115.26	0	01:12	0.01
HP-PR-CB21	JUNCTION	0.00	0.01	115.41	0	01:11	0.01
HP-PR-CB22	JUNCTION	0.00	0.01	115.41	0	01:13	0.01
HP-PR-CB23	JUNCTION	0.00	0.02	115.42	0	01:12	0.01
HP-PR-CB24	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB25a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB25b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB26a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB26b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CB27a	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB27b	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB28a	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CB28b	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
HP-PR-CBMH104	JUNCTION	0.00	0.00	113.75	0	00:00	0.00
HP-PR-CBMH105	JUNCTION	0.00	0.00	113.68	0	00:00	0.00
HP-PR-CBMH106	JUNCTION	0.00	0.00	113.80	0	00:00	0.00
HP-PR-CBMH107a	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CBMH107b	JUNCTION	0.00	0.00	113.85	0	00:00	0.00
HP-PR-CBMH108	JUNCTION	0.00	0.00	113.90	0	00:00	0.00
HP-PR-CBMH109	JUNCTION	0.01	0.15	113.75	0	01:22	0.12
HP-PR-CBMH110	JUNCTION	0.00	0.01	115.26	0	01:18	0.01
HP-PR-CBMH112	JUNCTION	0.00	0.01	115.41	0	01:14	0.01
HP-PR-CBMH114a	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CBMH114b	JUNCTION	0.00	0.00	115.85	0	00:00	0.00
HP-PR-CBMH115	JUNCTION	0.00	0.00	116.20	0	00:00	0.00
SWALE01	JUNCTION	0.01	0.14	113.74	0	01:11	0.14
SWALE02	JUNCTION	0.03	0.47	113.73	0	01:11	0.47
SWALE03	JUNCTION	0.01	0.14	113.29	0	01:10	0.14
HP-PR-CB01	OUTFALL	0.00	0.00	113.63	0	00:00	0.00
HP-PR-CB11	OUTFALL	0.00	0.00	113.80	0	02:00	0.00
HP-PR-CB29	OUTFALL	0.00	0.02	113.02	0	01:13	0.01
HP-PR-CB30	OUTFALL	0.00	0.01	112.71	0	01:11	0.01
HP-PR-CB31	OUTFALL	0.00	0.02	112.72	0	01:13	0.02
HP-PR-CB32	OUTFALL	0.00	0.03	112.58	0	01:06	0.03
HP-PR-CBMH118	OUTFALL	0.00	0.02	112.72	0	01:08	0.02
SWM_Pond	OUTFALL	0.11	0.34	103.29	0	01:23	0.34
SWM_Pond_OV	OUTFALL	0.00	0.06	106.06	0	01:13	0.06
EX-BLDG01	STORAGE	0.01	0.11	120.11	0	01:16	0.11
EX-CB116	STORAGE	0.74	1.39	113.78	0	01:23	1.33
EX-CB117	STORAGE	0.98	2.26	113.75	0	01:23	2.23
EX-CB128	STORAGE	1.28	2.10	114.01	0	01:21	2.10
EX-CB131	STORAGE	0.10	1.82	107.11	0	01:12	1.81
EX-CB137	STORAGE	0.81	2.35	113.75	0	01:24	2.35
EX-CB14	STORAGE	1.15	2.60	113.19	0	01:14	2.60
EX-CB28	STORAGE	1.33	2.17	114.00	0	02:40	2.17
EX-CB30	STORAGE	1.29	2.10	114.00	0	02:41	2.10
EX-CB50	STORAGE	1.58	2.33	114.07	0	01:47	2.32
EX-CB52	STORAGE	1.51	2.21	114.05	0	03:10	2.21
EX-CB54	STORAGE	1.45	2.13	114.05	0	03:10	2.13
EX-CB58	STORAGE	1.50	2.25	114.09	0	01:58	2.24
EX-CB60	STORAGE	0.29	1.77	113.92	0	01:10	1.77
EX-CB62	STORAGE	0.20	1.29	113.93	0	01:10	1.28
EX-CB64	STORAGE	0.85	2.26	113.76	0	01:22	2.22
EX-CB72	STORAGE	0.03	1.75	112.93	0	01:10	1.74
EX-CB82	STORAGE	0.74	1.92	113.94	0	01:12	1.92
EX-CB84	STORAGE	0.74	2.28	113.80	0	01:21	2.28
EX-CB87	STORAGE	1.28	2.10	114.00	0	02:41	2.10
EX-CB90	STORAGE	1.28	2.09	114.00	0	02:40	2.09
EX-CB92	STORAGE	1.29	2.12	114.01	0	01:21	2.12
EX-CB95	STORAGE	1.31	2.17	114.02	0	01:21	2.16
EX-CB96	STORAGE	1.44	2.39	114.01	0	01:21	2.39
EX-MH101	STORAGE	0.11	0.34	104.91	0	01:23	0.34
EX-MH101A	STORAGE	0.11	0.31	107.49	0	01:22	0.31
EX-MH101B	STORAGE	0.10	0.28	105.61	0	01:22	0.28
EX-MH102	STORAGE	0.11	0.30	109.68	0	01:22	0.30

EX-MH102A	STORAGE	0.08	0.17	112.59	0	01:43	0.17
EX-MH103	STORAGE	0.01	0.10	110.81	0	01:11	0.10
EX-MH104	STORAGE	0.11	0.34	110.99	0	01:26	0.34
EXMH-105	STORAGE	1.38	2.72	114.00	0	02:33	2.72
EXMH-105a	STORAGE	0.07	0.13	111.41	0	02:33	0.13
EX-MH106	STORAGE	0.89	1.85	114.00	0	02:33	1.85
EX-MH106a	STORAGE	1.13	2.29	114.00	0	02:33	2.29
EX-MH107	STORAGE	0.78	1.65	114.00	0	02:40	1.65
EX-MH107a	STORAGE	0.87	1.81	114.00	0	02:31	1.81
EX-MH108	STORAGE	0.05	0.68	112.00	0	01:25	0.68
EX-MH109	STORAGE	0.14	0.50	111.48	0	01:25	0.50
EX-MH112	STORAGE	1.12	1.90	114.05	0	03:10	1.90
EX-MH112a	STORAGE	0.07	0.10	112.25	0	03:11	0.10
EX-MH115	STORAGE	0.08	0.36	105.41	0	01:29	0.36
EX-MH116	STORAGE	0.08	0.35	105.85	0	01:28	0.35
EX-STUB02	STORAGE	0.05	0.78	112.16	0	01:25	0.78
PR-BLDG01	STORAGE	0.04	0.15	120.15	0	01:50	0.15
PR-BLDG02	STORAGE	0.03	0.15	120.15	0	01:42	0.15
PR-CB01	STORAGE	0.21	1.19	113.55	0	01:36	1.19
PR-CB02	STORAGE	0.20	1.15	113.55	0	01:35	1.15
PR-CB02a	STORAGE	0.22	1.27	113.55	0	01:35	1.27
PR-CB03	STORAGE	0.20	1.15	113.55	0	01:33	1.15
PR-CB04	STORAGE	0.20	1.15	113.55	0	01:34	1.15
PR-CB05	STORAGE	0.16	1.17	113.62	0	01:30	1.17
PR-CB06	STORAGE	0.32	1.22	113.67	0	02:12	1.22
PR-CB07	STORAGE	0.35	1.28	113.64	0	01:59	1.28
PR-CB08	STORAGE	0.33	1.21	113.71	0	02:01	1.21
PR-CB09	STORAGE	0.36	1.22	113.82	0	02:10	1.22
PR-CB10	STORAGE	0.29	1.42	113.67	0	01:42	1.42
PR-CB11	STORAGE	0.49	1.20	113.80	0	02:00	1.20
PR-CB12	STORAGE	0.59	1.39	113.81	0	02:02	1.39
PR-CB13	STORAGE	0.16	1.37	113.72	0	01:26	1.37
PR-CB14	STORAGE	0.19	1.37	113.72	0	01:27	1.37
PR-CB15	STORAGE	0.53	1.52	113.72	0	01:28	1.52
PR-CB16/17	STORAGE	0.47	1.65	113.74	0	01:23	1.63
PR-CB18	STORAGE	0.13	1.42	115.27	0	01:11	1.42
PR-CB19	STORAGE	0.36	1.61	115.26	0	01:20	1.61
PR-CB20	STORAGE	0.30	1.42	115.27	0	01:12	1.41
PR-CB21	STORAGE	0.27	1.42	115.42	0	01:11	1.42
PR-CB22	STORAGE	0.58	1.62	115.42	0	01:13	1.61
PR-CB23	STORAGE	0.46	1.42	115.42	0	01:12	1.42
PR-CB24	STORAGE	0.41	1.47	115.82	0	02:01	1.47
PR-CB25	STORAGE	0.94	1.70	115.84	0	03:11	1.70
PR-CB26	STORAGE	0.77	1.49	115.84	0	03:10	1.49
PR-CB27	STORAGE	0.70	1.62	116.13	0	02:53	1.62
PR-CB28	STORAGE	0.57	1.44	116.14	0	02:53	1.44
PR-CB29	STORAGE	0.32	1.53	113.03	0	01:13	1.52
PR-CB29a	STORAGE	0.03	0.07	111.57	0	01:14	0.07
PR-CB30	STORAGE	0.40	1.52	112.72	0	01:10	1.52
PR-CB31	STORAGE	0.50	1.72	112.73	0	01:13	1.72
PR-CB32	STORAGE	0.24	1.71	112.61	0	01:06	1.70
PR-CBMH104	STORAGE	0.18	1.31	113.61	0	01:30	1.31
PR-CBMH105	STORAGE	0.38	1.38	113.64	0	01:59	1.38
PR-CBMH106	STORAGE	0.40	1.40	113.71	0	02:01	1.40
PR-CBMH107	STORAGE	0.45	1.41	113.82	0	02:10	1.41
PR-CBMH108	STORAGE	0.73	1.59	113.80	0	02:02	1.59
PR-CBMH108a	STORAGE	0.05	0.08	112.29	0	02:03	0.08
PR-CBMH109	STORAGE	0.74	1.85	113.75	0	01:22	1.83
PR-CBMH110	STORAGE	0.51	1.96	115.26	0	01:18	1.96
PR-CBMH112	STORAGE	0.70	1.80	115.41	0	01:14	1.80
PR-CBMH114	STORAGE	1.10	1.89	115.84	0	03:11	1.89
PR-CBMH115	STORAGE	0.92	1.94	116.13	0	02:53	1.94
PR-CBMH115a	STORAGE	0.03	0.06	114.25	0	02:53	0.06
PR-CBMH118	STORAGE	0.60	1.90	112.74	0	01:08	1.89
PR-MH100	STORAGE	0.27	1.39	113.55	0	01:34	1.39
PR-MH100a	STORAGE	0.06	0.18	112.34	0	01:42	0.18
PR-MH101	STORAGE	0.08	0.21	111.91	0	01:44	0.21
PR-MH102	STORAGE	0.10	0.24	111.52	0	01:26	0.24
PR-MH103	STORAGE	0.12	0.40	111.50	0	01:26	0.40
PR-MH111	STORAGE	0.08	0.16	113.46	0	01:42	0.16
PR-MH113	STORAGE	0.07	0.10	113.83	0	02:30	0.10
PR-MH116	STORAGE	0.04	0.12	110.39	0	01:20	0.12
PR-MH117	STORAGE	0.06	0.11	110.84	0	01:18	0.11
PR-STUB01	STORAGE	0.02	0.12	110.83	0	01:20	0.12
PR-TD01	STORAGE	0.04	0.82	113.47	0	01:14	0.81
PR-TD02	STORAGE	0.10	0.92	113.57	0	01:23	0.92

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
HP-01	JUNCTION	0.00	38.33	0 01:18	0	0.0225	-0.000
HP-02	JUNCTION	0.00	32.24	0 01:20	0	0.0339	-0.002
HP-03	JUNCTION	0.00	60.88	0 01:12	0	0.0518	-0.000
HP-05	JUNCTION	0.00	213.69	0 01:12	0	0.161	-0.030

HP-EX-CB116	JUNCTION	0.00	214.60	0	01:23	0	0.0572	-0.879	
HP-EX-CB117	JUNCTION	0.00	268.23	0	01:13	0	0.199	-0.017	
HP-EX-CB128	JUNCTION	0.00	27.90	0	01:21	0	0.00423	-0.017	
HP-EX-CB131	JUNCTION	0.00	501.23	0	01:13	0	0.587	-0.006	
HP-EX-CB137	JUNCTION	0.00	154.84	0	01:24	0	0.0891	-0.123	
HP-EX-CB14	JUNCTION	0.00	334.83	0	01:14	0	0.389	0.002	
HP-EX-CB28	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB30a	JUNCTION	0.00	42.48	0	01:14	0	0.0786	-0.006	
HP-EX-CB30b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB50a	JUNCTION	0.00	168.64	0	01:58	0	0.218	0.493	
HP-EX-CB50b	JUNCTION	0.00	44.93	0	01:51	0	0.00511	-1.230	
HP-EX-CB52	JUNCTION	0.00	0.16	0	03:10	0	1.5e-05	-0.976	ltr
HP-EX-CB54	JUNCTION	0.00	13.20	0	01:46	0	0.0282	0.075	
HP-EX-CB58a	JUNCTION	0.00	245.70	0	01:39	0	0.289	-0.856	
HP-EX-CB58b	JUNCTION	0.00	91.04	0	01:51	0	0.0179	-1.219	
HP-EX-CB60	JUNCTION	0.00	75.76	0	01:10	0	0.0522	-0.021	
HP-EX-CB62	JUNCTION	0.00	36.24	0	01:10	0	0.0381	-0.010	
HP-EX-CB64	JUNCTION	0.00	318.11	0	01:12	0	0.161	0.076	
HP-EX-CB72	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB82	JUNCTION	0.00	209.01	0	01:12	0	0.161	-0.001	
HP-EX-CB84	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB87a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB87b	JUNCTION	0.00	32.00	0	01:19	0	0.0522	-0.007	
HP-EX-CB90	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-EX-CB92	JUNCTION	0.00	107.30	0	01:17	0	0.039	-0.060	
HP-EX-CB95a	JUNCTION	0.00	68.97	0	01:17	0	0.0264	0.033	
HP-EX-CB95b	JUNCTION	0.00	28.70	0	01:21	0	0.00503	-0.014	
HP-EX-CB96	JUNCTION	0.00	131.14	0	01:16	0	0.0725	-0.024	
HP-PR-CB02	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB03	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB04	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB05	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB06	JUNCTION	0.00	91.18	0	01:51	0	0.19	-0.903	
HP-PR-CB07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB13	JUNCTION	0.00	24.14	0	01:21	0	0.0235	0.215	
HP-PR-CB14	JUNCTION	0.00	28.59	0	01:24	0	0.0308	0.072	
HP-PR-CB15	JUNCTION	0.00	343.95	0	01:22	0	0.141	0.346	
HP-PR-CB16/17	JUNCTION	0.00	258.47	0	01:23	0	0.18	0.294	
HP-PR-CB18	JUNCTION	0.00	79.83	0	01:11	0	0.0257	-0.010	
HP-PR-CB19	JUNCTION	0.00	32.24	0	01:20	0	0.0339	0.004	
HP-PR-CB20	JUNCTION	0.00	60.67	0	01:12	0	0.0518	0.001	
HP-PR-CB21	JUNCTION	0.00	60.61	0	01:11	0	0.0241	-0.008	
HP-PR-CB22	JUNCTION	0.00	46.82	0	01:13	0	0.0398	0.002	
HP-PR-CB23	JUNCTION	0.00	65.32	0	01:12	0	0.052	-0.000	
HP-PR-CB24	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB25a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB25b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB26a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB26b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB27a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB27b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB28a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB28b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH104	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH105	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH106	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH107a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH107b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH108	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH109	JUNCTION	0.00	461.19	0	01:13	0	0.189	0.053	
HP-PR-CBMH110	JUNCTION	0.00	38.32	0	01:18	0	0.0225	0.002	
HP-PR-CBMH112	JUNCTION	0.00	36.03	0	01:14	0	0.0247	0.002	
HP-PR-CBMH114a	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH114b	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CBMH115	JUNCTION	0.00	0.00	0	00:00	0	0	0.000	ltr
SWALE01	JUNCTION	159.63	159.63	0	01:10	0.22	0.22	-0.196	
SWALE02	JUNCTION	0.00	178.25	0	01:12	0	0.272	0.177	
SWALE03	JUNCTION	355.68	490.96	0	01:10	0.491	0.797	-0.337	
HP-PR-CB01	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
HP-PR-CB11	OUTFALL	0.00	7.06	0	02:00	0	0.0416	0.000	
HP-PR-CB29	OUTFALL	0.00	84.82	0	01:13	0	0.0514	0.000	
HP-PR-CB30	OUTFALL	0.00	40.47	0	01:11	0	0.0592	0.000	
HP-PR-CB31	OUTFALL	0.00	87.11	0	01:13	0	0.0594	0.000	
HP-PR-CB32	OUTFALL	0.00	124.10	0	01:06	0	0.0813	0.000	
HP-PR-CBMH118	OUTFALL	0.00	108.61	0	01:08	0	0.0823	0.000	
SWM_Pond	OUTFALL	0.00	659.34	0	01:23	0	8.52	0.000	
SWM_Pond_OV	OUTFALL	0.00	487.57	0	01:13	0	0.534	0.000	
EX-BLDG01	STORAGE	414.77	414.77	0	01:10	0.624	0.624	-0.016	
EX-CB116	STORAGE	37.08	210.05	0	01:23	0.0525	0.0711	0.621	
EX-CB117	STORAGE	40.20	422.92	0	01:22	0.0515	0.321	-0.020	
EX-CB128	STORAGE	33.66	96.85	0	01:19	0.0498	0.0643	-0.281	
EX-CB131	STORAGE	114.42	318.45	0	01:12	0.197	0.411	-0.014	
EX-CB137	STORAGE	119.98	314.37	0	01:23	0.156	0.25	-0.615	
EX-CB14	STORAGE	0.00	479.18	0	01:10	0	0.822	0.488	
EX-CB28	STORAGE	137.57	137.57	0	01:10	0.19	0.256	0.146	
EX-CB30	STORAGE	121.55	121.55	0	01:10	0.161	0.182	0.043	
EX-CB50	STORAGE	124.99	444.80	0	01:39	0.177	0.576	0.129	
EX-CB52	STORAGE	98.98	226.30	0	01:37	0.138	0.313	-0.201	

EX-CB54	STORAGE	48.98	50.28	0	00:54	0.0621	0.068	-0.345
EX-CB58	STORAGE	75.70	332.05	0	01:39	0.107	0.267	0.816
EX-CB60	STORAGE	56.39	91.14	0	01:51	0.0781	0.145	-0.117
EX-CB62	STORAGE	31.31	35.46	0	01:21	0.0468	0.0513	-0.001
EX-CB64	STORAGE	55.95	403.02	0	01:13	0.0746	0.286	0.001
EX-CB72	STORAGE	23.90	23.90	0	01:10	0.0306	0.0306	-0.003
EX-CB82	STORAGE	195.59	223.97	0	01:11	0.273	0.299	0.008
EX-CB84	STORAGE	81.27	81.27	0	01:10	0.113	0.113	0.064
EX-CB87	STORAGE	83.20	83.20	0	01:10	0.11	0.148	0.044
EX-CB90	STORAGE	93.97	93.97	0	01:10	0.131	0.175	0.025
EX-CB92	STORAGE	104.62	107.99	0	01:13	0.138	0.156	0.060
EX-CB95	STORAGE	33.00	183.28	0	01:12	0.0471	0.119	-0.197
EX-CB96	STORAGE	113.31	187.35	0	01:17	0.16	0.293	0.217
EX-MH101	STORAGE	0.00	659.38	0	01:22	0	8.52	-0.007
EX-MH101A	STORAGE	0.00	483.81	0	01:22	0	7.25	0.000
EX-MH101B	STORAGE	0.00	483.81	0	01:22	0	7.25	0.004
EX-MH102	STORAGE	0.00	464.83	0	01:22	0	6.83	0.000
EX-MH102A	STORAGE	0.00	47.41	0	01:42	0	1.44	-0.000
EX-MH103	STORAGE	0.00	22.47	0	01:10	0	0.0306	-0.002
EX-MH104	STORAGE	0.00	412.90	0	01:25	0	5.36	0.001
EXMH-105	STORAGE	0.00	34.60	0	00:59	0	0.943	0.000
EXMH-105a	STORAGE	0.00	21.85	0	02:33	0	0.943	-0.000
EX-MH106	STORAGE	0.00	56.57	0	00:59	0	0.711	-0.020
EX-MH106a	STORAGE	0.00	70.47	0	00:59	0	0.974	0.007
EX-MH107	STORAGE	0.00	58.57	0	01:00	0	0.357	-0.125
EX-MH107a	STORAGE	0.00	77.90	0	01:00	0	0.727	0.021
EX-MH108	STORAGE	0.00	178.59	0	01:25	0	0.624	-0.012
EX-MH109	STORAGE	0.00	350.80	0	01:25	0	4.17	0.013
EX-MH112	STORAGE	0.00	20.86	0	00:55	0	0.454	-0.017
EX-MH112a	STORAGE	0.00	8.62	0	03:10	0	0.447	0.001
EX-MH115	STORAGE	0.00	68.21	0	01:39	0	0.97	0.076
EX-MH116	STORAGE	0.00	68.26	0	01:20	0	0.97	0.013
EX-STUB02	STORAGE	0.00	178.60	0	01:11	0	0.624	0.020
PR-BLDG01	STORAGE	571.23	571.23	0	01:10	0.837	0.837	0.003
PR-BLDG02	STORAGE	152.89	152.89	0	01:10	0.223	0.223	0.003
PR-CB01	STORAGE	32.47	59.09	0	01:05	0.0432	0.0445	0.111
PR-CB02	STORAGE	20.45	46.80	0	01:05	0.0275	0.0311	0.134
PR-CB02a	STORAGE	0.00	59.72	0	01:05	0	0.0802	-0.016
PR-CB03	STORAGE	47.01	47.01	0	01:10	0.0588	0.0588	-0.020
PR-CB04	STORAGE	44.03	44.03	0	01:10	0.0619	0.0619	0.026
PR-CB05	STORAGE	41.17	64.73	0	01:04	0.0583	0.0618	0.053
PR-CB06	STORAGE	34.77	84.01	0	02:31	0.0447	0.119	0.127
PR-CB07	STORAGE	44.08	104.60	0	01:59	0.0561	0.235	-0.251
PR-CB08	STORAGE	51.09	102.80	0	01:05	0.0724	0.0767	-0.055
PR-CB09	STORAGE	56.05	112.74	0	01:05	0.0795	0.0851	-0.378
PR-CB10	STORAGE	71.54	71.54	0	01:10	0.0961	0.0961	-0.268
PR-CB11	STORAGE	73.41	140.72	0	01:06	0.104	0.154	-0.545
PR-CB12	STORAGE	98.70	164.86	0	01:05	0.14	0.295	0.052
PR-CB13	STORAGE	24.30	24.35	0	01:23	0.0344	0.0511	-0.001
PR-CB14	STORAGE	20.45	38.71	0	01:10	0.0252	0.0572	-0.045
PR-CB15	STORAGE	57.17	421.76	0	01:22	0.0743	0.229	-0.218
PR-CB16/17	STORAGE	256.44	608.99	0	01:09	0.355	0.488	-2.565
PR-CB18	STORAGE	27.92	81.33	0	01:11	0.0367	0.0608	0.013
PR-CB19	STORAGE	31.55	85.25	0	01:13	0.0421	0.144	-0.012
PR-CB20	STORAGE	37.20	91.43	0	01:12	0.0527	0.108	-0.074
PR-CB21	STORAGE	82.80	82.80	0	01:10	0.118	0.118	-0.444
PR-CB22	STORAGE	81.32	177.67	0	01:05	0.116	0.233	-0.047
PR-CB23	STORAGE	106.12	180.75	0	01:06	0.151	0.159	0.147
PR-CB24	STORAGE	106.13	106.13	0	01:10	0.151	0.151	-0.269
PR-CB25	STORAGE	87.77	191.48	0	01:05	0.125	0.309	-0.056
PR-CB26	STORAGE	116.53	189.54	0	01:06	0.166	0.174	0.127
PR-CB27	STORAGE	78.85	156.63	0	01:05	0.112	0.25	0.021
PR-CB28	STORAGE	76.87	153.50	0	01:07	0.109	0.121	-0.418
PR-CB29	STORAGE	130.65	130.65	0	01:10	0.182	0.2	-0.305
PR-CB29a	STORAGE	0.00	9.24	0	01:13	0	0.168	0.025
PR-CB30	STORAGE	69.91	149.73	0	01:07	0.0995	0.134	0.380
PR-CB31	STORAGE	83.70	166.89	0	01:04	0.119	0.257	0.078
PR-CB32	STORAGE	118.98	118.98	0	01:10	0.169	0.186	-0.085
PR-CBMH104	STORAGE	27.42	45.21	0	01:05	0.0357	0.0975	0.025
PR-CBMH105	STORAGE	28.11	39.84	0	01:07	0.0354	0.14	-0.007
PR-CBMH106	STORAGE	54.83	63.87	0	01:08	0.0769	0.154	0.004
PR-CBMH107	STORAGE	63.49	70.39	0	01:08	0.09	0.175	0.015
PR-CBMH108	STORAGE	108.62	108.62	0	01:10	0.154	0.42	-0.001
PR-CBMH108a	STORAGE	0.00	9.41	0	02:02	0	0.398	0.010
PR-CBMH109	STORAGE	111.76	537.37	0	01:13	0.142	0.486	-0.060
PR-CBMH110	STORAGE	31.57	83.71	0	01:14	0.0422	0.174	0.025
PR-CBMH112	STORAGE	82.30	92.55	0	01:04	0.117	0.302	-0.011
PR-CBMH114	STORAGE	87.77	100.32	0	01:04	0.125	0.425	0.005
PR-CBMH115	STORAGE	76.86	86.86	0	01:04	0.109	0.347	-0.039
PR-CBMH115a	STORAGE	0.00	7.29	0	02:53	0	0.331	0.005
PR-CBMH118	STORAGE	146.96	146.96	0	01:10	0.21	0.427	0.009
PR-MH100	STORAGE	0.00	59.29	0	01:05	0	0.196	0.004
PR-MH100a	STORAGE	0.00	49.53	0	01:41	0	0.839	-0.004
PR-MH101	STORAGE	0.00	68.98	0	01:43	0	1.32	0.008
PR-MH102	STORAGE	0.00	93.05	0	01:44	0	2.15	0.045
PR-MH103	STORAGE	0.00	101.91	0	01:33	0	2.23	-0.045
PR-MH111	STORAGE	0.00	47.42	0	01:41	0	1.44	0.019
PR-MH113	STORAGE	0.00	20.89	0	02:30	0	0.898	-0.033
PR-MH116	STORAGE	0.00	68.26	0	01:20	0	0.97	0.009
PR-MH117	STORAGE	0.00	19.57	0	01:14	0	0.505	0.042
PR-STUB01	STORAGE	0.00	38.94	0	01:20	0	0.343	0.004
PR-TD01	STORAGE	27.97	27.97	0	01:10	0.0344	0.0344	0.003

PR-TD02	STORAGE	65.16	65.16	0	01:10	0.0858	0.0858	0.008

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Node Surcharge Summary
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No nodes were surcharged.

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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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 LPS
EX-BLDG01	0.008	0	0	0	0.166	4	0 01:16	178.60
EX-CB116	0.006	41	0	0	0.014	100	0 01:11	178.31
EX-CB117	0.013	29	0	0	0.046	100	0 01:09	347.04
EX-CB128	0.009	41	0	0	0.022	100	0 01:21	70.27
EX-CB131	0.000	5	0	0	0.000	100	0 01:03	315.08
EX-CB137	0.005	42	0	0	0.012	100	0 01:12	240.61
EX-CB14	0.005	73	0	0	0.007	100	0 00:47	353.86
EX-CB28	0.044	23	0	0	0.147	78	0 02:40	39.23
EX-CB30	0.035	23	0	0	0.116	78	0 02:41	47.17
EX-CB50	0.050	43	0	0	0.116	100	0 01:21	277.45
EX-CB52	0.041	31	0	0	0.130	98	0 03:10	134.10
EX-CB54	0.013	47	0	0	0.027	100	0 01:20	25.25
EX-CB58	0.033	43	0	0	0.076	100	0 01:23	224.35
EX-CB60	0.003	12	0	0	0.027	100	0 01:10	84.25
EX-CB62	0.001	14	0	0	0.004	100	0 01:06	38.59
EX-CB64	0.006	35	0	0	0.018	100	0 01:07	469.20
EX-CB72	0.000	0	0	0	0.000	0	0 00:00	22.47
EX-CB82	0.006	26	0	0	0.023	100	0 01:02	228.42
EX-CB84	0.006	8	0	0	0.042	55	0 01:21	21.96
EX-CB87	0.028	22	0	0	0.093	76	0 02:41	32.00
EX-CB90	0.038	23	0	0	0.127	77	0 02:40	23.39
EX-CB92	0.032	40	0	0	0.079	100	0 01:15	116.89
EX-CB95	0.011	45	0	0	0.023	100	0 01:17	92.25
EX-CB96	0.035	43	0	0	0.081	100	0 01:12	152.77
EX-MH101	0.000	5	0	0	0.000	14	0 01:23	659.34
EX-MH101A	0.000	2	0	0	0.000	6	0 01:22	483.81
EX-MH101B	0.000	2	0	0	0.000	5	0 01:22	483.81
EX-MH102	0.000	2	0	0	0.000	6	0 01:22	464.84
EX-MH102A	0.000	5	0	0	0.000	9	0 01:43	47.41
EX-MH103	0.000	0	0	0	0.000	4	0 01:11	22.26
EX-MH104	0.000	3	0	0	0.000	11	0 01:26	412.89
EXMH-105	0.000	38	0	0	0.000	75	0 02:33	21.85
EXMH-105a	0.000	3	0	0	0.000	5	0 02:33	21.85
EX-MH106	0.000	33	0	0	0.000	68	0 02:33	49.98
EX-MH106a	0.000	36	0	0	0.000	73	0 02:33	41.92
EX-MH107	0.000	32	0	0	0.000	67	0 02:40	39.65
EX-MH107a	0.000	33	0	0	0.000	69	0 02:31	56.57
EX-MH108	0.000	2	0	0	0.000	29	0 01:25	178.56
EX-MH109	0.000	5	0	0	0.000	20	0 01:25	350.46
EX-MH112	0.000	41	0	0	0.000	70	0 03:10	15.99
EX-MH112a	0.000	4	0	0	0.000	6	0 03:11	8.62
EX-MH115	0.000	4	0	0	0.000	20	0 01:29	68.47
EX-MH116	0.000	6	0	0	0.000	26	0 01:28	68.21
EX-STUB02	0.000	2	0	0	0.000	34	0 01:25	178.59
PR-BLDG01	0.106	2	0	0	0.553	9	0 01:50	46.00
PR-BLDG02	0.022	1	0	0	0.138	8	0 01:42	14.90
PR-CB01	0.003	6	0	0	0.025	46	0 01:36	38.88
PR-CB02	0.003	8	0	0	0.020	60	0 01:35	22.32
PR-CB02a	0.000	11	0	0	0.000	60	0 01:35	37.85
PR-CB03	0.003	5	0	0	0.020	42	0 01:33	24.11
PR-CB04	0.003	5	0	0	0.029	39	0 01:34	35.28
PR-CB05	0.003	5	0	0	0.030	49	0 01:30	19.03
PR-CB06	0.006	21	0	0	0.027	100	0 01:19	61.24
PR-CB07	0.006	17	0	0	0.031	91	0 01:59	80.35
PR-CB08	0.009	16	0	0	0.045	76	0 02:01	9.11
PR-CB09	0.013	18	0	0	0.056	81	0 02:10	6.94
PR-CB10	0.009	13	0	0	0.060	81	0 01:42	6.11
PR-CB11	0.028	30	0	0	0.096	99	0 02:00	9.68
PR-CB12	0.031	21	0	0	0.099	67	0 02:02	67.40
PR-CB13	0.001	11	0	0	0.006	100	0 01:07	24.33
PR-CB14	0.001	12	0	0	0.012	100	0 01:12	27.75
PR-CB15	0.053	23	0	0	0.191	85	0 01:28	131.84
PR-CB16/17	0.055	24	0	0	0.225	100	0 01:12	277.82
PR-CB18	0.001	8	0	0	0.008	100	0 01:11	86.10
PR-CB19	0.004	21	0	0	0.019	100	0 01:20	45.95
PR-CB20	0.003	20	0	0	0.017	100	0 01:12	83.97

PR-CB21	0.009	17	0	0	0.052	100	0	01:11	66.88
PR-CB22	0.021	33	0	0	0.064	100	0	01:13	75.71
PR-CB23	0.017	29	0	0	0.061	100	0	01:12	80.39
PR-CB24	0.022	19	0	0	0.102	87	0	02:01	6.39
PR-CB25	0.046	39	0	0	0.110	94	0	03:11	74.24
PR-CB26	0.039	37	0	0	0.100	95	0	03:10	26.31
PR-CB27	0.029	25	0	0	0.085	73	0	02:53	77.13
PR-CB28	0.026	23	0	0	0.082	73	0	02:53	18.20
PR-CB29	0.016	18	0	0	0.089	100	0	01:12	94.05
PR-CB29a	0.000	1	0	0	0.000	3	0	01:14	9.19
PR-CB30	0.013	27	0	0	0.049	100	0	01:10	66.56
PR-CB31	0.020	27	0	0	0.072	100	0	01:12	87.11
PR-CB32	0.007	17	0	0	0.043	100	0	01:06	133.99
PR-CBMH104	0.001	4	0	0	0.012	36	0	01:30	34.70
PR-CBMH105	0.006	14	0	0	0.028	73	0	01:59	36.61
PR-CBMH106	0.011	12	0	0	0.049	56	0	02:01	57.35
PR-CBMH107	0.014	19	0	0	0.057	81	0	02:10	62.60
PR-CBMH108	0.032	20	0	0	0.093	58	0	02:02	78.57
PR-CBMH108a	0.000	2	0	0	0.000	3	0	02:03	9.41
PR-CBMH109	0.029	34	0	0	0.084	100	0	01:15	318.85
PR-CBMH110	0.007	20	0	0	0.036	100	0	01:18	45.45
PR-CBMH112	0.024	37	0	0	0.064	100	0	01:14	80.97
PR-CBMH114	0.050	41	0	0	0.114	93	0	03:11	86.43
PR-CBMH115	0.032	29	0	0	0.080	72	0	02:53	73.59
PR-CBMH115a	0.000	1	0	0	0.000	2	0	02:53	7.29
PR-CBMH118	0.020	35	0	0	0.057	100	0	01:08	162.46
PR-MH100	0.000	11	0	0	0.000	55	0	01:34	38.45
PR-MH100a	0.000	2	0	0	0.000	7	0	01:42	49.53
PR-MH101	0.000	4	0	0	0.000	9	0	01:44	68.98
PR-MH102	0.000	4	0	0	0.000	11	0	01:26	93.82
PR-MH103	0.000	5	0	0	0.000	16	0	01:26	103.79
PR-MH111	0.000	4	0	0	0.000	8	0	01:42	47.41
PR-MH113	0.000	3	0	0	0.000	5	0	02:30	20.89
PR-MH116	0.000	2	0	0	0.000	5	0	01:20	68.26
PR-MH117	0.000	2	0	0	0.000	4	0	01:18	19.56
PR-STUB01	0.000	1	0	0	0.000	5	0	01:20	38.94
PR-TD01	0.000	2	0	0	0.010	61	0	01:14	11.96
PR-TD02	0.003	5	0	0	0.040	64	0	01:23	12.74

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Outfall Loading Summary
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	Flow	Avg	Max	Total

Outfall Node	Freq Pcnt	Flow LPS	Flow LPS	Volume 10^6 ltr
HP-PR-CB01	0.00	0.00	0.00	0.000
HP-PR-CB11	90.21	0.61	7.06	0.042
HP-PR-CB29	94.32	1.18	84.82	0.051
HP-PR-CB30	94.59	1.27	40.47	0.059
HP-PR-CB31	94.31	1.31	87.11	0.059
HP-PR-CB32	95.21	1.93	124.10	0.081
HP-PR-CBMH118	94.96	1.94	108.61	0.082
SWM_Pond	98.95	124.57	659.34	8.523
SWM_Pond_OV	11.45	118.43	487.57	0.534
System	74.89	251.24	487.57	9.433

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
102_(CB)	CONDUIT	31.79	0	01:04	0.65	0.77	1.00
104_(CB)	CONDUIT	49.66	0	01:05	1.01	1.21	1.00
108_(CB)	CONDUIT	24.11	0	01:05	0.49	0.55	1.00
115_(CB)	CONDUIT	39.44	0	01:04	0.56	0.41	1.00
121_(CB)	CONDUIT	42.87	0	01:08	0.87	1.02	1.00
126_(STM)	CONDUIT	80.77	0	01:07	1.65	1.91	1.00
138_(CB)	CONDUIT	38.88	0	01:05	0.55	0.56	1.00
14_(STM)	CONDUIT	8.62	0	03:11	0.54	0.20	0.28
142_(STM)	CONDUIT	35.28	0	01:05	0.72	0.83	1.00
145_(CB)	CONDUIT	56.86	0	01:05	1.16	1.36	1.00
150_(STM)_2	CONDUIT	9.19	0	01:14	0.87	0.16	0.27
154_(CB)	CONDUIT	85.49	0	01:05	1.74	2.01	1.00
156_(STM)_1	CONDUIT	26.68	0	01:05	0.54	0.59	1.00
156_(STM)_2	CONDUIT	24.18	0	01:05	0.34	0.35	1.00
17_(1)_(STM)_4	CONDUIT	19.56	0	01:18	0.84	0.29	0.36
18_(STM)	CONDUIT	68.26	0	01:20	2.89	0.47	0.48
20_(STM)	CONDUIT	38.94	0	01:20	1.69	0.46	0.48
28_(STM)	CONDUIT	47.41	0	01:42	1.31	0.49	0.51
30_(STM)	CONDUIT	20.89	0	02:30	0.97	0.24	0.39
32_(STM)	CONDUIT	7.29	0	02:53	0.60	0.08	0.24
34_(1)_(STM)	CONDUIT	77.13	0	01:07	1.57	1.83	1.00

34_(STM)	CONDUIT	66.83	0	01:07	1.36	1.35	1.00
36_(1)_(STM)	CONDUIT	79.94	0	01:05	1.63	1.91	1.00
42_(1)_(STM)	CONDUIT	75.71	0	01:06	1.54	1.75	1.00
42_(2)_(STM)	CONDUIT	74.63	0	01:05	1.52	1.81	1.00
49_(STM)	CONDUIT	74.24	0	01:06	1.51	1.79	1.00
5_(STM)	CONDUIT	49.53	0	01:42	0.91	0.32	0.37
57_(STM)	CONDUIT	9.41	0	02:03	0.68	0.14	0.25
59_(STM)	CONDUIT	69.73	0	01:04	1.42	1.66	1.00
61_(STM)	CONDUIT	67.40	0	01:06	1.37	1.59	1.00
64_(CB)	CONDUIT	92.99	0	01:07	1.89	1.57	1.00
7_(STM)	CONDUIT	68.98	0	01:44	0.97	0.29	0.36
86_(CB)	CONDUIT	51.76	0	01:05	1.05	1.24	1.00
9_(1)_(STM)	CONDUIT	103.79	0	01:36	0.77	0.31	0.74
9_(STM)_2	CONDUIT	93.82	0	01:33	0.88	0.28	0.53
94_(CB)	CONDUIT	26.29	0	01:04	0.54	0.64	1.00
C1	CONDUIT	31.47	0	01:04	1.15	0.65	1.00
C10	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C100	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C101	CONDUIT	0.00	0	00:00	0.00	0.00	0.18
C102	CONDUIT	0.00	0	00:00	0.00	0.00	0.20
C103	CONDUIT	0.00	0	00:00	0.00	0.00	0.20
C104	CONDUIT	0.00	0	00:00	0.00	0.00	0.17
C105	CONDUIT	42.48	0	01:14	0.10	0.00	0.23
C106	CONDUIT	42.30	0	01:14	0.09	0.00	0.24
C107	CONDUIT	0.00	0	00:00	0.00	0.00	0.19
C108	CONDUIT	0.00	0	00:00	0.00	0.00	0.18
C109	CONDUIT	0.00	0	00:00	0.00	0.00	0.18
C11	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C110	CONDUIT	0.00	0	00:00	0.00	0.00	0.19
C111	CONDUIT	107.30	0	01:17	0.19	0.00	0.26
C112	CONDUIT	150.36	0	01:17	0.28	0.00	0.24
C113	CONDUIT	31.70	0	01:19	0.07	0.00	0.24
C114	CONDUIT	12.44	0	01:19	0.05	0.00	0.17
C115	CONDUIT	22.96	0	01:46	0.04	0.00	0.24
C116	CONDUIT	199.12	0	01:37	0.35	0.00	0.24
C117	CONDUIT	168.02	0	01:58	0.29	0.00	0.23
C118	CONDUIT	314.79	0	01:36	0.60	0.01	0.22
C119	CONDUIT	323.97	0	01:39	0.60	0.01	0.21
C12	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C120	CONDUIT	131.14	0	01:16	0.29	0.00	0.26
C121	CONDUIT	143.35	0	01:16	0.38	0.00	0.26
C122	CONDUIT	68.97	0	01:17	0.14	0.00	0.22
C123	CONDUIT	78.91	0	01:19	0.18	0.00	0.17
C124	CONDUIT	27.90	0	01:21	0.06	0.00	0.14
C125	CONDUIT	23.93	0	01:21	0.10	0.00	0.08
C126	CONDUIT	0.16	0	03:10	0.00	0.00	0.19
C127	CONDUIT	0.29	0	03:06	0.00	0.00	0.09
C128	CONDUIT	19.91	0	01:24	0.09	0.00	0.11
C129	CONDUIT	18.95	0	01:21	0.56	0.00	0.11
C13	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C130	CONDUIT	44.93	0	01:51	0.08	0.00	0.18
C131	CONDUIT	29.60	0	01:51	0.06	0.00	0.16
C132	CONDUIT	91.04	0	01:51	0.17	0.00	0.18
C133	CONDUIT	78.35	0	01:51	0.22	0.00	0.12
C134	CONDUIT	334.84	0	01:14	2.58	0.00	0.05
C135	CONDUIT	166.94	0	01:24	1.65	0.00	0.04
C136	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
C137	CONDUIT	487.57	0	01:13	2.57	0.01	0.06
C138	CONDUIT	28.70	0	01:21	0.07	0.00	0.14
C139	CONDUIT	26.09	0	01:21	0.84	0.00	0.05
C14	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C140	CONDUIT	103.65	0	01:10	0.27	0.08	0.49
C141	CONDUIT	28.78	0	01:08	0.25	0.08	0.30
C15	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C16	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C17	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C18	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C19	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C2	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C20	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C21	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C22	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C23	CONDUIT	65.35	0	01:12	0.23	0.00	0.12
C24	CONDUIT	46.62	0	01:13	0.18	0.00	0.11
C25	CONDUIT	35.77	0	01:14	0.15	0.00	0.11
C26	CONDUIT	40.47	0	01:11	0.08	0.00	0.16
C27	CONDUIT	154.84	0	01:24	0.28	0.00	0.19
C28	CONDUIT	87.11	0	01:13	0.17	0.00	0.17
C29	CONDUIT	287.64	0	01:23	0.51	0.01	0.20
C3	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C30	CONDUIT	84.82	0	01:13	0.16	0.00	0.17
C31	CONDUIT	189.08	0	01:22	1.57	0.00	0.24
C32	CONDUIT	108.61	0	01:08	0.21	0.00	0.18
C33	CONDUIT	197.74	0	01:23	0.41	0.01	0.18
C34	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C35	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C36	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C37	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C38	CONDUIT	7.06	0	02:00	0.06	0.00	0.10
C39	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C4	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C40	CONDUIT	0.00	0	00:00	0.00	0.00	0.11

C41	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C42	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C43	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C44	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C45	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C46	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C47	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C48	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C49	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
C5	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C50	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C51	CONDUIT	0.00	0	00:00	0.00	0.00	0.08
C52	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C53	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C53_1	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C53_2	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C54	CONDUIT	20.65	0	01:20	0.12	0.00	0.12
C54_1	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C54_2	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C55	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C56	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C57	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C58	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C59	CONDUIT	75.18	0	02:31	0.24	0.00	0.13
C6	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C60	CONDUIT	102.44	0	01:59	0.31	0.00	0.13
C61	CONDUIT	0.00	0	00:00	0.00	0.00	0.10
C62	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C63	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
C64	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
C65	CONDUIT	27.15	0	01:24	0.79	0.00	0.19
C66	CONDUIT	399.86	0	01:22	1.77	0.01	0.23
C67	CONDUIT	276.91	0	01:22	0.47	0.01	0.24
C68	CONDUIT	60.61	0	01:11	0.17	0.00	0.12
C69	CONDUIT	60.72	0	01:11	0.17	0.00	0.12
C7	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C70	CONDUIT	136.08	0	01:10	0.27	0.02	0.30
C71	CONDUIT	60.67	0	01:12	0.18	0.00	0.11
C72	CONDUIT	375.53	0	01:10	0.31	0.02	0.49
C73	CONDUIT	32.24	0	01:20	0.10	0.00	0.11
C74	CONDUIT	38.32	0	01:18	0.12	0.00	0.11
C75	CONDUIT	79.83	0	01:11	0.23	0.00	0.12
C76	CONDUIT	80.25	0	01:11	0.31	0.00	0.09
C77	CONDUIT	60.88	0	01:12	1.89	0.00	0.01
C78	CONDUIT	60.84	0	01:12	0.09	0.00	0.24
C79	CONDUIT	32.24	0	01:20	1.49	0.00	0.01
C8	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
C80	CONDUIT	32.24	0	01:20	0.20	0.00	0.07
C81	CONDUIT	38.33	0	01:18	1.76	0.00	0.01
C82	CONDUIT	38.33	0	01:18	0.03	0.00	0.43
C83	CONDUIT	334.83	0	01:14	0.25	0.01	0.45
C84	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
C84_1	CONDUIT	209.01	0	01:12	0.68	0.01	0.10
C84_2	CONDUIT	213.69	0	01:12	2.07	0.01	0.03
C85	CONDUIT	213.81	0	01:12	3.22	0.00	0.11
C86	CONDUIT	203.88	0	01:12	0.58	0.02	0.12
C87	CONDUIT	0.00	0	00:00	0.00	0.00	0.01
C88	CONDUIT	124.10	0	01:06	0.35	0.00	0.12
C89	CONDUIT	242.61	0	01:23	0.37	0.01	0.26
C9	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C90	CONDUIT	291.27	0	01:12	0.62	0.01	0.31
C91	CONDUIT	268.23	0	01:13	0.59	0.01	0.30
C92	CONDUIT	321.12	0	01:13	0.95	0.01	0.17
C93	CONDUIT	318.11	0	01:12	0.51	0.01	0.27
C94	CONDUIT	471.37	0	01:13	1.56	0.01	0.22
C95	CONDUIT	461.19	0	01:13	1.28	0.02	0.18
C96	CONDUIT	36.24	0	01:10	0.19	0.00	0.13
C97	CONDUIT	42.74	0	01:21	0.15	0.00	0.17
C98	CONDUIT	75.76	0	01:10	0.20	0.00	0.13
C99	CONDUIT	75.85	0	01:10	0.35	0.00	0.13
C-CB22	CONDUIT	46.82	0	01:13	0.14	0.00	0.11
C-CB23	CONDUIT	65.32	0	01:12	0.18	0.00	0.12
C-CB24	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
C-CB25	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
C-CB87	CONDUIT	32.00	0	01:19	0.08	0.00	0.22
C-CBMH112	CONDUIT	36.03	0	01:14	0.11	0.00	0.11
C-CBMH114	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
CULV-4	CONDUIT	138.26	0	01:11	1.58	1.35	0.68
X-CB-129_(X-CB)	CONDUIT	46.68	0	00:58	1.51	1.68	1.00
X-CB-89_(X-CB)	CONDUIT	15.71	0	01:01	0.50	0.24	1.00
X-CB-91_(X-CB)	CONDUIT	23.39	0	01:00	1.19	0.31	1.00
X-CB-94_(X-CB)	CONDUIT	20.21	0	01:00	0.64	0.51	1.00
X-CB-97_(X-CB)	CONDUIT	42.04	0	00:58	0.68	0.51	1.00
X-CB-98_(X-CB)	CONDUIT	41.04	0	01:21	0.58	0.97	1.00
X-STM-13_(1)_(X-STM)	CONDUIT	483.81	0	01:22	2.75	0.37	0.42
X-STM-13_(X-STM)	CONDUIT	483.81	0	01:22	2.97	0.29	0.40
X-STM-17_(X-STM)	CONDUIT	464.84	0	01:22	2.83	0.33	0.40
X-STM-19_(X-STM)	CONDUIT	47.41	0	01:43	1.24	0.52	0.53
X-STM-2_(X-STM)	CONDUIT	659.34	0	01:23	3.41	0.42	0.45
X-STM-21_(X-STM)	CONDUIT	412.89	0	01:26	2.54	0.59	0.56
X-STM-23_(X-STM)	CONDUIT	21.85	0	02:33	0.69	0.19	0.25
X-STM-25_(X-STM)_1	CONDUIT	49.98	0	00:59	1.19	0.14	1.00

X-STM-25_(X-STM)_2	CONDUIT	34.60	0	00:59	0.72	0.09	1.00
X-STM-27_(X-STM)_1	CONDUIT	39.65	0	00:56	0.63	0.78	1.00
X-STM-27_(X-STM)_2	CONDUIT	56.57	0	00:59	1.06	1.17	1.00
X-STM-29_(X-STM)	CONDUIT	39.23	0	01:00	0.65	1.54	1.00
X-STM-31_(X-STM)	CONDUIT	21.35	0	01:00	0.68	0.95	1.00
X-STM-33_(X-STM)	CONDUIT	350.46	0	01:25	1.56	0.98	0.74
X-STM-5_(X-STM)	CONDUIT	68.47	0	01:40	0.98	1.01	1.00
X-STM-51_(X-STM)	CONDUIT	16.16	0	01:21	0.39	0.55	1.00
X-STM-53_(X-STM)	CONDUIT	24.22	0	00:54	0.34	0.59	1.00
X-STM-55_(X-STM)	CONDUIT	42.96	0	00:54	0.88	0.91	1.00
X-STM-59_(X-STM)	CONDUIT	14.16	0	00:54	0.45	0.43	1.00
X-STM-63_(X-STM)	CONDUIT	11.16	0	01:01	0.48	0.45	1.00
X-STM-7_(X-STM)	CONDUIT	68.21	0	01:39	1.11	1.00	1.00
X-STM-71_(X-STM)	CONDUIT	22.26	0	01:11	1.12	0.22	0.32
X-STM-75_(X-STM)	CONDUIT	178.56	0	01:25	1.62	1.00	1.00
X-STM-77_(X-STM)	CONDUIT	178.59	0	01:25	1.62	1.46	1.00
102_(5)_(CB)	ORIFICE	6.04	0	02:00			1.00
114_(CB)	ORIFICE	7.13	0	01:18			1.00
124_(CB)	ORIFICE	6.27	0	01:11			1.00
131_(CB)	ORIFICE	10.44	0	01:08			1.00
147_(CB)	ORIFICE	6.24	0	02:10			1.00
151_(STM)	ORIFICE	9.24	0	01:13			1.00
36_(STM)	ORIFICE	6.39	0	02:01			1.00
42_(STM)	ORIFICE	7.08	0	01:14			1.00
46_(STM)	ORIFICE	7.24	0	03:11			1.00
54_(STM)	ORIFICE	6.27	0	01:11			1.00
66_(CB)	ORIFICE	7.16	0	01:22			1.00
69_(CB)	ORIFICE	8.20	0	01:23			1.00
78_(CB)	ORIFICE	6.16	0	01:26			1.00
81_(CB)	ORIFICE	3.95	0	01:27			1.00
88_(CB)	ORIFICE	6.19	0	02:02			1.00
91_(CB)	ORIFICE	6.11	0	01:42			1.00
96_(CB)	ORIFICE	10.11	0	01:24			1.00
OR1	ORIFICE	9.90	0	01:06			1.00
OR10	ORIFICE	12.74	0	01:23			1.00
OR11	ORIFICE	8.62	0	03:10			1.00
OR2	ORIFICE	7.29	0	02:53			1.00
OR3	ORIFICE	8.49	0	01:10			1.00
OR4	ORIFICE	9.41	0	02:02			1.00
OR5	ORIFICE	14.89	0	01:34			1.00
OR6	ORIFICE	9.72	0	01:23			1.00
OR7	ORIFICE	21.85	0	02:33			1.00
OR8	ORIFICE	8.20	0	01:22			1.00
OR9	ORIFICE	11.96	0	01:14			1.00
X-CB-135_(X-CB)	ORIFICE	8.42	0	01:24			1.00
X-CB-83_(X-CB)	ORIFICE	19.42	0	01:12			1.00
X-CB-86_(X-CB)	ORIFICE	21.96	0	01:21			1.00
X-STM-130_(X-STM)	ORIFICE	111.20	0	01:12			1.00
X-STM-15_(X-STM)	ORIFICE	19.03	0	01:14			1.00
X-STM-73_(X-STM)	ORIFICE	22.47	0	01:10			1.00
EX-BLDG01-OUT	DUMMY	178.60	0	01:11			
PR-BLDG01-OUT	DUMMY	46.00	0	01:27			
PR-BLDG02-OUT	DUMMY	14.90	0	01:24			

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Flow Classification Summary
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	Adjusted	Fraction of Time in Flow Class								
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm	Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
102_(CB)	1.00	0.01	0.00	0.00	0.36	0.00	0.00	0.62	0.01	0.00
104_(CB)	1.00	0.01	0.00	0.00	0.36	0.00	0.00	0.63	0.01	0.00
108_(CB)	1.00	0.01	0.00	0.00	0.22	0.00	0.00	0.76	0.01	0.00
115_(CB)	1.00	0.01	0.30	0.00	0.59	0.00	0.00	0.10	0.62	0.00
121_(CB)	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.34	0.00
126_(STM)	1.00	0.01	0.00	0.00	0.52	0.00	0.00	0.47	0.06	0.00
138_(CB)	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.63	0.00
14_(STM)	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
142_(STM)	1.00	0.01	0.00	0.00	0.23	0.00	0.00	0.76	0.01	0.00
145_(CB)	1.00	0.01	0.00	0.00	0.44	0.00	0.00	0.55	0.03	0.00
150_(STM)_2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
154_(CB)	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.04	0.00
156_(STM)_1	1.00	0.01	0.00	0.00	0.23	0.00	0.00	0.76	0.01	0.00
156_(STM)_2	1.00	0.01	0.00	0.00	0.45	0.00	0.00	0.54	0.25	0.00
17_(1)_(STM)_4	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
18_(STM)	1.00	0.01	0.00	0.00	0.00	0.01	0.00	0.99	0.00	0.00
20_(STM)	1.00	0.01	0.00	0.00	0.19	0.00	0.00	0.80	0.21	0.00
28_(STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
30_(STM)	1.00	0.01	0.00	0.00	0.19	0.12	0.00	0.68	0.26	0.00
32_(STM)	1.00	0.01	0.02	0.00	0.86	0.00	0.00	0.10	0.98	0.00
34_(1)_(STM)	1.00	0.01	0.00	0.00	0.67	0.00	0.00	0.31	0.23	0.00
34_(STM)	1.00	0.01	0.00	0.00	0.71	0.00	0.00	0.28	0.19	0.00
36_(1)_(STM)	1.00	0.01	0.00	0.00	0.88	0.00	0.00	0.10	0.04	0.00
42_(1)_(STM)	1.00	0.01	0.00	0.00	0.62	0.00	0.00	0.37	0.13	0.00
42_(2)_(STM)	1.00	0.01	0.00	0.00	0.65	0.00	0.00	0.34	0.04	0.00
49_(STM)	1.00	0.01	0.00	0.00	0.84	0.00	0.00	0.15	0.21	0.00
5_(STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
57_(STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00

59_(STM)	1.00	0.01	0.00	0.00	0.64	0.00	0.00	0.35	0.03	0.00
61_(STM)	1.00	0.01	0.00	0.00	0.62	0.00	0.00	0.37	0.05	0.00
64_(CB)	1.00	0.01	0.00	0.00	0.69	0.00	0.00	0.30	0.37	0.00
7_(STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
86_(CB)	1.00	0.01	0.00	0.00	0.39	0.00	0.00	0.59	0.03	0.00
9_(1)_(STM)	1.00	0.01	0.01	0.00	0.46	0.00	0.00	0.52	0.01	0.00
9_(STM)_2	1.00	0.01	0.00	0.00	0.73	0.25	0.00	0.01	0.36	0.00
94_(CB)	1.00	0.01	0.00	0.00	0.19	0.00	0.00	0.80	0.02	0.00
C1	1.00	0.04	0.00	0.00	0.26	0.00	0.00	0.70	0.00	0.00
C10	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C100	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C101	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C102	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C103	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C104	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C105	1.00	0.51	0.23	0.00	0.26	0.00	0.00	0.00	0.73	0.00
C106	1.00	0.51	0.23	0.00	0.26	0.00	0.00	0.00	0.73	0.00
C107	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C108	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C109	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C110	1.00	0.51	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C111	1.00	0.51	0.24	0.00	0.25	0.00	0.00	0.00	0.74	0.00
C112	1.00	0.51	0.24	0.00	0.25	0.00	0.00	0.00	0.74	0.00
C113	1.00	0.51	0.24	0.00	0.25	0.00	0.00	0.00	0.74	0.00
C114	1.00	0.46	0.31	0.00	0.23	0.00	0.00	0.00	0.76	0.00
C115	1.00	0.40	0.38	0.00	0.23	0.00	0.00	0.00	0.77	0.00
C116	1.00	0.40	0.38	0.00	0.23	0.00	0.00	0.00	0.76	0.00
C117	1.00	0.40	0.38	0.00	0.23	0.00	0.00	0.00	0.77	0.00
C118	1.00	0.40	0.39	0.00	0.22	0.00	0.00	0.00	0.76	0.00
C119	1.00	0.40	0.38	0.00	0.22	0.00	0.00	0.00	0.77	0.00
C12	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C120	1.00	0.51	0.17	0.00	0.32	0.00	0.00	0.00	0.67	0.00
C121	1.00	0.51	0.17	0.00	0.32	0.00	0.00	0.00	0.67	0.00
C122	1.00	0.51	0.31	0.00	0.18	0.00	0.00	0.00	0.81	0.00
C123	1.00	0.54	0.28	0.00	0.18	0.00	0.00	0.00	0.80	0.00
C124	1.00	0.54	0.40	0.00	0.06	0.00	0.00	0.00	0.91	0.00
C125	1.00	0.85	0.09	0.00	0.06	0.00	0.00	0.00	0.94	0.00
C126	1.00	0.40	0.60	0.00	0.01	0.00	0.00	0.00	0.87	0.00
C127	1.00	0.89	0.10	0.00	0.00	0.00	0.00	0.01	0.00	0.00
C128	1.00	0.90	0.01	0.00	0.10	0.00	0.00	0.00	0.90	0.00
C129	1.00	0.87	0.03	0.00	0.10	0.00	0.00	0.00	0.91	0.00
C13	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C130	1.00	0.40	0.56	0.00	0.04	0.00	0.00	0.00	0.93	0.00
C131	1.00	0.73	0.23	0.00	0.04	0.00	0.00	0.00	0.93	0.00
C132	1.00	0.40	0.54	0.00	0.05	0.00	0.00	0.00	0.93	0.00
C133	1.00	0.84	0.11	0.00	0.05	0.00	0.00	0.00	0.94	0.00
C134	1.00	0.88	0.02	0.00	0.00	0.10	0.00	0.00	0.95	0.00
C135	1.00	0.88	0.06	0.00	0.01	0.04	0.00	0.00	0.95	0.00
C136	1.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C137	1.00	0.88	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00
C138	1.00	0.54	0.40	0.00	0.06	0.00	0.00	0.00	0.91	0.00
C139	1.00	0.88	0.06	0.00	0.05	0.01	0.00	0.00	0.94	0.00
C14	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C140	1.00	0.01	0.00	0.00	0.32	0.00	0.00	0.66	0.28	0.00
C141	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.97	0.00
C15	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C20	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C21	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C22	1.00	0.84	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23	1.00	0.82	0.06	0.00	0.13	0.00	0.00	0.00	0.95	0.00
C24	1.00	0.82	0.06	0.00	0.12	0.00	0.00	0.00	0.95	0.00
C25	1.00	0.82	0.09	0.00	0.09	0.00	0.00	0.00	0.95	0.00
C26	1.00	0.05	0.00	0.00	0.21	0.00	0.00	0.74	0.10	0.00
C27	1.00	0.87	0.07	0.00	0.06	0.00	0.00	0.00	0.92	0.00
C28	1.00	0.05	0.01	0.00	0.20	0.00	0.00	0.74	0.10	0.00
C29	1.00	0.87	0.01	0.00	0.12	0.00	0.00	0.00	0.89	0.00
C3	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C30	1.00	0.05	0.01	0.00	0.16	0.00	0.00	0.79	0.09	0.00
C31	1.00	0.76	0.12	0.00	0.11	0.00	0.00	0.01	0.90	0.00
C32	1.00	0.05	0.01	0.00	0.21	0.00	0.00	0.74	0.12	0.00
C33	1.00	0.81	0.05	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C34	1.00	0.64	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C37	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	0.05	0.05	0.00	0.30	0.00	0.00	0.60	0.23	0.00
C39	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C42	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C43	1.00	0.74	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C44	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C45	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C46	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C47	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C48	1.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C49	1.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C50	1.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C51	1.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C52	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53_1	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53_2	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54	1.00	0.87	0.03	0.00	0.10	0.00	0.00	0.00	0.89	0.00
C54_1	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54_2	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C55	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C57	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C58	1.00	0.85	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C59	1.00	0.76	0.11	0.00	0.13	0.00	0.00	0.00	0.85	0.00
C6	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C60	1.00	0.76	0.11	0.00	0.13	0.00	0.00	0.00	0.86	0.00
C61	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C62	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C63	1.00	0.82	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C64	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C65	1.00	0.73	0.18	0.00	0.09	0.00	0.00	0.01	0.89	0.00
C66	1.00	0.73	0.14	0.00	0.13	0.00	0.00	0.00	0.86	0.00
C67	1.00	0.72	0.15	0.00	0.13	0.00	0.00	0.00	0.86	0.00
C68	1.00	0.84	0.09	0.00	0.06	0.00	0.00	0.00	0.92	0.00
C69	1.00	0.92	0.02	0.00	0.06	0.00	0.00	0.00	0.95	0.00
C7	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C70	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.97	0.00
C71	1.00	0.82	0.09	0.00	0.10	0.00	0.00	0.00	0.89	0.00
C72	1.00	0.01	0.00	0.00	0.32	0.00	0.00	0.66	0.28	0.00
C73	1.00	0.82	0.10	0.00	0.09	0.00	0.00	0.00	0.90	0.00
C74	1.00	0.82	0.11	0.00	0.07	0.00	0.00	0.00	0.91	0.00
C75	1.00	0.92	0.04	0.00	0.04	0.00	0.00	0.00	0.93	0.00
C76	1.00	0.89	0.06	0.00	0.04	0.00	0.00	0.00	0.95	0.00
C77	1.00	0.90	0.00	0.00	0.00	0.10	0.00	0.00	0.89	0.00
C78	1.00	0.02	0.88	0.00	0.10	0.00	0.00	0.00	0.95	0.00
C79	1.00	0.91	0.00	0.00	0.00	0.09	0.00	0.00	0.90	0.00
C8	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C80	1.00	0.01	0.90	0.00	0.09	0.00	0.00	0.00	0.95	0.00
C81	1.00	0.93	0.00	0.00	0.00	0.07	0.00	0.00	0.91	0.00
C82	1.00	0.68	0.25	0.00	0.07	0.00	0.00	0.00	0.95	0.00
C83	1.00	0.68	0.22	0.00	0.10	0.00	0.00	0.00	0.89	0.00
C84	1.00	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C84_1	1.00	0.89	0.04	0.00	0.07	0.00	0.00	0.00	0.93	0.00
C84_2	1.00	0.93	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.00
C85	1.00	0.93	0.00	0.00	0.05	0.00	0.00	0.02	0.02	0.00
C86	1.00	0.88	0.00	0.00	0.05	0.00	0.00	0.07	0.00	0.00
C87	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C88	1.00	0.05	0.00	0.00	0.08	0.00	0.00	0.87	0.01	0.00
C89	1.00	0.75	0.12	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C9	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C90	1.00	0.75	0.07	0.00	0.19	0.00	0.00	0.00	0.81	0.00
C91	1.00	0.77	0.04	0.00	0.19	0.00	0.00	0.00	0.81	0.00
C92	1.00	0.83	0.02	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C93	1.00	0.75	0.11	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C94	1.00	0.72	0.14	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C95	1.00	0.83	0.02	0.00	0.14	0.00	0.00	0.00	0.86	0.00
C96	1.00	0.85	0.02	0.00	0.13	0.00	0.00	0.00	0.87	0.00
C97	1.00	0.84	0.03	0.00	0.13	0.00	0.00	0.00	0.87	0.00
C98	1.00	0.84	0.09	0.00	0.07	0.00	0.00	0.00	0.91	0.00
C99	1.00	0.83	0.09	0.00	0.07	0.00	0.00	0.00	0.95	0.00
C-CB22	1.00	0.74	0.14	0.00	0.12	0.00	0.00	0.00	0.87	0.00
C-CB23	1.00	0.74	0.14	0.00	0.13	0.00	0.00	0.00	0.86	0.00
C-CB24	1.00	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB25	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-CB87	1.00	0.51	0.24	0.00	0.25	0.00	0.00	0.00	0.74	0.00
C-CBMH112	1.00	0.74	0.17	0.00	0.09	0.00	0.00	0.00	0.89	0.00
C-CBMH114	1.00	0.53	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULV-4	1.00	0.01	0.00	0.00	0.78	0.20	0.00	0.00	0.00	0.10
X-CB-129_(X-CB)	1.00	0.04	0.00	0.00	0.54	0.00	0.00	0.42	0.01	0.00
X-CB-89_(X-CB)	1.00	0.03	0.03	0.00	0.95	0.00	0.00	0.00	0.46	0.00
X-CB-91_(X-CB)	1.00	0.03	0.03	0.00	0.94	0.00	0.00	0.00	0.47	0.00
X-CB-94_(X-CB)	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.47	0.00
X-CB-97_(X-CB)	1.00	0.03	0.01	0.00	0.55	0.00	0.00	0.42	0.01	0.00
X-CB-98_(X-CB)	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.44	0.00
X-STM-13_(1)_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-13_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.19	0.00	0.80	0.14	0.00
X-STM-17_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-19_(X-STM)	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
X-STM-2_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.99	0.00	0.00	0.36	0.00
X-STM-21_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-23_(X-STM)	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
X-STM-25_(X-STM)_1	1.00	0.03	0.00	0.00	0.94	0.03	0.00	0.00	0.45	0.00
X-STM-25_(X-STM)_2	1.00	0.03	0.00	0.00	0.57	0.00	0.00	0.40	0.01	0.00
X-STM-27_(X-STM)_1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.46	0.00
X-STM-27_(X-STM)_2	1.00	0.03	0.00	0.00	0.55	0.00	0.00	0.42	0.00	0.00
X-STM-29_(X-STM)	1.00	0.03	0.00	0.00	0.54	0.00	0.00	0.43	0.00	0.00
X-STM-31_(X-STM)	1.00	0.03	0.00	0.00	0.55	0.00	0.00	0.43	0.01	0.00
X-STM-33_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-5_(X-STM)	1.00	0.01	0.00	0.00	0.70	0.00	0.00	0.30	0.56	0.00

X-STM-51_(X-STM)	1.00	0.03	0.00	0.00	0.68	0.00	0.00	0.29	0.00	0.00
X-STM-53_(X-STM)	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.32	0.00
X-STM-55_(X-STM)	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.34	0.00
X-STM-59_(X-STM)	1.00	0.03	0.00	0.00	0.68	0.00	0.00	0.29	0.01	0.00
X-STM-63_(X-STM)	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.81	0.00	0.00
X-STM-7_(X-STM)	1.00	0.01	0.00	0.00	0.98	0.02	0.00	0.00	0.68	0.00
X-STM-71_(X-STM)	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
X-STM-75_(X-STM)	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.96	0.00
X-STM-77_(X-STM)	1.00	0.01	0.00	0.00	0.86	0.13	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
102_(CB)	6.68	6.68	7.02	0.01	0.01
104_(CB)	6.39	6.39	6.65	0.01	0.01
108_(CB)	3.56	3.56	3.64	0.01	0.01
115_(CB)	5.57	5.57	6.95	0.01	0.01
121_(CB)	4.94	4.94	5.80	0.01	0.01
126_(STM)	8.07	8.07	9.89	0.05	0.01
138_(CB)	3.55	3.55	3.67	0.01	0.01
142_(STM)	3.56	3.56	3.67	0.01	0.01
145_(CB)	7.78	7.78	8.69	0.02	0.01
154_(CB)	9.97	9.97	11.13	0.05	0.01
156_(STM)_1	3.56	3.56	3.69	0.01	0.01
156_(STM)_2	3.67	3.67	3.92	0.01	0.01
34_(1)_(STM)	11.29	11.29	13.35	0.04	0.01
34_(STM)	13.44	13.44	15.45	0.04	0.01
36_(1)_(STM)	18.05	18.05	19.66	0.03	0.01
42_(1)_(STM)	9.87	9.87	12.04	0.03	0.01
42_(2)_(STM)	12.14	12.14	13.63	0.03	0.01
49_(STM)	15.43	15.43	17.73	0.03	0.01
59_(STM)	12.51	12.51	13.71	0.03	0.01
61_(STM)	10.95	10.95	12.44	0.04	0.01
64_(CB)	12.54	12.54	14.98	0.15	0.01
86_(CB)	6.82	6.82	7.60	0.02	0.01
94_(CB)	2.57	2.57	2.76	0.01	0.01
C1	4.97	4.97	5.11	0.01	0.01
CULV-4	0.01	0.19	0.01	0.24	0.01
X-CB-129_(X-CB)	11.59	11.59	11.65	0.02	0.01
X-CB-89_(X-CB)	11.62	11.62	12.62	0.01	0.01
X-CB-91_(X-CB)	11.61	11.61	12.62	0.01	0.01
X-CB-94_(X-CB)	11.63	11.63	12.26	0.01	0.01
X-CB-97_(X-CB)	11.58	11.58	11.93	0.01	0.01
X-CB-98_(X-CB)	12.07	12.07	12.13	0.01	0.22
X-STM-25_(X-STM)_1	11.83	11.83	12.48	0.01	0.01
X-STM-25_(X-STM)_2	12.48	12.48	12.73	0.01	0.01
X-STM-27_(X-STM)_1	11.70	11.70	12.13	0.01	0.01
X-STM-27_(X-STM)_2	12.13	12.13	12.15	0.01	0.01
X-STM-29_(X-STM)	11.61	11.61	11.62	0.08	0.10
X-STM-31_(X-STM)	11.64	11.64	11.83	0.01	0.01
X-STM-5_(X-STM)	0.32	0.40	0.44	0.03	0.31
X-STM-51_(X-STM)	14.64	14.64	14.69	0.01	0.15
X-STM-53_(X-STM)	14.47	14.47	14.64	0.01	0.01
X-STM-55_(X-STM)	14.44	14.44	14.52	0.01	0.01
X-STM-59_(X-STM)	14.64	14.64	15.23	0.01	0.01
X-STM-63_(X-STM)	2.95	2.95	2.97	0.01	0.01
X-STM-7_(X-STM)	0.25	0.25	0.40	0.05	0.01
X-STM-75_(X-STM)	0.52	0.52	0.83	0.19	0.45
X-STM-77_(X-STM)	0.52	0.54	0.52	0.58	0.52

Analysis begun on: Tue Nov 19 13:29:14 2019
Analysis ended on: Tue Nov 19 13:29:21 2019
Total elapsed time: 00:00:07

Appendix E

Development Servicing Checklist

Hard Rock Hotel Casino
4837 Albion Road, Ottawa
DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content	Addressed (Y/N/NA)	Comments
Executive Summary (for larger reports only).	N/A	
Date and revision number of the report.	Y	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	Refer to Report Figures
Plan showing the site and location of all existing services.	Y	Refer to Grading and Servicing Plans
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Y	Refer to Site Plan
Summary of Pre-consultation Meetings with City and other approval agencies.	Y	
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	N/A	
Statement of objectives and servicing criteria.	Y	Report Sections: 2.0 Water Servicing , 3.0 Sanitary Servicing, 4.0 Storm Servicing and Stormwater Management
Identification of existing and proposed infrastructure available in the immediate area.	Y	
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y	Refer to Grading Plan and Stormwater Management Plan

Hard Rock Hotel Casino
4837 Albion Road, Ottawa
DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content	**Addressed (Y/N/NA)**	**Comments**
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A	
Proposed phasing of the development, if applicable.	N/A	
Reference to geotechnical studies and recommendations concerning servicing.	Y	Report Section 4.0 Site Constraints
All preliminary and formal site plan submissions should have the following information:		
Metric scale	Y	
North arrow (including construction North)	Y	
Key plan	Y	
Name and contact information of applicant and property owner	Y	
Property limits including bearings and dimensions	Y	
Existing and proposed structures and parking areas	Y	
Easements, road widening and rights-of-way	Y	
Adjacent street names	Y	

Hard Rock Hotel Casino
4837 Albion Road, Ottawa
DEVELOPMENT SERVICING STUDY CHECKLIST

4.2 Water	Addressed (Y/N/NA)	Comments
Confirm consistency with Master Servicing Study, if available.	N/A	
Availability of public infrastructure to service proposed development.	Y	Report Sections: 2.0 Water Servicing , 3.0 Sanitary Servicing,4.0 Storm Servicing and Stormwater Management
Identification of system constraints.	N/A	
Identify boundary conditions.	Y	Provided by City of Ottawa
Confirmation of adequate domestic supply and pressure.	Y	Refer to Appendix A
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	Refer to Appendix A
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	Refer to Appendix A
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	N/A	
Address reliability requirements such as appropriate location of shut-off valves.	Y	Refer to Appendix A
Check on the necessity of a pressure zone boundary modification.	N/A	
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	Report Section 2.0 Water Servicing
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	Report Section 2.0 Water Servicing
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	Report Section 2.0 Water Servicing
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A	

4.3 Wastewater	Addressed (Y/N/NA)	**Comments**
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	Report Section 3.0 Sanitary Servicing
Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	Report Section 3.0 Sanitary Servicing
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	Refer to Appendix B
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A	
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	Report Section 3.0 Sanitary Servicing
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A	
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	Y	Report Section 3.3 Existing Sanitary Sewer and Pump Station
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A	
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A	
Special considerations such as contamination, corrosive environment etc.	N/A	

Hard Rock Hotel Casino
4837 Albion Road, Ottawa
DEVELOPMENT SERVICING STUDY CHECKLIST

4.4 Stormwater	Addressed (Y/N/NA)	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	Report Section 4.0 Storm Servicing and Stormwater Management
Analysis of the available capacity in existing public infrastructure.	N/A	Storm outlet is to an existing private pond, which ultimatly outlets an open ditch system
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y	Refer to Stormwater Management Plan
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	Report Section 4.0 Storm Servicing and Stormwater Management
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	4.0 Storm Servicing and Stormwater Management
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	4.0 Storm Servicing and Stormwater Management
Set-back from private sewage disposal systems.	N/A	
Watercourse and hazard lands setbacks.	N/A	
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A	
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	Refer to Appendix D
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	Refer to Appendix D
Any proposed diversion of drainage catchment areas from one outlet to another.	N/A	
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	N/A	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A	

Hard Rock Hotel Casino
4837 Albion Road, Ottawa
DEVELOPMENT SERVICING STUDY CHECKLIST

4.4 Stormwater	Addressed (Y/N/NA)	Comments
Identification of potential impacts to receiving watercourses.	N/A	
Identification of municipal drains and related approval requirements.	N/A	
Description of how the conveyance and storage capacity will be achieved for the development.	Y	4.0 Storm Servicing and Stormwater Management
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	Refer to Stormwater Management Plan
Inclusion of hydraulic analysis including HGL elevations.	N/A	
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	Report Section 5.0 Erosion and Sediment Control Measures
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A	
Identification of fill constrains related to floodplain and geotechnical investigation.	N/A	

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Comments
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A	
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A	
Changes to Municipal Drains.	N/A	
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A	

4.6 Conclusion	Addressed (Y/N/NA)	Comments
Clearly stated conclusions and recommendations.	Y	Report Section 6.0 Conclusions and Recommendations
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A	T.B.D.
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	

Appendix F

Drawings