City Of Ottawa

Lansdowne Park Event Centre - Ottawa, ON

Stormwater Management Report

September 13, 2024 Confidential

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Confidential

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Revision History

FIRST ISSUE

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REVISION 1

REVISION 2

FINAL

Signatures

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Project Engineer, Water Resources

Date

Approved[1] by (must be reviewed for technical accuracy prior to approval)

Iain Smith, P.Eng.
Senior Project Engineer, Water Resources

Date

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Client

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1 INTRODUCTION

1.1 Scope

Following the Zoning By-Law Amendment submission in September 2023, the Lansdowne Park redevelopment project (Lansdowne 2.0) entered the Site Plan Control Application stage. WSP was again retained by the City of Ottawa to provide servicing, grading and stormwater management design services for the phase 1 (Event Centre) development of the project for Site Plan Control Application.

1.2 Site Location

The Lansdowne site is home to many commercial, residential, and leisure facilities. This includes TD place Stadium, Aberdeen Pavilion, Horticultural Building, mixed-use retail/office/residential, and a subsurface parking lot. The overall site is approximately 15.4 ha, and borders Bank Street to the west, Holmwood Ave to the north, and Queen Elizabeth Drive to the south and east.

1.3 Design Criteria

The existing stormwater management system is outlined in the Stormwater Management Design Report for Lansdowne Urban Park, February 2012, by Stantec Consulting Ltd. The design criteria for the proposed development will follow the same criteria outlined in the Stantec 2012.

- Peak flow rate of 616 L/s to O'Connor Street sewer for all events from the 2-year to the 100-year return period
- Stormwater shall be treated to MOE "enhanced" standard (80% TSS removal)
- The "first flush" (i.e. 10mm event) shall be directed to the O'Connor Street sewer for the entire site drainage area.
- Outflow to O'Connor Street Sewer will be restricted if the downstream system surcharges and will be cut off when the receiving sewer HGL is higher than the onsite HGL.
- Minor system shall be design for a 5-year level of service with minimal surface ponding.
- Major system shall provide a 100-year level of service while minimizing outflow to the canal.

2 EXISTING CONDITIONS

2.1 General

The existing conditions on the Lansdowne site are as designed in the Stantec Stormwater Management Design Report – Lansdowne Urban Park (2012). The primary site stormwater outlet is to the storm sewer on O'Connor Street, which discharges to a combined sewer at the intersection with Fifth Street. During large storm events (i.e. greater than the 5-year return period) runoff is directed to the Rideau Canal through an overflow pipe.

Based on the 2012 Stantec report and Survey runoff from O'Connor Street flows south to a sag in the road next to Syliva Holden Park.

2.2 Rainfall Information

The stormwater management system consists of two subsurface storage tanks, surface storage on the Great Lawn, outlet controls, and quality control structures. The two underground storage tanks provide 600 m^3 in Basin 1 and 2200 m^3 in Basin 2, with 700 m^3 provided in pipe storage (total of 3500 m^3 subsurface storage). A minimum storage volume of 3000 m^3 is also provided on the surface of the Great Lawn.

A schematic of the existing stormwater management strategy is included in Appendix B.

A PCSWMM model was created to represent the existing conditions on the site based on the documentation provided in the Stantec 2012 report and the As-Built servicing drawings, included in Appendix B.

2.3 Modelling Methodology

A PCSWMM model of existing conditions was created as a baseline with which to compare the proposed design.

- **Catchment Areas**: Catchment areas were delineated based on the Stantec catchment area plan (C03). Sub-catchment imperviousness was determined by creating a land use shapefile and using the PCSWMM spatial weighting tool. Sub-catchment parameters are included in Appendix B.
- **Storm Sewers**: Storm sewers were modelled as conduits with their size and inverts based on the as-built servicing drawing. A roughness coefficient of 0.013 and average loss coefficient of 0.2 was used.

- **Weirs**: Weirs were used to direct runoff to the major flow route when storm sewer capacity is exceeded. Weirs are also used within the underground storm chamber inlet/outlet structures.
- **Orifices**: An orifice was modelled at the quantity control structure with a discharge coefficient of 0.62. Orifices were also used in the model to represent the 450 mm backflow preventers within the underground storage chamber inlet/outlet structures.
- **Storage**: Underground storage chambers were modelled using storage nodes with storage curves based on their storage area. The Great Lawn was modelled as a storage node with storage defined as the average area available for storage. Roof storage was also modelled based on the documentation in the DSEL FSR report (2012).
- **Ditches**: Ditches shown in the Stantec grading plan were modelled as conduits. Ditches were connected to storm sewers with a catch basin and discharge curve as per MTO design chart 4.19.
- **Rainfall**: The 3-hour Chicago storm using the IDF parameters from the Ottawa Sewer Design Guidelines was used in the analysis.
- **Tailwater Conditions**: Tailwater conditions at O'Connor Street were set as a timeseries with a peak at the 5-year peak HGL of 65.2 m. The timeseries was calibrated to produce similar results to those shown in the Stantec report. This tailwater condition will be revised as more information becomes available.

The results of the existing conditions PCSWMM model are not expected to exactly match those of the Stantec 2012 report due to the following:

1. Data regarding tailwater condition – In the Stantec analysis, they were provided with the City of Ottawa Infoworks model for the Holmwood and O'Connor sewer system so were able to incorporate a dynamic tailwater condition at the site outlet. The PCSWMM model can be refined as more information becomes available.

2. Infoworks Model – Stantec modelling for the existing site was completed in Infoworks. WSP has requested this model to review catchment parameters and model setup. Without the model or detailed documentation, differences in modelling parameters and methodology are inevitable leading to variations in model results.

3. SWMM Engines – Developments in stormwater management modelling software engines have been made since 2012, which affects the ability to replicate results.

The focus of this analysis is on the comparison between storage and outflows in the existing conditions PCSWMM model versus the proposed conditions PCSWMM model.

The design intent is to match the outflows from the existing conditions PCSWMM model. PCSWMM modelling output is included in Appendix B.

2.4 Existing Conditions Model Results

The existing conditions PCSWMM model was run for the 5-year and the 100-year events. Storage volumes for Basin 1, Basin 2, and the Great Lawn are shown in Table 2.1, and peak flows at the outfalls in Table 2.2.

Table 2.1: Existing Condition Storage Results

	5-year		100-year	
	Peak Volume (m^3)	Peak HGL (m)	Peak Volume (m^3)	Peak HGL (m)
Basin 1	630	64.47	632	64.67
Basin 2	2236	64.47	2238	64.65
Great Lawn	215	64.43	2040	64.65

Table 2.2: Existing Condition Peak Flows

Outlet Location	5-year Peak Flow (m^3/s)	100-year Peak Flow (m^3/s)
O'Connor Sewer	0.524	0.590
Rideau Canal	0.0	0.131

Please note that the 2012 Stantec report and infoworks model resulted in a 100-year release rate of 0.616 m^3/s. The recreated PCSWMM model presented above in Table 2.2 shows a lower flow rate. An allowable release rate of 0.616 m^3/s is used for the purpose of this report.

3 POST DEVELOPMENT CONDITIONS

3.1 General

Under proposed conditions the majority of the site land use remains as it is under existing conditions, except for the new event centre. The new event centre requires some rerouting of storm sewers and encroaches on the surface storage previously provided in the Great Lawn. The proposed design involves routing storm sewers south of the new event centre and installing subsurface storage beneath the Great Lawn to account for the additional storage required from the change in land use and elimination of storage available on the surface.

3.2 Minor System

The subject site will be serviced by a storm sewer system designed in accordance with the amendment to the storm sewer and stormwater management elements of the Ottawa Design Guidelines. The minor system has been designed to convey the 5-year storm without ponding on the surface. Storm sewer design sheets are included in Appendix C. A hydraulic analysis report prepared by the trench drain supplier, ACO, demonstrates that the trench drains can collect and convey the 100-year runoff rate without over topping, the report is included in Appendix C.

3.3 Major System

The major system will remain similar to how it is in existing conditions. The site is graded toward to Great Lawn where trench drains around the perimeter will intercept overland runoff and direct it to the underground storm chamber under the Great Lawn. Emergency overland flow is directed toward the Rideau Canal during extreme events exceeding the 100-year design storm. There is no pipe outlet to the Rideau Canal.

3.4 Quantity Control

Additional storage is required to account for the addition of the new event centre and the removal of surface storage on the Great Lawn. The proposed storm system was modelled in PCSWMM according to the same methodology presented in Section 2.3. Sub-catchment areas and parameters were modified based on the proposed development. To size of the new underground storage chamber (Basin 3) it was modelled iteratively to determine the required area and volume to match the existing conditions PCSWMM model results.

The new underground storage chamber beneath the Great Lawn will have a volume of 4777 m^3. A specification drawing from the supplier is included in Appendic-C3. Replacing the surface storage with underground storage will improve the useability of the Great Lawn for recreation and events as the ground surface will no longer be used to pond runoff. Overland flow directed to the Great Lawn will be captured by trench drains around the perimeter, and the lawn will be graded to avoid ponding. In events greater than the 100-year storm flow will be directed overland to the Rideau Canal.

Storage volumes and peak HGL during the 5-year and 100-year events for Basin 1, Basin 2, and the new Basin 3 are shown in Table 3.1. Peak flows are shown in Table 3.2.

Table 3.1: Proposed Condition Storage Results

	5-year		100-year	
	Peak Volume (m^3)	Peak HGL (m)	Peak Volume (m^3)	Peak HGL (m)
Basin 1	530	63.91	630	64.46
Basin 2	1289	63.67	2237	64.47
Great Lawn/ Basin 3	2614	63.67	4648	64.47

Table 3.2: Proposed Condition Peak Flows

Outlet Location	5-year Peak Flow (m^3/s)	100-year Peak Flow (m^3/s)	100-year Allowable Release Rate (m^3/s)
O'Connor Sewer	0.315	0.581	0.616
Overland to Rideau Canal	0.0	0.0	0.0

3.5 Quality Control

As noted in Section 1.3, the water quality criteria requires the long-term removal of 80% TSS on an annual loading basis. To achieve the required water quality requirement a treatment train approach is proposed.

Runoff directed to the proposed underground storage will be treated by an OGS and the Isolator® Row Plus provided in the chamber system.

An Isolator® Row Plus shall be proposed at each storm inlet to provide water quality control with easy access for maintenance. The Isolator® Row Plus is the first row of StormTech chambers covered in a non-woven geotextile fabric with a single layer of proprietary woven fabric at the bottom that serves as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal. The open-bottom chambers allow stormwater to flow out of the chambers, while sediment is captured in the Isolator® Row Plus.

The Isolator® Row Plus is designed to capture the “first flush” and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole not only provides access to the Isolator® Row Plus but includes a flow splitter such that stormwater flow rates or volumes that exceed the capacity of the Isolator® Row Plus bypass through a manifold to the other chambers. This creates a differential between the Isolator® Row Plus and the manifold, thus allowing for settlement time in the Isolator® Row Plus. After Stormwater flows through the Isolator® Row Plus and into the rest of the StormTech chamber system, it is passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row® Plus was verified by Environmental Technology Verification (ETV) in July 2020, with an average 82% removal efficiency of Total Suspended Solids (TSS). Refer to Appendix C for ETV verification statement.

The net annual removal efficiency of the proposed OGS and Isolator Row® Plus is provided in Appendix C.

4 CONCLUSIONS

The Ottawa Sport and Entertainment Group in collaboration with the City of Ottawa are proposed to demolish the existing Civic Arena and North Stands. The proposed Lansdowne 2.0 will include a new 5,500 seat Event Centre, a new 11,200 to 12,000 seat spectator North Stadium Stands and the addition of rental and owned residential units with approx. 1199 units, and associated subsurface parking, as well as the significant landscaping east of the new Event Centre.

Water Quantity

The site will be required by the City to limit the discharge of stormwater to the existing conditions peak flow rate, with stormwater up to the post-development 100yr storm stored on-site. Preliminary estimates of the runoff rates lead to an approximate maximum site discharge rate of 581 L/s to the O'Connor Street sewer, with additional required storage of 4648 m^3.

Water Quality

A treatment train comprised of an OGS and isolator row are proposed to in order to ensure 80% TSS removal for the site.

APPENDIX

A

City NCC Comments

File Number: D01-01-23-0009
D02-02-23-0047

August 3, 2023

Patricia Warren
Fotenn Planning + Design
Via email: warren@fotenn.com

Subject: Official Plan and Zoning By-law Amendment Application – 945 & 1015 Bank Street – Formal Review Comments

Please find below the consolidated comments from the formal review of the above noted applications.

1. Planning

Comments:

1.1. Generally, the proposal is in keeping with the Official Plan adopted by Council.

1.2. The Policy team is supportive of the proposed OPA, but requested that a minor change be made.

> "Rather than stating that the Special District policies supersede the Greenspace designation, it would be more appropriate to simply list in the area-specific policy the desired permitted uses on lands designated as Greenspace within the Special District (i.e., an event centre with a green roof etc.).
>
> The preamble in Section 6.6 – Special Districts of the Official Plan states: "[…] They are distinct areas that transcend the role and function of Hubs, Corridors and Neighbourhoods, and warrant unique planning approaches." Notably, Greenspaces are not included in this list as they are intended to maintain their original function within the Special Districts.
>
> It would be more appropriate to expand what is permitted rather than risk setting a precedent that allows for OPAs to effectively eliminate the greenspace function in other Special Districts."

1.3. Please see the draft OPA and ZBA details attached for review and comment.

2. Engineering

Comments:

Functional Servicing & Stormwater Management Study, prepared by WSP, May 25, 2023

2.1. *General*

Section 1.3 of the report states “the minutes for the Pre-Application Consultation Meeting for this Zoning By Law Amendment is provided for reference in Appendix A”. Meeting minutes could not be found in appendix A please revise.

2.2. *Storm*

PCSWMM models are under review by City of Ottawa staff, comments will be provided upon receipt.

The underground storm water storage tank (approx. 4100m3) proposed within the great lawn as part of the study requires technical foundation design based off a geotechnical investigation of the subsurface profile. Please coordinate with the geotechnical engineering consultant Parsons to ensure that the geotechnical study considers this aspect of the design and speak to this in the report.

2.3. *Sanitary*

Provide detailed calculations used to determine the existing sanitary flows, and the anticipated sanitary flows.

2.4. *Water*

Table 2-2 Water Demand and Boundary Conditions Existing Conditions does not match the required fire flow or water demand calculations in Appendix A please clarify and revise.

Provide boundary condition email correspondence with the City of Ottawa in the Appendix of the study.

Please modify section 2.3 (Domestic Supply and pressure) to reference technical bulletin ISD-2010-0

Geotechnical Investigation Proposed Lansdowne Rink and Towers, prepared by Paterson Group, June 28, 2023, Report: PG5792-1

2.5. The project consists of significant underground storm water storage tank (approx. 4100m3) proposed within the great lawn as part of the functional servicing and storm water management study prepared by WSP. Please confirm and coordinate with WSP’s consulting team to ensure that the geotechnical study considers this aspect of the design and speaks to this in the report. The geotechnical investigation should speak to the foundation of the storage tank and determine if additional investigation of the subsurface within the great lawn is required for this proposed structure. For more information, please consult the study prepared by WSP.

Roadway Traffic Noise Feasibility Assessment, prepared by Gradient Wind Engineering Inc., June 16, 2023, Report: 23-053-Traffic noise feasibility.

2.6. During 10. Bank street is divided Arterial not undivided in front of the project, so traffic volume count should be 35,000 instead of 30,000, please clarify. In addition, Queen Elizabeth Drive roadway classification is not listed within the city of Ottawa official plan and Transportation master plan please provide source of Queen Elizabeth Drive roadway classification.

2.7. In section 4.2.3 of the assessment, it is unclear if the listed parameters used for the noise prediction calculations were imputed for the STAMSON model, the Predictor-Lima model, or both. Please clarify in the body of the report.

2.8. The noise feasibility assessment is required to be modeled using the City of Ottawa approved STAMSON modeling program. Additionally, the STAMSON results shown in the report have shown consistently higher results therefore it is possible the STAMSON model is more conservative. Please provide significant justification for the use of the Predictor-Lima software over the approved STAMSON software.

2.9. Have noise impacts from the stadium been factored into the assessment for the predicted noise levels of the outdoor living areas?

2.10. Additional information is required for the analysis of the proposed event center. Quantify the predicted noise levels, and to what extent will the proposed 'room within a room' design mitigate the anticipated noise. Similarly, quantifiable information and assessment of the noise generated from pedestrians congregating at the event center is required to be investigated. What are the potential sound levels generated by the congregating pedestrians, will this impact the residential units as well as the outdoor amenity areas of the proposed towers?

2.11. The STAMSON calculations for receptor 3 and receptor 4 use different barrier heights, please clarify.

2.12. The STAMSON calculations for receptor 3 use a receiver source distance of 80m where receptor 4 uses a receiver source distance of 76m. Based on figure-3 it appears that receptor 3 is closer to the noise source please clarify.

2.13. As per the noise feasibility assessment the following construction is proposed for the event center east of the proposed towers "*the floor could be isolated, jack up slab, the interior walls would be built of double row studs with the first row of studs built on top of the isolation slab. The second row of studs would be on the surrounding structure. A suspended ceiling would be hung using isolation hangers*". Please confirm and coordinate with the geotechnical consultant, Parsons Group, that this type of construction is feasible within the geotechnical constraints of the site. Please speak to this within the assessment.

<u>Phase I & Phase II Environmental Site Assessment</u>

2.14. It has been confirmed with City staff that a Phase I & Phase II environmental site assessment is not required for the Zoning By-law Amendment or The Official Plan Amendment. A phase I and phase II environmental site assessment will be required for the subsequent Site Plan Control application.

<u>Pedestrian Level Wind Study, prepared by Gradient Wind Engineering Inc., June 15, 2023</u>

2.15. It has been confirmed with City staff that the pedestrian level wind study is under review by the urban design.

3. **Corporate Real Estate Office**

Comments:

3.1. A new Phase One Environmental Site Assessment (ESA) will be required at the time of Site Plan. Should the Phase One identify any Areas of Potential Environmental Concern, a Phase Two ESA will also be required.

3.2. A Record of Site Condition (RSC) will have to be filed with the Ministry of Environment, Conservation and Parks in order to permit the more sensitive residential land use in the area currently occupied by the north side stands and arena structure. This can also be addressed with conditions at the time of Site Plan Approval.

4. **Transportation**

Comments are forthcoming.

5. **Urban Design**

Comments:

Clarification questions and additional information requested:

5.1. The zoning schedule permits 38m heights and has a notch close to the Aberdeen Pavilion (Please see the Appendix 1, image 1- area circled in red color). The podium of Tower 3 appears to extend the permitted 38m beyond the zoning line. Does the 'tail' of the proposed building fall within the area with a 6m height max (see Appendix 1, image 2– blue line is estimated as the location of the zoning line). Please provide a drawing that overlays the zoning lines with the proposed building footprint to provide clarity.

5.2. During games or festival times, it is essential to have a well-thought-out plan to handle the crowd effectively, including crowd interface with vehicular circulation and parking. Please clarify:

5.2.1. What are the assumptions regarding pedestrian volumes?

5.2.2. What calculations were used to determine volumes for the commercial areas, when there are events and / or multiple events on site, during different seasons etc.?

5.2.3. Were the edges of the public realm determined by pedestrian volumes or by the limits of easements and building footprints?

5.3. Please clarify:

5.3.1. Which vehicles can drive down to the Exhibition Way as far as the Aberdeen Pavilion.

5.3.2. Is there residential drop-off / delivery all the way to Tower 3?

5.3.3. Are there alternate locations for the servicing / loading function?

5.4. What is the current amount of useable park / great lawn space and what is the size of the park in the proposed concept? Additional dimensioned plans and section drawings of the berm and grade transition from parkland to Event Centre should be provided.

5.5. The Design Brief TOR noted the need to provide both streetscape cross-sections and a conceptual landscape plan. Neither requirement has been met. These drawings are required to evaluate how the public spaces around Aberdeen, Tower 3, and Event Centre, in particular, will work. The drawings should focus on the proposed public realm and indicate, at minimum:

5.5.1. The locations for pedestrian and vehicular movement.

5.5.2. The size and location of pedestrian gathering points and plazas.

5.5.3. The area available for outdoor staging (current versus proposed).

5.5.4. The room available for tree planting.

5.5.5. the space available for street furniture.

5.6. Streetscape cross-sections and a conceptual landscape plan are required with the second UDRP submission.

5.7. Updated wind and shadow studies are required with the second UDRP submission, based on any proposed revisions.

<u>Building Massing and Public Spaces</u>:

5.8. As noted in previous comments and by the UDRP, tower floorplates shall adhere to the City's High-Rise Building Design Guidelines. Therefore, the floorplates, including balconies, cannot exceed 750m2.

5.9. For towers up to 30-storeys, the minimum separation distance between towers is 23m. For towers over 30-storeys, the minimum separation distance is 25m. Greater tower separations should be provided when tower floorplates exceed 750m².

5.10. The wind and shadow studies provided show negative impacts on the public realm. Specifically, the shadow study shows that Exhibition Way and the Aberdeen Pavilion are in shadow for large amounts of the day. The wind study shows that Exhibition Way and the plaza spaces around the Pavilion were comfortable for sitting, but with new development these comfortable areas will be reduced. The approach to massing and tower placement should re-considered to minimize the impacts of shadowing and wind on the public realm.

5.11. Tower 3 takes away from the experience of the Aberdeen Pavilion; it shifts views and emphasis away from the Pavilion and blocks certain views of the Pavilion. Additionally, it creates significant shadow and wind impacts on the public realm. Urban Design's position is that Tower 3, and the associated podium, should be eliminated (Please see attached Appendix 1, image 3,4 and 5) and the redevelopment of this site should, at maximum, include only two towers.

5.12. Urban Design believes that there should be no building where the Tower 3 podium / base is shown. The space should remain open, at grade, public space in order to: (1) enhance the experience of the Aberdeen Pavilion as seen from the south side stands, (2) allow for enlarged gathering spaces around the Pavilion and entrance to the Event Center (see Public Space comments below) which will be particularly important when there are events / concurrent events, (3) create more opportunities for tree planting and seating areas, and (4) Provide additional public realm on-site.

5.13. The attached Appendix 1, images 3,4 and 5 shows the positive impacts on the open space and Aberdeen Pavilion with the removal of the tower 3 and its podium. The removal of this podium and tower also creates clear sight lines from north to south, creating a stronger visual connection between the Event Centre and the existing Lansdowne commercial/mixed use development and associated public realm. This space should remain free and clear of any buildings, including if a three- tower solution be pursued,

5.14. Should a three-tower scenario be pursued, the towers are to have a maximum 750m2 floor plate (including balconies) with appropriate separations indicated above, and be located above the north side stands. The attached Appendix 2 illustrates a few conceptual three-tower options.

5.15. In a three-tower scenario towers should be of different heights generally. Taller building / higher density should be positioned closest to Bank Street, while the lower can be placed closer to the Aberdeen Pavilion to better integrate with the historical context of the site (see attached Appendix 2).

5.16. In a two-tower scenario, which is preferred, a twin-tower design may be appropriate. Appendix 3 compares the shadow impacts of the 3-tower scenario and a 2 -tower scenario.

5.17. As currently shown, the Event Centre interrupts the open space and the current slope from the lawn to roof appears to be too steep. Event Centre must be sunk further into the landscape and that the roof must be green and accessible, in order to create a continuous lawn as an extension of the public realm.

5.18. It appears as though there will be significant vehicular circulation on the west end of Exhibition Way. There will also be significant pedestrian circulation. The truck entrance to underground parking in front of the Aberdeen Pavilion will also cross a significant pedestrian space. Alternative solutions should be considered to address the potential conflicts where pedestrians and vehicles cross paths.

Key Recommendations:

5.19. The Urban Design recommends a zoning envelope for this site be produced by way of a schedule for the final proposed podium and tower(s). In the absence of a zoning schedule, the RFO / RFP process to follow should include the following requirements for the redevelopment:

5.19.1. A maximum tower floor plate, including balconies, of 750m2.

5.19.2. A minimum separation distance of 23m between towers up to 30-storeys and 25m between towers above 30-storeys.

5.19.3. No building where Podium / Tower 3 is currently proposed.

5.19.4. Towers to be of different heights (unless in Tower 2 scenario the twin-tower may be appropriate)

5.19.5. Direction regarding podium design and height

5.19.6. An Event Center with a publicly accessible, green roof that functions as a useable extension of the public open space.

5.19.7. The maximum footprint of the Event Centre

6. Urban Design Review Panel

Key Recommendations:

6.1. The Panel recommends designing the site both for event days and the everyday experience of locals.

6.2. The Panel recommends the focus of this next phase of development should be to ensure established qualities are not compromised by the new development.

6.2.1. The Panel recommends year-round success of the pedestrian realm must be achieved and enhanced.

6.2.2. The Panel recommends the pedestrian accessibility of the site needs to be maintained for events such as the Farmer's Market and future large gatherings around the proposed event space.

6.3. The Panel supports opening up Exhibition Way to further pedestrian activity.

6.4. The Panel has concerns with the proposed event centre being too high in the landscape.

6.4.1. The Panel strongly recommends lowering the event centre further into the ground and providing pedestrian access to the rooftop greenspace as a continuation of the park lawn.

6.4.1.1. Consider the overall pedestrian accessibility to the event space, and the potential for large gatherings.

6.5. The Panel strongly recommends the towers follow the City's guidelines of a 750-sq.m. floorplate.

6.5.1. The Panel recommends further investigating a single-tower or two-tower concept to allow for the 750-sq.m floorplates to be achieved.

6.5.2. The Panel suggests doing so will improve the porosity of the site and maintain north-south views across Lansdowne Park, while minimizing wind and shadow impacts on the public realm.

6.6. The Panel has concerns with the orientation and location of Tower 'C' and its tight condition with the Aberdeen Pavilion.

6.6.1. Consider forgoing a three-tower approach.

6.7. The Panel recommends that the future design of the podium consider using masonry to best relate to the Bank Street frontage and neighbourhood character.

Site Design & Public Realm:

6.8. The Panel appreciates and understands all the challenges with funding and the complexity of adding users, servicing, access, and new stands, etc.

6.9. The Panel suggests locating the truck entrance in front of the Aberdeen Pavilion is problematic and would create a lot of challenges.

6.9.1. Consider consolidating servicing to avoid conflicts.

6.9.2. Consider locating the servicing between the podium and the bleachers, preferably with access from west side closer to Bank Street to mitigate trucks driving further into the site.

6.10. The Panel appreciates the existing amenities of Lansdowne and how it has maintained amenities that are multi-generational, with a good balance of commercial uses and public spaces/events. Consider reinforcing this aspect of the site.

6.11. The Panel appreciates that the site could support additional density to help animate Lansdowne Park. However, the Panel has concerns with Lansdowne Park's ability to provide space that is pedestrian friendly and pedestrian focused, which are central to Lansdowne Park's success—and transformative for Ottawa.

6.11.1. The Panel recommends that this unique characteristic of Lansdowne as a pedestrian space and as a city outdoor public amenity must be protected and enhanced. Any diminishment of that would be a concern.

6.12. The Panel has concerns with the lack of porosity north-south.

6.12.1. Consider increasing the porosity between the buildings in the north-south direction.

6.13. The Panel has concerns with the relationship between Tower 'C' and Aberdeen Pavilion.

6.13.1. The Panel has concerns with how Tower 'C' seems to significantly obstruct the Aberdeen Pavilion and the event centre.

6.13.2. The Panel suggests that Tower 'C' obstructs the connectivity and accessibility of the site and negatively affects the north-south access in front of Aberdeen Pavilion.

6.14. The Panel has questions and concerns with the location and orientation of Tower 'C'.

6.14.1. Consider re-orientation to align with the street grid.

6.15. The Panel appreciates that the views from the Rideau Canal have been maintained. However, Tower 'C' shifts the views away from the heritage of Aberdeen Pavilion and is much too prominent in the view planes.

6.15.1. The Panel recommends enhancing the entrance to the event centre and protecting the views of Aberdeen Pavilion by removing Tower 'C'.

6.16. The Panel recommends at a minimum to incorporate a 23-meter separation between Tower 'C' and the Aberdeen Pavilion.

6.17. The Panel has concerns with the proposal's large impact on the pedestrian realm, and outdoor eating and patio spaces.

6.17.1. The Panel recommends a single tower and podium approach that minimizes the wind and shadowing effects of the tower on the pedestrian realm.

6.18. The Panel appreciates that there are various elements of the proposal that are being connected through the site by the promenade behind the stands and the ceremonial stairway, however these may not be the priority to preserve in the grand scheme.

6.19. The Panel recommends any redevelopment of Lansdowne ensures that it remains a great destination in the city for Ottawans and visitors.

Sustainability:

6.20. The Panel strongly recommends and emphasizes that it is an important task to adhere to the sustainability standards and urban design guidelines that the City has implemented or is planning on implementing.

Sustainability:

6.21. The Panel strongly recommends and emphasizes that it is an important task to adhere to the sustainability standards and urban design guidelines that the City has implemented or is planning on implementing.

6.22. The Panel appreciates the aspirations and objectives of the project and the rejuvenation of the stands and site.

6.22.1. The Panel understands the economic model of the project and the neutral cost aspect.

6.23. The Panel strongly recommends adhering to the City's high-rise design guidelines for this City-led project.

6.23.1. The Panel strongly recommends that the guideline's 750-sq.m. floorplate should be followed.

6.23.1.1. Views from the entrance off Queen Elizabeth Driveway (11), from the Bank Street bridge (13), and from Sunnyside/Bristol (7) are all significantly improved with a smaller floorplate design.

6.23.2. The Panel strongly recommends the massing be adjusted with slender towers that meet the 750-sq.m. floorplates and separation distances of the guidelines. Doing so would result in much better views of Lansdowne from afar, and reduce the shadow and wind impacts on the pedestrian realm.

6.24. The Panel recommends that more slender towers and protecting important sky views will greatly improve the proposal.

6.25. The Panel recommends staggering the heights of the towers with the goal of making the high-rise portion seem less like a barrier.

6.26. The Panel recommends designing the project with a brick and stone material palette to help create a cohesive sense of a precinct and to strengthen the character of the area.

6.26.1. The Panel recommends the final product pick up on the prominent use of brick as a character element of Bank Street.

6.26.2. The Panel appreciates the articulation of the podium, however, recommends the materiality should be more tactile and more residential in nature rather than having a glazed commercial appearance.

6.26.3. The Panel recommends the final product should be a residential brick and stone palette, especially on the podium, to enhance the character of Bank.

6.27. The Panel has concerns with the event centre in terms of how it blocks and interrupts the pedestrian experience of the site.

6.27.1. The Panel encourages the applicant to consider alternate sectional studies and provide further analysis to better inform the end result.

6.27.2. The Panel strongly recommends lowering the event centre into the ground and seamlessly connecting the park with its roof to create a park space for public enjoyment, despite additional cost.

6.28. The Panel encourages the applicant to consider alternate sectional studies and provide further analysis to better inform the end result.

6.28.1. Consider other amenities instead to highlight the ‘highline’ effects. Residential units facing the bleachers should not be an option.

6.29. The Panel appreciates the decision to setback the podium and open up space on the south side of Exhibition Way.

6.30. The Panel recommends further developing the ceremonial stairway. Consideration needs to be given to accessibility standards.

6.31. The Panel recommends pursuing a two-tower approach instead of the three-tower proposal.

7. Heritage

Comments:

7.1. Heritage Context and Background

Existing Context

The Lansdowne Park is the site of the former Central Canada Exhibition Association fairground (1888 – 2009). It is bounded by Bank Street to the west, Holmwood Avenue to the north, and the Queen Elizabeth Driveway (QED) and the Rideau Canal, National Historic Site of Canada, Canadian Heritage River and UNESCO World Heritage Site to the east and south.

The site contains the Aberdeen Pavilion and Horticulture Building, both of which are designated under Part IV of the Ontario Heritage Act. The Aberdeen Pavilion - a structural steel and pressed metal late-Victorian exhibition hall – was designed by architect Moses C. Edey and constructed in 1898. It is designated a National Historic Site and is also designated by the City of Ottawa under Section 29 of the Ontario Heritage Act (Bylaw No. 22-84). The Prairie-style two-storey brick Horticulture Building opened in 1914 and its design is attributed to architects Francis C. Sullivan (1882-1929) and Allan Keefer (1883-1952).

Permissions, Applications and Review

Part of the site, including the Aberdeen Pavilion and Horticulture Building, are subject to a 2012 Heritage Conservation Easement Agreement between the City of Ottawa and the Ontario Heritage Trust, which includes protected view corridors, and delineated framing and setting lands. Permission will be required from the Ontario Heritage Trust for any construction within the Easement.

The Site is subject to the 1993 Parks Canada and City of Ottawa Cost-Share Agreement and accompanying (1990) Aberdeen Pavilion Conservation Report that identifies the importance of maintaining clear vistas at each of the four entries to the Pavilion.

In accordance with Section 33 (1) of the Ontario Heritage Act, a heritage permit is not required as the proposed alterations will not impact the heritage attributes of the Aberdeen Pavilion and Horticulture building as set out in the designating by-law. This document has been prepared by Heritage Planning staff at the City of Ottawa as the formal comments on the Official Plan and Zoning By-law Amendments for Lansdowne Park.

Section 4.5.2.1 of the City's Official Plan states that when reviewing development applications properties on, or adjacent to a designated property, the City will ensure that the proposal is compatible by respecting and conserving the cultural heritage value and attributes of the heritage property as defined by the associated designation bylaw and having regard for the Standards and Guidelines for the Conservation of Historic Places in Canada. This will be accomplished through the adaptation of the mitigative measures in the HIA and through the consideration and implementation of Heritage Staff's comments.

7.2. <u>Heritage Impact Assessment:</u>

Heritage Staff generally concur with the findings, recommendations, and conclusions in the HIA provided by ERA Architects Inc. dated June 29,2023. Some of the key impacts identified include:

- The visibility of the proposed towers beyond the silhouette of the Aberdeen Pavilion from the east having some visual impact
- Impact to the dynamic views of the site from the Rideau Canal and adjacent landscapes

- The shadow impact on existing built heritage resources
- The proposed new event centre and extended berm will encroach into the framing lands and Great Lawn south of the Aberdeen Pavilion.

The report concludes that:

The proposed development generally conserves the cultural heritage value of the Site, while allowing for its revitalization. New construction is sited to the southwest portion of the Site, where high-density contemporary structures are currently located. The existing built heritage resources will be retained and rehabilitated as part of ongoing City-initiated programs. Other existing land uses and the spatial organization of the Site will remain unchanged. The proposed development has been designed and situated to minimize impact on the protected HCEA and Parks Canada Cost-Share Agreement views, the setting and framing lands, the Aberdeen Pavilion, and the Horticulture Building. Though protecting the silhouette of the Aberdeen Pavilion is not an express objective of the HCEA, the proposed towers will be visible beyond the silhouette of the Aberdeen Pavilion, creating some visual impact

Mitigative Measures

The mitigative measures identified in the HIA should be implemented and used as guiding principles through the next stages of planning and design for the project. These measure include;

- Design the new retail podium to enhance views to and experience of the Aberdeen Pavilion;
- Enhance the public realm surrounding the new retail podium along Exhibition Way and design for year-round usability;
- Consider the form, massing and materiality of the high-rise towers to complement the new backdrop setting of the Aberdeen Pavilion;
- Consider the high-rise tower shape, placement and articulation to minimize shadow impact; and
- Design the new event centre and berm to minimize visual impact on the south elevation of the Aberdeen Pavilion, while enhancing the Great Lawn open space.
- The commemoration and interpretation of Frank Clair Stadium and Ottawa Civic Centre

Conservation Design Parameters

Similarly, the HIA has detailed Conservation Design Parameters, which are intended to establish a set of conservation objectives and design guidelines for the following areas: Exhibition Way, Event Centre and Southeastern Edge and Tower Design. The Conservation Design Parameters (CDPs) should be implemented to help guide the overall design and maintain the cultural heritage value of the site.

Heritage staff recommend the implementation of the Conservation Design Parameters be included as part of the framework for the RFP of the air rights.

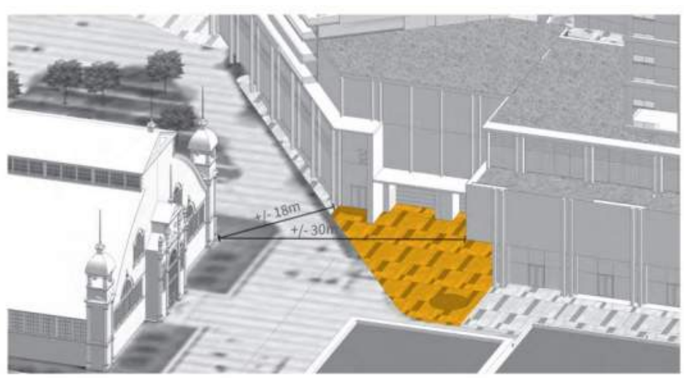
7.3. Additional Heritage Issues /Concerns

Aberdeen Pavillion and the East Tower

Heritage staff have concerns with the proposed eastern tower on the site and its potential impact on the Aberdeen Pavilion. The revitalization of Lansdowne Park offers an opportunity to further highlight the Aberdeen Pavilion as the heart of Lansdowne, efforts should be made to highlight this landmark building and improve the existing condition between the Aberdeen Pavilion and the new building.

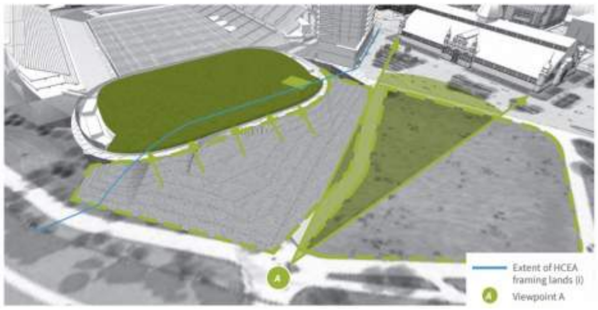
The proposed east tower is adjacent to the Aberdeen Pavilion. The HIA identifies that the proposed development will have an adverse impact on the visual prominence of the Aberdeen Pavilion from certain vantage points within and adjacent to the Site. The 2022 Council-approved (in principle) Lansdowne 2.0 Concept Plan tower heights and massing create a shadow impact on the Aberdeen Pavilion by obscuring heritage features from late morning to early afternoon during the fall and winter months. Character-defining attributes including the central cupola and clerestory windows are cast in new shadow during the September and December test dates. Potential at-grade impacts may include pedestrian and vehicular congestion as well as potential impact during construction. The measures identified in in the HIA will help mitigate these impacts and should be implemented.

Heritage Staff suggest that alternative option(s) be considered, such as reducing the floor plate and/or height of the eastern tower and/or removing the tower. Further to the appendices provided with comments from the Public Realm and Urban Design Branch, heritage staff encourage the elimination of the third tower or if three towers are to be considered, moving the tower west towards Bank Street so that all three towers are oriented towards Exhibition Way. As shown in these documents, this will mitigate the negative shadow impacts of the current proposal.



Event Centre

The proposed event centre and relocated berm to the east of the TD Place Stadium will encroach in the framing lands as identified within the Ontario Heritage Trust Easement.



Heritage staff support the Conservation Design Parameter in the HIA that states that: The location and design of the event centre should be further refined to minimize visual impact on the south elevation of the Aberdeen Pavilion, while allowing for continued public use of the Great Lawn.

Any alterations to the property within the boundaries of this easement area requires consultation with and approval from the Ontario Heritage Trust.

Public Realm

The open space surrounding the Aberdeen Pavilion contributes to the legibility and prominence of the building. Recommendations to improve the public realm should be explored in coordination with the Council-approved Guiding Principles for the Transformation of Lansdowne and the City of Ottawa's Strategic Investment Plan for the Urban Park and Public Realm.

Heritage Staff encourage the removal of the proposed parking entrance closest to the Aberdeen Pavilion. If required, it should be limited to use as service access.

7.4. <u>Zoning Specific Recommendations– Heritage</u>

Heritage staff recommend that the following be considered through the proposed Zoning By-Law Amendment and Official Plan Amendment.

7.4.1. Reduce potential impacts on the Aberdeen Pavilion
- For the towers, locate the taller height closer to Bank Street and reduce the height and/or building floor plate of the east tower

7.4.2. Protection and enhancement of views of Aberdeen Pavilion
- Establish an increased setback along the southern portion of Exhibition Way to increase the visibility of the Aberdeen pavilion and ensure both spires of the pavilion are visible from Bank Street.

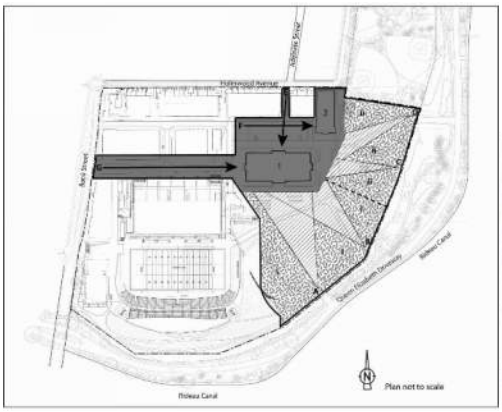
7.4.3. Define and relate the podium height to the Aberdeen Pavilion
- Limit the height of the podium along Exhibition Way to provide a 3-4 storey streetwall height to ensure compatibility with the Aberdeen Pavilion and the original stadium/grandstand.

7.4.4. Provide a maximum height of the event centre

- Limit the height of the event centre to ensure that the dynamic view of the upper portions of the Aberdeen Pavillion, as defined in the OHT easement, are maintained

7.4.5. Public Realm enhancements to conserve and highlight the Aberdeen Pavilion

- Ensure that the zoning considers the role of open space surrounding the pavilion to maintain its prominence and maintain the established protected views



7.5. <u>Additional Plans and Studies for Site Plan</u>

The following additional plans and studies should be required at site plan:

- HIA Addendum: to look at the more detailed design, including architectural detailing.
- Heritage Interpretation Plan
- Documentation and Salvage Plan for Frank Clair Stadium.
- Heritage Protection Plan for the site which includes:
    - Pre-construction building condition survey and documentation;
    - Vibration and crack monitoring;
    - Implementation of physical protection for the designated buildings;
    - Management of construction dust, debris etc.; and
    - Post-construction building condition survey and documentation.

Heritage Planning Staff can assist in the creation and establishment of the terms of reference for these studies and plans.

8. Ontario Heritage Trust

Comments:

8.1. Building Heights

Towers of the height proposed in the ZBA would impose a negative impact on nearby cultural heritage, by:

- Altering the background of protected views of the Aberdeen Pavilion;
- Placing the Pavilion, Park, and adjacent portions of the Canal in shadow;
- Introducing an abrupt transition of building scale, particularly with respect to proposed Tower 3.

The OHT offers this summary assessment while recognizing that the proposed tower locations are not contained within the boundaries of the provincial easement.

8.2. Event Centre

OHT staff have seen conceptual depictions of the proposed Event Centre pass through several iterations. Previously we have indicated that the heritage impact, though negative, appeared manageable.

The iteration contained in these applications, while understood to be still conceptual, appears to have grown significantly in scale (both the building scale and hardscaping). Its impact would be more considerable than that of previous iterations:

- All iterations of the proposed Event Centre would negatively impact protected views of the Aberdeen Pavilion. The iteration associated with this application appears to have grown in height, and therefore in visual impact;
- All iterations would involve construction within identified zones of archaeological potential;
- This iteration shows hardscape extending further into the Park, and in general, a potentially significant reduction of green space within the easement boundaries;
- The current iteration, unlike previous ones, would appear also to disrupt current community uses of this green space. OHT staff have requested that community uses be integrated.

Recognizing again the conceptual state of progress, the design associated with these applications raises new concerns about impact. The OHT looks forward to continuing discussions with the City.

9. Ottawa Public Health

Comments:

9.1. We note that the provision of 1200 bicycle parking spaces exceeds the current Zoning By-law requirements, however, given that many units will be occupied by more than one person, would recommend increasing this. Unsecure bike parking would be a significant disincentive to using cycling as a primary mode. This would support OP policies 2.2.4, and 4.1 that seek to incentivize active transportation and make cycling the healthy and easy choice.

9.2. Could there be integration of the High Performance Development Standards (HPDS) in this application, given this is on City lands?

10. Climate Change and Resiliency

Comments:

10.1. While the HPDS has not come into effect, given that this is a City-owned site, it would be appropriate to push this development to apply the HPDS to the fullest extent possible as a showcase example of a City-led project that advances sustainable and resilient design. In my quick review of the Planning Rationale, I see that:

- The project will seek a "high level of sustainable design" as part of the future Site Plan Control application, including:
  - alternative energy and energy-efficient measures, including electric and solar energy sources
  - alternatives to fuel-dependent vehicles
- The proposed concept will aim for LEED Silver certification and will follow the City's Corporate Green Building Policy
- Consideration of a green roof for the event centre.

Here is the link to the Tier 1 and Tier 2 of the HPDS: [High Performance Development Standards (HPDS) | City of Ottawa]

11. Accessibility Committee

Comments:

11.1. The UDRP package only includes the word accessibility once. Given the scope and application of this work, it should be more explicit in the vision and design objectives.

11.2. Overall, the site should include many accessible rest areas in both active and green spaces.

11.3. Renderings:

11.3.1. Should include people with various disabilities. This shows the disability community that they are considered and included in our work.

11.3.2. Ensure TWSIs are not shown as being obstructed. This is something that should be a strong consideration as the Lansdowne space is reimagined. As constructed, they are not serving their intended purpose.

11.3.3. Ensure a clear pedestrian path of travel (unobstructed by bikes, A-frames, patios, etc.)- the City requires 2 m which won't be demonstrated accurately in a rendering, however, it can demonstrate a clear path

11.3.4. Patios are required to be delineated. This should be shown in renderings.

11.4. How many of the 739 parking spaces will be accessible?

11.5. How many visitor parking spaces will be accessible?

11.6. Are the ceremonial stairs a primary entrance to the buildings or do they serve a strictly decorative purpose?

11.7. Lansdowne has a designated “on-street” accessible parking space above ground - will more of these be included?

12. Rideau Valley Conservation Authority

Comments:

12.1. The RVCA has reviewed the above noted Official Plan and Zoning By-law Amendment application for the Lansdowne 2.0 project to permit building heights up to 40 storeys and facilitate a new stand-alone Event Centre at the east end of TD Place stadium and have no objections.

13. National Capital Commission

Comments are forthcoming.

14. Parks Canada

Comments are forthcoming.

15. Enbridge Gas

Comments:

15.1. Enbridge Gas does not object to the proposed application(s) however, we reserve the right to amend or remove development conditions.

15.2. The applicant will contact Enbridge Gas Customer Service at 1-877-362-7434 prior to any site construction activities to determine if existing piping facilities need to be relocated or abandoned.

16. Telecon

Comments:

16.1. EXTREME CAUTION! TELUS HAS CABLE IN FOREIGN UTILITY'S LEASED DUCTS AND VAULTS, close to the proposed route. Please call for locates.

17. Ottawa Catholic School Board

Comments:

17.1. The Ottawa Catholic School Board has no objection to the proposed zoning amendments and the site plan control proposal for the property located at 945, 1015 Bank Street. However, since new residential developments have an impact on enrolment, transportation routes and attendance boundaries, we would like to be notified of all decisions pertaining to this application, including notice of public meetings, street name dedications and approval status.

18. **Ottawa Catholic School Board**

Comments:

18.1. The Planning staff has reviewed the above-noted Official Plan & Zoning By-Law Amendment application. It is understood that the proposed development will have the North stadium stands removed and reconstructed as a standalone structure, which will be the new event centre for Lansdown Park. The proposed development also includes three high-rise residential towers with a maximum height of 40 storeys to be established and will have up to 1,200 residential units.

It is our understanding that the City seeks to amend Area-Specific Policy of the Lansdown Special District designation through an Official Plan Amendment to clarify the City's Official Plan with the following amendments:

- Confirm that the Lansdowne Special District policies supersede the Greenspace and Mainstreet
- Corridor functional designations that are shown on Schedule B2 of the Official Plan.
- Allow for a maximum building height of 40 storeys on the site.
- Allow for a portion of the existing greenspace on the site to be repurposed for a new event centre.

The Zoning By-Law application seeks to rezone a portion of the subject site to permit the new event centre, as well as increase the maximum permitted building height to allow for the proposed 40 storeys and a maximum proposed height of 15.05 meters for the event centre.

Please be advised that our response to your request for comments regarding the proposed development is as follows:

The Ottawa-Carleton District School Board (OCDSB) has no concerns against the proposed Official Plan & Zoning By-Law Amendment. The city is seeking to increase intensification within the urban boundary, and the OCDSB recognizes that new dwellings will generate new students to our local schools.

We would also like to note that the owner be required to inform prospective purchasers that school accommodation pressures exist in the Ottawa-Carleton District School Board schools designated to serve this development which are

19. **Councillor and Community issues**

Comments:

19.1. Please see summary of community comments (Document 2) attached for review and comment. A public meeting was held on July 13, 2023, with approximately 150 people in attendance.

19.2. At this time, planning staff have not received formal comments from Councillor Menard.

19.3. Staff received approximately 175 public comments during the comment period. Approximately 60 percent of respondent was opposed to the development while 40 percent are either in support or indifferent.

Please review the following comments and provide a response for each theme.

Building height

- Increase of up to 40 storeys from current limit of 20 storeys is selfish and dangerous
- General opposition to Zoning By-law amendment to increase height
- Tall buildings are an eye sore
- The request to increase the maximum height restriction from 38 metres to 127 is excessive and over three times the existing height.
- These heights are out of place for the neighbourhood and the surrounding heritage buildings
- No building should be taller vs. what is there today
- A set of mid-rise residential buildings, with a more fitting aesthetic for the area, would be much more appealing to Glebe residents

Transition to Adjacent Low-rise neighbourhood

- The high-rises are out of place in comparison to the rest of the Glebe
- Completely out of scale with the charm of the surrounding neighbourhood.
- The Glebe has always had an old-world (aka low-rise) feel. This changes the landscape of this beautiful old community,
- This is an iconic Ottawa site, and to propose 40 story towers, which are so shockingly out of proportion with the surrounding cityscape and the site is outrageous.
- The imposing presence of these buildings not only clashes with the surrounding Glebe aesthetic, it also invades the sight lines of Glebe residents, shoppers, and seasonal event goers

Wind impact

- The towers will cause a wind tunnel that will make walking on Marché very unbearable in winter months.
- The wind study as presented, lacks significant information for an assessment to be made as to its validity and appropriateness in the

current context. If anything, it may underestimate the wind climate problems which could occur were this development to be built.

Shadow impact

- The 3 residential towers proposed will be too tall and will provide too much shade on the Aberdeen Pavilion and the existing structures at Lansdowne
- Three high-rise towers will overwhelm the site - especially at 40 stories. They will block the sun and cast long shadows. They will destroy the character of the surrounding area.
- The towers will create large shadows and wind tunnels that will cause the very popular patios on Marché Way to lose most of their sunlight.
- 40 stories will shade so much it will reduce quality of life and enjoyment in the whole area.
- Not only will much of the Lansdowne site be covered by shadow, but also neighboring streets in the Glebe as far as 1st Ave, the canal and streets in Old Ottawa South (across the canal!)
- The angled tower next to the Aberdeen Pavilion is particularly egregious and should be eliminated entirely as it over-shadows the Pavilion
- Eliminating all the sunlight for businesses on exhibition way would be a travesty.

Traffic

- The congestion and confusion in the neighbourhood when events are on now (and even when they aren’t) will only be exacerbated by the existence of so many new residential units and the additional events.
- Traffic needs to be addressed to public, and discussions need to be had early on for solving traffic related issues
- Please do whatever is possible to deter more vehicular traffic. It's already a disaster in this regard for anyone living nearby or trying to get to/from that area

Active Transportation (Bicycle and Pedestrian connectivity/safety)

- The active transportation along Bank Street and the Queen Elizabeth Driveway needs to be improved.
- The addition of up to 1200 new units will clog up Bank Street and the nearby neighbourhoods and reduce the ability for pedestrians and cyclists to enjoy the canal and Lansdowne itself.
- Need to widen the Bank Street sidewalks and create properly separated bike lanes

- Increase the transit service to and from the park on Bank Street with a dedicated lane. Get bike lanes on Bank Street and create new and safe bicycling infrastructure to and through the site

Transit

- Insufficient transit options for the site, the busses are insufficient and will only get worse upon development
- How will all of the new residents and visitors get to and from the site.
- Transit for all the events at Lansdowne does not work, building this without implementing better busses or the O-Train will not work

Parking

- 739 parking spaces for 1200 units will be woefully insufficient and 400 cars will try to park in surrounding streets
- unless there is a spot per unit, there will be a spillover to the local neighbourhood
- That a number of dedicated disabled parking spots be implemented in this area would be welcomed.
- Adding 739 vehicles to this space seems designed to create traffic chaos on the site and affected roads.

Density

- Increased density makes sense if there is increased greenspace
- Clearly, the city center is already overcrowded and adding the traffic density expected from thousands of new residents will further degrade the residential environment
- The density of this project will have a negative impact on traffic, transportation, servicing, and greenspace

Loss of Greenspace

- Loss of greenspace will negatively affect the residents on Holmwood Ave
- Replacing the arena and moving it to the green space park is a terrible and costly idea. The lawn is well used and enjoyed by many, and will be needed even more to serve the local population if it increases with the towers
- It is obviously a bad idea to add 1200+ yard-free occupants to the site and eliminate greenspace.
- Lansdowne already has very little green space. None of the green space should be lost, especially to build an arena that is not needed. With this loss of green space, Lansdowne will not have enough green

space to hold music festivals. Also, Lansdowne will be even more of a concrete jungle.

- The plan for 35, 40 and 46 storey towers removes whatever pretext remains for calling Landsdowne a park.
- Make the green roof on the new arena accessible to the public. Doing so would help to offset much of the usable greenspace being lost by relocating the arena.
- The overall design of the project should enhance the site with green space and fit in with some aspect of historical respect for the look of the canal site
- Lansdowne is a park and should be kept as such. Should not be developed on and should be enjoyed by all residents of the city.
- Please save all the green area possible in the inner city lest it become a wasteland.

Housing

- The plan is trying to fit in more residential units than are appropriate for the space
- 40-story condominium buildings at Landsdowne will generate very good property tax revenue for the City but does nothing to address the affordable housing shortage. If you were making affordable or public housing this would be acceptable, but it is not.
- We need more affordable housing, and this project will not be, why aren't we seeing proposals for 5-10 storey buildings lining streets instead?
- If housing is to be added to Lansdowne Park, it should be rent-to-income only. I don't feel like subsidizing rich people's access to pricey condos overlooking the sports fields. I can't afford to buy at Lansdowne. Many people cannot.
- These towers would be better used with 2 and 3 bedroom units - Ottawa already has enough bachelor and one bedroom towers, we need to be thinking of more affordable options for families.

Land Use

- People WANT a park -- not an event space, not an arena, but a PARK. A place for leisure, walking, meeting friends
- The proposed three towers would render this end of the Glebe almost unlivable
- This is not a “partnership” (public, private) but handover of public, precious land to satisfy and expand commercial interests.

- Should not be building 40 storey towers in what is supposed to be a park
- Plant some trees, preserve what little green space is left, build people-friendly sized buildings with affordable housing
- Why aren't we redeveloping the St Laurent shopping centre into high density and putting the stadium there? It's right on the transit way and the freeway

Heritage

- The towers are also in no way in respect to the beauty and heritage of the UNESCO Rideau Canal and the two heritage buildings on site; the Aberdeen Pavillon and the Horticulture Building. Imagine the city of Rome allowing towers such as proposed to be built beside the Colosseum or beside the Pantheon. We need to honor and respect our heritage buildings and not pollute them with 40 story condo buildings.
- This project will fundamentally change the area by overshadowing the historic Aberdeen Pavilion

Sustainability

- There is waste in destroying the recently built podium.
- Force the developers to use only green technologies to lower Lansdowne's carbon footprint. How about increasing rooftop green space use by planting garden beds and vertical gardens?
- Concrete and steel consumption contribute greatly to carbon emissions. It would be irresponsible to dispose of what's already been built, only to replace it with more concrete and steel.
- putting an arena where some of the limited current green space exists seems contrary to all city policies and guidance for greater green space, and inconsistent with fighting climate change.

Noise

- The increased noise, commotion will absolutely kill The Glebe.
- Please revise to lower density and noise

General Inquiries and comments:

- What failed in financial model of 1.0, and how is that being addressed/prevented in 2.0
- The time to complete this large project of this size would be years. Trying to keep the businesses already in place here running during extensive construction will be very difficult

- Saddling the tax payers of Ottawa for years with billions of dollars of debt to finance the proposal and to line the pockets of OSEG members is criminal.
- Where will the kids go to school? Where will they go to the Doctor/Dentist?
- Lack of public consultation

Positive Comments:

- Full support of application in their current state
- This looks great. I was expecting more of the green space to be used so that more people could live in this desirable neighborhood, but there's not much to object with on the modest proposal
- Density and building heights are good, and keeping the arena within Lansdowne is key to the continued success of the area
- I am in full support of densification. This is essential to improving affordability in the city and reducing our environmental impact.
- I think the towers add good density to an attractive site, and bring a critical mass of residents to increase the vibrancy of Lansdowne.
- I LOVE the proposal for Lansdowne 2.0!! We NEED housing. We NEED a football stadium. We NEED a hockey arena for 67s. PLEASE build this as presented. The 3 towers are in the PERFECT PLACE!!! BUILD THIS PLEASE!!! Thank you.
- Review the financials but as for the development as proposed please approve.
- As a homeowner in the Glebe, I'm trilled to hear that the Glebe will be further densified by this development, as it rightly should be. These new towers will provide valuable housing to this supply-constrained market, will provide many people the opportunity to live in one of the best parts of Ottawa, and will bring tons of business to the local businesses.
- I support the project for 945 and 1015 bank St and I think there should be even more apartments.
- I'm a resident of Centretown, frequenting the Glebe/Lansdowne, and I am 100% in favour of this application moving forward. As someone who has lived inner-city in various cities across Canada, I have witnessed first-hand the good that density like this - whether it be market-rate homes for ownership or rental and/or social/affordable homes - does for a community. In my view, intensification makes areas vibrant - it supports businesses, creates walkable areas, helps cut down on our environmental impact, and fosters a sense of community.

- I am in support. This project will make Ottawa a more competitive city for events and will provide more apartments for people to live in.

Should there be any other questions, please do not hesitate to contact me.

Sincerely,

Krishon Walker

cc. Sean Moore, Director, Lansdowne Park Redevelopment Project
Simon Deiaco, Senior Planner
Abdul Mottalib, Infrastructure Project Manager
Mike Giampa, Transportation Project Manager

National Capital Commission Comments

Thank you for circulating the National Capital Commission (NCC) on applications for Official Plan Amendment and Zoning By-law Amendment for 945 and 1015 Bank Street (D01-01-23-0009 / D02-02-23-0047), "Lansdowne 2.0". The Lansdowne 2.0 initiative presents an opportunity to think boldly about Lansdowne, QED, and broader Capital-building and City-building perspectives. We present the below comments (paired with an attached Appendix in response to the 'Lessons Learned' report) in a spirit of openminded discussion and collaboration on this exciting initiative.

<u>Context</u>

- The current process leading to the redevelopment of Lansdowne began in 2007 as the City sought to replace the existing south-side stands and revitalize the site with new development.
- Lansdowne is bounded to the east and south by the NCC-owned Queen Elizabeth Drive (QED) and Capital Urban Greenspace beside the Rideau Canal.
- The Rideau Canal is owned and managed by Parks Canada, and is a UNESCO World Heritage Site.
- The NCC has been a collaborative stakeholder in the redevelopment of Lansdowne, including approving improvements to pedestrian connectivity from the Rideau Canal Capital Pathway, participating in the Lansdowne Transportation Monitoring and Operations Committee (LTMOC), and permitting by agreement the use of QED for park-and-ride shuttles for major events.

<u>Proposed Development</u>

- The proposal comprises:
  - three high-rise residential towers with up to 1,200 new dwelling units and 739 new parking spaces;
  - replacing the current 3,809 square metres of retail space attached to the arena/stadium complex along Exhibition Way with 9,290 square metres of new mixed-use retail space in the podium of the new residential towers;
  - replacing the north-side stadium stands;
  - a new 1,500-person music hall; and
  - a new 5,500 seat multipurpose event centre.

<u>Comments</u>

1. **Queen Elizabeth Drive**

a. The NCC shares the City’s goal of re-imagining Queen Elizabeth Driveway to reduce the road’s importance as a commuter route in favour of active mobility and the public realm. The QED is a capital parkway designed for its experiential quality, and not intended as a principal commuting transportation route.

b. The NCC’s guiding principles for Queen Elizabeth Driveway emphasize sustainable and active modes of mobility over private motor vehicle use of the roadway, consistent with the overall vision for NCC parkways as scenic connections between major national areas of significance while providing opportunities for recreational purposes.

   QED is a federal parkway under the jurisdiction of the NCC. Since 1970 the NCC has hosted bike days, including periodic full closures of Colonel By Drive. Since 2020 the NCC has expanded this program to other parkways so they are periodically reserved for active use and not for use by vehicles and QED is seasonally reserved for active use from May to October on varying days.

   We remain concerned that the TIA analysis does not reflect the reality of regular periods when QED is not available for private vehicle use. We provided feedback on the draft TIA and requested that it evaluate a range of scenarios – different levels of intensity of events at Lansdowne with different formats of QED use. There is a wide range of options and level of impact, wherein QED could be reserved for active use, or opened to shuttles at events of certain sizes. Similarly, the impacts of each option vary by the size of events at Lansdowne: the 1,500-person music venue, the 5,500-seat event venue, events at the Aberdeen Pavilion, and the stadium itself – as each venue is added to a concurrent peak demand, the ways that QED could be used vary.

   The TIA and associated studies did not evaluate these more nuanced options to inform the conversation about QED access, instead relying on “*our assumption is that the QED will, generally, remain as a viable secondary vehicular access point to Lansdowne*”. The response provided in the Lessons Learned states that “*If the assumptions are not valid, then the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective*.” This generalization lacks nuance – there are levels of intensity of activity at Lansdowne wherein QED access is more critical than others.

Lacking a study of those different levels of intensity and QED access as was requested leaves the applications relying on broad assumptions.

Note: The NCC is currently reviewing its Parkway Policy which will provide direction for future use and evolution of QED. We look forward to working with the City to support sustainable mobility while protecting QED's unique capital vocation.

c. The transportation challenges of Lansdowne will not be solved by prioritizing access by personal vehicles. Where access to Lansdowne is needed for major events, Queen Elizabeth Drive has proven successful at efficiently moving large numbers of people through the shuttle program. Improving access to Lansdowne must prioritize increasing capacity and mobility through making transit and other sustainable modes the preferred choice.

These modes will be the preferred choice not only by requiring the attendees of ticketed events to pay for their transit by providing a transit fare with every ticket, but also on a day-to-day basis making access to Lansdowne by transit and other sustainable modes competitively preferable to personal vehicles in cost, time, and convenience. Keeping QED open to personal vehicles at all times undermines this effort.

2. Capital Urban Greenspace

a. The *Strategic Investment Plan for the Urban Park and Public Realm* identifies potential projects on adjacent NCC-owned lands:

   a. Redesigned entrance to Lansdowne at Queen Elizabeth Driveway to better accommodate cyclists and pedestrians with the possibility of a signalized crosswalk.
   b. Forestry and floral plantings along QED
   c. Additional signage of speed limit along QED
   d. A new pedestrian crossing of QED at the site's southeast edge
   e. A two-way accessible link from Colonel By Drive to Bank via Echo Street

Note: We are supportive of improvements to active transportation connectivity and enhancements to animation of the QED corridor, when they are in keeping with its heritage and cultural significance. A Federal

Land Use Design and Transaction Approval (FLUDTA) will be required for any work that is proposed on federal land.

3. **Transportation**
    a. It is essential that the transportation plans associated with Lansdowne 2.0 adequately explore the necessary bold sustainable transportation initiatives, projects and investments and site access improvements to reach the City's and the NCC's objectives. Whether identifying issues through the Transportation Impact Assessment for Lansdowne or proposing new projects for the Transportation Master Plan, these processes must work in tandem to improve mobility and access to this important destination.

    b. As noted, the NCC is currently reviewing its Parkway Policy. This initiative, combined with Lansdowne 2.0, presents the opportunity to discuss bold exploratory ideas such as, but not limited to:
        i. Piloting conversion of QED & Colonel By Drive to one-way streets while reducing the number of lanes to provide more space for active use;
        ii. Realigning a portion QED to provide a dedicated access to Lansdowne; and/or
        iii. Exploring limiting access to QED to major event shuttles, emergency vehicles, and active modes on an ongoing basis by design.

    c. As discussed in Item 1 above, it needs to be understood how Lansdowne 2.0 and the surrounding transportation network will function under a day-to-day scenario (no medium, major or mega events occurring) with QED closed for active use programming. If it is hypothesized that any long-term, frequent closure of QED will negatively impact the viability of events at Lansdowne, it needs to be understood at what point, in terms of event size programming, does this negative situation occur.

    d. To support a viable Lansdowne at all times, TDM activities must strive for a transit mode share that strives beyond the targets set for Lansdowne 1.0; applying the status quo is not a target.
        i. It is important to plan for a transit mode share greater than 10% and an auto mode share lower than 75%, even for events below 10,000 persons in attendance. The smaller events with attendance levels of 5,000 or less occur more frequently at Lansdowne. Of the 161 events

expected in 2024 at Lansdowne, approximately 128 (79%) will be under 5,000.

ii. The Official Plan calls for by 2046, the majority of trips in the city will be made by sustainable transportation. Planning for a 10% transit modal share for 79% of events at Lansdowne will not achieve this objective.

iii. There is inconsistency in the modal share targets. Table 2 indicates a Transit & Shuttle target of 50-55% for Minor Events. Table 4 indicates a target of 10%.

iv. The TIA remains based on forecasted trip generation rates and modal splits. We believe back-casting to identify what actions (built form, TDM, parking supply, transit service, pricing) are needed to reach a desired future scenario is more likely to achieve transportation goals.

v. The growth of automotive mode share should be considered constrained by existing and anticipated conditions on the network including active-use programs on QED.

vi. The TDM report assumes 8,225 person trips as the cap on automotive mode share based on an existing on-street parking supply of 2,175 spaces and on-site of 600 spaces. This appears to presume on-street spaces are available for Lansdowne users despite numerous competing demands for on-street spaces.

vii. Providing capacity to Lansdowne needs to be addressed through high-capacity transportation modes such as shuttles and transit; reliance on the private vehicle will not address the capacity needed.

e. Identifying alternative off-site parking locations is a good approach to intercepting and diverting traffic from Bank. However, consideration should be given to providing shuttle service for locations located further away (i.e. 30-40 minute walk from Lansdowne). For some event goers, the walk may be longer than their drive to the off-site parking location. Park & ride locations that see low usage on evening and weekends present such an opportunity.

f. The inclusion of the concept of a “Fare Free” zone on Bank Street such as is employed in downtown Calgary can support local businesses, including Lansdowne, and reduce the reliance on auto travel while supportive the evolution of Bank Street into a 24/7 transit priority corridor. This is a positive idea that merits serious consideration.

g. To incentivize the use of transit and support a lasting change in commuting behaviour, consideration should be given to providing a preloaded PRESTO card with a 6-month or 1 year transit pass to new residents. A similar type of incentive should be developed for businesses and offered to their employees.

h. In addition to the continuance of bicycle workshops (recommended in the report for the spring), it is recommended that a second workshop be introduced in the fall to provide information on winter cycling. Currently, the multi-use pathways along QED and Colonel By Drive, as well as the cycling facilities on O'Connor St. and Fifth Ave. (QED to O'Connor) are winter maintained routes. Lansdowne 2.0 should take advantage of its proximity to these year-round cycling facilities.

   Although the City is only beginning discussion on a City-wide, City-led bike share program, could a Lansdowne specific bike share program be implemented that would serve the residents of both the new and existing towers? Potentially this program could be managed by the TMA.

i. During the planning process for Lansdowne 1.0, City Staff were directed to retain two qualified transit and transportation planning professionals from outside Ottawa to undertake an independent peer review of the Lansdowne Transportation Impact and Assessment Study and TDM Plan. We suggest a similar peer review be required to provide an independent third-party opinion.

j. The Lansdowne 2.0 proposal includes 739 additional parking spaces for 1,200 new dwelling units, while the zoning by-law requires a minimum rate of 0.5 spaces per dwelling unit. There is no rationale provided for why parking in excess of the minimum is proposed to be provide. Indeed there is no analysis of why a lower rate than the minimum was not considered. Each parking space constructed is a sunk cost into vehicular use that will be paid for by the future residents and users of the site, and by residents surrounding the site through additional traffic generation.

k. The Capital Pathways Strategic Plan is the NCC's principal guiding document for the Capital Pathway network. Based on the thresholds set by the Plan, the Rideau Canal West pathway adjacent to QED exceeds its peak capacity and does not provide the level of high-quality comfortable experience intended for users, nor does the existing pathway width support ongoing growth of active transportation users. More room for active transportation users is required, especially given ongoing intensification in the inner urban area such as that proposed by Lansdowne 2.0.

4. **Civil**

a. We understand the existing stormwater management system for Lansdowne includes subsurface storage, surface storage, conveyance sewers, quality control structures and outlet controls. Lansdowne's stormwater management (SWM) discharges to the O'Connor Street combined sewer, and the Rideau Canal sewer functions as a relief sewer, but only once the underground storage system is full and major storm drainage flows enter the Great Lawn (i.e. for events greater than the 5-year event).

SWM runoff to the Rideau Canal is a pressing concern – it not only carries nutrients and sediment that can impact the aquatic ecosystem, but also salt that impacts the ability of the Canal to freeze and be used for skating. Ongoing NCC research in collaboration with Carleton University also identifies warm winter meltwater as exacerbating challenges of establishing and maintaining the Canal's frozen surface for winter skating. It is important that any development brings net improvements to the SWM approach and further avoids directing runoff to the Rideau Canal.

It appears that the proposed Major Event Centre will impact the existing Great Lawn, Berm, and associated SWM storage area. The proposed Major Event Centre is also located on top of the existing Rideau Canal SWM outlet pipe.

We request the City through future detailed design ensure no increase in runoff volume to the Rideau Canal, and evaluate opportunities to reduce or eliminate existing runoff.

Appendix A: Lessons Learned Report Response

In May 2023 the NCC was invited to submit comments on 'Lessons Learned' from experiences of transportation effects of Lansdowne 1.0 (2014-2020). The Lessons Learned document prepared by OSEG (June 2023) contains input from members of the community, the NCC, City Traffic Services, and the Glebe BIA. In preparing the Lessons Learned document, OSEG on behalf of the City, elected to only provide responses to the comments of the NCC. The below comments are further responses.

1. **NCC Comment (May 2023)**: The location of the principal parking garage access at the east end of the site adjacent to the QED forces an unfortunate choice between the impacts to the QED and the vehicular ingress across the quasi- pedestrianized core of Lansdowne.

   OSEG Response: *Based on parking garage data, as well as updated turning movement count data. The QED access functions as an important secondary access point to the site, as intended, and accommodates approximately 35% of vehicular access to Lansdowne. The Bank Street garage ramp functions as the primary access point during regular non-event days. It is noted that the QED access plays a vital role in balancing transportation demands and access arrangements, including during major events when vehicular access from Bank Street is restricted to safely accommodate pedestrian and transit passenger demands from the 450- series shuttle service.*

   NCC Response (July 2023): Vehicular ingress across the quasi-pedestrianized core of Lansdowne is an acknowledged challenge. Despite being designed as a 'shared street', post-development Princess Patricia Way internal to Lansdowne was restricted to pedestrians only, and vehicle traffic was routed through the site via Marché Way. The May 2022 '*Lansdowne Partnership Sustainability Plan and Implementation Report'* contains extensive discussion of the challenges of the design of Aberdeen Square and the internal streets of Lansdowne, and recommends investment to '*improve on-site safety for all users and reduce conflict between transportation modes*.' The location of the parking garage access at the east end of the site adjacent to the QED forces an unfortunate choice between the impacts to the QED and the vehicular ingress across the quasi- pedestrianized core of Lansdowne.

2. **NCC Comment (May 2023)**: Assumptions of unfettered access to the federal parkways from major transportation demand generators, such as was the case for Lansdowne 1.0, led to under-planning for other modes of travel and dissatisfaction when access is not available.

   a) NCC staff flagged this issue in 2011. Quote May 2011 NCC staff comments to the City regarding the then-draft *Transit Service and Shuttle Services and Off-Site Parking Plan Technical Report,* which discussed whether to focus shuttles on QED or Bank, and which heavily favored QED: *"[The report] must be written in neutral language without prejudice, and cannot be seen to be 'prejudging'*

> *outcomes in advance of the findings and conclusions of the pilot project. The outcomes cannot be predicted, and it is unfair to present opinions on one option as the sure success, and the other as a failure. As was mentioned, the City and OSEG have to make the Bank Street shuttle route work, as the QED will not be available for shuttles for all Lansdowne events.* ***So why not make the best effort, devise the best plan, put the best foot forward for the Bank Street option?****" [emphasis added].*

OSEG Response: *One of the key achievements of the TDM program since its implementation in 2014 is the gradual reduction of Park & Shuttle buses operating on QED during major events. As of 2022, the number of Park & Shuttle buses operating on QED has been reduced to an average of 30 - 60 inbound bus trips per major event. This is significantly lower than the original number of bus trips estimated in the 2011 TDM Plan, which is upwards of 100 buses per hour on QED (upwards of +200 bus trips for inbound service). Currently, the majority of Park & Shuttle customers are utilizing the 450-series shuttles with service provided on Bank Street.*

This achievement is consistent with the ideal long-term objective outlined in the ***City of Ottawa – NCC Letter of Intent for Special Event Shuttle Service Pilot Project****, which envisioned a reduction in the number of shuttle buses operating on QED over time.*

It is noted that under a future scenario where no shuttle services are operating on QED, the parkway continues to play a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events.

During major events, vehicular access to Lansdowne is temporarily restricted on Bank Street to safely accommodate the large number of transit passengers, pedestrians and cyclists accessing Lansdowne from Bank Street. During these temporary closures, vehicular access to the underground garage and TNC drop- offs (i.e. Uber and Lyft) is accommodated at the QED access. Under a full QED closure scenario during major events, the expected traffic impacts would be extremely severe and the viability of running events safely with minimal impact to the community would be severely compromised.

NCC Response (July 2023): The reduction in shuttles on QED is an accomplishment in line with the Letter of Intent for the Pilot Project. This does not diminish that the NCC has been consistent in the feedback (as quoted above) that 'the QED will not be available for shuttles for all Lansdowne events' and that development of the site cannot rely on the assumption of unfettered vehicular access.

The NCC provided feedback during the preparation of the TIA, requesting that it model certain scenarios to understand the transportation impacts of different forms of QED access amidst different levels of intensity of Lansdowne programming. No such modeling took place, leaving the analysis of the true impacts of the Lansdowne 2.0 proposal under-informed. The NCC similarly provided detailed comments on the TIA's analysis of MMLOS, transit capacity, and exemptions, among other elements, *but received no response.*

The NCC has not determined to close QED during major events but rather has continued to collaborate with the City and OSEG to ensure major events function well. However, we note our 2011 comment that "[The report] must be written in neutral language without prejudice" and that comments such as "the expected traffic impacts would be extremely severe" without the benefit of the requested analysis of such a scenario are premature.

b) **NCC Comment (May 2023):** The NCC reiterated that it ''*will continue (and retains full rights) to close the parkways at its own discretion for its own requirements and third party events''* in a June 2015 letter to OSEG and the City of Ottawa.

OSEG Response: *It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC. It is recognized that the NCC closes QED to vehicular traffic for the staging of Capital events, which historically averages between 15 to 20 days annually. These closures, which occur from time to time as we understand, are successfully coordinated in a collaborative fashion between the NCC, City of Ottawa and OSEG for events such as Winterlude and the Ottawa Race Weekend. OSEG has indicated, for example, that closures that occur in the morning of events, where QED is returned to full operations two hours before events, generally work well.*

NCC Response (July 2023): Major Events (i.e. Ottawa RedBlacks games at the stadium) only constitute 10 to 12 events per year. We continue to coordinate with the City and OSEG to facilitate their successful operation. To suggest that QED should be available to vehicles over the course of the year due to events that occur 10 to 12 times would drastically prioritize vehicular access for a limited number of peak demand events.

c) **NCC Comment (May 2023):** This mirrors our earlier comment that Lansdowne 2.0's studies cannot rely on the assumption that QED will be available upon demand.

OSEG Response: *It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC Irrespective of Lansdowne 2.0, QED is an integral part of the city's transportation network and plays a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events. As previously stated, our assumption is that the QED will, generally, remain as a viable secondary vehicular access point to Lansdowne. If the assumptions is not valid, then the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective.*

NCC Response (July 2023): As previously stated, the NCC provided feedback during the preparation of the TIA, requesting that it model certain scenarios to understand the transportation impacts of different forms of QED access amidst different levels of intensity of Lansdowne programming. No such modeling took place. The assumption of ongoing QED access was refuted by the NCC in 2011 and consistently since then. Such access is not a binary question of no restrictions or complete closures – there are forms of QED access for different modes, and levels of intensity of programming at Lansdowne. To state that ‘the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective’ is over-broad and lacks nuance or qualification.

3. **NCC Comment (May 2023):** Transportation Demand Management has not been consistently supported.

    a) As the Office of the Auditor General: Audit of the Management of the Lansdowne Contract report noted that while OSEG employed a TDM coordinator from 2014 to 2017, despite being required to do so by the site plan agreement “*effective January 1, 2017, OSEG no longer has a dedicated TDM Coordinator, thereby increasing the risk that the effectiveness of the TDM program may be negatively impacted.*”

    b) The 12 November 2020 Lansdowne Annual Report to Finance and Economic Development Committee noted that OSEG did not have a dedicated TDM Coordinator.

    c) The 2021-2022 Lansdowne Annual Report makes no mention of whether this gap has been filled.

    OSEG Response: *Administering the TDM program on-site remains a key component to the success of the TDM program at Lansdowne through the planning and delivery of the various event services and supplementary programming, and support for workplaces and residents at Lansdowne. Currently, the coordination of the TDM program at Lansdowne is administered through a full team that is comprised of individuals within OSEG. This includes the VP, Guest Relations and Operation, and the Director of Safety, Security and Guest Services, who oversee the TDM program and are responsible for the annual TDM reports, in addition to various OSEG staff within Guest Relations and Marketing.*

    NCC Response (July 2023): The 2011 Transportation Demand Management Plan identified the role of a dedicated, on-site TDM Coordinator as key to achieving target modal shares, particularly related to special events. While mode share targets have been met for many events, new TDM initiatives have lagged with the lack of a dedicated TDM coordinator whose responsibilities are not divided with other matters; car sharing is no longer provided, and recommendations related to carpool preferential parking spaces were not implemented. If Lansdowne is to intensify in its residential development and frequency of events, further efforts of TDM will be required.

4. **NCC Comment (May 2023):** In the first months and years following the opening of

Lansdowne's first revitalization, transit was heavily and proactively emphasized as the best way to reach Lansdowne, in marketing material and in direct communications to sports fans. It is our observation that there has been a decline in such promotion in recent years.

OSEG Response: *The inclusion of free transit for all ticketed events at Lansdowne continues to be provided on the TD Place website, as well as through e-mail communications with all event ticketholders. Information is also shared on social media periodically. By example, the inclusion of free transit and enhanced park and shuttle service information is shared on "Know Before You Go" videos that are broadcasted at the start of each season.*

5. **NCC Comment (May 2023):** Lack of clarity on the threshold for enhanced, free, and discounted transit service outside of major event days at the stadium has led to Lansdowne not achieving as high a transit modal share as would be the case if it were commonly known that attending any event at Lansdowne entitled an attendee to ride transit for free.

OSEG Response: *One of the hallmarks of the TDM program for events at Lansdowne is the inclusion of free transit for all ticketed events at Lansdowne with all costs for enhanced public transportation and shuttles paid for by OSEG. This is provided for all events, irrespective of the size of the event. Promotion of free transit service is shared on the TD Place website and shared on social media and promotional materials. The current messaging on the TD Place website for events and concerts states:*

a) The April 2022 "*Lansdowne Partnership Sustainability Plan and Implementation Report*" dismissed any consideration of free transit to Lansdowne, writing "Before an assessment of free transit can be undertaken, an identified funding mechanism is needed."

b) The report stated that" The concept of free transit, and its implications, was considered by Transportation Committee as a Motion ACS2021-OCC-TRC-0032 on December 1, 2021." The December 2021 response to the motion was regarding free transit being studied through the TMP, not regarding Lansdowne and its redevelopment.

c) The entire premise of Lansdowne 2.0 is funding a major civic project (the replacement of the north stands and the new Event Centre) through the sale of air rights, property tax uplift, and ticket surcharge revenues. The Lansdowne 2.0 analysis should identify the range of costs of providing discount or free transit and the funding mechanisms available to provide this (e.g. further sale of air rights, property tax uplift, and ticket surcharge revenues).

OSEG Response: *As stated earlier, ticketholders to all events at Lansdowne currently have access to free transit and shuttle service for events. The incremental costs of enhancing transit service and providing free transit is paid for by OSEG.*

NCC Response (July 2023): Ticketholders are not provided with free transit, they purchase their transit ride with their ticket cost. The 2012 Site Plan Agreement requires OSEG to include "the cost of enhanced transportation services such as transit, off-site parking and shuttle services and the cost to provide secure temporary on-site bicycle parking corrals **in the ticket price**" [emphasis added].

Despite the continued comment that ticketholders to all events have access to transit, the transit modal share target for Lansdowne 2.0 for minor events (less than 10,000 attendees) is only 10%. This modal share target is low and it appears additional efforts are required to increase transit ridership to minor events and reduce reliance on the private auto (target modal share is 75%).

The analysis of the TIA shows the existing TLOS along Bank at Lansdowne at F. Requiring ticketholders to purchase a transit fare with their ticket may assist with events, but everyday conditions outside of major event days demonstrate the need for improved transit at all times.

6. **NCC Comment (May 2023):** The event size increments for TDM measures is large, which may suggest that implementing more discrete TDM measures commensurate with the size of a wider variety of events should be analyzed

OSEG Response: *The TDM program in place at Lansdowne has been a successful in meetings its goals. Much experience has been gained by City of Ottawa Traffic Services, OC Transpo, and OSEG on a complex program that changes due to factors such as day of the week, time of day, and time of year.*

The management of these factors within the revised attendance levels: less than 5,000, 5,000 to 15,000, 15,000 to 25,000, 25,000 to 40,000, and over 40,000 have proven to be effective. Also, as stated previously, the size of average events at TD Place has proven smaller than initially anticipated. OSEG expects 78% of events held this year to be below 5,000.

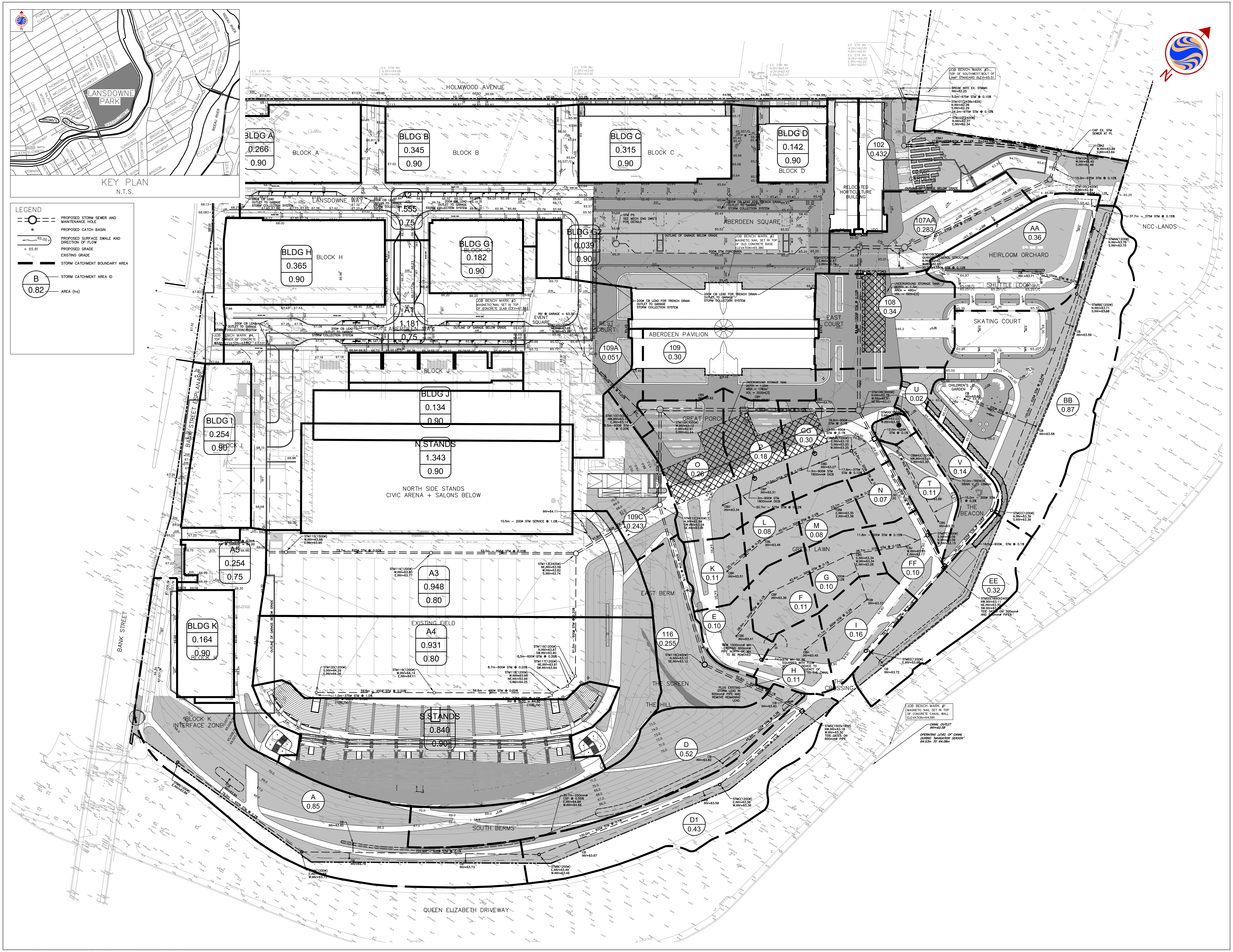
NCC Response (July 2023): It is good to see the TDM Report identify updated thresholds of minor and major events, and the growth of public and non-ticketed events that may occur concurrently with other events.

APPENDIX

B

Existing Conditions

B-1 Stantec 2012 Existing Drainage Plan



CLIENT PARTNERSHIP

Ottawa

OSEG

CONSULTANT TEAM

CANNONDESIGN

CORUSH SUNDERLAND WRIGHT

DSEL david schaeffer engineering ltd

GreenbergFarrow

Stantec

PHILLIPS FAREVAAG SMALLENBERG

REVISIONS

No.	Date	Details	By
1	2011-11-21	ISSUED TO CITY FOR REVIEW	JVG
2	2011-12-12	REVISED AS PER CITY COMMENTS	JVG
3	2012-01-11	REVISED AS PER COORDINATION WITH DSEL.	JVG
4	2012-01-26	REVISED AS PER CITY COMMENTS	JVG

1:600 0 6 18 30m

PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

CATCHMENT AREA PLAN

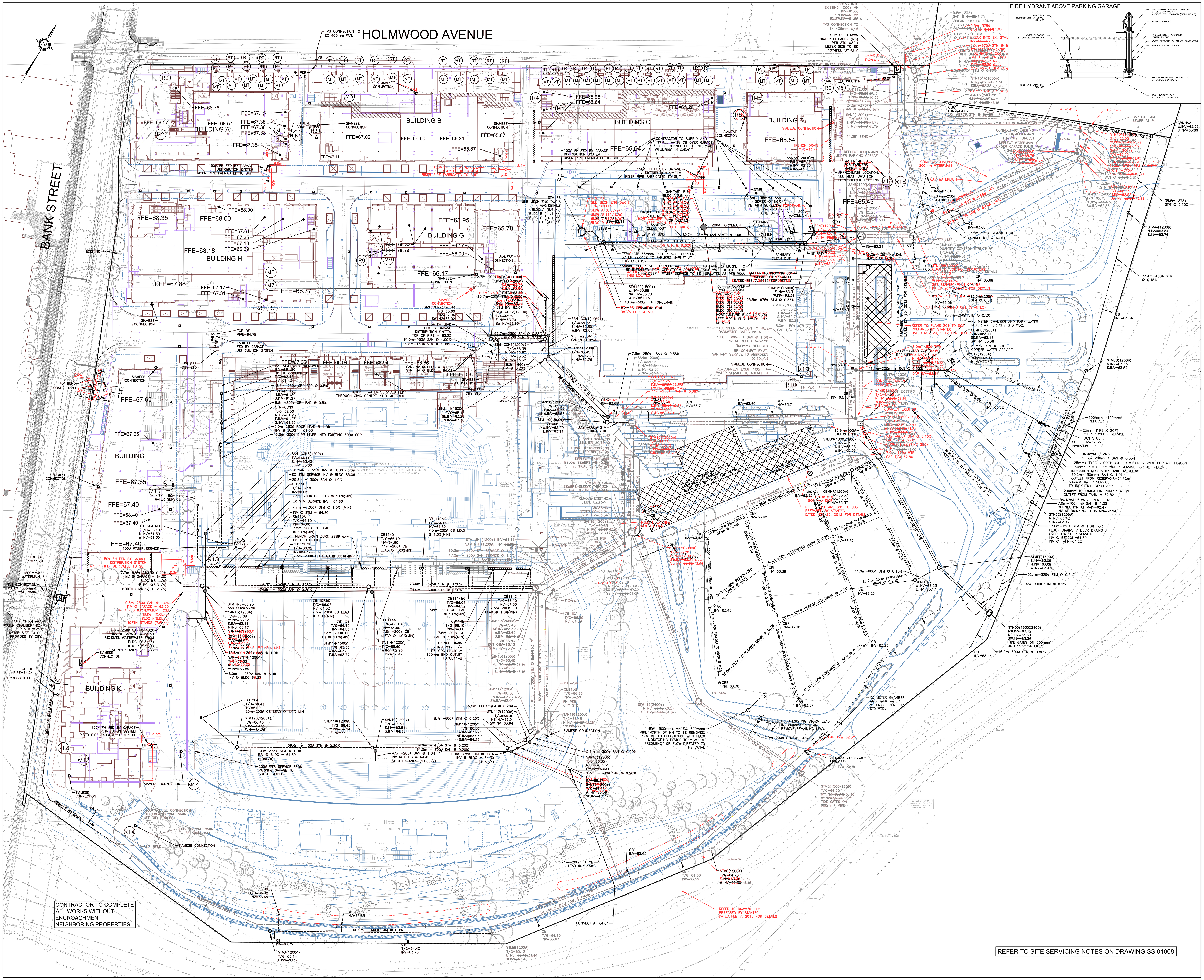
DATE

SCALE
1:600

REVISION #
4

DRAWING No.
C03

B-2 As Built Drawings



z:\projects\09-378 lansdowne park\design\c detailed design\c.2 drawings\c.2.1 cad drawings\spa_base\spa_378-2015-02-03_servicing-overlay.dwg

REDEVELOPMENT OF LANSDOWNE PARK

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK | LA TRANSFORMATION DU PARC LANSDOWNE

Ottawa

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Ottawa Sports and Entertainment Group

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www.stantec.com

Drawings are not to be scaled.

Contractor must verify all dimensions on the job and report any discrepancy to architects before proceeding with the work

All drawings and specifications are the property of the architect and must be returned at the completion of the work

This drawing is not to be used for construction until countersigned.

Signature: Date:

Seals:

GENERAL NOTES

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISION OF THE STANDARDS AND SPECIFICATIONS FOR THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTORS EXPENSE.
4. ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
5. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE DEVELOPER.
6. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 'OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.' THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE 'CONSTRUCTOR' AS DEFINED IN THE ACT.
7. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE MINISTRY OF TRANSPORTATION OF ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PER LATEST AMENDMENT.
8. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES TO PREVENT CONFLICTS.
9. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
10. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
11. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
12. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE REFER TO THE SITE SERVICING AND STORMWATER MANAGEMENT REPORT.
13. ALL SEWERS CONSTRUCTED WITH GRADES LESS THAN 1.0% SHALL BE INSTALLED USING LASER ALIGNMENT AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
14. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF THE SAME.
15. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING, OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
16. ALL PIPE / CULVERT SECTION SIZES REFER TO INSIDE DIMENSIONS.
17. SHOULD DEEPLY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY.
18. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING / REMOVAL.
19. DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL SITE PLAN.
20. THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER ONE SET OF AS CONSTRUCTED SITE SERVICING AND GRADING DRAWINGS.
21. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY FAIRHALL, MOFFATT & WOODLEAND LTD.
PROJ. NO. P19500
DATED 2011-09-27

SITE PLAN INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY CORUSH, SUNDERLAND , AND WRIGHT
PROJ. NO. 1766
DATED 2013-06-14

BENCH MARK

MAGNETIC NAIL SET IN TOP OF CONCRETE WALL OF CANAL LOCATED AT SOUTH EAST SITE ACCESS
ELEV=64.581

No.	Description	Date
21	Issued to City	Jan 27/15
20	Issued to City	Sept 04/14
19	Revised Bldg G1 Siamese connection	June 17/14
18	Revised Siamese connections	May 8/14
17	Revised FH Bank Street	Feb 2/14
16	Revised per municipal comments	Dec 10/13
15	Added Meter and Remote Meter locations	Dec 4/13
14	Revised water meter at Bank street, updated per CCN-SS-9r3, CCN-SS-10, CD-SS-3, CD-SS-4	Nov 26/13

SUBJECT PROPERTY

KEY PLAN

Drawing Title:

LANSDOWNE PARK

SITE SERVICING PLAN

Scale.: 1:500 Date Created: MM/DD/YR

Project No.: 09-378 Checked by: CHK

SS 01003

B-3 Stantec 2012 Existing Storm Sewer Design Sheet

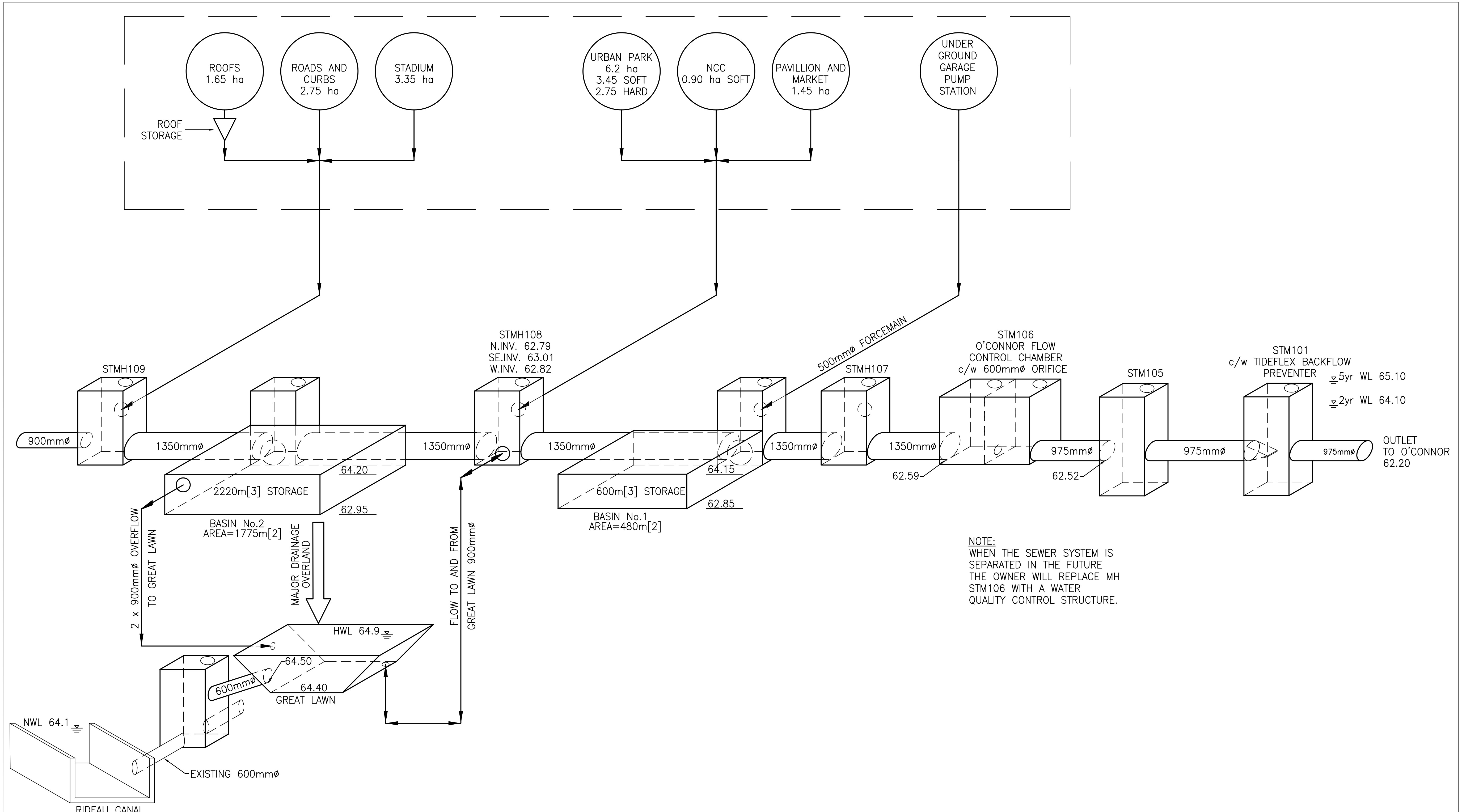
Storm Sewer Calculation Sheet
Lansdowne Park Re-Development

														Sewer Data								
Up	**Down**	**BLDG ID**	**Q_{BLDG}**	**$Q_{BLDG\ TOT}$**	**AREA ID**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**Q_{TOT}**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(L/s)	**(L/s)**		**(ha)**	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
120	119	S. Stands	106.0	106.0				0.00	0.00	***20.0***	70.3	0.0	106.0	450	0.20	59.6	0.159	0.113	0.80	127.5	1.2	0.83
119	118			106.0				0.00	0.00	21.2	67.6	0.0	106.0	450	0.20	59.6	0.159	0.113	0.80	127.5	1.2	0.83
118	117	S. Stands	106.0	212.0				0.00	0.00	22.5	65.2	0.0	212.0	600	0.20	8.7	0.283	0.150	0.97	274.6	0.1	0.77
117	116			212.0				0.00	0.00	22.6	65.0	0.0	212.0	600	0.20	3.8	0.283	0.150	0.97	274.6	0.1	0.77
116	113			212.0				0.00	0.00	22.7	64.8	0.0	212.0	600	0.20	62.4	0.283	0.150	0.97	274.6	1.1	0.77
										23.8												
115	114	I, K, N.STANDS	232.6	232.6	A3, A4, A5	2.133	0.80	1.71	1.71	***20.0***	70.3	333.0	565.6	825	0.20	73.7	0.535	0.206	1.20	641.9	1.0	0.88
114	113			232.6				0.00	1.71	21.0	68.1	322.7	555.4	825	0.20	73.0	0.535	0.206	1.20	641.9	1.0	0.87
										22.0												
113	112			444.6				0.00	1.71	23.8	62.9	298.4	743.0	1050	0.10	47.8	0.866	0.263	1.00	863.5	0.8	0.86
										24.6												
A	B			0.0		0.870	0.35	0.30	0.30	***15.0***	83.6	70.7	70.7	600	0.10	100.0	0.283	0.150	0.69	194.2	2.4	0.36
B	C			0.0		0.430	0.35	0.15	0.46	17.4	76.5	96.6	96.6	600	0.10	100.0	0.283	0.150	0.69	194.2	2.4	0.50
C	D			0.0				0.00	0.46	19.9	70.6	89.2	89.2	600	0.10	57.0	0.283	0.150	0.69	194.2	1.4	0.46
D	D1			0.0		0.520	0.35	0.18	0.64	21.2	67.6	119.7	119.7	900	0.10	55.8	0.636	0.225	0.90	572.5	1.0	0.21
D1	112			0.0		0.340	0.35	0.12	0.76	22.3	65.6	137.8	137.8	900	0.10	85.0	0.636	0.225	0.90	572.5	1.6	0.24
										23.8												
112	109			444.6				0.00	2.46	24.6	61.6	421.4	866.0	1200	0.10	46.8	1.131	0.300	1.09	1232.9	0.7	0.70
										25.3												
111	110	H, G1, G2, J	23.1	23.1	A1	1.181	0.75	0.89	0.89	***20.0***	70.3	172.8	196.0	600	0.20	39.6	0.283	0.150	0.97	274.6	0.7	0.71
110	109			23.1				0.00	0.89	20.7	68.8	169.3	192.4	600	0.20	8.5	0.283	0.150	0.97	274.6	0.1	0.70
										20.8												
109	108			467.8				0.00	3.35	25.3	60.5	562.3	1030.0	1350	0.10	99.8	1.431	0.338	1.18	1687.8	1.4	0.61
										26.7												
CB1A	AA			0.0		0.430	0.60	0.26	0.26	***15.0***	83.6	59.9	59.9	375	0.15	114.0	0.110	0.094	0.61	67.9	3.1	0.88
AA	BB			0.0		0.360	0.35	0.13	0.38	18.1	74.7	79.7	79.7	450	0.12	35.0	0.159	0.113	0.62	98.8	0.9	0.81
BB	CC			0.0		0.870	0.35	0.30	0.69	19.0	72.5	138.6	138.6	525	0.24	120.0	0.216	0.131	0.97	210.7	2.1	0.66
CC	DD			0.0				0.00	0.69	21.1	68.0	130.0	130.0	525	0.24	38.0	0.216	0.131	0.97	210.7	0.7	0.62
										21.7												
EE	DD			0.0		0.320	0.35	0.11	0.11	***15.0***	83.6	26.0	26.0	300	0.40	59.0	0.071	0.075	0.87	61.2	1.1	0.43
										16.1												
DD	FF			0.0				0.00	0.80	***21.7***	66.7	148.2	148.2	900	0.10	31.0	0.636	0.225	0.90	572.5	0.6	0.26
										22.3												
H	G			0.0		0.270	0.35	0.09	0.09	***15.0***	83.6	21.9	21.9	300	0.20	66.0	0.071	0.075	0.61	43.2	1.8	0.51
G	J			0.0		0.310	0.35	0.11	0.20	16.8	78.2	44.1	44.1	375	0.15	30.0	0.110	0.094	0.61	67.9	0.8	0.65
J	FF			0.0		0.100	0.35	0.04	0.24	17.6	76.0	50.2	50.2	600	0.15	12.0	0.283	0.150	0.84	237.8	0.2	0.21
										17.8												
FF	GG			0.0				0.00	1.04	***22.3***	65.6	189.1	189.1	900	0.10	57.0	0.636	0.225	0.90	572.5	1.1	0.33
										23.4												
K	M			0.0		0.270	0.35	0.09	0.09	***15.0***	83.6	21.9	21.9	300	0.20	65.0	0.071	0.075	0.61	43.2	1.8	0.51
M	R			0.0		0.070	0.35	0.02	0.12	16.8	78.2	25.9	25.9	300	0.20	47.0	0.071	0.075	0.61	43.2	1.3	0.60
										18.1												

Storm Sewer Calculation Sheet
Lansdowne Park Re-Development

Up	Down	BLDG ID	Q_{BLDG} (L/s)	$Q_{BLDG\ TOT}$ (L/s)	AREA ID	Area (ha)	C (-)	Indiv AxC	Acc AxC	T_C (min)	I (mm/hr)	Q (L/s)	Q_{TOT} (L/s)	Sewer Data DIA (mm)	Slope (%)	Length (m)	$A_{hydraulic}$ (m^2)	R (m)	Velocity (m/s)	Qcap (L/s)	Time Flow (min)	Q / Q full (-)
O	P			0.0		0.280	0.60	0.17	0.17	***15.0***	83.6	39.0	39.0	375	0.12	21.0	0.110	0.094	0.55	60.7	0.6	0.64
P	Q			0.0		0.180	0.60	0.11	0.28	15.6	81.6	62.5	62.5	375	0.10	34.0	0.110	0.094	0.50	55.4	1.1	1.13
Q	R			0.0		0.300	0.60	0.18	0.46	16.8	78.3	99.1	99.1	375	0.12	18.0	0.110	0.094	0.55	60.7	0.5	1.63
R	GG			0.0				0.00	0.58	17.3	76.8	122.6	122.6	600	0.10	13.0	0.283	0.150	0.69	194.2	0.3	0.63
										17.6												
S	U			0.0		0.130	0.60	0.08	0.08	***15.0***	83.6	18.1	18.1	450	0.20	30.0	0.159	0.113	0.80	127.5	0.6	0.14
U	GG			0.0		0.140	0.60	0.08	0.16	15.6	81.6	36.7	36.7	525	0.10	17.0	0.216	0.131	0.63	136.0	0.5	0.27
										16.1												
GG	108			0.0				0.00	1.78	***17.6***	75.9	374.5	374.5	900	0.10	22.0	0.636	0.225	0.90	572.5	0.4	0.65
										18.0												
108	107			0.0		0.340	0.60	0.20	5.33	***26.7***	58.3	863.2	863.2	1350	0.10	81.4	1.431	0.338	1.18	1687.8	1.2	0.51
107	106	A, B, C, D	34.4	502.2	A2	1.555	0.75	1.17	6.49	27.8	56.7	1023.0	1525.1	1350	0.10	20.7	1.431	0.338	1.18	1687.8	0.3	0.90
										28.1												
CONTROLLED FLOW																						
106	105		616.0	616.0				0.00	0.00	27.8	56.7	0.0	616.0	975	0.10	80.2	0.747	0.244	0.95	708.7	1.4	0.87
105	104			616.0				0.00	0.00	29.2	54.9	0.0	616.0	975	0.10	12.1	0.747	0.244	0.95	708.7	0.2	0.87
104	103			616.0				0.00	0.00	29.5	54.6	0.0	616.0	975	0.10	19.2	0.747	0.244	0.95	708.7	0.3	0.87
103	102			616.0				0.00	0.00	29.8	54.2	0.0	616.0	975	0.10	54.2	0.747	0.244	0.95	708.7	1.0	0.87
102	101			616.0				0.00	0.00	30.7	53.0	0.0	616.0	975	0.10	24.2	0.747	0.244	0.95	708.7	0.4	0.87
101	EX			616.0				0.00	0.00	31.2	52.5	0.0	616.0	975	0.10	5.8	0.747	0.244	0.95	708.7	0.1	0.87
										31.3												

B-4 Stantec 2012 Storm Drainage Schematic



NOTE:
WHEN THE SEWER SYSTEM IS SEPARATED IN THE FUTURE THE OWNER WILL REPLACE MH STM106 WITH A WATER QUALITY CONTROL STRUCTURE.

V:\01-634\active\1604_00832_Lansdowne Park Competition\design\drawing\160400832 Storm Drainage Schematic.dwg
2012/02/06 2:59 PM By: Sharp, Mike

ORIGINAL SHEET – ISO A3

September, 2011
160400832

Stantec
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. (613) 722-4420
Fax. (613) 722-2799
www.stantec.com

Legend

Notes

Client/Project
City of Ottawa
LANSDOWNE PARK COMPETITION

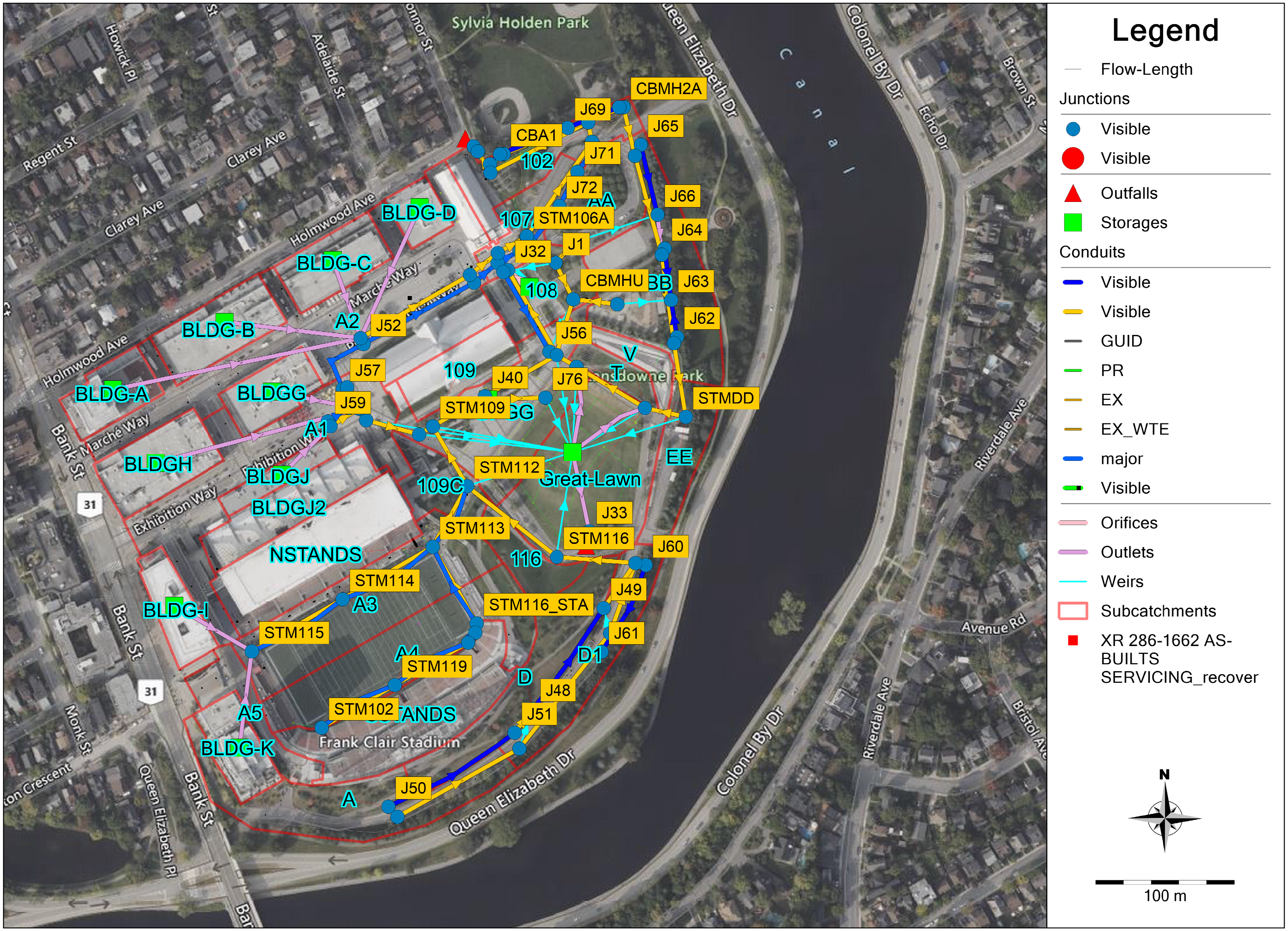
Figure No.
1.0

Title
PLATE 1
STORM DRAINAGE SCHEMATIC

B-5 PCSWMM Output

PCSWMM Catchment Parameters – Existing Conditions

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)
102	0.444	44.4	100.14	0.5	64.2
107AA	0.270	176.7	15.28	0.5	86.3
108	0.344	162.7	21.16	0.5	68.5
109	0.288	88.9	32.42	0.5	87.5
109C	0.254	52.3	48.58	0.5	66.5
116	0.212	66.8	31.67	10	13.9
A	0.733	37.9	193.25	0.5	43.3
A1	1.028	236.0	43.57	0.5	98.5
A2	1.578	358.2	44.06	0.5	97.9
A3	0.931	263.1	35.38	0.5	90.3
A4	0.832	227.3	36.59	2	84.6
A5	0.246	30.9	79.59	0.5	99.9
AA	0.370	72.8	50.84	0.5	54.4
BB	0.891	50.5	176.24	0.5	41.1
BLDG-A	0.254	254.2	10.00	0.5	100.0
BLDG-B	0.363	362.6	10.00	0.5	100.0
BLDG-C	0.299	299.3	10.00	0.5	100.0
BLDG-D	0.138	138.0	10.00	0.5	100.0
BLDGG	0.243	242.9	10.00	0.5	100.0
BLDGH	0.371	370.9	10.00	0.5	100.0
BLDG-I	0.226	225.6	10.00	0.5	100.0
BLDGJ	0.137	137.1	10.00	0.5	100.0
BLDGJ2	0.389	388.5	10.00	0.5	100.0
BLDG-K	0.247	247.3	10.00	0.5	100.0
D	0.584	56.5	103.36	0.5	30.0
D1	0.479	271.3	17.65	0.5	32.5
EE	0.347	38.6	89.83	0.5	15.3
Great-Lawn	1.013	164.4	61.62	0.5	26.5
NSTANDS	0.756	97.2	77.76	2	100.0
OPGG	0.813	147.5	55.14	0.5	59.6
SSTANDS	0.799	165.3	48.34	10	100.0
T	0.131	75.9	17.24	0.5	27.8
V	0.158	167.8	9.40	0.5	96.6


Legend
Flow-Length
Junctions
Visible
Visible
Outfalls
Storages
Conduits
Visible
Visible
GUID
PR
EX
EX_WTE
major
Visible
Orifices
Outlets
Weirs
Subcatchments
XR 286-1662 AS-BUILTS SERVICING_recover
N
100 m
Sylvia Holden Park
Frank Clair Stadium
Canal
Queen Elizabeth Dr
Colonel By Dr
Bank St
Holmwood Ave
Clarey Ave
Regent St
Marché Way
Exhibition Way
Echo Dr
Riverdale Ave
Avenue Rd
Brown St
Bristol Ave
Monk St
Adelaide St
Howick Pl
CBMH2A
J69
J65
CBA1
102
J71
J66
J72
AA
107
STM106A
J64
J32
J1
CBMHU
BB
J63
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J62
J56
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BLDG-C
A2
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BLDG-B
J57
109
J40
J76
V
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BLDGG
J59
STM109
GG
A1
BLDGH
BLDGJ
EE
STM112
Great-Lawn
109C
BLDGJ2
J33
STM113
STM116
J60
NSTANDS
116
STM114
J49
A3
STM116_STA
BLDG-I
STM115
J61
A4
STM119
D1
D
J48
A5
STM102
ANDS
J51
BLDG-K
J50
A
31

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

WARNING 03: negative offset ignored for Link C11
WARNING 03: negative offset ignored for Link C18_1
WARNING 03: negative offset ignored for Link C18_2
WARNING 03: negative offset ignored for Link C27_2
WARNING 03: negative offset ignored for Link C42
WARNING 03: negative offset ignored for Link C43
WARNING 03: negative offset ignored for Link C44
WARNING 04: minimum elevation drop used for Conduit C46
WARNING 04: minimum elevation drop used for Conduit C64
WARNING 03: negative offset ignored for Link C27_1
WARNING 03: negative offset ignored for Link OR1
WARNING 03: negative offset ignored for Link OR2
WARNING 10: crest elevation raised to downstream invert for regulator Link W41
WARNING 10: crest elevation raised to downstream invert for regulator Link W42
WARNING 10: crest elevation raised to downstream invert for regulator Link W43
WARNING 02: maximum depth increased for Node CBA1
WARNING 02: maximum depth increased for Node CBMH2A
WARNING 02: maximum depth increased for Node CBMHU
WARNING 02: maximum depth increased for Node J1
WARNING 02: maximum depth increased for Node J19
WARNING 02: maximum depth increased for Node J32
WARNING 02: maximum depth increased for Node J37
WARNING 02: maximum depth increased for Node J76
WARNING 02: maximum depth increased for Node STM102
WARNING 02: maximum depth increased for Node STM102A
WARNING 02: maximum depth increased for Node STM105
WARNING 02: maximum depth increased for Node STM106A
WARNING 02: maximum depth increased for Node STM106B
WARNING 02: maximum depth increased for Node STM107
WARNING 02: maximum depth increased for Node STM108
WARNING 02: maximum depth increased for Node STM109
WARNING 02: maximum depth increased for Node STM110
WARNING 02: maximum depth increased for Node STM111
WARNING 02: maximum depth increased for Node STM111A
WARNING 02: maximum depth increased for Node STM112
WARNING 02: maximum depth increased for Node STM113
WARNING 02: maximum depth increased for Node STM114
WARNING 02: maximum depth increased for Node STM115
WARNING 02: maximum depth increased for Node STM116
WARNING 02: maximum depth increased for Node STM116_STA
WARNING 02: maximum depth increased for Node STM117
WARNING 02: maximum depth increased for Node STM118
WARNING 02: maximum depth increased for Node STM119
WARNING 02: maximum depth increased for Node STM121
WARNING 02: maximum depth increased for Node STM122
WARNING 02: maximum depth increased for Node STMA
WARNING 02: maximum depth increased for Node STMAA
WARNING 02: maximum depth increased for Node STMB
WARNING 02: maximum depth increased for Node STMBB
WARNING 02: maximum depth increased for Node STMC
WARNING 02: maximum depth increased for Node STMCC
WARNING 02: maximum depth increased for Node STM-CCN1
WARNING 02: maximum depth increased for Node STM-CCN2
WARNING 02: maximum depth increased for Node STMD
WARNING 02: maximum depth increased for Node STMDD
WARNING 02: maximum depth increased for Node STMFF
WARNING 02: maximum depth increased for Node STMGG
```

****
Element Count
****

```
Number of rain gages ...... 18
Number of subcatchments ... 33
Number of nodes ........... 89
Number of links ........... 134
Number of pollutants ...... 0
Number of land uses ....... 0
```

****
Raingage Summary
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Name	Data Source	Data Type	Recording Interval
100yr_3hr_Chicago	100yr_3hr_Chicago	INTENSITY	10 min.
100yr_3hr_Chicago_Climate_Change	100yr_3hr_Chicago_Increase_20percent	INTENSITY	10 min.
100yr_6hr_Chicago	100yr_6hr_Chicago	INTENSITY	10 min.
100yr_6hr_Chicago_Climate_Change	100yr_6hr_Chicago_Increase_20percent	INTENSITY	10 min.
100yr-SCS_12hr_Type_II	100yr-SCS_12hr_Type_II	INTENSITY	6 min.
100yr-SCS_24hr_Type_II	100yr-SCS_24hr_Type_II	INTENSITY	15 min.
10yr_3hr_Chicago	10yr_3hr_Chicago	INTENSITY	10 min.
10yr_6hr_Chicago	10yr_6hr_Chicago	INTENSITY	10 min.
25mm_3hr_Chicago	25mm_3hr_Chicago	INTENSITY	10 min.
25mm_4hr_Chicago	25mm_4hr_Chicago	INTENSITY	10 min.
25yr_3hr_Chicago	25yr_3hr_Chicago	INTENSITY	10 min.
25yr_6hr_Chicago	25yr_6hr_Chicago	INTENSITY	10 min.
2yr_3hr_Chicago	2yr_3hr_Chicago	INTENSITY	10 min.
2yr_6hr_Chicago	2yr_6hr_Chicago	INTENSITY	10 min.
50yr_3hr_Chicago	50yr_3hr_Chicago	INTENSITY	10 min.
50yr_6hr_Chicago	50yr_6hr_Chicago	INTENSITY	10 min.
5yr_3hr_Chicago	5yr_3hr_Chicago	INTENSITY	10 min.
5yr_6hr_Chicago	5yr_6hr_Chicago	INTENSITY	10 min.

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Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
102	0.44	44.37	64.22	0.5000	100yr_3hr_Chicago	CBMH2A
107AA	0.27	176.73	86.34	0.5000	100yr_3hr_Chicago	STM106A
108	0.34	162.73	68.53	0.5000	100yr_3hr_Chicago	BASIN1
109	0.29	88.92	87.48	0.5000	100yr_3hr_Chicago	
109C	0.25	52.31	66.54	0.5000	100yr_3hr_Chicago	STM112
116	0.21	66.78	13.91	10.0000	100yr_3hr_Chicago	STM116
A	0.73	37.91	43.28	0.5000	100yr_3hr_Chicago	J50
A1	1.03	236.01	98.55	0.5000	100yr_3hr_Chicago	J58
A2	1.58	358.18	97.91	0.5000	100yr_3hr_Chicago	J52
A3	0.93	263.12	90.26	0.5000	100yr_3hr_Chicago	STM114
A4	0.83	227.29	84.59	2.0000	100yr_3hr_Chicago	STM119
A5	0.25	30.92	99.94	0.5000	100yr_3hr_Chicago	STM115
AA	0.37	72.80	54.39	0.5000	100yr_3hr_Chicago	J37
BB	0.89	50.53	41.05	0.5000	100yr_3hr_Chicago	J63
BLDG-A	0.25	254.20	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-A
BLDG-B	0.36	362.60	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-B
BLDG-C	0.30	299.30	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-C
BLDG-D	0.14	138.00	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-D
BLDGG	0.24	242.90	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-G
BLDGH	0.37	370.90	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-H
BLDG-I	0.23	225.60	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-I
BLDGJ	0.14	137.10	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-J
BLDGJ2	0.39	388.50	100.00	0.5000	100yr_3hr_Chicago	STM-CCN2
BLDG-K	0.25	247.30	99.99	0.5000	100yr_3hr_Chicago	S-BLDG-K
D	0.58	56.48	30.02	0.5000	100yr_3hr_Chicago	J48
D1	0.48	271.32	32.46	0.5000	100yr_3hr_Chicago	J61
EE	0.35	38.57	15.30	0.5000	100yr_3hr_Chicago	STMDD
Great-Lawn	1.01	164.38	26.54	0.5000	100yr_3hr_Chicago	STMFF
NSTANDS	0.76	97.25	100.00	2.0000	100yr_3hr_Chicago	STM113
OPGG	0.81	147.51	59.59	0.5000	100yr_3hr_Chicago	STMGG
SSTANDS	0.80	165.31	99.95	10.0000	100yr_3hr_Chicago	STM119
T	0.13	75.86	27.76	0.5000	100yr_3hr_Chicago	STMGG
V	0.16	167.82	96.59	0.5000	100yr_3hr_Chicago	STMFF

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CBA1	JUNCTION	64.07	1.93	0.0	
CBMH2A	JUNCTION	63.89	2.31	0.0	
CBMHU	JUNCTION	63.36	2.64	0.0	
J1	JUNCTION	63.56	2.79	0.0	
J19	JUNCTION	63.62	2.08	720.0	
J32	JUNCTION	62.76	3.44	0.0	
J33	JUNCTION	63.09	3.00	0.0	
J37	JUNCTION	63.68	2.42	466.0	
J40	JUNCTION	62.91	2.21	0.0	
J48	JUNCTION	64.69	3.00	0.0	
J49	JUNCTION	64.40	3.00	0.0	
J50	JUNCTION	65.08	3.00	0.0	
J51	JUNCTION	65.35	3.00	0.0	
J52	JUNCTION	65.31	3.00	0.0	
J53	JUNCTION	65.25	3.00	0.0	
J54	JUNCTION	65.25	3.00	0.0	
J55	JUNCTION	65.20	3.00	0.0	
J56	JUNCTION	64.95	3.00	0.0	
J57	JUNCTION	65.30	3.00	0.0	
J58	JUNCTION	65.35	3.00	0.0	
J59	JUNCTION	65.58	3.00	0.0	
J60	JUNCTION	64.65	3.00	0.0	
J61	JUNCTION	64.30	3.00	0.0	
J62	JUNCTION	64.70	3.00	0.0	
J63	JUNCTION	64.50	3.00	0.0	
J64	JUNCTION	64.65	3.00	0.0	
J65	JUNCTION	65.10	3.00	0.0	
J66	JUNCTION	64.50	3.00	0.0	
J67	JUNCTION	65.17	3.00	0.0	
J68	JUNCTION	65.00	3.00	0.0	
J69	JUNCTION	65.43	3.00	0.0	
J70	JUNCTION	65.20	3.00	0.0	
J71	JUNCTION	65.70	3.00	0.0	
J72	JUNCTION	65.30	3.00	0.0	
J73	JUNCTION	64.93	3.00	0.0	
J74	JUNCTION	65.01	3.00	0.0	
J75	JUNCTION	65.89	3.00	0.0	
J76	JUNCTION	62.95	2.45	0.0	
STM101	JUNCTION	62.25	2.88	0.0	
STM101A	JUNCTION	62.29	2.84	0.0	
STM102	JUNCTION	64.26	3.14	0.0	
STM102A	JUNCTION	62.35	3.65	0.0	
STM104	JUNCTION	62.49	2.88	0.0	
STM105	JUNCTION	62.53	4.36	0.0	
STM106A	JUNCTION	62.64	3.29	1000.0	
STM106B	JUNCTION	62.64	3.29	1000.0	
STM107	JUNCTION	62.72	3.53	0.0	
STM108	JUNCTION	62.00	3.95	0.0	
STM109	JUNCTION	62.91	3.32	0.0	
STM110	JUNCTION	63.14	3.10	0.0	
STM111	JUNCTION	63.28	3.17	0.0	

STM111A	JUNCTION	63.76	2.54	0.0
STM112	JUNCTION	62.99	3.13	0.0
STM113	JUNCTION	63.59	3.83	0.0
STM114	JUNCTION	63.77	2.78	0.0
STM115	JUNCTION	63.95	3.10	0.0
STM116	JUNCTION	63.14	2.73	0.0
STM116_STA	JUNCTION	63.87	3.64	0.0
STM117	JUNCTION	63.91	3.51	0.0
STM118	JUNCTION	63.96	3.51	0.0
STM119	JUNCTION	64.11	3.00	0.0
STM121	JUNCTION	63.31	2.94	0.0
STM122	JUNCTION	63.68	2.63	0.0
STMA	JUNCTION	63.56	2.58	0.0
STMAA	JUNCTION	63.76	2.64	0.0
STMB	JUNCTION	63.44	2.58	0.0
STMBB	JUNCTION	63.57	2.83	0.0
STMC	JUNCTION	63.35	2.21	0.0
STMCC	JUNCTION	63.42	2.78	0.0
STM-CCN1	JUNCTION	63.32	3.03	0.0
STM-CCN2	JUNCTION	63.79	2.79	0.0
STMD	JUNCTION	63.18	2.72	0.0
STMDD	JUNCTION	63.12	2.93	0.0
STMFF	JUNCTION	63.09	2.82	0.0
STMGG	JUNCTION	63.03	2.85	0.0
Canal_Outlet	OUTFALL	62.58	1.02	0.0
J28	OUTFALL	62.22	0.97	0.0
BASIN1	STORAGE	62.81	2.23	0.0
BASIN2	STORAGE	62.95	2.19	0.0
Great-Lawn-Storage	STORAGE	64.40	0.50	0.0
S-BLDG-A	STORAGE	100.00	0.15	0.0
S-BLDG-B	STORAGE	100.00	0.15	0.0
S-BLDG-C	STORAGE	100.00	0.15	0.0
S-BLDG-D	STORAGE	100.00	0.15	0.0
S-BLDG-G	STORAGE	100.00	0.15	0.0
S-BLDG-H	STORAGE	100.00	0.15	0.0
S-BLDG-I	STORAGE	100.00	0.15	0.0
S-BLDG-J	STORAGE	100.00	0.15	0.0
S-BLDG-K	STORAGE	100.00	0.15	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	% Slope	Roughness
C1	STM115	STM114	CONDUIT	75.0	0.2001	0.0130
C10	STMC	STMD	CONDUIT	53.4	0.0937	0.0130
C11	STMD	STM116	CONDUIT	56.4	0.0709	0.0130
C12	STM116	STM112	CONDUIT	81.9	0.1588	0.0130
C13	STM-CCN2	STM-CCN1	CONDUIT	24.3	0.4946	0.0130
C14	STM111A	STM-CCN1	CONDUIT	17.9	0.50	
C15	STM-CCN1	STM111	CONDUIT	9.4	0.2126	0.0130
C16	STM111	STM110	CONDUIT	39.5	0.2785	0.0130
C17	STM110	STM109	CONDUIT	11.3	0.1770	0.0130
C18	STMDD	STMFF	CONDUIT	30.2	0.0992	0.0130
C18_1	STM109	J40	CONDUIT	43.3	0.1271	0.0130
C18_2	J40	STM108	CONDUIT	59.3	0.1265	0.0130
C19	STMFF	STMGG	CONDUIT	57.0	0.0526	0.0130
C2	STM102	STM119	CONDUIT	60.8	0.1975	0.0130
C20	STMGG	STM108	CONDUIT	16.7	6.1921	0.0130
C21	STMCC	STMDD	CONDUIT	53.4	0.2247	0.0130
C21_1	STM108	J32	CONDUIT	70.1	0.0599	0.0130
C21_2	J32	STM107	CONDUIT	14.2	0.0565	0.0130
C22	J19	CBMHU	CONDUIT	31.8	0.5029	0.0130
C23	CBMHU	STM108	CONDUIT	41.5	0.5054	0.0130
C24	STM122	STM121	CONDUIT	90.6	0.3752	0.0130
C25	STM121	STM107	CONDUIT	25.4	0.3937	0.0130
C26	STM107	STM106A	CONDUIT	23.5	0.1703	0.0130
C27	STMBB	STMCC	CONDUIT	63.9	0.2347	0.0130
C27_2	STM106B	STM105	CONDUIT	82.3	0.1093	0.0130
C28	STM105	STM104	CONDUIT	14.1	0.0711	0.0130
C29	STM104	STM102A	CONDUIT	78.9	0.1394	0.0130
C3	STM119	STM118	CONDUIT	60.7	0.1976	0.0130
C30	STM102A	STM101A	CONDUIT	17.8	0.1125	0.0130
C31	STM101A	STM101	CONDUIT	4.6	0.4383	0.0130
C32	STM101	J28	CONDUIT	8.1	0.3695	0.0130
C33	J37	J1	CONDUIT	20.0	0.4509	0.0130
C34	J1	CBMHU	CONDUIT	29.0	0.5178	0.0130
C35	STMA	STMB	CONDUIT	100.1	0.0999	0.0130
C36	STMB	STMC	CONDUIT	105.1	0.0761	0.0130
C37	J33	Canal_Outlet	CONDUIT	10.7	0.8418	0.0130
C38	STMAA	STMBB	CONDUIT	73.4	0.1498	0.0130
C39	CBMH2A	STMAA	CONDUIT	35.7	0.1400	0.0130
C4	STM118	STM117	CONDUIT	8.8	0.2278	0.0130
C40	CBA1	CBMH2A	CONDUIT	92.3	0.1517	0.0130
C41	J48	J49	CONDUIT	88.2	0.3287	0.0350
C42	J49	STMD	CONDUIT	39.4	1.7782	0.0130
C43	J50	J51	CONDUIT	105.0	- 0.2570	0.0350
C44	J51	J48	CONDUIT	21.6	3.0571	0.0240
C45	J52	J53	CONDUIT	90.8	0.0661	0.0130
C46	J53	J54	CONDUIT	22.0	0.0014	0.0130
C47	J54	J55	CONDUIT	7.7	0.6525	0.0130
C48	J55	J56	CONDUIT	65.7	0.3804	0.0130
C49	J59	J58	CONDUIT	18.0	1.2770	0.0130
C5	STM117	STM116_STA	CONDUIT	6.7	0.1504	0.0130
C50	J58	J57	CONDUIT	14.2	0.3521	0.0130
C51	J57	J52	CONDUIT	47.6	- 0.0210	0.0130
C52	J60	J61	CONDUIT	70.3	0.4980	0.0350
C53	J62	J63	CONDUIT	26.8	0.7450	0.0350
C54	J64	J63	CONDUIT	37.1	0.4039	0.0350
C55	J65	J66	CONDUIT	51.5	1.1643	0.0350
C56	J67	J68	CONDUIT	10.1	1.6809	0.0350
C57	J69	J68	CONDUIT	52.1	0.8247	0.0350
C58	J69	J70	CONDUIT	39.7	0.5794	0.0350
C59	J71	J72	CONDUIT	27.8	1.4378	0.0130
C6	STM116_STA	STM113	CONDUIT	63.3	0.2053	0.0130
C60	J72	J73	CONDUIT	34.0	1.0892	0.0130
C61	J74	J73	CONDUIT	9.6	0.8371	0.0130
C62	J54	J74	CONDUIT	17.9	1.3420	0.0130
C63	J75	J71	CONDUIT	22.1	0.8607	0.0130
C64	BASIN2	J76	CONDUIT	3.0	0.0102	0.0130
C7	STM114	STM113	CONDUIT	74.9	0.2004	0.0130
C8	STM113	STM112	CONDUIT	50.1	0.0999	0.0130
C9	STM112	STM109	CONDUIT	49.2	0.1015	0.0130
W24	STM115	STM114	CONDUIT	75.5	0.6623	0.0100
W25	STM114	STM113	CONDUIT	76.0	0.1974	0.0130
W26	STM113	STM112	CONDUIT	51.0	0.5495	0.0100
W27	STM102	STM119	CONDUIT	61.3	0.4727	0.0130
W28	STM119	STM118	CONDUIT	61.3	3.5105	0.0100
W29	STM118	STM117	CONDUIT	10.4	25.4307	0.0130
W30	STM117	STM116_STA	CONDUIT	8.3	0.2411	0.0130
W31	STM116_STA	STM113	CONDUIT	63.5	0.1417	0.0100
C27_1	STM106A	STM106B	ORIFICE			
OR1	BASIN2	J40	ORIFICE			
OR2	BASIN1	J32	ORIFICE			
OL16	STM102A	J68	WEIR			
W10	STMB	J48	WEIR			
W11	STMC	J49	WEIR			
W12	STMA	J50	WEIR			
W13	STM111	Great-Lawn-Storage	WEIR			
W14	STMD	J60	WEIR			
W15	STMDD	Great-Lawn-Storage	WEIR			
W16	STM122	J52	WEIR			
W17	STM121	J53	WEIR			
W18	STM107	J54	WEIR			
W19	J32	J55	WEIR			
W2	J40	BASIN2	WEIR			
W20	STM108	J56	WEIR			
W21	STM-CCN2	J59	WEIR			
W22	STM-CCN1	J58	WEIR			
W23	STM111A	J57	WEIR			
W3	J32	BASIN1	WEIR			
W32	STM110	Great-Lawn-Storage	WEIR			
W33	STMAA	J65	WEIR			
W34	STMBB	J64	WEIR			
W35	STMCC	J62	WEIR			
W36	J1	J55	WEIR			
W37	CBMHU	J56	WEIR			
W38	CBA1	J68	WEIR			
W39	CBMH2A	J70	WEIR			
W4	J19	J63	WEIR			
W40	STM109	Great-Lawn-Storage	WEIR			
W41	STM106A	J73	WEIR			
W42	STM105	J75	WEIR			
W43	STM106B	J73	WEIR			
W44	J76	Great-Lawn-Storage	WEIR			
W45	J37	J66	WEIR			
W5	STM116	Great-Lawn-Storage	WEIR			

W6	STMFF	Great-Lawn-Storage	WEIR
W7	STMGG	Great-Lawn-Storage	WEIR
W8	STM108	Great-Lawn-Storage	WEIR
W9	STM112	Great-Lawn-Storage	WEIR
OL1	J61	STMC	OUTLET
OL10	S-BLDG-H	STM-CCN1	OUTLET
OL11	S-BLDG-G	STM-CCN1	OUTLET
OL12	S-BLDG-I	STM115	OUTLET
OL13	S-BLDG-K	STM115	OUTLET
OL14	Great-Lawn-Storage	STMGG	OUTLET
OL15	Great-Lawn-Storage	STMFF	OUTLET
OL17	S-BLDG-J	STM-CCN2	OUTLET
OL2	J63	STMCC	OUTLET
OL3	J66	STMBB	OUTLET
OL4	J68	CBA1	OUTLET
OL5	J70	CBMH2A	OUTLET
OL6	S-BLDG-A	STM122	OUTLET
OL7	S-BLDG-B	STM122	OUTLET
OL8	S-BLDG-C	STM122	OUTLET
OL9	S-BLDG-D	STM122	OUTLET
W1	Great-Lawn-Storage	J33	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
C1	CIRCULAR	0.82	0.53	0.21	0.82	1	0.64
C10	CIRCULAR	0.60	0.28	0.15	0.60	1	0.19
C11	CIRCULAR	0.90	0.64	0.23	0.90	1	0.48
C12	CIRCULAR	0.90	0.64	0.23	0.90	1	0.72
C13	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C14	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C15	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28
C16	CIRCULAR	0.60	0.28	0.15	0.60	1	0.32
C17	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
C18	CIRCULAR	0.90	0.64	0.23	0.90	1	0.57
C18_1	CIRCULAR	1.35	1.43	0.34	1.35	1	1.90
C18_2	CIRCULAR	1.35	1.43	0.34	1.35	1	1.90
C19	CIRCULAR	0.90	0.64	0.23	0.90	1	0.42
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.13
C20	CIRCULAR	0.90	0.64	0.23	0.90	1	4.51
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.20
C21_1	CIRCULAR	1.35	1.43	0.34	1.35	1	1.31
C21_2	CIRCULAR	1.35	1.43	0.34	1.35	1	1.27
C22	CIRCULAR	0.20	0.03	0.05	0.20	1	0.02
C23	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C24	CIRCULAR	0.68	0.36	0.17	0.68	1	0.51
C25	CIRCULAR	0.68	0.36	0.17	0.68	1	0.53
C26	CIRCULAR	1.35	1.43	0.34	1.35	1	2.20
C27	CIRCULAR	0.53	0.22	0.13	0.53	1	0.21
C27_2	CIRCULAR	0.97	0.75	0.24	0.97	1	0.74
C28	CIRCULAR	0.97	0.75	0.24	0.97	1	0.60
C29	CIRCULAR	0.97	0.75	0.24	0.97	1	0.84
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.13
C30	CIRCULAR	0.97	0.75	0.24	0.97	1	0.75
C31	CIRCULAR	0.97	0.75	0.24	0.97	1	1.48
C32	CIRCULAR	0.97	0.75	0.24	0.97	1	1.36
C33	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C34	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.19
C36	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C37	CIRCULAR	0.60	0.28	0.15	0.60	1	0.56
C38	CIRCULAR	0.45	0.16	0.11	0.45	1	0.11
C39	CIRCULAR	0.38	0.11	0.09	0.38	1	0.07
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.29
C40	CIRCULAR	0.38	0.11	0.09	0.38	1	0.07
C41	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	4.38
C42	CIRCULAR	0.30	0.07	0.07	0.30	1	0.13
C43	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	3.87
C44	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C45	RECT_OPEN	1.00	8.00	0.80	8.00	1	13.63
C46	RECT_OPEN	1.00	8.00	0.80	8.00	1	1.98
C47	RECT_OPEN	1.00	8.00	0.80	8.00	1	42.85
C48	RECT_OPEN	1.00	8.00	0.80	8.00	1	32.71
C49	RECT_OPEN	1.00	8.00	0.80	8.00	1	59.94
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24
C50	RECT_OPEN	1.00	8.00	0.80	8.00	1	31.48
C51	RECT_OPEN	1.00	8.00	0.80	8.00	1	7.69
C52	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	5.39
C53	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	6.59
C54	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	4.85
C55	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	8.24
C56	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	6.76
C57	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	4.74
C58	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	3.97
C59	RECT_OPEN	1.00	8.00	0.80	8.00	1	63.60
C6	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28
C60	RECT_OPEN	1.00	8.00	0.80	8.00	1	55.36
C61	RECT_OPEN	1.00	8.00	0.80	8.00	1	48.53
C62	RECT_OPEN	1.00	8.00	0.80	8.00	1	61.44
C63	RECT_OPEN	1.00	8.00	0.80	8.00	1	49.21
C64	CIRCULAR	0.90	0.64	0.23	0.90	1	0.18
C7	CIRCULAR	0.82	0.53	0.21	0.82	1	0.64
C8	CIRCULAR	1.05	0.87	0.26	1.05	1	0.86
C9	CIRCULAR	1.20	1.13	0.30	1.20	1	1.24
W24	RECT_OPEN	1.00	4.00	0.67	4.00	1	24.85
W25	RECT_OPEN	1.00	4.00	0.67	4.00	1	10.44
W26	RECT_OPEN	1.00	4.00	0.67	4.00	1	22.63
W27	RECT_OPEN	1.00	4.00	0.67	4.00	1	16.15
W28	RECT_OPEN	1.00	4.00	0.67	4.00	1	57.20
W29	RECT_OPEN	1.00	4.00	0.67	4.00	1	118.43
W30	RECT_OPEN	1.00	4.00	0.67	4.00	1	11.53
W31	RECT_OPEN	1.00	4.00	0.67	4.00	1	11.49

****
Shape Summary
****

Shape 0.510_1

Area:

0.0040	0.0122	0.0237	0.0378	0.0541
0.0723	0.0915	0.1116	0.1323	0.1535
0.1753	0.1974	0.2200	0.2429	0.2660
0.2892	0.3125	0.3357	0.3589	0.3821
0.4053	0.4285	0.4517	0.4749	0.4981
0.5213	0.5445	0.5677	0.5910	0.6142
0.6374	0.6606	0.6838	0.7070	0.7302
0.7534	0.7766	0.7998	0.8230	0.8462
0.8695	0.8927	0.9159	0.9381	0.9570
0.9725	0.9845	0.9931	0.9983	1.0000

Hrad:

0.0326	0.0620	0.0927	0.1255	0.1571
0.1941	0.2345	0.2757	0.3174	0.3595
0.4018	0.4435	0.4860	0.5280	0.5727
0.6191	0.6650	0.7103	0.7551	0.7994
0.8433	0.8866	0.9295	0.9719	1.0138
1.0552	1.0963	1.1369	1.1770	1.2167
1.2560	1.2949	1.3334	1.3715	1.4092
1.4465	1.4834	1.5199	1.5561	1.5919
1.6273	1.6624	1.6971	1.5863	1.4511
1.3366	1.2373	1.1497	1.0712	1.0000

Width:

0.2699	0.4300	0.5564	0.6554	0.7492
0.8096	0.8484	0.8791	0.9048	0.9265
0.9452	0.9640	0.9791	0.9940	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	0.8889	0.7407
0.5926	0.4444	0.2963	0.1481	0.0000

Shape 0.510_2

Area:

0.0007	0.0029	0.0063	0.0108	0.0164
0.0230	0.0306	0.0392	0.0487	0.0591
0.0705	0.0827	0.0958	0.1097	0.1244
0.1399	0.1562	0.1733	0.1911	0.2096
0.2288	0.2488	0.2694	0.2908	0.3128
0.3355	0.3589	0.3829	0.4075	0.4329

0.4589	0.4855	0.5128	0.5408	0.5694
0.5987	0.6287	0.6593	0.6906	0.7225
0.7551	0.7884	0.8223	0.8570	0.8923
0.9284	0.9598	0.9822	0.9956	1.0000

Hrad:

0.0372	0.0761	0.1167	0.1577	0.1971
0.2365	0.2767	0.3160	0.3545	0.3926
0.4324	0.4727	0.5123	0.5513	0.5899
0.6298	0.6707	0.7109	0.7506	0.7899
0.8288	0.8684	0.9079	0.9473	0.9872
1.0266	1.0657	1.1045	1.1430	1.1812
1.2191	1.2568	1.2943	1.3316	1.3687
1.4056	1.4423	1.4789	1.5153	1.5517
1.5879	1.6237	1.6580	1.6923	1.7266
1.7432	1.4768	1.2801	1.1258	1.0000

Width:

0.0402	0.0771	0.1097	0.1387	0.1678
0.1958	0.2219	0.2480	0.2741	0.3002
0.3244	0.3474	0.3704	0.3935	0.4165
0.4380	0.4582	0.4785	0.4987	0.5189
0.5392	0.5585	0.5776	0.5964	0.6146
0.6327	0.6509	0.6691	0.6872	0.7054
0.7235	0.7417	0.7599	0.7780	0.7962
0.8143	0.8325	0.8506	0.8688	0.8870
0.9051	0.9235	0.9428	0.9622	0.9816
0.9876	0.7397	0.4917	0.2445	0.0000

Shape 0.510_3

Area:

0.0005	0.0019	0.0043	0.0076	0.0119
0.0170	0.0230	0.0299	0.0377	0.0464
0.0559	0.0663	0.0776	0.0897	0.1027
0.1165	0.1312	0.1467	0.1631	0.1804
0.1985	0.2175	0.2373	0.2580	0.2795
0.3018	0.3250	0.3489	0.3736	0.3991
0.4254	0.4525	0.4804	0.5091	0.5386
0.5689	0.6000	0.6319	0.6645	0.6980
0.7323	0.7673	0.8031	0.8396	0.8769
0.9149	0.9516	0.9785	0.9946	1.0000

Hrad:

0.0376	0.0752	0.1127	0.1518	0.1901
0.2280	0.2657	0.3033	0.3414	0.3798
0.4180	0.4559	0.4937	0.5313	0.5689
0.6063	0.6437	0.6811	0.7183	0.7556
0.7928	0.8300	0.8671	0.9042	0.9429
0.9819	1.0207	1.0593	1.0978	1.1362
1.1744	1.2125	1.2505	1.2884	1.3262
1.3639	1.4016	1.4392	1.4767	1.5142
1.5516	1.5904	1.6294	1.6682	1.7069
1.7455	1.5679	1.3259	1.1446	1.0000

Width:

0.0248	0.0496	0.0744	0.0976	0.1208
0.1440	0.1672	0.1904	0.2131	0.2352
0.2574	0.2796	0.3018	0.3240	0.3462
0.3684	0.3905	0.4127	0.4349	0.4571
0.4793	0.5015	0.5236	0.5458	0.5668
0.5874	0.6079	0.6285	0.6490	0.6696

0.6902	0.7107	0.7313	0.7519	0.7724
0.7930	0.8135	0.8341	0.8547	0.8752
0.8958	0.9153	0.9345	0.9538	0.9730
0.9923	0.8333	0.5556	0.2778	0.0000

Shape 1.030_1

Area:

0.0011	0.0036	0.0070	0.0115	0.0170
0.0237	0.0348	0.0512	0.0715	0.0924
0.1137	0.1363	0.1590	0.1817	0.2045
0.2272	0.2499	0.2727	0.2954	0.3181
0.3409	0.3636	0.3863	0.4090	0.4318
0.4545	0.4772	0.5000	0.5227	0.5454
0.5681	0.5909	0.6136	0.6363	0.6591
0.6818	0.7045	0.7272	0.7500	0.7727
0.7954	0.8182	0.8409	0.8636	0.8864
0.9091	0.9318	0.9545	0.9773	1.0000

Hrad:

0.0314	0.0635	0.0926	0.1201	0.1455
0.1620	0.1324	0.1419	0.1823	0.2297
0.2745	0.3125	0.3616	0.4100	0.4577
0.5046	0.5507	0.5962	0.6410	0.6850
0.7284	0.7712	0.8133	0.8548	0.8957
0.9360	0.9758	1.0149	1.0535	1.0916
1.1291	1.1661	1.2026	1.2386	1.2741
1.3091	1.3436	1.3777	1.4113	1.4445
1.4773	1.5096	1.5415	1.5730	1.6041
1.6348	1.6651	1.6950	1.7246	1.0000

Width:

0.0832	0.1290	0.1738	0.2192	0.2684
0.3361	0.6079	0.8354	0.9071	0.9283
0.9547	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

Shape 1.030_2

Area:

0.0006	0.0025	0.0059	0.0111	0.0174
0.0246	0.0324	0.0407	0.0495	0.0589
0.0687	0.0791	0.0900	0.1014	0.1133
0.1257	0.1388	0.1524	0.1667	0.1815
0.1973	0.2142	0.2318	0.2503	0.2694
0.2893	0.3100	0.3313	0.3532	0.3758
0.3991	0.4229	0.4473	0.4723	0.4978
0.5241	0.5510	0.5787	0.6077	0.6381
0.6695	0.7019	0.7354	0.7699	0.8055
0.8421	0.8797	0.9185	0.9586	1.0000

Hrad:

0.0439	0.0784	0.1169	0.1600	0.2149
0.2771	0.3374	0.3949	0.4523	0.5075
0.5611	0.6132	0.6640	0.7137	0.7620
0.8054	0.8484	0.8912	0.9337	0.9723

0.9801	1.0115	1.0497	1.0882	1.1268
1.1656	1.2075	1.2511	1.2946	1.3380
1.3842	1.4302	1.4758	1.5212	1.5663
1.6056	1.6451	1.6692	1.6678	1.6891
1.7156	1.7430	1.7713	1.8004	1.8302
1.8607	1.8918	1.9130	1.9355	1.0000

Width:

0.0272	0.0632	0.1025	0.1394	0.1631
0.1778	0.1913	0.2046	0.2167	0.2288
0.2408	0.2529	0.2650	0.2771	0.2894
0.3036	0.3178	0.3320	0.3462	0.3619
0.3912	0.4118	0.4296	0.4473	0.4651
0.4829	0.4993	0.5148	0.5304	0.5458
0.5598	0.5739	0.5879	0.6020	0.6160
0.6325	0.6491	0.6724	0.7082	0.7349
0.7597	0.7846	0.8094	0.8343	0.8591
0.8840	0.9088	0.9392	0.9696	1.0000

Shape 1.030_3

Area:

0.0028	0.0081	0.0149	0.0226	0.0310
0.0401	0.0498	0.0600	0.0709	0.0824
0.0943	0.1068	0.1199	0.1335	0.1476
0.1624	0.1777	0.1937	0.2102	0.2274
0.2451	0.2634	0.2823	0.3018	0.3219
0.3425	0.3637	0.3855	0.4079	0.4308
0.4543	0.4784	0.5030	0.5282	0.5540
0.5804	0.6073	0.6348	0.6628	0.6913
0.7203	0.7496	0.7794	0.8096	0.8402
0.8711	0.9025	0.9343	0.9668	1.0000

Hrad:

0.0451	0.0901	0.1398	0.1923	0.2412
0.2899	0.3377	0.3838	0.4285	0.4737
0.5176	0.5606	0.6026	0.6435	0.6817
0.7195	0.7569	0.7939	0.8306	0.8670
0.9031	0.9390	0.9747	1.0109	1.0473
1.0834	1.1193	1.1550	1.1906	1.2260
1.2612	1.2964	1.3313	1.3662	1.4010
1.4356	1.4702	1.5050	1.5431	1.5809
1.6213	1.6633	1.7049	1.7462	1.7871
1.8279	1.8683	1.8978	1.9230	1.0000

Width:

0.1283	0.1844	0.2182	0.2395	0.2610
0.2801	0.2978	0.3155	0.3330	0.3490
0.3651	0.3811	0.3971	0.4134	0.4311
0.4488	0.4666	0.4843	0.5020	0.5197
0.5374	0.5552	0.5729	0.5901	0.6071
0.6242	0.6412	0.6582	0.6752	0.6922
0.7092	0.7262	0.7432	0.7603	0.7773
0.7943	0.8113	0.8281	0.8427	0.8574
0.8703	0.8821	0.8939	0.9057	0.9174
0.9292	0.9410	0.9589	0.9794	1.0000

Shape 1170_1

Area:

0.0018	0.0072	0.0137	0.0215	0.0304
0.0401	0.0506	0.0624	0.0759	0.0914

0.1075	0.1242	0.1414	0.1591	0.1773
0.1960	0.2153	0.2350	0.2553	0.2761
0.2975	0.3193	0.3417	0.3646	0.3881
0.4121	0.4366	0.4616	0.4882	0.5202
0.5669	0.6113	0.6533	0.6929	0.7301
0.7649	0.7973	0.8273	0.8548	0.8800
0.9028	0.9232	0.9412	0.9568	0.9700
0.9808	0.9892	0.9952	0.9988	1.0000

Hrad:

0.0375	0.1240	0.1851	0.2523	0.3182
0.3831	0.4393	0.4740	0.4912	0.5519
0.6223	0.6900	0.7553	0.8185	0.8798
0.9393	0.9973	1.0539	1.1093	1.1635
1.2166	1.2688	1.3201	1.3700	1.4193
1.4680	1.5160	1.5558	1.5322	0.9940
1.0362	1.0707	1.0984	1.1200	1.1364
1.1479	1.1552	1.1587	1.1586	1.1554
1.1494	1.1407	1.1297	1.1165	1.1013
1.0842	1.0654	1.0450	1.0232	1.0000

Width:

0.1024	0.1194	0.1520	0.1734	0.1922
0.2082	0.2276	0.2610	0.3080	0.3282
0.3390	0.3498	0.3606	0.3713	0.3821
0.3929	0.4037	0.4144	0.4252	0.4360
0.4468	0.4575	0.4684	0.4795	0.4906
0.5017	0.5128	0.5273	0.5728	0.9926
0.9429	0.8933	0.8437	0.7940	0.7444
0.6948	0.6452	0.5955	0.5459	0.4963
0.4467	0.3970	0.3474	0.2978	0.2481
0.1985	0.1489	0.0993	0.0496	0.0000

Shape 1170_2

Area:

0.0005	0.0018	0.0041	0.0074	0.0117
0.0169	0.0230	0.0298	0.0374	0.0459
0.0551	0.0652	0.0762	0.0879	0.1005
0.1144	0.1311	0.1544	0.1817	0.2092
0.2367	0.2642	0.2917	0.3192	0.3467
0.3742	0.4017	0.4292	0.4567	0.4842
0.5117	0.5393	0.5668	0.5943	0.6218
0.6493	0.6768	0.7043	0.7318	0.7593
0.7868	0.8143	0.8418	0.8693	0.8968
0.9244	0.9519	0.9780	0.9945	1.0000

Hrad:

0.0316	0.0626	0.0953	0.1241	0.1548
0.1901	0.2251	0.2588	0.2916	0.3223
0.3530	0.3837	0.4152	0.4465	0.4776
0.4832	0.4225	0.4104	0.4516	0.5088
0.5636	0.6161	0.6665	0.7149	0.7614
0.8061	0.8492	0.8907	0.9307	0.9692
1.0065	1.0424	1.0772	1.1108	1.1433
1.1747	1.2052	1.2347	1.2633	1.2911
1.3180	1.3441	1.3695	1.3942	1.4182
1.4415	1.4642	1.3515	1.1540	1.0000

Width:

0.0333	0.0679	0.0983	0.1370	0.1758
0.2064	0.2344	0.2623	0.2904	0.3214

```
          0.3523      0.3833      0.4129      0.4424      0.4718
          0.5431      0.7533      0.9431      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      0.8000      0.4000      0.0000

Shape 2961
Area:
          0.0057      0.0121      0.0191      0.0264      0.0341
          0.0422      0.0506      0.0593      0.0684      0.0778
          0.0876      0.0978      0.1082      0.1257      0.1448
          0.1647      0.1849      0.2052      0.2257      0.2463
          0.2672      0.2881      0.3093      0.3306      0.3521
          0.3741      0.4001      0.4262      0.4523      0.4784
          0.5045      0.5305      0.5566      0.5827      0.6088
          0.6349      0.6609      0.6870      0.7131      0.7392
          0.7653      0.7914      0.8174      0.8435      0.8696
          0.8957      0.9218      0.9478      0.9739      1.0000
Hrad:
          0.0599      0.1132      0.1636      0.2129      0.2593
          0.3031      0.3448      0.3846      0.4229      0.4598
          0.4956      0.5303      0.5641      0.4010      0.4344
          0.4810      0.5308      0.5795      0.6270      0.6734
          0.7189      0.7633      0.8069      0.8496      0.8908
          0.8013      0.8477      0.8930      0.9374      0.9808
          1.0233      1.0649      1.1057      1.1456      1.1847
          1.2230      1.2605      1.2973      1.3334      1.3688
          1.4035      1.4375      1.4709      1.5037      1.5359
          1.5674      1.5984      1.6289      1.6588      1.0000
Width:
          0.2320      0.2558      0.2754      0.2887      0.3020
          0.3153      0.3286      0.3419      0.3552      0.3685
          0.3818      0.3951      0.4084      0.7054      0.7522
          0.7696      0.7759      0.7822      0.7886      0.7949
          0.8012      0.8075      0.8138      0.8201      0.8274
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000

Shape 3235
Area:
          0.0097      0.0196      0.0299      0.0405      0.0513
          0.0625      0.0740      0.0857      0.0978      0.1101
          0.1228      0.1357      0.1490      0.1625      0.1764
          0.1905      0.2141      0.2379      0.2617      0.2855
          0.3094      0.3332      0.3570      0.3808      0.4046
          0.4284      0.4523      0.4761      0.4999      0.5237
          0.5475      0.5713      0.5951      0.6190      0.6428
          0.6666      0.6904      0.7142      0.7380      0.7618
          0.7857      0.8095      0.8333      0.8571      0.8809
          0.9047      0.9286      0.9524      0.9762      1.0000
Hrad:
```

```
          0.0581      0.1132      0.1656      0.2157      0.2636
          0.3097      0.3541      0.3970      0.4385      0.4788
          0.5179      0.5560      0.5931      0.6294      0.6648
          0.6995      0.4904      0.5388      0.5861      0.6324
          0.6776      0.7219      0.7652      0.8076      0.8492
          0.8898      0.9296      0.9687      1.0069      1.0444
          1.0811      1.1171      1.1525      1.1871      1.2211
          1.2545      1.2872      1.3193      1.3509      1.3819
          1.4123      1.4422      1.4715      1.5003      1.5287
          1.5565      1.5839      1.6108      1.6373      1.0000
Width:
          0.4124      0.4250      0.4375      0.4500      0.4625
          0.4750      0.4875      0.5000      0.5125      0.5250
          0.5375      0.5500      0.5625      0.5750      0.5876
          0.6001      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000
          1.0000      1.0000      1.0000      1.0000      1.0000


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

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 07/23/2009 00:01:00
Ending Date .............. 07/24/2009 00:01:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 20
Number of Threads ........ 2
Head Tolerance ........... 0.001500 m
```

```
**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         1.159        71.677
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.225        13.897
Surface Runoff ...........         0.923        57.120
Final Storage ............         0.019         1.165
Continuity Error (%) .....        -0.705


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.923         9.234
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.003
External Outflow .........         0.720         7.204
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.005
Final Stored Volume ......         0.141         1.411
Continuity Error (%) .....         6.779


*************************
Highest Continuity Errors
*************************
Node J40 (6.39%)
Node BASIN2 (2.87%)
Node J60 (2.28%)
Node STM119 (1.44%)
Node J50 (1.38%)


***************************
Time-Step Critical Elements
***************************
Link C64 (6.56%)


********************************
Highest Flow Instability Indexes
********************************
Link C27_1 (60)
Link OR1 (53)
Link C31 (35)
Link C28 (34)
Link OR2 (34)


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

```
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     0.98 sec
Maximum Time Step           :     1.00 sec
Percent in Steady State     :    -0.00
Average Iterations per Step :     6.11
Percent Not Converging      :    17.95
Time Step Frequencies       :
    1.000 -  0.871 sec      :    94.92 %
    0.871 -  0.758 sec      :     1.61 %
    0.758 -  0.660 sec      :     1.42 %
    0.660 -  0.574 sec      :     0.97 %
    0.574 -  0.500 sec      :     1.09 %


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

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
102	71.68	0.00	0.00	20.12	45.43	28.48	51.20	0.23	0.11	0.714
107AA	71.68	0.00	0.00	5.97	60.78	4.19	64.97	0.18	0.13	0.906
108	71.68	0.00	0.00	14.03	48.26	8.93	57.20	0.20	0.15	0.798
109	71.68	0.00	0.00	5.52	61.79	3.68	65.47	0.19	0.14	0.913
109C	71.68	0.00	0.00	18.19	47.02	32.06	53.22	0.14	0.09	0.743
116	71.68	0.00	0.00	39.92	9.77	32.87	32.87	0.07	0.07	0.459
A	71.68	0.00	0.00	36.15	30.61	35.26	35.26	0.26	0.07	0.492
A1	71.68	0.00	0.00	0.63	69.69	0.47	70.17	0.72	0.51	0.979
A2	71.68	0.00	0.00	0.91	69.24	0.67	69.91	1.10	0.78	0.975
A3	71.68	0.00	0.00	4.28	63.78	2.89	66.67	0.62	0.45	0.930
A4	71.68	0.00	0.00	6.76	59.59	4.64	64.23	0.53	0.40	0.896
A5	71.68	0.00	0.00	0.03	70.69	0.02	70.71	0.17	0.12	0.987
AA	71.68	0.00	0.00	23.96	38.42	28.30	47.51	0.18	0.10	0.663
BB	71.68	0.00	0.00	36.89	29.04	34.55	34.55	0.31	0.08	0.482
BLDG-A	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.18	0.13	0.981

BLDG-B	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.25	0.18	0.981
BLDG-C	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.21	0.15	0.981
BLDG-D	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.10	0.07	0.981
BLDGG	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.17	0.12	0.981
BLDGH	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.26	0.18	0.981
BLDG-I	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.16	0.11	0.981
BLDGJ	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.10	0.07	0.981
BLDGJ2	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.27	0.19	0.981
BLDG-K	71.68	0.00	0.00	0.00	70.31	0.00	70.32	0.17	0.12	0.981
D	71.68	0.00	0.00	39.90	21.21	31.67	31.67	0.18	0.06	0.442
D1	71.68	0.00	0.00	32.49	22.80	28.00	39.40	0.19	0.14	0.550
EE	71.68	0.00	0.00	46.41	10.77	25.25	25.25	0.09	0.03	0.352
Great-Lawn	71.68	0.00	0.00	39.27	18.70	32.37	32.37	0.33	0.13	0.452
NSTANDS	71.68	0.00	0.00	0.00	70.70	0.00	70.70	0.53	0.37	0.986
OPGG	71.68	0.00	0.00	18.99	42.11	10.17	52.28	0.43	0.29	0.729
SSTANDS	71.68	0.00	0.00	0.02	70.30	0.02	70.32	0.56	0.40	0.981
T	71.68	0.00	0.00	32.90	19.50	19.45	38.95	0.05	0.04	0.543
V	71.68	0.00	0.00	1.48	67.90	1.13	69.03	0.11	0.08	0.963

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	hr:min	Reported Max Depth Meters
CBA1	JUNCTION	0.15	0.82	64.89	0	01:13	0.80
CBMH2A	JUNCTION	0.21	0.99	64.88	0	01:14	0.96
CBMHU	JUNCTION	0.41	1.77	65.13	0	01:13	1.75
J1	JUNCTION	0.32	1.62	65.18	0	01:12	1.60
J19	JUNCTION	0.29	1.15	64.77	0	01:13	1.15
J32	JUNCTION	0.98	1.91	64.66	0	01:29	1.90
J33	JUNCTION	0.99	1.44	64.53	0	00:00	1.00
J37	JUNCTION	0.28	1.53	65.21	0	01:11	1.53
J40	JUNCTION	0.84	1.89	64.79	0	01:21	1.76
J48	JUNCTION	0.01	0.12	64.81	0	01:20	0.12
J49	JUNCTION	0.06	0.34	64.74	0	01:27	0.33
J50	JUNCTION	0.06	0.17	65.25	0	01:25	0.17
J51	JUNCTION	0.00	0.00	65.35	0	00:00	0.00
J52	JUNCTION	0.01	0.18	65.49	0	01:10	0.18
J53	JUNCTION	0.01	0.12	65.37	0	01:10	0.12
J54	JUNCTION	0.00	0.05	65.30	0	01:10	0.05
J55	JUNCTION	0.00	0.06	65.26	0	01:11	0.06
J56	JUNCTION	0.01	0.23	65.18	0	01:13	0.22
J57	JUNCTION	0.01	0.19	65.49	0	01:10	0.19
J58	JUNCTION	0.00	0.15	65.50	0	01:10	0.15
J59	JUNCTION	0.00	0.02	65.60	0	01:10	0.02
J60	JUNCTION	0.00	0.09	64.74	0	01:27	0.08
J61	JUNCTION	0.08	0.44	64.74	0	01:28	0.43
J62	JUNCTION	0.00	0.02	64.72	0	01:30	0.02
J63	JUNCTION	0.03	0.22	64.72	0	01:31	0.22
J64	JUNCTION	0.00	0.07	64.72	0	01:30	0.07
J65	JUNCTION	0.00	0.00	65.10	0	00:00	0.00
J66	JUNCTION	0.03	0.23	64.73	0	01:32	0.22
J67	JUNCTION	0.00	0.00	65.17	0	00:00	0.00
J68	JUNCTION	0.00	0.00	65.00	0	00:00	0.00
J69	JUNCTION	0.00	0.00	65.43	0	00:00	0.00
J70	JUNCTION	0.00	0.00	65.20	0	00:00	0.00
J71	JUNCTION	0.00	0.00	65.70	0	00:00	0.00
J72	JUNCTION	0.00	0.00	65.30	0	00:00	0.00
J73	JUNCTION	0.01	0.26	65.19	0	01:12	0.25
J74	JUNCTION	0.00	0.18	65.19	0	01:12	0.17
J75	JUNCTION	0.00	0.00	65.89	0	00:00	0.00
J76	JUNCTION	0.79	1.79	64.74	0	01:21	1.70
STM101	JUNCTION	1.42	2.42	64.67	0	03:06	2.40
STM101A	JUNCTION	1.38	2.39	64.68	0	03:09	2.38
STM102	JUNCTION	0.12	1.99	66.25	0	01:04	1.94
STM102A	JUNCTION	1.32	2.30	64.65	0	03:06	2.30
STM104	JUNCTION	1.19	2.20	64.69	0	02:49	2.18
STM105	JUNCTION	1.15	2.12	64.65	0	03:09	2.12
STM106A	JUNCTION	1.09	2.02	64.66	0	01:29	2.02
STM106B	JUNCTION	1.05	2.02	64.66	0	03:12	2.01
STM107	JUNCTION	1.02	1.95	64.67	0	01:29	1.94
STM108	JUNCTION	1.72	2.67	64.67	0	01:29	2.66
STM109	JUNCTION	0.84	1.79	64.70	0	01:24	1.76
STM110	JUNCTION	0.61	1.60	64.74	0	01:21	1.53
STM111	JUNCTION	0.48	1.45	64.73	0	01:21	1.40
STM111A	JUNCTION	0.26	1.65	65.41	0	01:10	1.64
STM112	JUNCTION	0.76	1.71	64.70	0	01:24	1.69
STM113	JUNCTION	0.31	1.13	64.72	0	01:24	1.09
STM114	JUNCTION	0.25	1.04	64.81	0	01:23	0.92
STM115	JUNCTION	0.19	0.88	64.83	0	01:23	0.73
STM116	JUNCTION	0.61	1.60	64.74	0	01:24	1.55
STM116_STA	JUNCTION	0.22	1.26	65.13	0	01:12	1.17
STM117	JUNCTION	0.21	1.31	65.22	0	01:12	1.22
STM118	JUNCTION	0.20	1.36	65.32	0	01:12	1.26
STM119	JUNCTION	0.16	2.05	66.16	0	01:09	2.05
STM121	JUNCTION	0.45	1.45	64.76	0	01:23	1.36
STM122	JUNCTION	0.27	1.32	65.00	0	01:11	0.99
STMA	JUNCTION	0.31	1.21	64.77	0	01:29	1.21
STMAA	JUNCTION	0.24	1.01	64.77	0	01:14	0.99
STMB	JUNCTION	0.35	1.32	64.76	0	01:25	1.31
STMBB	JUNCTION	0.31	1.16	64.73	0	01:31	1.15
STMC	JUNCTION	0.41	1.39	64.74	0	01:27	1.38
STMCC	JUNCTION	0.36	1.30	64.72	0	01:31	1.30
STM-CCN1	JUNCTION	0.44	1.45	64.77	0	01:21	1.36
STM-CCN2	JUNCTION	0.25	1.90	65.69	0	01:10	1.90
STMD	JUNCTION	0.57	1.56	64.74	0	01:26	1.53
STMDD	JUNCTION	0.63	1.56	64.68	0	01:29	1.55
STMFF	JUNCTION	0.66	1.58	64.67	0	01:29	1.58
STMGG	JUNCTION	0.72	1.64	64.67	0	01:29	1.63
Canal_Outlet	OUTFALL	1.50	1.50	64.08	0	00:00	1.50
J28	OUTFALL	1.60	2.98	65.20	0	03:00	2.98
BASIN1	STORAGE	0.92	1.86	64.67	0	01:29	1.86
BASIN2	STORAGE	0.79	1.83	64.78	0	01:21	1.70
Great-Lawn-Storage	STORAGE	0.06	0.25	64.65	0	03:15	0.25
S-BLDG-A	STORAGE	0.01	0.07	100.07	0	01:52	0.07
S-BLDG-B	STORAGE	0.02	0.08	100.08	0	01:54	0.08
S-BLDG-C	STORAGE	0.01	0.07	100.07	0	01:52	0.07
S-BLDG-D	STORAGE	0.01	0.08	100.08	0	01:53	0.08
S-BLDG-G	STORAGE	0.02	0.09	100.09	0	02:11	0.09
S-BLDG-H	STORAGE	0.02	0.08	100.08	0	01:54	0.08
S-BLDG-I	STORAGE	0.01	0.07	100.07	0	01:50	0.07
S-BLDG-J	STORAGE	0.02	0.08	100.08	0	01:54	0.08
S-BLDG-K	STORAGE	0.03	0.10	100.10	0	02:20	0.10

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CBA1	JUNCTION	0.000	0.029	0	01:10	0	0.0118	0.430
CBMH2A	JUNCTION	0.113	0.113	0	01:10	0.227	0.241	0.542
CBMHU	JUNCTION	0.000	0.122	0	01:09	0	0.226	0.027
J1	JUNCTION	0.000	0.069	0	01:06	0	0.133	-0.072
J19	JUNCTION	0.000	0.034	0	01:13	0	0.0429	-0.007
J32	JUNCTION	0.000	1.797	0	01:08	0	8.24	0.358
J33	JUNCTION	0.000	0.444	0	00:00	0	1.67	0.096
J37	JUNCTION	0.102	0.102	0	01:10	0.176	0.176	0.141
J40	JUNCTION	0.000	3.420	0	01:11	0	7.95	6.831
J48	JUNCTION	0.059	0.059	0	01:20	0.185	0.185	-0.972
J49	JUNCTION	0.000	0.148	0	01:25	0	0.198	0.757
J50	JUNCTION	0.066	0.066	0	01:25	0.258	0.258	1.403
J51	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J52	JUNCTION	0.776	1.109	0	01:10	1.1	1.46	-0.001
J53	JUNCTION	0.000	0.964	0	01:10	0	1.23	0.001
J54	JUNCTION	0.000	0.883	0	01:10	0	1.05	-0.006
J55	JUNCTION	0.000	0.347	0	01:11	0	0.418	-0.007
J56	JUNCTION	0.000	0.321	0	01:11	0	0.383	0.000
J57	JUNCTION	0.000	0.470	0	01:10	0	0.647	0.001
J58	JUNCTION	0.506	0.576	0	01:10	0.722	0.75	-0.002
J59	JUNCTION	0.000	0.070	0	01:10	0	0.0284	0.010
J60	JUNCTION	0.000	0.063	0	01:25	0	0.00672	2.329
J61	JUNCTION	0.143	0.252	0	01:24	0.189	0.3	-0.057
J62	JUNCTION	0.000	0.004	0	01:30	0	0.000472	1.368
J63	JUNCTION	0.082	0.119	0	02:47	0.308	0.402	-0.229
J64	JUNCTION	0.000	0.012	0	01:25	0	0.00203	1.208
J65	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J66	JUNCTION	0.000	0.143	0	01:11	0	0.11	-1.038
J67	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J68	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J69	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J70	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J71	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J72	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J73	JUNCTION	0.000	0.501	0	01:11	0	0.607	0.000
J74	JUNCTION	0.000	0.514	0	01:10	0	0.607	0.004
J75	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J76	JUNCTION	0.000	0.734	0	01:21	0	1.94	0.425
STM101	JUNCTION	0.000	0.725	0	01:11	0	5.54	0.111
STM101A	JUNCTION	0.000	0.723	0	01:11	0	5.55	0.159

STM102	JUNCTION	0.000	0.059	0	01:04	0	0.0188	0.175
STM102A	JUNCTION	0.000	0.647	0	01:11	0	5.59	0.645
STM104	JUNCTION	0.000	0.647	0	01:11	0	5.62	0.599
STM105	JUNCTION	0.000	0.593	0	01:11	0	5.66	0.533
STM106A	JUNCTION	0.131	0.659	0	01:10	0.175	5.73	0.595
STM106B	JUNCTION	0.000	0.627	0	01:10	0	5.75	0.318
STM107	JUNCTION	0.000	0.698	0	01:08	0	6.28	0.196
STM108	JUNCTION	0.000	1.546	0	01:11	0	7.38	0.611
STM109	JUNCTION	0.138	2.113	0	01:10	0.189	4.91	0.376
STM110	JUNCTION	0.000	0.380	0	01:06	0	1.17	0.106
STM111	JUNCTION	0.000	0.382	0	01:06	0	1.17	0.160
STM111A	JUNCTION	0.000	0.141	0	01:05	0	0.293	0.193
STM112	JUNCTION	0.086	1.657	0	01:10	0.135	3.7	0.123
STM113	JUNCTION	0.374	1.400	0	01:10	0.535	2.75	0.419
STM114	JUNCTION	0.451	0.549	0	01:09	0.621	1.14	0.036
STM115	JUNCTION	0.119	0.229	0	01:22	0.174	0.513	-0.146
STM116	JUNCTION	0.072	0.346	0	01:03	0.0695	0.957	1.104
STM116_STA	JUNCTION	0.000	0.552	0	01:13	0	1.09	0.355
STM117	JUNCTION	0.000	0.563	0	01:11	0	1.09	-0.047
STM118	JUNCTION	0.000	0.801	0	01:09	0	1.09	-0.376
STM119	JUNCTION	0.796	0.813	0	01:09	1.1	1.12	1.465
STM121	JUNCTION	0.000	0.431	0	01:11	0	1.15	0.064
STM122	JUNCTION	0.000	0.297	0	01:10	0	0.968	0.108
STMA	JUNCTION	0.000	0.155	0	01:06	0	0.276	0.079
STMAA	JUNCTION	0.000	0.095	0	01:14	0	0.229	-0.026
STMB	JUNCTION	0.000	0.223	0	01:05	0	0.339	-0.119
STMBB	JUNCTION	0.000	0.241	0	01:14	0	0.344	-0.061
STMC	JUNCTION	0.000	0.296	0	01:38	0	0.752	0.239
STMCC	JUNCTION	0.000	0.261	0	01:16	0	0.692	0.194
STM-CCN1	JUNCTION	0.000	0.384	0	01:06	0	1.17	-0.051
STM-CCN2	JUNCTION	0.193	0.197	0	01:10	0.273	0.37	0.467
STMD	JUNCTION	0.000	0.283	0	01:16	0	0.827	0.458
STMDD	JUNCTION	0.027	0.290	0	01:16	0.0875	0.753	0.388
STMFF	JUNCTION	0.185	0.445	0	01:15	0.437	2.36	0.381
STMGG	JUNCTION	0.328	0.657	0	01:13	0.476	3.63	0.208
Canal_Outlet	OUTFALL	0.000	0.444	0	00:00	0	1.67	0.000
J28	OUTFALL	0.000	0.725	0	01:11	0	5.54	0.000
BASIN1	STORAGE	0.151	1.921	0	01:08	0.197	2.59	-0.024
BASIN2	STORAGE	0.000	3.418	0	01:11	0	4.02	2.954
Great-Lawn-Storage	STORAGE	0.000	0.845	0	01:29	0	3.62	-0.350
S-BLDG-A	STORAGE	0.126	0.126	0	01:10	0.179	0.179	0.005
S-BLDG-B	STORAGE	0.180	0.180	0	01:10	0.255	0.255	0.005
S-BLDG-C	STORAGE	0.148	0.148	0	01:10	0.21	0.21	0.005
S-BLDG-D	STORAGE	0.068	0.068	0	01:10	0.097	0.097	0.005
S-BLDG-G	STORAGE	0.120	0.120	0	01:10	0.171	0.171	0.005
S-BLDG-H	STORAGE	0.184	0.184	0	01:10	0.261	0.261	0.005
S-BLDG-I	STORAGE	0.112	0.112	0	01:10	0.159	0.159	0.005
S-BLDG-J	STORAGE	0.068	0.068	0	01:10	0.0964	0.0964	0.005
S-BLDG-K	STORAGE	0.123	0.123	0	01:10	0.174	0.174	0.005

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J33	JUNCTION	24.00	0.844	1.556
J40	JUNCTION	6.35	0.445	0.317
STM101	JUNCTION	23.08	1.430	0.455
STM101A	JUNCTION	23.06	1.378	0.447
STM104	JUNCTION	7.02	1.192	0.683

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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 CMS
BASIN1	0.380	60	0	0	0.632	99	0	01:29	0.433
BASIN2	1.216	54	0	0	2.240	100	0	01:21	0.734
Great-Lawn-Storage	0.491	12	0	0	2.040	50	0	03:15	0.405
S-BLDG-A	0.017	4	0	0	0.121	24	0	01:52	0.009
S-BLDG-B	0.028	4	0	0	0.176	27	0	01:54	0.011
S-BLDG-C	0.021	3	0	0	0.142	24	0	01:52	0.011
S-BLDG-D	0.010	4	0	0	0.066	25	0	01:53	0.005
S-BLDG-G	0.024	7	0	0	0.125	38	0	02:11	0.006
S-BLDG-H	0.027	4	0	0	0.179	27	0	01:54	0.012
S-BLDG-I	0.015	3	0	0	0.106	23	0	01:50	0.008
S-BLDG-J	0.010	4	0	0	0.066	26	0	01:54	0.004
S-BLDG-K	0.028	9	0	0	0.130	42	0	02:20	0.005

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Canal_Outlet	25.26	0.075	0.444	1.671
J28	74.97	0.092	0.725	5.536
System	50.12	0.167	0.725	7.207

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.183	0	01:22	0.37	0.28	1.00
C10	CONDUIT	0.227	0	01:16	0.80	1.21	1.00
C11	CONDUIT	0.294	0	01:16	0.46	0.61	1.00
C12	CONDUIT	0.347	0	01:16	0.55	0.48	1.00
C13	CONDUIT	0.145	0	01:03	2.95	3.47	1.00
C14	CONDUIT	0.135	0	01:05	2.76	3.21	1.00
C15	CONDUIT	0.382	0	01:06	1.35	1.35	1.00
C16	CONDUIT	0.380	0	01:06	1.34	1.17	1.00
C17	CONDUIT	0.376	0	01:06	1.33	1.46	1.00
C18	CONDUIT	0.291	0	01:15	0.46	0.51	1.00
C18_1	CONDUIT	2.094	0	01:10	1.50	1.10	1.00
C18_2	CONDUIT	1.550	0	01:11	1.08	0.82	1.00
C19	CONDUIT	0.455	0	01:15	0.72	1.10	1.00
C2	CONDUIT	0.059	0	01:04	0.37	0.47	1.00
C20	CONDUIT	0.654	0	01:13	1.03	0.15	1.00
C21	CONDUIT	0.263	0	01:16	1.22	1.29	1.00
C21_1	CONDUIT	1.087	0	01:08	0.77	0.83	1.00
C21_2	CONDUIT	0.687	0	01:08	0.70	0.54	1.00
C22	CONDUIT	0.034	0	01:13	1.09	1.47	1.00
C23	CONDUIT	0.085	0	01:09	1.73	2.01	1.00
C24	CONDUIT	0.352	0	01:11	0.98	0.68	1.00
C25	CONDUIT	0.549	0	01:11	1.53	1.04	1.00
C26	CONDUIT	0.577	0	08:01	0.73	0.26	1.00
C27	CONDUIT	0.155	0	01:16	0.72	0.74	1.00
C27_2	CONDUIT	0.593	0	01:11	0.81	0.80	1.00
C28	CONDUIT	0.647	0	01:11	0.87	1.08	1.00
C29	CONDUIT	0.647	0	01:11	0.87	0.77	1.00
C3	CONDUIT	0.464	0	01:04	2.93	3.66	1.00
C30	CONDUIT	0.723	0	01:11	0.97	0.96	1.00
C31	CONDUIT	0.725	0	01:11	0.97	0.49	1.00
C32	CONDUIT	0.725	0	01:11	0.97	0.53	1.00
C33	CONDUIT	0.069	0	01:06	1.41	1.74	1.00
C34	CONDUIT	0.057	0	01:07	1.17	1.34	1.00
C35	CONDUIT	0.155	0	01:06	0.71	0.80	1.00
C36	CONDUIT	0.223	0	01:05	0.89	1.32	1.00
C37	CONDUIT	0.444	0	00:00	2.00	0.79	1.00
C38	CONDUIT	0.096	0	01:14	0.61	0.87	1.00
C39	CONDUIT	0.095	0	01:14	0.92	1.44	1.00
C4	CONDUIT	0.563	0	01:11	1.99	1.92	1.00
C40	CONDUIT	0.029	0	01:10	0.27	0.42	1.00
C41	CONDUIT	0.058	0	01:20	0.33	0.01	0.23
C42	CONDUIT	0.060	0	01:20	1.02	0.47	1.00
C43	CONDUIT	0.000	0	00:00	0.00	0.00	0.08
C44	CONDUIT	0.000	0	00:00	0.00	0.00	0.25
C45	CONDUIT	0.964	0	01:10	0.80	0.07	0.15
C46	CONDUIT	0.883	0	01:10	1.26	0.45	0.09
C47	CONDUIT	0.347	0	01:11	0.79	0.01	0.05

C48	CONDUIT	0.321	0	01:11	0.35	0.01	0.14
C49	CONDUIT	0.069	0	01:10	0.11	0.00	0.08
C5	CONDUIT	0.552	0	01:13	1.95	2.32	1.00
C50	CONDUIT	0.470	0	01:10	0.35	0.01	0.17
C51	CONDUIT	0.343	0	01:10	0.23	0.04	0.19
C52	CONDUIT	0.063	0	01:25	0.17	0.01	0.26
C53	CONDUIT	0.004	0	01:30	0.02	0.00	0.12
C54	CONDUIT	0.012	0	01:25	0.10	0.00	0.15
C55	CONDUIT	0.000	0	00:00	0.00	0.00	0.12
C56	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C57	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C58	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C59	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C6	CONDUIT	0.558	0	01:13	1.97	2.01	1.00
C60	CONDUIT	0.000	0	00:00	0.00	0.00	0.13
C61	CONDUIT	0.501	0	01:11	0.35	0.01	0.22
C62	CONDUIT	0.514	0	01:10	0.83	0.01	0.12
C63	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C64	CONDUIT	0.734	0	01:21	1.15	4.02	1.00
C7	CONDUIT	0.535	0	01:10	1.04	0.83	1.00
C8	CONDUIT	1.377	0	01:10	2.01	1.59	1.00
C9	CONDUIT	1.615	0	01:10	1.43	1.30	1.00
W24	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W25	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W26	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W27	CONDUIT	0.000	0	00:00	0.00	0.00	0.02
W28	CONDUIT	0.443	0	01:09	0.24	0.01	0.52
W29	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
W30	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W31	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C27_1	ORIFICE	0.576	0	08:00			1.00
OR1	ORIFICE	0.160	0	09:11			1.00
OR2	ORIFICE	0.054	0	09:01			1.00
OL16	WEIR	0.000	0	00:00			0.00
W10	WEIR	0.000	0	00:00			0.00
W11	WEIR	0.063	0	01:25			0.18
W12	WEIR	0.066	0	01:25			0.11
W13	WEIR	0.000	0	00:00			0.00
W14	WEIR	0.000	0	00:00			0.00
W15	WEIR	0.000	0	00:00			0.00
W16	WEIR	0.138	0	01:10			0.18
W17	WEIR	0.080	0	01:10			0.12
W18	WEIR	0.022	0	01:10			0.05
W19	WEIR	0.025	0	01:11			0.06
W2	WEIR	3.418	0	01:11			1.00
W20	WEIR	0.197	0	01:13			0.23
W21	WEIR	0.070	0	01:10			0.11
W22	WEIR	0.102	0	01:10			0.15
W23	WEIR	0.141	0	01:05			0.19
W3	WEIR	1.777	0	01:08			1.00
W32	WEIR	0.000	0	00:00			0.00
W33	WEIR	0.000	0	00:00			0.00
W34	WEIR	0.000	0	00:00			0.00
W35	WEIR	0.000	0	00:00			0.00
W36	WEIR	0.000	0	00:00			0.00
W37	WEIR	0.092	0	01:13			0.18
W38	WEIR	0.000	0	00:00			0.00
W39	WEIR	0.000	0	00:00			0.00
W4	WEIR	0.034	0	01:13			0.07
W40	WEIR	0.000	0	00:00			0.00
W41	WEIR	0.245	0	01:12			0.26
W42	WEIR	0.000	0	00:00			0.00
W43	WEIR	0.245	0	01:12			0.26
W44	WEIR	0.743	0	01:21			0.34
W45	WEIR	0.069	0	01:11			0.11
W5	WEIR	0.000	0	00:00			0.00
W6	WEIR	0.000	0	00:00			0.00
W7	WEIR	0.000	0	00:00			0.00
W8	WEIR	0.000	0	00:00			0.00
W9	WEIR	0.000	0	00:00			0.00
OL1	DUMMY	0.200	0	01:24			
OL10	DUMMY	0.012	0	01:06			
OL11	DUMMY	0.006	0	01:04			
OL12	DUMMY	0.008	0	01:07			
OL13	DUMMY	0.005	0	01:03			
OL14	DUMMY	0.188	0	01:29			
OL15	DUMMY	0.189	0	01:29			
OL17	DUMMY	0.004	0	01:06			
OL2	DUMMY	0.169	0	01:31			
OL3	DUMMY	0.147	0	01:15			
OL4	DUMMY	0.000	0	00:00			
OL5	DUMMY	0.000	0	00:00			
OL6	DUMMY	0.009	0	01:07			
OL7	DUMMY	0.011	0	01:06			
OL8	DUMMY	0.011	0	01:07			
OL9	DUMMY	0.005	0	01:06			
W1	DUMMY	0.481	0	00:00			

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
C1	1.00	0.01	0.00	0.00	0.33	0.00	0.00	0.65	0.03	0.00
C10	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C11	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.01	0.00
C13	1.00	0.01	0.00	0.00	0.33	0.00	0.00	0.65	0.01	0.00
C14	1.00	0.02	0.00	0.00	0.33	0.00	0.00	0.65	0.01	0.00

C15	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C16	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C17	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C18	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C18_1	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C18_2	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.00	0.00	0.00	0.97	0.00	0.00	0.03	0.00	0.00
C2	1.00	0.02	0.01	0.00	0.31	0.00	0.00	0.67	0.01	0.00
C20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.00
C21	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.58	0.00
C21_1	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C21_2	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C22	1.00	0.04	0.00	0.00	0.38	0.00	0.00	0.58	0.63	0.00
C23	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C24	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.64	0.00
C25	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C26	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.01	0.00	0.00
C27	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.28	0.00
C27_2	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C28	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C29	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.31	0.00	0.00	0.67	0.03	0.00
C30	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C31	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C32	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C33	1.00	0.01	0.00	0.00	0.34	0.00	0.00	0.64	0.01	0.00
C34	1.00	0.02	0.00	0.00	0.40	0.00	0.00	0.58	0.08	0.00
C35	1.00	0.04	0.00	0.00	0.38	0.00	0.00	0.58	0.03	0.00
C36	1.00	0.02	0.43	0.00	0.55	0.00	0.00	0.00	0.59	0.00
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

C38	1.00	0.02	0.00	0.00	0.33	0.00	0.00	0.65	0.01	0.00
C39	1.00	0.01	0.00	0.00	0.31	0.00	0.00	0.68	0.01	0.00
C4	1.00	0.01	0.00	0.00	0.30	0.00	0.00	0.68	0.00	0.00
C40	1.00	0.02	0.02	0.00	0.30	0.00	0.00	0.65	0.02	0.00
C41	1.00	0.04	0.34	0.00	0.62	0.00	0.00	0.00	0.95	0.00
C42	1.00	0.04	0.00	0.00	0.33	0.00	0.00	0.63	0.06	0.00
C43	1.00	0.04	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C44	1.00	0.38	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C45	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.93	0.00
C46	1.00	0.02	0.00	0.00	0.97	0.01	0.00	0.00	0.00	0.00
C47	1.00	0.46	0.12	0.00	0.40	0.01	0.00	0.00	0.39	0.00
C48	1.00	0.04	0.44	0.00	0.51	0.00	0.00	0.00	0.92	0.00
C49	1.00	0.15	0.83	0.00	0.02	0.00	0.00	0.00	0.96	0.00
C5	1.00	0.02	0.00	0.00	0.31	0.00	0.00	0.67	0.00	0.00
C50	1.00	0.01	0.14	0.00	0.85	0.00	0.00	0.00	0.95	0.00
C51	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.84	0.00
C52	1.00	0.45	0.05	0.00	0.50	0.00	0.00	0.00	0.26	0.00
C53	1.00	0.72	0.16	0.00	0.12	0.00	0.00	0.00	0.93	0.00
C54	1.00	0.72	0.02	0.00	0.27	0.00	0.00	0.00	0.25	0.00
C55	1.00	0.73	0.27	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	0.02	0.00	0.00	0.32	0.00	0.00	0.66	0.01	0.00
C60	1.00	0.08	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C61	1.00	0.07	0.32	0.00	0.61	0.00	0.00	0.00	0.84	0.00
C62	1.00	0.36	0.22	0.00	0.32	0.10	0.00	0.00	0.41	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	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

C7	1.00	0.01	0.00	0.00	0.39	0.00	0.00	0.59	0.02	0.00
C8	1.00	0.01	0.00	0.00	0.35	0.00	0.00	0.64	0.00	0.00
C9	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
W24	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W25	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W26	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W27	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W28	1.00	0.01	0.98	0.00	0.01	0.00	0.00	0.00	0.96	0.00
W29	1.00	0.02	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W30	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W31	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	0.01	0.01	2.61	0.01	0.01
C10	7.29	7.29	7.41	0.08	0.11
C11	7.00	7.00	7.10	0.01	0.02
C12	7.10	7.10	7.39	0.01	0.01
C13	7.14	7.18	7.38	0.48	0.35
C14	7.20	7.21	7.38	0.44	0.41
C15	7.38	7.38	7.42	0.17	0.20
C16	7.47	7.47	7.70	0.14	0.16
C17	7.76	7.76	7.80	0.19	0.23
C18	7.12	7.12	7.19	0.01	0.01
C18_1	6.52	6.52	6.62	0.03	0.07
C18_2	6.62	6.62	6.73	0.01	0.01
C19	7.19	7.19	7.25	0.11	0.16
C2	0.62	0.62	5.56	0.01	0.01
C20	7.32	7.32	23.39	0.01	0.01
C21	7.29	7.29	7.57	0.15	0.16
C21_1	6.79	6.79	6.86	0.01	0.01
C21_2	6.86	6.86	6.88	0.01	0.02
C22	7.58	7.58	7.92	0.19	0.01
C23	8.05	8.05	9.72	0.38	0.38
C24	6.39	6.39	7.10	0.01	0.01
C25	7.17	7.17	7.40	0.01	0.02
C26	6.95	6.95	7.05	0.01	0.01
C27	6.94	6.94	7.29	0.01	0.01
C27_2	6.94	6.94	7.00	0.01	0.01
C28	7.01	7.02	7.02	0.01	1.52
C29	7.37	7.37	23.05	0.01	0.01
C3	6.18	6.24	6.54	0.53	0.37
C30	23.06	23.06	23.06	0.01	0.62
C31	23.08	23.08	23.08	0.01	1.20
C32	23.08	23.08	24.00	0.01	0.01
C33	7.36	7.36	7.55	0.16	0.24
C34	7.61	7.61	7.92	0.08	0.09
C35	6.84	6.84	7.04	0.01	0.01
C36	7.08	7.08	7.27	0.05	0.01
C37	24.00	24.00	24.00	0.01	0.01
C38	6.70	6.70	6.93	0.01	0.01
C39	6.65	6.65	6.69	0.21	0.21
C4	6.16	6.16	6.29	0.30	0.28
C40	6.43	6.43	6.61	0.01	0.01
C42	0.18	0.18	7.19	0.01	0.01
C5	6.39	6.39	6.41	0.32	0.30
C6	6.46	6.47	6.62	0.28	0.27
C64	7.35	7.35	7.35	0.48	3.30
C7	4.80	4.80	6.36	0.01	0.01
C8	1.52	1.52	5.03	0.22	0.01
C9	6.74	6.74	6.85	0.17	0.19
W28	0.01	0.01	22.86	0.01	0.01

Analysis begun on: Thu Aug 8 19:48:32 2024
Analysis ended on: Thu Aug 8 19:48:39 2024
Total elapsed time: 00:00:07

APPENDIX

C

Proposed Conditions

C-1 Storm Sewer Design Sheet

STORM SEWER DESIGN SHEET
LANSDOWNE 2.0
REDEVELOPMENT
CITY OF OTTAWA
Project: CA0033920.1056
Date: August, 2024

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW														PROPSOED SEWER DATA								
BLDG FLOW	AREA ID	FROM	TO	C= 0.20	C= 0.35	C= 0.75	C= 0.80	C= 0.90	C= 1.00	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	ICD FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Lansdowne 2.0																																
+106 l/s	*S. STANDS*	*Ex. STM 120*	*Ex. STM 119*							0.000	0.000	20.00	21.24	52.03	70.25	119.95			0.00			0.00	106.00	CONC	*450.0*	*0.20*	*59.60*	127.63	0.80	1.24	21.63	16.95%
		Ex. STM 119	*Ex. STM 118*							0.000	0.000	21.24	22.48	50.12	67.64	115.46			0.00			0.00	106.00	CONC	*450.0*	*0.20*	*59.60*	127.63	0.80	1.24	21.63	16.95%
+106 l/s		*Ex. STM 118*	*Ex. STM 117*							0.000	0.000	22.48	22.63	48.36	65.24	111.33			0.00			0.00	212.00	CONC	*600.0*	*0.20*	*8.70*	274.87	0.97	0.15	62.87	22.87%
		Ex. STM 117	STMH 208							0.000	0.000	22.63	22.68	48.16	64.97	110.85			0.00			0.00	212.00	CONC	600.0	0.20	3.00	274.87	0.97	0.05	62.87	22.87%
+232.6 l/s	A3, A4, A5, BLDG I, K, N STANDS	*Ex. STM 115*	*Ex. STM 114*	1.118				0.399		1.620	1.620	20.00	21.02	52.03	70.25	119.95			113.80			113.80	346.40	CONC	*825.0*	*0.20*	*73.70*	642.59	1.20	1.02	296.19	46.09%
		Ex. STM 114	STMH 209							0.000	1.620	21.02	22.06	50.44	68.08	116.22			110.29			110.29	342.89	CONC	*825.0*	*0.20*	*74.50*	642.59	1.20	1.03	299.71	46.64%
	Half of NEC Area	STMH 209	STMH 208	0.000				0.486		1.215	2.835	22.06	23.27	48.94	66.04	112.69			187.19			187.19	419.79	CONC	900.0	0.10	65.64	573.05	0.90	1.22	153.26	26.74%
$Q_{bldg\ Tot}$ = 444.6 l/s		STMH 208	STMH 207							0.000	2.835	23.27	23.58	47.30	63.80	108.84			180.85			180.85	625.45	CONC	1050.0	0.10	18.55	864.40	1.00	0.31	238.95	27.64%
		STMH 207	STMH 206							0.000	2.835	23.58	23.97	46.90	63.26	107.91			179.31			179.31	623.91	CONC	1050.0	0.10	23.14	864.40	1.00	0.39	240.49	27.82%
	A6	STMH 206	STMH 205	0.048				0.025		0.089	2.924	23.97	24.61	46.41	62.59	106.77			183.01			183.01	627.61	CONC	1050.0	0.10	38.05	864.40	1.00	0.64	236.79	27.39%
		STMH 205	STMH 204							0.000	2.924	24.61	25.10	45.64	61.53	104.94			179.92			179.92	624.52	CONC	1050.0	0.10	29.50	864.40	1.00	0.49	239.89	27.75%
	Half of NEC Area	STMH 204	STMH 203	0.000				0.486		1.215	4.139	25.10	25.55	45.05	60.74	103.58			251.38			251.38	695.98	CONC	1050.0	0.10	27.14	864.40	1.00	0.45	168.43	19.48%
	Great Lawn 5	STMH 203	CBMH 202	0.089				0.026		0.115	4.253	25.55	26.25	44.53	60.03	102.36			255.31			255.31	699.91	CONC	1050.0	0.10	41.65	864.40	1.00	0.70	164.49	19.03%
	Great Lawn 6, A, D, D1, D2	*Ex. STMD*	CBMH 210	1.237				0.542		2.044	2.044	20.00	20.83	52.03	70.25	119.95			143.58			143.58		CONC	600.0	0.10	34.40	194.36	0.69	0.83	50.78	26.13%
	Great Lawn 4	CBMH 210	CBMH 202	0.160				0.024		0.149	2.193	20.83	21.37	50.73	68.47	116.88			150.15			150.15		CONC	600.0	0.10	22.20	194.36	0.69	0.54	44.22	22.75%
$Q_{bldg\ Tot}$ = 444.6 l/s		CBMH 202	CHAMBER / *Ex. Chamber*							0.000	6.446	26.25	26.25	43.75	58.97	100.54			380.15			380.15	824.75	REFER TO STORMTECH DESIGN								
	OPGG5, Great Lawn 3	CHAMBER / *Ex. Chamber*	*Ex. 1350 PIPE*	0.228				0.131		0.455	6.901	26.25	26.25	43.75	58.97	100.54			406.95			406.95	851.55	REFER TO STORMTECH DESIGN								
+23.1 l/s	A1, BLDGS H, G, J, J1, J2	*Ex. STM-CCN1*	NEW STMH 212	0.019				0.938		2.357	2.357	20.00	20.21	52.03	70.25	119.95			165.61			165.61	188.71	CONC	600.0	0.20	12.03	274.87	0.97	0.21	86.16	31.35%
		NEW STMH 212	NEW STMH 211							0.000	2.357	20.21	20.72	51.70	69.80	119.18			164.55			164.55	187.65	CONC	600.0	0.20	30.00	274.87	0.97	0.51	87.22	31.73%
		NEW STMH 211	*Ex. STM 110*							0.000	2.357	20.72	20.91	50.90	68.71	117.29			161.97			161.97	185.07	CONC	600.0	0.20	11.00	274.87	0.97	0.19	89.80	32.67%
	OPGG1, OPGG4	*Ex. STM 110*	*Ex. STM 109*	0.015				0.160		0.409	2.766	20.91	21.11	50.61	68.31	116.62			188.97			188.97	212.07	CONC	*600.0*	*0.20*	*11.70*	274.87	0.97	0.20	62.81	22.85%
$Q_{bldg\ Tot}$ = 467.7 l/s	OPGG2	*Ex. STM 109*	*Ex. STM 108*	0.020				0.251		0.639	10.306	26.25	27.49	43.75	58.97	100.54			607.77			607.77	1075.47	CONC	*1350.0*	*0.13*	*99.80*	1926.37	1.34	1.24	850.90	44.17%
	102, AA, BB, EE	*Ex. STMDD*	*Ex. STMFF*	1.410				0.594		2.270	2.270	21.70	22.27	49.45	66.73	113.88			151.48			151.48		CONC	*900.0*	*0.10*	*31.00*	573.05	0.90	0.57	421.57	73.57%
	Great Lawn 1 & 2, T1, T2, V1, V2	*Ex. STMFF*	*Ex. STMGG*	0.508				0.295		1.021	3.291	22.27	23.33	48.64	65.62	111.98			215.95			215.95		CONC	*900.0*	*0.10*	*57.00*	573.05	0.90	1.06	357.10	62.32%
		Ex. STMGG	*Ex. STM 108*							0.000	3.291	23.33	23.74	47.23	63.70	108.67			209.61			209.61		CONC	*900.0*	*0.10*	*22.00*	573.05	0.90	0.41	363.43	63.42%
$Q_{bldg\ Tot}$ = 467.7 l/s	OPGG3, 108	*Ex. STM 108*	*Ex. STM 107*	0.167				0.316		0.883	14.480	27.49	28.64	42.45	57.20	97.49			828.21			828.21	1295.91	CONC	*1350.0*	*0.10*	*81.40*	1689.54	1.18	1.15	393.63	23.30%
+34.4 l/s, Qbldg Tot = 502.1 l/s	A2, BLDGS A, B, C, D	*Ex. STM 107*	*Ex. STM 106*	0.032				1.555		3.908	18.388	28.64	28.93	41.31	55.65	94.82			1023.27			1023.27	1525.37	CONC	*1350.0*	*0.10*	*20.70*	1689.54	1.18	0.29	164.17	9.72%
Controlled Flow		*Ex. STM 106*	*Ex. STM 105*																			616.00		CONC	*975.0*	*0.10*	*80.20*	709.40	0.95	1.41	93.40	13.17%
		Ex. STM 105	*Ex. STM 104*																			616.00		CONC	*975.0*	*0.10*	*12.10*	709.40	0.95	0.21	93.40	13.17%
		Ex. STM 104	*Ex. STM 103*																			616.00		CONC	*975.0*	*0.10*	*19.20*	709.40	0.95	0.34	93.40	13.17%
		Ex. STM 103	*Ex. STM 102*																			616.00		CONC	*975.0*	*0.10*	*54.20*	709.40	0.95	0.95	93.40	13.17%
		Ex. STM 102	*Ex. STM 101*																			616.00		CONC	*975.0*	*0.10*	*24.20*	709.40	0.95	0.42	93.40	13.17%
		Ex. STM 101	*Ex. STM MH (O'Connnor)*																			616.00		CONC	*975.0*	*0.10*	*5.80*	709.40	0.95	0.10	93.40	13.17%

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

Notes:
1. Mannings coefficient (n) = 0.013

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

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

Designed: Z.A.
Checked: D.B.Y.
Dwg. Reference: F2

No.	Revision	Date
1.	City Submission No. 1	2023-05-25
2.	City Submission No. 2	2023-09-22
3.	City Submission No. 3	2024-08-07

File Reference:	Date:	Sheet No:
CA0002045.0622	2023-09-22	1 of 1

Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details
Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Customer
Company :
Contact Name :
Street Address, City :
State zip code :
Phone :
Email :

Input Data
Location : Ottawa

Number	Catchment Description	Area [m²]	C	D [min]	F [a]	I [mm/hr]	Catchment Surface Type	Installation
1	CB02 to TD1	1150.0	0.36	0	0	71		
2	CB03 to TD2	545.0	0.90	0	0	355		
3	CB05 to TD3	2420.0	0.39	0	0	160		
4	CB06 to TD4	3190.0	0.56	0	0	110		
5	CB07 to TD5	1840.0	0.29	0	0	50		
6	CB08 to TD6	2500.0	0.26	0	0	35		

Channel type	Catchment (s)	Catchment Area [m²]	C_m	Total run length [m]	Application
TD1	1	1150.00	0.36	16.00	
TD2	2	545.00	0.90	13.50	
TD3	3	2420.00	0.39	12.50	
TD4	4	3190.00	0.56	21.50	
TD5	5	1840.00	0.29	22.00	
TD6	6	2500.00	0.26	25.00	

Notes

ACO Systems Ltd.

2910 Brighton Rd
L6H 5S3 Oakville

Prepared By : K. Parmar
Phone :
Email : kalpit.parmar@aco.com
Website :

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD1
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 16.00
Catchment Area	[m²]	: 1150
Runoff Coefficient	[Cm]	: 0.36
Hydraulic run length	[m]	: 16.00

All run segments combine to give the total run lenth.

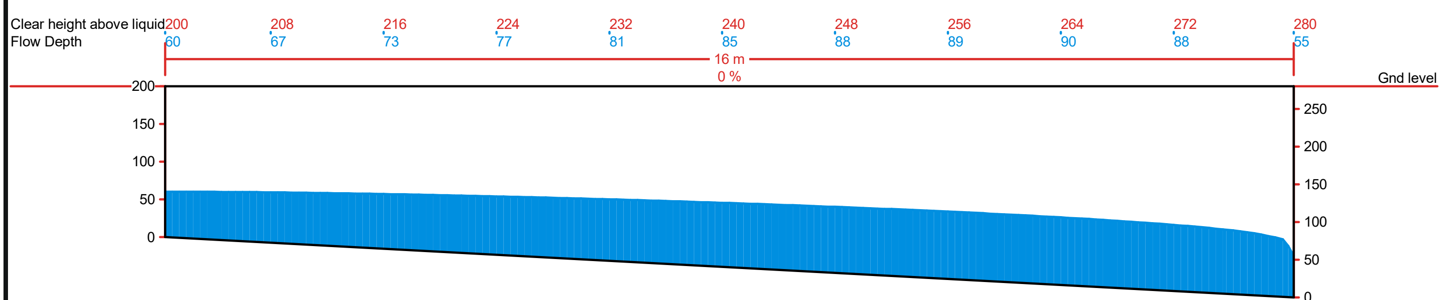
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	280									
Run Length	[m]	16									
Groundslope	[%]	0.000									

Results

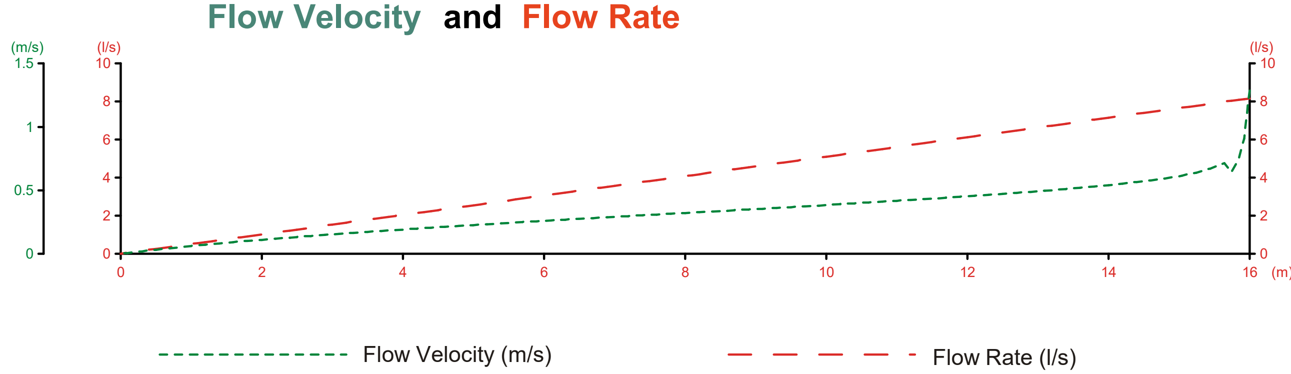
Discharge	[l/s]	: 8.16
Flow Velocity	[m/s]	: 1.29
Minimum Freeboard	[mm]	: 139.87, X = 0.00 m (Freeboard Depth)
Drain Capacity Utilised	[%]	: 25.47

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Channel type		: TD1
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 16.00
Hydraulic run length	[m]	: 16.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Input

Channel type : TD2
Trench drain system : ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout :
Roughness Coefficient (Strickler) inverse Mannings : 95
Invert Type : Neutral Depth
Type of Outlet : sump unit-DN/OD110
Run Length [m] : 13.50
Catchment Area [m²] : 545
Runoff Coefficient [Cm] : 0.90

Hydraulic run length [m] : 13.50

All run segments combine to give the total run lenth.

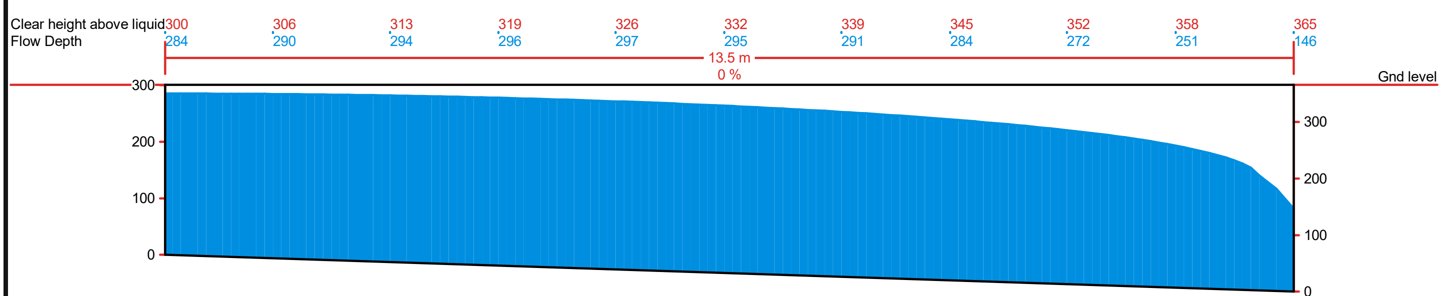
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	300									
Downstream Invert	[mm]	365									
Run Length	[m]	14									
Groundslope	[%]	0.000									

Results

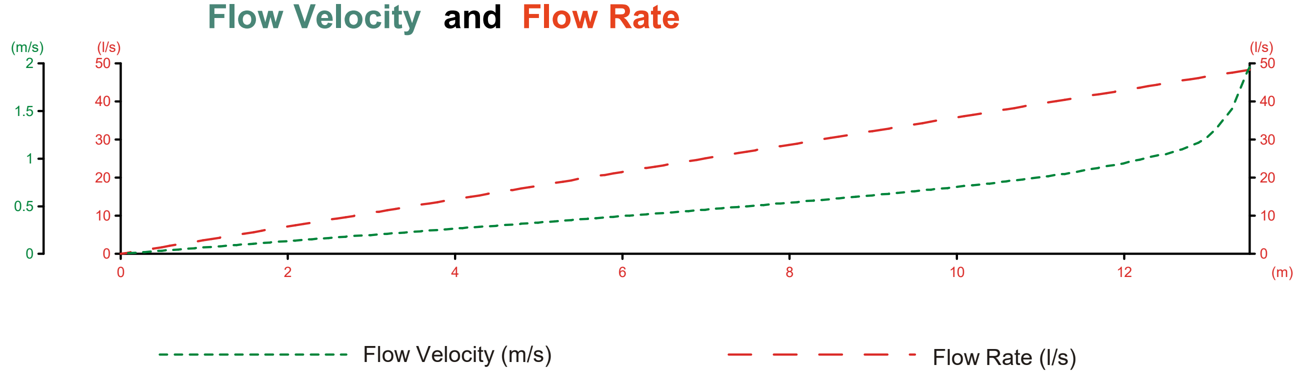
Discharge [l/s] : 48.37
Flow Velocity [m/s] : 1.96
Minimum Freeboard [mm] : 15.68, X = 0.00 m (Freeboard Depth)
Drain Capacity Utilised [%] : 94.01

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Channel type		: TD2
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 13.50
Hydraulic run length	[m]	: 13.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Date: 2024-09-11
Page: 6 of 13

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD3
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 12.50
Catchment Area	[m²]	: 2420
Runoff Coefficient	[C_m]	: 0.39
Hydraulic run length	[m]	: 12.50

All run segments combine to give the total run lenth.

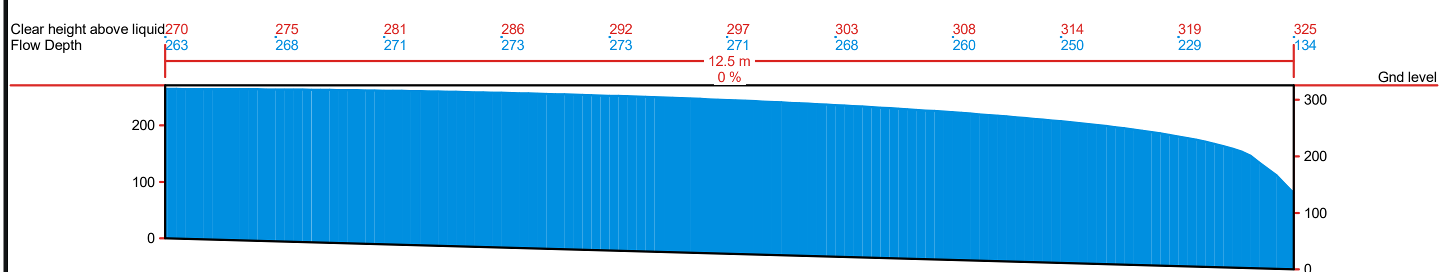
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	270									
Downstream Invert	[mm]	325									
Run Length	[m]	13									
Groundslope	[%]	0.000									

Results

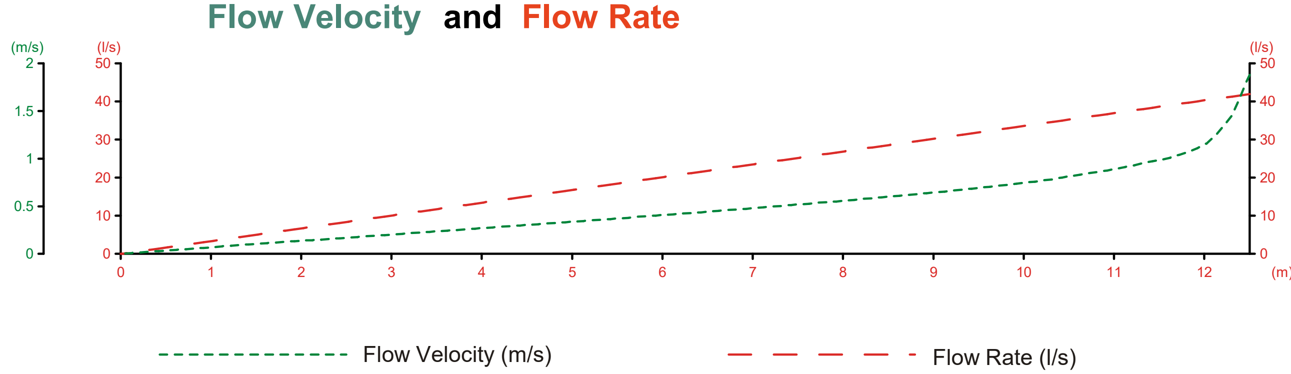
Discharge	[l/s]	: 41.95	
Flow Velocity	[m/s]	: 1.88	
Minimum Freeboard	[mm]	: 6.76, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 97.94	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Channel type		: TD3
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 12.50
Hydraulic run length	[m]	: 12.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Date: 2024-09-11
Page: 8 of 13

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD4
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 21.50
Catchment Area	[m²]	: 3190
Runoff Coefficient	[Cm]	: 0.56
Hydraulic run length	[m]	: 21.50

All run segments combine to give the total run lenth.

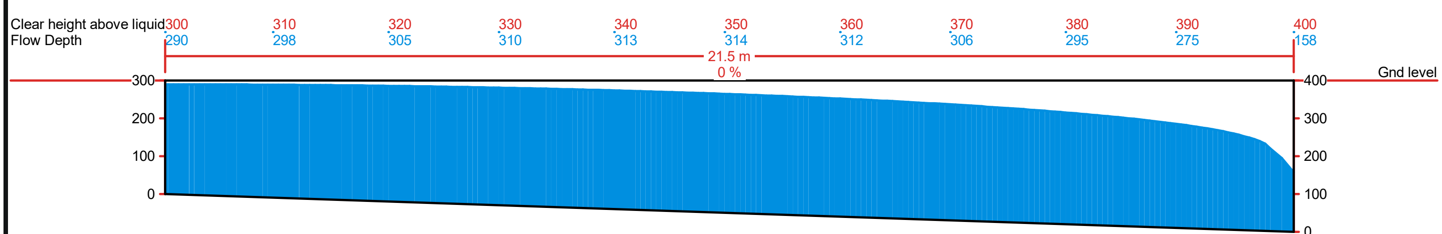
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	300									
Downstream Invert	[mm]	400									
Run Length	[m]	22									
Groundslope	[%]	0.000									

Results

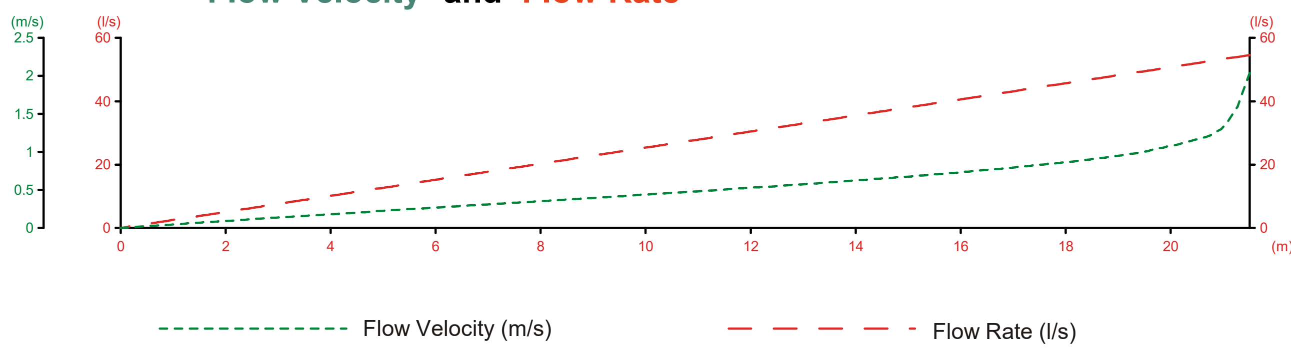
Discharge	[l/s]	: 54.58
Flow Velocity	[m/s]	: 2.04
Minimum Freeboard	[mm]	: 10.39, X = 0.00 m (Freeboard Depth)
Drain Capacity Utilised	[%]	: 96.59

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD4
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 21.50
Hydraulic run length	[m]	: 21.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Input

Channel type : TD5
Trench drain system : ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout :
Roughness Coefficient (Strickler) inverse Mannings : 95
Invert Type : Neutral Depth
Type of Outlet : sump unit-DN/OD110
Run Length [m] : 22.00
Catchment Area [m²] : 1840
Runoff Coefficient [Cm] : 0.29

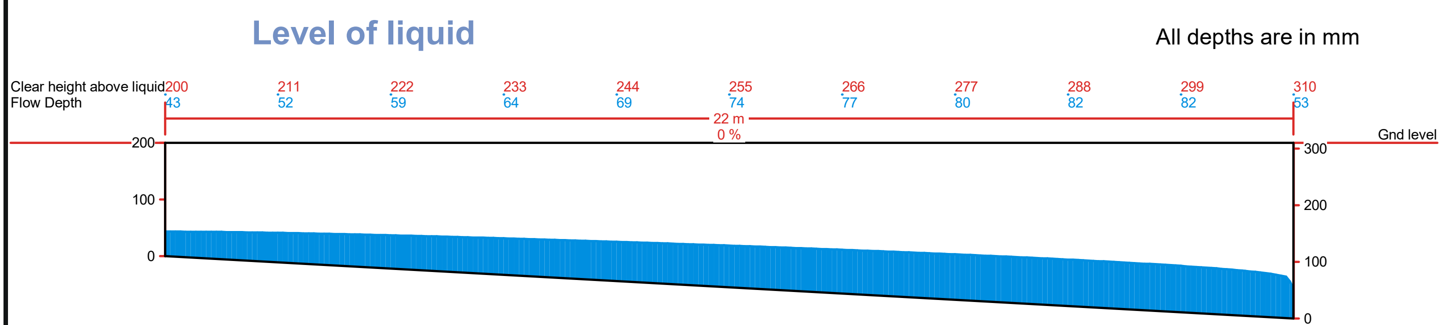
Hydraulic run length [m] : 22.00

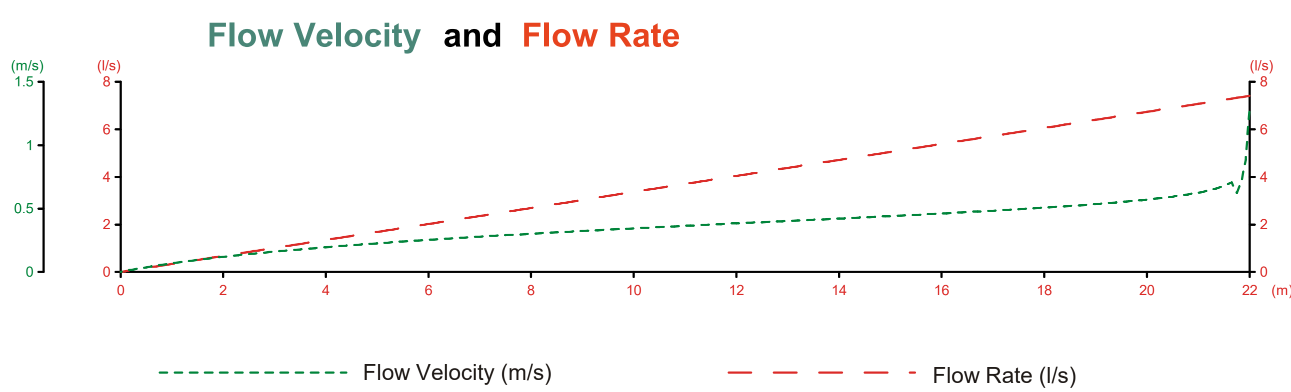
All run segments combine to give the total run lenth.

Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	310									
Run Length	[m]	22									
Groundslope	[%]	0.000									

Results

Discharge [l/s] : 7.41
Flow Velocity [m/s] : 1.27
Minimum Freeboard [mm] : 156.84, X = 0.00 m (Freeboard Depth)
Drain Capacity Utilised [%] : 20.59





Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Channel type		: TD5
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 22.00
Hydraulic run length	[m]	: 22.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Date: 2024-09-11

Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Input

Channel type : TD6
Trench drain system : ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout :
Roughness Coefficient (Strickler) inverse Mannings : 95
Invert Type : Neutral Depth
Type of Outlet : sump unit-DN/OD110
Run Length [m] : 25.00
Catchment Area [m²] : 2500
Runoff Coefficient [C_m] : 0.26

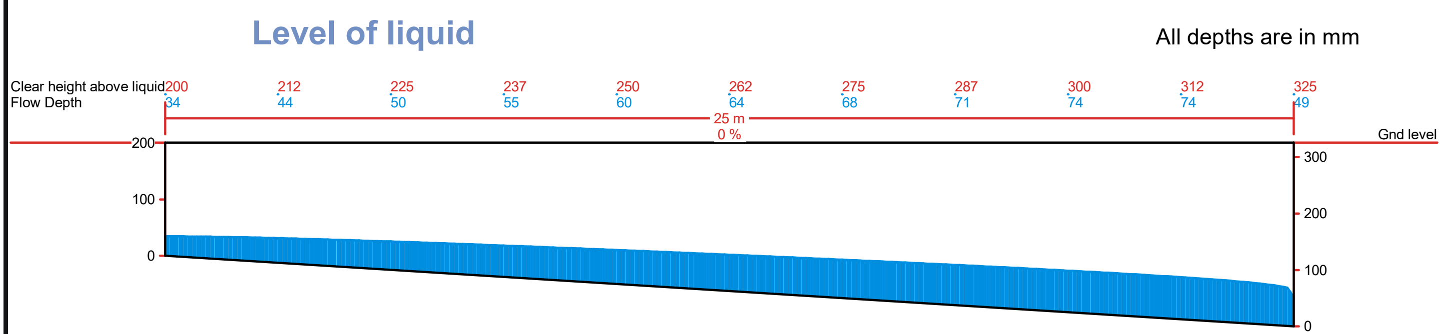
Hydraulic run length [m] : 25.00

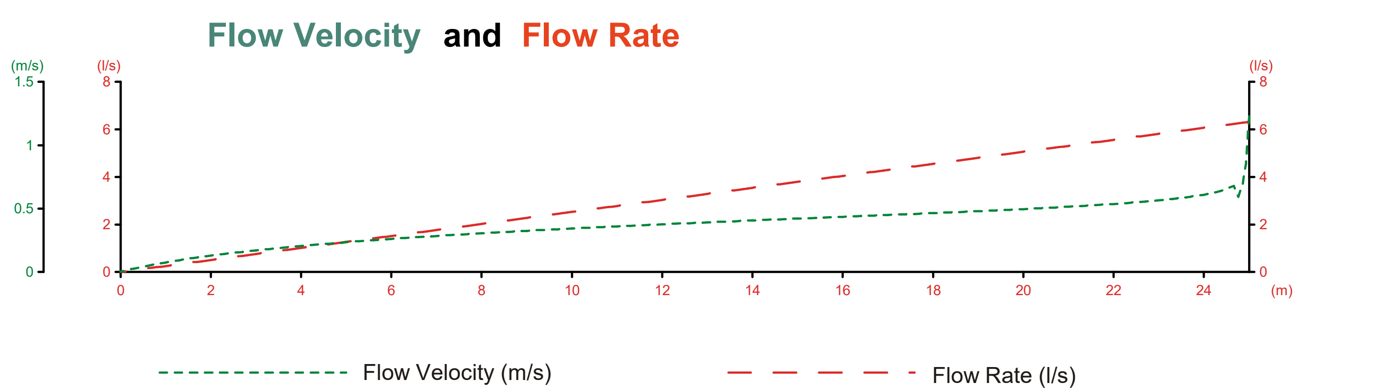
All run segments combine to give the total run lenth.

Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	325									
Run Length	[m]	25									
Groundslope	[%]	0.000									

Results

Discharge [l/s] : 6.32
Flow Velocity [m/s] : 1.23
Minimum Freeboard [mm] : 165.77, X = 0.00 m (Freeboard Depth)
Drain Capacity Utilised [%] : 16.61





Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

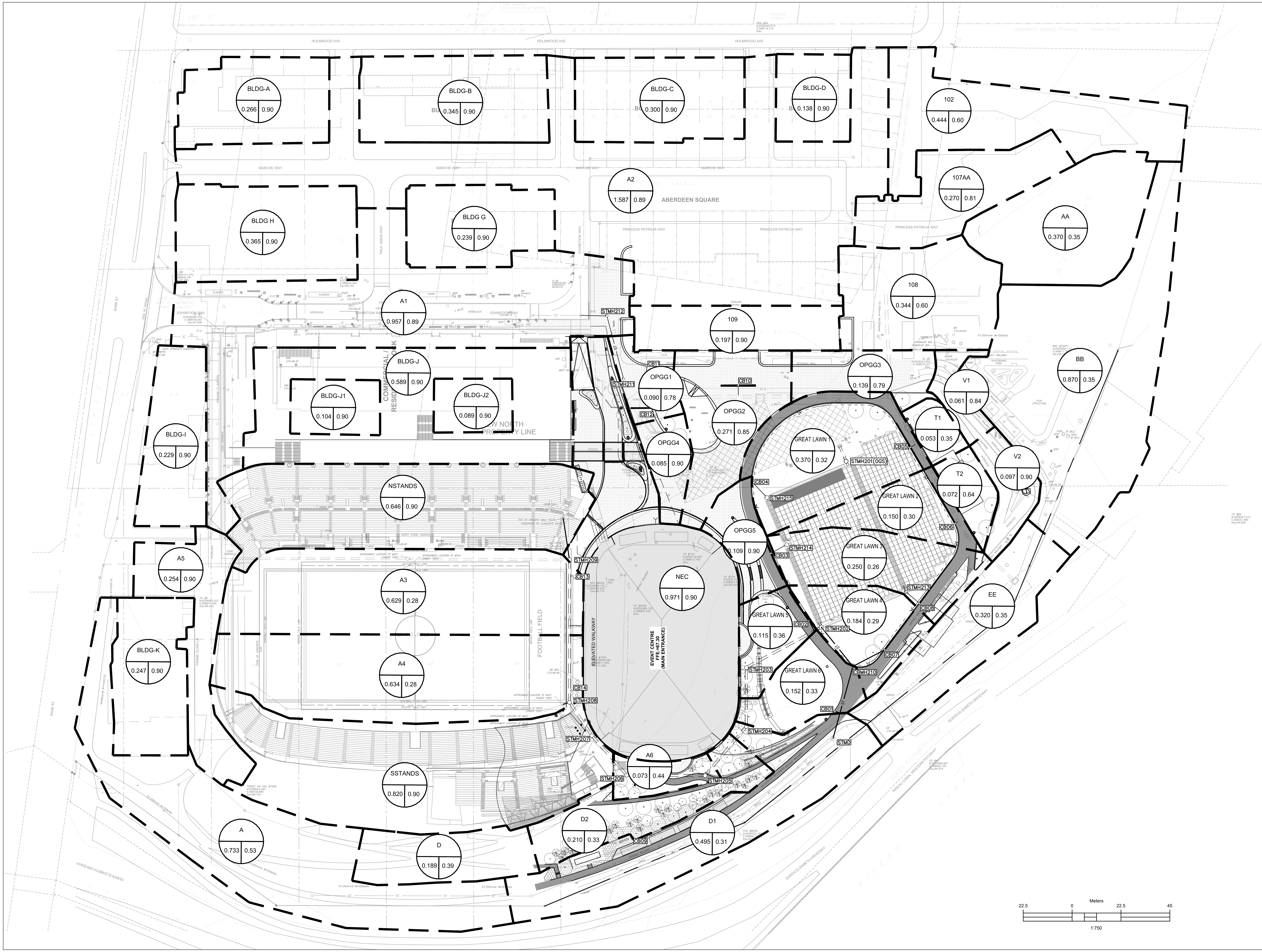
Channel type		: TD6
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 25.00
Hydraulic run length	[m]	: 25.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

C-2 PCSWMM Output



Ottawa

OSEG
Ottawa Sports and Entertainment Group

BRISBIN BROOK BEYNON ARCHITECTS
14 DUNCAN ST 4TH FLOOR
TORONTO, ON M5H 3G8
(416) 591-8999
ARCHITECT

ENTUITIVE
135 LAURIER AVE WEST, SUITE 413
OTTAWA, ON K1P 5J2
(343) 308-9274
STRUCTURAL ENGINEER

TMP
200 KING. ST. WEST, SUITE 310
TORONTO, ON M5H 3T4
(416) 499-8000
MECH, PLUMB, FIRE PROTECTION ENGINEER

MULVEY & BANANI
90 SHEPPARD AVE EAST, SUITE 500
TORONTO, ON M2N 3A
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ELEC, LIGHTING ENGINEER

S2O
530 N. WOOD STREET #C
CHICAGO, IL 60622
(224) 717-1999
FOOD AND BEVERAGE

CSW
319 MCRAE AVENUE, SUITE 502
OTTAWA, ONTARIO K1Z 0B9
(613) 729-4536
LANDSCAPE ARCHITECT

WSP
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO K2B 8K2
(613) 829-2800
CIVIL ENGINEER

NO.	DESCRIPTION	DATE
2	REVISED AS PER CITY COMMENTS	2024-09-13
1	ISSUED FOR SPA	2024-08-07

REVISIONS/ ISSUES

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
DO NOT SCALE THE DRAWINGS

SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2024-09-13
PROVINCE OF ONTARIO

NORTH

DRAWN J.T
DATE 2024/09/13
CHECKED W.Y

LANSDOWNE EC

DWG. TITLE
POST-DRAINAGE AREA PLAN

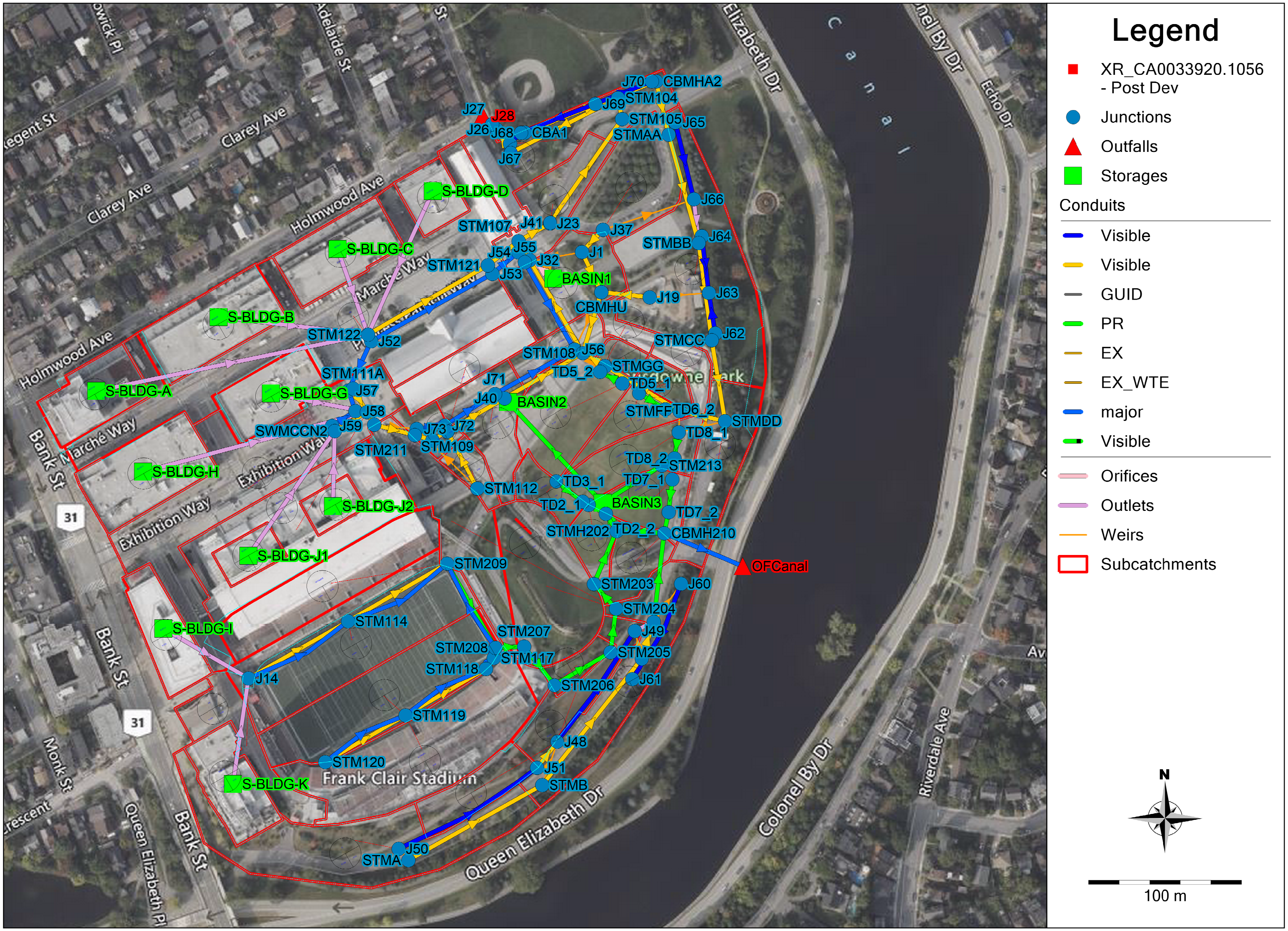
SCALE 1:750
DWG. NO. C07
PROJ. NO. CA0033920.1056

DATE PLOTTED:

PCSWMM Catchment Parameters –Proposed Conditions

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)
102	0.444	44.4	100.14	0.5	64.2
107AA	0.270	176.7	15.28	0.5	86.3
108	0.344	162.7	21.16	0.5	68.5
109	0.198	88.9	22.24	0.5	87.5
A	0.733	43.0	170.37	0.5	47.4
A1	0.957	234.9	40.75	0.5	98.5
A2	1.578	358.2	44.06	0.5	97.9
A3	0.770	217.1	35.45	0.5	100.0
A4	0.623	170.2	36.59	2	100.0
A5	0.246	30.9	79.59	0.5	99.9
A6	0.073	14.9	49.23	0.5	44.0
AA	0.370	72.8	50.84	0.5	54.4
BB	0.891	50.5	176.24	0.5	41.1
BLDG-A	0.254	254.2	10.00	0.5	100.0
BLDG-B	0.363	362.6	10.00	0.5	100.0
BLDG-C	0.299	299.3	10.00	0.5	100.0
BLDG-D	0.138	138.0	10.00	0.5	100.0
BLDGG	0.243	242.9	10.00	0.5	100.0
BLDGH	0.371	370.9	10.00	0.5	100.0
BLDG-I	0.226	225.6	10.00	0.5	100.0
BLDG-J	0.604	604.4	10.00	0.5	100.0
BLDG-J1	0.104	103.9	10.00	0.5	100.0
BLDG-J2	0.089	89.2	10.00	0.5	100.0
BLDG-K	0.247	247.3	10.00	0.5	100.0
D	0.189	38.7	48.90	0.5	27.1
D_2	0.210	38.7	54.30	0.5	19.1
D1	0.495	271.3	18.25	0.5	15.2
EE	0.353	38.6	91.52	0.5	15.3
Great-Lawn_1	0.370	75.0	49.33	0.5	17.0
Great-Lawn_2	0.150	46.0	32.61	0.5	15.0
Great-Lawn_3	0.250	41.0	61.05	0.5	9.0
Great-Lawn_4	0.184	49.7	37.08	0.5	13.0
Great-Lawn_5	0.115	45.5	25.20	0.5	23.0
Great-Lawn_6	0.152	40.0	38.05	0.5	18.0
Great-Lawn_9	0.000	135.1	0.00	0.5	19.0
NEC1	0.486	247.7	19.62	10	99.0
NEC2	0.486	247.7	19.62	10	99.0
NSTANDS	0.472	62.2	75.86	2	100.0
OPGG_1	0.090	42.8	20.94	0.5	83.0
OPGG_2	0.273	83.0	32.86	0.5	93.0
OPGG_3	0.139	67.0	20.70	0.5	84.0
OPGG_4	0.085	47.0	18.00	0.5	99.0

OPGG5	0.109	42.0	25.95	0.5	99.0
SSTANDS	0.786	162.6	48.34	10	100.0
T	0.131	75.9	17.24	0.5	27.8
V_1	0.061	167.8	3.62	0.5	96.6
V_2	0.097	167.8	5.77	0.5	96.6


Legend
XR_CA0033920.1056 - Post Dev
Junctions
Outfalls
Storages
Conduits
Visible
Visible
GUID
PR
EX
EX_WTE
major
Visible
Orifices
Outlets
Weirs
Subcatchments
N
100 m
S-BLDG-A
S-BLDG-B
S-BLDG-C
S-BLDG-D
S-BLDG-G
S-BLDG-H
S-BLDG-I
S-BLDG-J1
S-BLDG-J2
S-BLDG-K
BASIN1
BASIN2
BASIN3
OFCanal
J28
CBMHA2
STM104
STM105
STMAA
CBA1
STMBB
STMCC
STMDD
STMFF
STMGG
CBMHU
SWMCCN2
STM107
STM108
STM109
STM111A
STM112
STM114
STM117
STM118
STM119
STM120
STM121
STM122
STM203
STM204
STM205
STM206
STM207
STM208
STM209
STM211
STM213
STMH202
CBMH210
STMA
STMB
Frank Clair Stadium
Holmwood Ave
Clarey Ave
Marché Way
Exhibition Way
Bank St
Queen Elizabeth Dr
Colonel By Dr
Riverdale Ave
Monk St
Canal

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

WARNING 03: negative offset ignored for Link OR1
WARNING 03: negative offset ignored for Link OR2
WARNING 10: crest elevation raised to downstream invert for regulator Link W26
WARNING 02: maximum depth increased for Node CBA1
WARNING 02: maximum depth increased for Node CBMH210
WARNING 02: maximum depth increased for Node CBMHA2
WARNING 02: maximum depth increased for Node CBMHU
WARNING 02: maximum depth increased for Node J1
WARNING 02: maximum depth increased for Node J14
WARNING 02: maximum depth increased for Node J19
WARNING 02: maximum depth increased for Node J32
WARNING 02: maximum depth increased for Node J37
WARNING 02: maximum depth increased for Node STM107
WARNING 02: maximum depth increased for Node STM108
WARNING 02: maximum depth increased for Node STM112
WARNING 02: maximum depth increased for Node STM114
WARNING 02: maximum depth increased for Node STM117
WARNING 02: maximum depth increased for Node STM118
WARNING 02: maximum depth increased for Node STM119
WARNING 02: maximum depth increased for Node STM120
WARNING 02: maximum depth increased for Node STM121
WARNING 02: maximum depth increased for Node STM208
WARNING 02: maximum depth increased for Node STM209
WARNING 02: maximum depth increased for Node STM212
WARNING 02: maximum depth increased for Node STMA
WARNING 02: maximum depth increased for Node STMAA
WARNING 02: maximum depth increased for Node STMB
WARNING 02: maximum depth increased for Node STMC
WARNING 02: maximum depth increased for Node STMCC
WARNING 02: maximum depth increased for Node STMD
WARNING 02: maximum depth increased for Node STMDD
WARNING 02: maximum depth increased for Node STMFF
WARNING 02: maximum depth increased for Node STMGG
WARNING 02: maximum depth increased for Node TD2_1
WARNING 02: maximum depth increased for Node TD3_1
WARNING 02: maximum depth increased for Node TD3_2
WARNING 02: maximum depth increased for Node TD5_1
WARNING 02: maximum depth increased for Node TD6_1
WARNING 02: maximum depth increased for Node TD6_2
WARNING 02: maximum depth increased for Node TD7_1
WARNING 02: maximum depth increased for Node TD7_2
WARNING 02: maximum depth increased for Node TD8_1
WARNING 02: maximum depth increased for Node TD8_2

****
Element Count
****

Number of rain gages 18
Number of subcatchments ... 47
Number of nodes 106
Number of links 145
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
100yr_3hr_Chicago	100yr_3hr_Chicago	INTENSITY	10 min.
100yr_3hr_Chicago_Climate_Change	100yr_3hr_Chicago_Increase_20percent	INTENSITY	10 min.
100yr_6hr_Chicago	100yr_6hr_Chicago	INTENSITY	10 min.
100yr_6hr_Chicago_Climate_Change	100yr_6hr_Chicago_Increase_20percent	INTENSITY	10 min.
100yr-SCS_12hr_Type_II	100yr-SCS_12hr_Type_II	INTENSITY	6 min.
100yr-SCS_24hr_Type_II	100yr-SCS_24hr_Type_II	INTENSITY	15 min.
10yr_3hr_Chicago	10yr_3hr_Chicago	INTENSITY	10 min.
10yr_6hr_Chicago	10yr_6hr_Chicago	INTENSITY	10 min.
25mm_3hr_Chicago	25mm_3hr_Chicago	INTENSITY	10 min.
25mm_4hr_Chicago	25mm_4hr_Chicago	INTENSITY	10 min.
25yr_3hr_Chicago	25yr_3hr_Chicago	INTENSITY	10 min.
25yr_6hr_Chicago	25yr_6hr_Chicago	INTENSITY	10 min.
2yr_3hr_Chicago	2yr_3hr_Chicago	INTENSITY	10 min.
2yr_6hr_Chicago	2yr_6hr_Chicago	INTENSITY	10 min.
50yr_3hr_Chicago	50yr_3hr_Chicago	INTENSITY	10 min.
50yr_6hr_Chicago	50yr_6hr_Chicago	INTENSITY	10 min.
5yr_3hr_Chicago	5yr_3hr_Chicago	INTENSITY	10 min.
5yr_6hr_Chicago	5yr_6hr_Chicago	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
102	0.44	44.37	64.22	0.5000	100yr_3hr_Chicago	J67
107AA	0.27	176.73	86.34	0.5000	100yr_3hr_Chicago	J23
108	0.34	162.73	68.53	0.5000	100yr_3hr_Chicago	BASIN1
109	0.20	88.92	87.49	0.5000	100yr_3hr_Chicago	STM109
A	0.73	43.00	47.40	0.5000	100yr_3hr_Chicago	J50
A1	0.96	234.86	98.54	0.5000	100yr_3hr_Chicago	J59
A2	1.58	358.18	97.91	0.5000	100yr_3hr_Chicago	J52
A3	0.77	217.10	100.00	0.5000	100yr_3hr_Chicago	STM114
A4	0.62	170.22	100.00	2.0000	100yr_3hr_Chicago	STM119
A5	0.25	30.92	99.94	0.5000	100yr_3hr_Chicago	J14
A6	0.07	14.87	44.00	0.5000	100yr_3hr_Chicago	STM206
AA	0.37	72.80	54.39	0.5000	100yr_3hr_Chicago	J37
BB	0.89	50.53	41.05	0.5000	100yr_3hr_Chicago	J64
BLDG-A	0.25	254.20	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-A
BLDG-B	0.36	362.60	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-B
BLDG-C	0.30	299.30	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-C
BLDG-D	0.14	138.00	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-D
BLDGG	0.24	242.90	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-G
BLDGH	0.37	370.90	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-H
BLDG-I	0.23	225.60	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-I
BLDG-J	0.60	604.40	100.00	0.5000	100yr_3hr_Chicago	SWMCCN1
BLDG-J1	0.10	103.90	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-J1
BLDG-J2	0.09	89.20	100.00	0.5000	100yr_3hr_Chicago	S-BLDG-J2
BLDG-K	0.25	247.30	99.99	0.5000	100yr_3hr_Chicago	S-BLDG-K
D	0.19	38.69	27.10	0.5000	100yr_3hr_Chicago	J48
D_2	0.21	38.69	19.10	0.5000	100yr_3hr_Chicago	J48
D1	0.50	271.32	15.20	0.5000	100yr_3hr_Chicago	J61
EE	0.35	38.57	15.30	0.5000	100yr_3hr_Chicago	STMDD
Great-Lawn_1	0.37	75.00	17.00	0.5000	100yr_3hr_Chicago	TD5_1
Great-Lawn_2	0.15	46.00	15.00	0.5000	100yr_3hr_Chicago	TD6_1
Great-Lawn_3	0.25	41.00	9.00	0.5000	100yr_3hr_Chicago	TD8_1
Great-Lawn_4	0.18	49.70	13.00	0.5000	100yr_3hr_Chicago	TD7_1
Great-Lawn_5	0.11	45.48	23.00	0.5000	100yr_3hr_Chicago	TD2_1
Great-Lawn_6	0.15	40.00	18.00	0.5000	100yr_3hr_Chicago	CBMH210
NEC1	0.49	247.73	99.00	10.0000	100yr_3hr_Chicago	STM204
NEC2	0.49	247.73	99.00	10.0000	100yr_3hr_Chicago	STM204
NSTANDS	0.47	62.16	99.98	2.0000	100yr_3hr_Chicago	STM209
OPGG_1	0.09	42.80	83.00	0.5000	100yr_3hr_Chicago	J73
OPGG_2	0.27	83.00	93.00	0.5000	100yr_3hr_Chicago	J71
OPGG_3	0.14	67.00	84.00	0.5000	100yr_3hr_Chicago	J56
OPGG_4	0.08	47.00	99.00	0.5000	100yr_3hr_Chicago	STM112
OPGG5	0.11	42.00	99.00	0.5000	100yr_3hr_Chicago	TD3_1
SSTANDS	0.79	162.57	99.99	10.0000	100yr_3hr_Chicago	STM119
T1	0.05	71.00	24.40	0.5000	100yr_3hr_Chicago	TD5_1
T2	0.08	75.86	27.76	0.5000	100yr_3hr_Chicago	TD6_1
V_1	0.06	78.30	96.59	0.5000	100yr_3hr_Chicago	TD5_2
V_2	0.10	167.82	96.59	0.5000	100yr_3hr_Chicago	TD6_1

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CBA1	JUNCTION	64.07	1.93	0.0	
CBMH210	JUNCTION	63.18	2.80	0.0	
CBMHA2	JUNCTION	63.89	2.31	0.0	
CBMHU	JUNCTION	63.36	2.64	0.0	
J1	JUNCTION	63.56	2.79	0.0	
J14	JUNCTION	63.95	3.10	0.0	
J19	JUNCTION	63.62	2.08	720.0	
J23	JUNCTION	62.59	2.30	1000.0	
J26	JUNCTION	62.29	2.84	0.0	
J27	JUNCTION	62.25	2.88	0.0	
J32	JUNCTION	62.76	3.44	0.0	
J37	JUNCTION	63.68	2.42	466.0	
J40	JUNCTION	62.85	2.26	0.0	
J41	JUNCTION	62.59	2.30	1000.0	
J48	JUNCTION	64.69	3.00	0.0	
J49	JUNCTION	63.82	3.58	0.0	
J50	JUNCTION	65.08	3.00	0.0	
J51	JUNCTION	64.88	3.47	0.0	
J52	JUNCTION	65.31	3.00	0.0	
J53	JUNCTION	65.25	3.00	0.0	
J54	JUNCTION	65.25	3.00	0.0	
J55	JUNCTION	65.20	3.00	0.0	
J56	JUNCTION	64.95	3.00	0.0	
J57	JUNCTION	65.30	3.00	0.0	
J58	JUNCTION	65.35	3.00	0.0	
J59	JUNCTION	65.58	3.00	0.0	
J60	JUNCTION	64.65	3.00	0.0	
J61	JUNCTION	64.30	3.00	0.0	
J62	JUNCTION	64.70	3.00	0.0	
J63	JUNCTION	64.50	3.00	0.0	
J64	JUNCTION	64.65	3.00	0.0	
J65	JUNCTION	65.10	3.00	0.0	
J66	JUNCTION	64.50	3.00	0.0	
J67	JUNCTION	65.17	3.00	0.0	
J68	JUNCTION	65.00	3.00	0.0	
J69	JUNCTION	65.43	3.00	0.0	
J70	JUNCTION	65.20	3.00	0.0	

J71	JUNCTION	65.18	3.00	0.0
J72	JUNCTION	64.75	3.00	0.0
J73	JUNCTION	65.45	3.00	0.0
STM102	JUNCTION	62.34	2.32	0.0
STM104	JUNCTION	62.47	2.90	0.0
STM105	JUNCTION	62.52	3.05	0.0
STM107	JUNCTION	62.72	3.53	0.0
STM108	JUNCTION	62.00	3.95	0.0
STM109	JUNCTION	62.96	1.79	0.0
STM110	JUNCTION	63.10	2.35	0.0
STM111A	JUNCTION	63.76	1.54	0.0
STM112	JUNCTION	63.03	3.42	0.0
STM114	JUNCTION	63.77	3.00	0.0
STM117	JUNCTION	63.91	3.51	0.0
STM118	JUNCTION	63.96	3.51	0.0
STM119	JUNCTION	64.11	3.34	0.0
STM120	JUNCTION	64.26	3.14	0.0
STM121	JUNCTION	63.31	2.94	0.0
STM122	JUNCTION	63.68	1.63	0.0
STM203	JUNCTION	63.19	5.07	0.0
STM204	JUNCTION	63.24	8.26	0.0
STM205	JUNCTION	63.29	4.76	0.0
STM206	JUNCTION	63.35	5.36	0.0
STM207	JUNCTION	63.40	5.43	0.0
STM208	JUNCTION	63.44	4.07	0.0
STM209	JUNCTION	63.58	3.84	0.0
STM211	JUNCTION	63.22	2.23	0.0
STM212	JUNCTION	63.29	3.16	0.0
STM213	JUNCTION	63.09	1.95	0.0
STMA	JUNCTION	63.56	2.58	0.0
STMAA	JUNCTION	63.76	2.64	0.0
STMB	JUNCTION	63.44	2.58	0.0
STMBB	JUNCTION	63.57	1.83	0.0
STMC	JUNCTION	63.35	2.21	0.0
STMCC	JUNCTION	63.42	2.78	0.0
STMD	JUNCTION	63.24	2.66	0.0
STMDD	JUNCTION	63.12	2.93	0.0
STMFF	JUNCTION	63.09	2.82	0.0
STMGG	JUNCTION	63.03	2.82	0.0
STMH202	JUNCTION	63.06	2.33	0.0
SWMCCN1	JUNCTION	63.32	2.03	0.0
SWMCCN2	JUNCTION	63.79	1.79	0.0
TD2_1	JUNCTION	65.38	0.28	0.0
TD2_2	JUNCTION	64.01	1.57	0.0
TD3_1	JUNCTION	65.98	0.36	0.0
TD3_2	JUNCTION	64.19	2.09	0.0
TD5_1	JUNCTION	64.64	0.33	0.0
TD5_2	JUNCTION	63.74	1.17	0.0
TD6_1	JUNCTION	64.71	0.40	0.0
TD6_2	JUNCTION	63.76	1.15	0.0
TD7_1	JUNCTION	64.71	0.31	0.0
TD7_2	JUNCTION	63.69	1.22	0.0
TD8_1	JUNCTION	64.70	0.33	0.0
TD8_2	JUNCTION	63.19	1.71	0.0
J28	OUTFALL	62.22	0.97	0.0
OFCanal	OUTFALL	64.50	1.00	0.0
BASIN1	STORAGE	62.81	2.39	0.0
BASIN2	STORAGE	62.95	2.19	0.0
BASIN3	STORAGE	62.86	1.68	0.0
S-BLDG-A	STORAGE	100.00	0.15	0.0
S-BLDG-B	STORAGE	100.00	0.15	0.0
S-BLDG-C	STORAGE	100.00	0.15	0.0
S-BLDG-D	STORAGE	100.00	0.15	0.0
S-BLDG-G	STORAGE	100.00	0.15	0.0
S-BLDG-H	STORAGE	100.00	0.15	0.0
S-BLDG-I	STORAGE	100.00	0.15	0.0
S-BLDG-J1	STORAGE	100.00	0.15	0.0
S-BLDG-J2	STORAGE	100.00	0.15	0.0
S-BLDG-K	STORAGE	100.00	0.15	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	% Slope	Roughness
C1	J14	STM114	CONDUIT	75.0	0.2001	0.0130
C10	STMH202	BASIN3	CONDUIT	20.5	0.0489	0.0130
C10_1	STMC	STMD	CONDUIT	25.1	0.0954	0.0130
C11	STMD	CBMH210	CONDUIT	34.4	0.1017	0.0130
C12	CBMH210	OFCanal	CONDUIT	55.8	0.8604	0.0100
C13	SWMCCN2	SWMCCN1	CONDUIT	23.0	0.5217	0.0130
C14	STM111A	SWMCCN1	CONDUIT	17.9	0.5037	0.0130
C15	SWMCCN1	STM212	CONDUIT	8.2	0.2439	0.0130
C16	STM212	STM211	CONDUIT	30.0	0.1667	0.0130
C17	STM110	STM109	CONDUIT	11.3	0.1770	0.0130
C18	STMDD	STMFF	CONDUIT	30.2	0.0992	0.0130
C18_1	STM109	J40	CONDUIT	43.3	0.2542	0.0130
C18_2	J40	STM108	CONDUIT	59.3	0.0337	0.0130
C19	STMFF	STMGG	CONDUIT	57.0	0.0526	0.0130
C2	STM120	STM119	CONDUIT	60.8	0.1975	0.0130
C20	STMGG	STM108	CONDUIT	16.7	6.1921	0.0130
C21	STMCC	STMDD	CONDUIT	53.4	0.2247	0.0130
C21_1	STM108	J32	CONDUIT	70.1	0.0599	0.0130
C21_2	J32	STM107	CONDUIT	14.2	0.0565	0.0130
C22	J19	CBMHU	CONDUIT	31.8	0.5029	0.0130
C23	CBMHU	STM108	CONDUIT	41.5	0.5054	0.0130
C24	STM122	STM121	CONDUIT	90.6	0.3752	0.0130
C25	STM121	STM107	CONDUIT	25.4	0.3937	0.0130
C26	STM107	J23	CONDUIT	20.7	0.1932	0.0130
C27	STMBB	STMCC	CONDUIT	63.9	0.2347	0.0130
C27_2	J41	STM105	CONDUIT	80.2	0.0873	0.0130
C28	STM105	STM104	CONDUIT	10.1	0.0990	0.0130
C29	STM104	STM102	CONDUIT	78.9	0.1394	0.0130
C3	STM119	STM118	CONDUIT	60.7	0.1976	0.0130
C30	STM102	J26	CONDUIT	17.8	0.1125	0.0130
C31	J26	J27	CONDUIT	4.6	0.4383	0.0130
C32	J27	J28	CONDUIT	8.1	0.3695	0.0130
C33	J37	J1	CONDUIT	19.3	0.4663	0.0130
C34	J1	CBMHU	CONDUIT	28.7	0.5227	0.0130
C35	STMA	STMB	CONDUIT	100.1	0.0999	0.0130
C36	STMB	STMC	CONDUIT	105.1	0.0761	0.0130
C37	J52	J57	CONDUIT	35.4	0.0565	0.0130
C38	STMAA	STMBB	CONDUIT	73.4	0.1498	0.0130
C39	CBMHA2	STMAA	CONDUIT	35.8	0.1397	0.0130
C4	STM118	STM117	CONDUIT	8.8	0.2278	0.0130
C40	CBA1	CBMHA2	CONDUIT	92.0	0.1522	0.0130
C41	J48	J49	CONDUIT	88.2	0.3287	0.0350
C43	J50	J51	CONDUIT	105.0	0.1904	0.0350
C44	J51	J48	CONDUIT	21.6	0.8797	0.0240
C45	J52	J53	CONDUIT	90.8	0.0661	0.0130
C46	J53	J54	CONDUIT	22.0	0.0455	0.0130
C47	J54	J55	CONDUIT	7.7	0.6525	0.0130
C48	J55	J56	CONDUIT	65.7	0.3804	0.0130
C49	J59	J58	CONDUIT	18.0	1.2770	0.0130
C5	STM117	STM208	CONDUIT	6.7	0.1504	0.0130
C50	J58	J57	CONDUIT	14.2	0.3521	0.0130
C51	STM213	BASIN3	CONDUIT	3.1	0.9741	0.0130
C52	J60	J61	CONDUIT	70.3	0.4980	0.0350
C53	J62	J63	CONDUIT	26.8	0.7450	0.0350
C54	J64	J63	CONDUIT	37.1	0.4039	0.0350
C55	J65	J66	CONDUIT	51.5	1.1643	0.0350
C56	J67	J68	CONDUIT	10.1	1.6809	0.0350
C57	J69	J68	CONDUIT	52.1	0.8247	0.0350
C58	J69	J70	CONDUIT	39.7	0.5794	0.0350
C59	STM207	STM206	CONDUIT	24.3	0.0823	0.0130
C6	STM209	STM208	CONDUIT	65.6	0.0914	0.0130
C60	STM206	STM205	CONDUIT	36.1	0.1109	0.0130
C61	STM205	STM204	CONDUIT	29.5	0.1016	0.0130
C62	STM204	STM203	CONDUIT	27.1	0.1105	0.0130
C63	STM203	STMH202	CONDUIT	41.6	0.0962	0.0130
C64	STM112	STM109	CONDUIT	44.0	0.1136	0.0130
C65	STM211	STM110	CONDUIT	11.0	0.2091	0.0130
C66	TD2_1	TD2_2	CONDUIT	16.0	0.5000	0.0130
C67	TD2_2	STMH202	CONDUIT	5.8	0.9263	0.0130
C68	TD3_1	TD3_2	CONDUIT	14.0	0.4643	0.0130
C69	TD3_2	BASIN3	CONDUIT	8.2	0.9816	0.0130
C7	STM114	STM209	CONDUIT	74.9	0.2004	0.0130
C70	TD5_1	TD5_2	CONDUIT	12.5	0.4400	0.0130
C71	TD5_2	STMGG	CONDUIT	3.0	1.0170	0.0130
C72	TD6_1	TD6_2	CONDUIT	21.5	0.9303	0.0130
C73	TD6_2	STMFF	CONDUIT	1.9	1.0811	0.0130
C74	TD7_1	TD7_2	CONDUIT	22.0	0.5000	0.0130
C75	TD7_2	CBMH210	CONDUIT	16.3	1.0462	0.0130
C76	TD8_1	TD8_2	CONDUIT	25.0	0.5000	0.0130

C77	TD8_2	STM213	CONDUIT	8.1		0.9889	0.0130
C78	J72	J71	CONDUIT	38.9	-	1.1057	0.0130
C79	J71	J56	CONDUIT	59.7		0.3855	0.0130
C8	STM208	STM207	CONDUIT	18.4		0.1084	0.0130
C80	J73	J72	CONDUIT	18.4		3.8019	0.0130
C9	CBMH210	STMH202	CONDUIT	22.2		0.1349	0.0130
W24	J14	STM114	CONDUIT	75.5		0.3709	0.0100
W25	STM114	STM209	CONDUIT	76.0	-	0.8556	0.0100
W27	STM120	STM119	CONDUIT	61.3		3.7356	0.0100
W28	STM119	STM118	CONDUIT	61.3		4.0665	0.0100
W29	STM118	STM117	CONDUIT	10.4		25.4307	0.0100
W30	STM117	STM208	CONDUIT	8.3		0.2411	0.0100
W31	STM208	STM209	CONDUIT	63.5		0.1417	0.0100
W4	BASIN3	BASIN2	CONDUIT	7.6		1.0499	0.0130
C27_1	J23	J41	ORIFICE				
OR1	BASIN2	J40	ORIFICE				
OR2	BASIN1	J32	ORIFICE				
W1	BASIN1	J32	WEIR				
W10	STMB	J48	WEIR				
W11	STMC	J49	WEIR				
W12	STMA	J50	WEIR				
W13	STM212	J73	WEIR				
W14	STMD	J60	WEIR				
W15	STMDD	TD8_1	WEIR				
W16	J52	STM122	WEIR				
W17	STM121	J53	WEIR				
W18	STM107	J54	WEIR				
W19	J32	J55	WEIR				
W2	J40	BASIN2	WEIR				
W20	J56	STM108	WEIR				
W21	J59	SWMCCN2	WEIR				
W22	J58	SWMCCN1	WEIR				
W23	J57	STM111A	WEIR				
W26	STM112	J73	WEIR				
W3	J32	BASIN1	WEIR				
W33	STMAA	J65	WEIR				
W34	J64	STMBB	WEIR				
W35	STMCC	J62	WEIR				
W36	J1	J55	WEIR				
W37	CBMHU	J56	WEIR				
W38	CBA1	J68	WEIR				
W39	CBMHA2	J70	WEIR				
W41	J72	STM109	WEIR				
W42	J71	J40	WEIR				
W43	J73	STM211	WEIR				
W5	J19	J63	WEIR				
W6	STMFF	TD8_1	WEIR				
W7	STMGG	TD5_2	WEIR				
W8	STM108	TD5_2	WEIR				
W9	J37	J66	WEIR				
C42	J49	STMD	OUTLET				
OL1	J61	STMC	OUTLET				
OL10	S-BLDG-H	SWMCCN1	OUTLET				
OL11	S-BLDG-G	SWMCCN1	OUTLET				
OL12	S-BLDG-I	J14	OUTLET				
OL13	S-BLDG-K	J14	OUTLET				
OL14	S-BLDG-J1	SWMCCN2	OUTLET				
OL15	S-BLDG-J2	SWMCCN2	OUTLET				
OL2	J63	STMCC	OUTLET				
OL3	J66	STMBB	OUTLET				
OL4	J68	CBA1	OUTLET				
OL5	J70	CBMHA2	OUTLET				
OL6	S-BLDG-A	STM122	OUTLET				
OL7	S-BLDG-B	STM122	OUTLET				
OL8	S-BLDG-C	STM122	OUTLET				
OL9	S-BLDG-D	STM122	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
C1	CIRCULAR	0.82	0.53	0.21	0.82	1	0.64
C10	CIRCULAR	1.05	0.87	0.26	1.05	1	0.60
C10_1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.19
C11	CIRCULAR	0.60	0.28	0.15	0.60	1	0.20
C12	RECT_OPEN	1.00	1.00	0.33	1.00	1	4.46
C13	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C14	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C15	CIRCULAR	0.60	0.28	0.15	0.60	1	0.30
C16	CIRCULAR	0.60	0.28	0.15	0.60	1	0.25
C17	CIRCULAR	0.60	0.28	0.15	0.60	1	0.26
C18	CIRCULAR	0.90	0.64	0.23	0.90	1	0.57
C18_1	CIRCULAR	1.35	1.43	0.34	1.35	1	2.69
C18_2	CIRCULAR	1.35	1.43	0.34	1.35	1	0.98
C19	CIRCULAR	0.90	0.64	0.23	0.90	1	0.42
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.13
C20	CIRCULAR	0.90	0.64	0.23	0.90	1	4.51
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.20
C21_1	CIRCULAR	1.35	1.43	0.34	1.35	1	1.31
C21_2	CIRCULAR	1.35	1.43	0.34	1.35	1	1.27
C22	CIRCULAR	0.20	0.03	0.05	0.20	1	0.02
C23	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C24	CIRCULAR	0.68	0.36	0.17	0.68	1	0.51
C25	CIRCULAR	0.68	0.36	0.17	0.68	1	0.53
C26	CIRCULAR	1.35	1.43	0.34	1.35	1	2.35
C27	CIRCULAR	0.53	0.22	0.13	0.53	1	0.21
C27_2	CIRCULAR	0.97	0.75	0.24	0.97	1	0.66
C28	CIRCULAR	0.97	0.75	0.24	0.97	1	0.71
C29	CIRCULAR	0.97	0.75	0.24	0.97	1	0.84
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.13
C30	CIRCULAR	0.97	0.75	0.24	0.97	1	0.75
C31	CIRCULAR	0.97	0.75	0.24	0.97	1	1.48
C32	CIRCULAR	0.97	0.75	0.24	0.97	1	1.36
C33	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C34	CIRCULAR	0.25	0.05	0.06	0.25	1	0.04
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.19
C36	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C37	RECT_OPEN	1.00	8.00	0.80	8.00	1	12.61
C38	CIRCULAR	0.45	0.16	0.11	0.45	1	0.11
C39	CIRCULAR	0.38	0.11	0.09	0.38	1	0.07
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.29
C40	CIRCULAR	0.38	0.11	0.09	0.38	1	0.07
C41	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	4.38
C43	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	3.33
C44	CIRCULAR	0.25	0.05	0.06	0.25	1	0.03
C45	RECT_OPEN	1.00	8.00	0.80	8.00	1	13.63
C46	RECT_OPEN	1.00	8.00	0.80	8.00	1	11.32
C47	RECT_OPEN	1.00	8.00	0.80	8.00	1	42.85
C48	RECT_OPEN	1.00	8.00	0.80	8.00	1	32.71
C49	RECT_OPEN	1.00	8.00	0.80	8.00	1	59.94
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24
C50	RECT_OPEN	1.00	8.00	0.80	8.00	1	31.48
C51	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C52	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	5.39
C53	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	6.59
C54	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	4.85
C55	TRAPEZOIDAL	1.00	4.00	0.55	7.00	1	8.24
C56	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	6.76
C57	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	4.74
C58	TRAPEZOIDAL	1.00	3.00	0.47	6.00	1	3.97
C59	CIRCULAR	1.05	0.87	0.26	1.05	1	0.78
C6	CIRCULAR	0.90	0.64	0.23	0.90	1	0.55
C60	CIRCULAR	1.05	0.87	0.26	1.05	1	0.91
C61	CIRCULAR	1.05	0.87	0.26	1.05	1	0.87
C62	CIRCULAR	1.05	0.87	0.26	1.05	1	0.91
C63	CIRCULAR	1.05	0.87	0.26	1.05	1	0.85
C64	CIRCULAR	1.20	1.13	0.30	1.20	1	1.31
C65	CIRCULAR	1.00	0.79	0.25	1.00	1	1.10
C66	RECT_OPEN	0.28	0.06	0.07	0.20	1	0.05
C67	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C68	RECT_OPEN	0.36	0.07	0.08	0.20	1	0.07
C69	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C7	CIRCULAR	0.82	0.53	0.21	0.82	1	0.64
C70	RECT_OPEN	0.33	0.07	0.08	0.20	1	0.06

C71	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C72	RECT_OPEN	0.40	0.08	0.08	0.20	1	0.11
C73	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C74	RECT_OPEN	0.31	0.06	0.08	0.20	1	0.06
C75	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C76	RECT_OPEN	0.33	0.07	0.08	0.20	1	0.06
C77	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C78	RECT_OPEN	1.00	8.00	0.80	8.00	1	55.77
C79	RECT_OPEN	1.00	8.00	0.80	8.00	1	32.93
C8	CIRCULAR	1.05	0.87	0.26	1.05	1	0.90
C80	RECT_OPEN	1.00	8.00	0.80	8.00	1	103.42
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.23
W24	RECT_OPEN	1.00	14.00	0.87	14.00	1	78.01
W25	RECT_OPEN	1.00	14.00	0.87	14.00	1	118.49
W27	RECT_OPEN	1.00	4.00	0.67	4.00	1	59.01
W28	RECT_OPEN	1.00	4.00	0.67	4.00	1	61.57
W29	RECT_OPEN	1.00	4.00	0.67	4.00	1	153.96
W30	RECT_OPEN	1.00	4.00	0.67	4.00	1	14.99
W31	RECT_OPEN	1.00	9.00	0.82	9.00	1	29.65
W4	CIRCULAR	0.90	0.64	0.23	0.90	1	1.86

****
Shape Summary
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Shape 0.510_1

Area:

0.0040	0.0122	0.0237	0.0378	0.0541
0.0723	0.0915	0.1116	0.1323	0.1535
0.1753	0.1974	0.2200	0.2429	0.2660
0.2892	0.3125	0.3357	0.3589	0.3821
0.4053	0.4285	0.4517	0.4749	0.4981
0.5213	0.5445	0.5677	0.5910	0.6142
0.6374	0.6606	0.6838	0.7070	0.7302
0.7534	0.7766	0.7998	0.8230	0.8462
0.8695	0.8927	0.9159	0.9381	0.9570
0.9725	0.9845	0.9931	0.9983	1.0000

Hrad:

0.0326	0.0620	0.0927	0.1255	0.1571
0.1941	0.2345	0.2757	0.3174	0.3595
0.4018	0.4435	0.4860	0.5280	0.5727
0.6191	0.6650	0.7103	0.7551	0.7994
0.8433	0.8866	0.9295	0.9719	1.0138
1.0552	1.0963	1.1369	1.1770	1.2167
1.2560	1.2949	1.3334	1.3715	1.4092
1.4465	1.4834	1.5199	1.5561	1.5919
1.6273	1.6624	1.6971	1.5863	1.4511
1.3366	1.2373	1.1497	1.0712	1.0000

Width:

0.2699	0.4300	0.5564	0.6554	0.7492
0.8096	0.8484	0.8791	0.9048	0.9265
0.9452	0.9640	0.9791	0.9940	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	0.8889	0.7407
0.5926	0.4444	0.2963	0.1481	0.0000

Shape 0.510_2

Area:

0.0007	0.0029	0.0063	0.0108	0.0164
0.0230	0.0306	0.0392	0.0487	0.0591
0.0705	0.0827	0.0958	0.1097	0.1244
0.1399	0.1562	0.1733	0.1911	0.2096
0.2288	0.2488	0.2694	0.2908	0.3128
0.3355	0.3589	0.3829	0.4075	0.4329
0.4589	0.4855	0.5128	0.5408	0.5694
0.5987	0.6287	0.6593	0.6906	0.7225
0.7551	0.7884	0.8223	0.8570	0.8923
0.9284	0.9598	0.9822	0.9956	1.0000

Hrad:

0.0372	0.0761	0.1167	0.1577	0.1971
0.2365	0.2767	0.3160	0.3545	0.3926
0.4324	0.4727	0.5123	0.5513	0.5899
0.6298	0.6707	0.7109	0.7506	0.7899
0.8288	0.8684	0.9079	0.9473	0.9872
1.0266	1.0657	1.1045	1.1430	1.1812
1.2191	1.2568	1.2943	1.3316	1.3687
1.4056	1.4423	1.4789	1.5153	1.5517
1.5879	1.6237	1.6580	1.6923	1.7266
1.7432	1.4768	1.2801	1.1258	1.0000

Width:

0.0402	0.0771	0.1097	0.1387	0.1678
0.1958	0.2219	0.2480	0.2741	0.3002
0.3244	0.3474	0.3704	0.3935	0.4165
0.4380	0.4582	0.4785	0.4987	0.5189
0.5392	0.5585	0.5776	0.5964	0.6146
0.6327	0.6509	0.6691	0.6872	0.7054
0.7235	0.7417	0.7599	0.7780	0.7962
0.8143	0.8325	0.8506	0.8688	0.8870
0.9051	0.9235	0.9428	0.9622	0.9816
0.9876	0.7397	0.4917	0.2445	0.0000

Shape 0.510_3

Area:

0.0005	0.0019	0.0043	0.0076	0.0119
0.0170	0.0230	0.0299	0.0377	0.0464
0.0559	0.0663	0.0776	0.0897	0.1027
0.1165	0.1312	0.1467	0.1631	0.1804
0.1985	0.2175	0.2373	0.2580	0.2795
0.3018	0.3250	0.3489	0.3736	0.3991
0.4254	0.4525	0.4804	0.5091	0.5386
0.5689	0.6000	0.6319	0.6645	0.6980
0.7323	0.7673	0.8031	0.8396	0.8769
0.9149	0.9516	0.9785	0.9946	1.0000

Hrad:

0.0376	0.0752	0.1127	0.1518	0.1901
0.2280	0.2657	0.3033	0.3414	0.3798
0.4180	0.4559	0.4937	0.5313	0.5689
0.6063	0.6437	0.6811	0.7183	0.7556
0.7928	0.8300	0.8671	0.9042	0.9429
0.9819	1.0207	1.0593	1.0978	1.1362
1.1744	1.2125	1.2505	1.2884	1.3262
1.3639	1.4016	1.4392	1.4767	1.5142
1.5516	1.5904	1.6294	1.6682	1.7069
1.7455	1.5679	1.3259	1.1446	1.0000

Width:

0.0248	0.0496	0.0744	0.0976	0.1208
0.1440	0.1672	0.1904	0.2131	0.2352
0.2574	0.2796	0.3018	0.3240	0.3462
0.3684	0.3905	0.4127	0.4349	0.4571
0.4793	0.5015	0.5236	0.5458	0.5668
0.5874	0.6079	0.6285	0.6490	0.6696
0.6902	0.7107	0.7313	0.7519	0.7724
0.7930	0.8135	0.8341	0.8547	0.8752
0.8958	0.9153	0.9345	0.9538	0.9730
0.9923	0.8333	0.5556	0.2778	0.0000

Shape 1.030_1

Area:

0.0011	0.0036	0.0070	0.0115	0.0170
0.0237	0.0348	0.0512	0.0715	0.0924
0.1137	0.1363	0.1590	0.1817	0.2045
0.2272	0.2499	0.2727	0.2954	0.3181
0.3409	0.3636	0.3863	0.4090	0.4318
0.4545	0.4772	0.5000	0.5227	0.5454
0.5681	0.5909	0.6136	0.6363	0.6591
0.6818	0.7045	0.7272	0.7500	0.7727
0.7954	0.8182	0.8409	0.8636	0.8864
0.9091	0.9318	0.9545	0.9773	1.0000

Hrad:

0.0314	0.0635	0.0926	0.1201	0.1455
0.1620	0.1324	0.1419	0.1823	0.2297
0.2745	0.3125	0.3616	0.4100	0.4577
0.5046	0.5507	0.5962	0.6410	0.6850
0.7284	0.7712	0.8133	0.8548	0.8957
0.9360	0.9758	1.0149	1.0535	1.0916
1.1291	1.1661	1.2026	1.2386	1.2741
1.3091	1.3436	1.3777	1.4113	1.4445
1.4773	1.5096	1.5415	1.5730	1.6041
1.6348	1.6651	1.6950	1.7246	1.0000

Width:

0.0832	0.1290	0.1738	0.2192	0.2684
0.3361	0.6079	0.8354	0.9071	0.9283
0.9547	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

Shape 1.030_2

Area:

0.0006	0.0025	0.0059	0.0111	0.0174
0.0246	0.0324	0.0407	0.0495	0.0589
0.0687	0.0791	0.0900	0.1014	0.1133
0.1257	0.1388	0.1524	0.1667	0.1815
0.1973	0.2142	0.2318	0.2503	0.2694
0.2893	0.3100	0.3313	0.3532	0.3758
0.3991	0.4229	0.4473	0.4723	0.4978
0.5241	0.5510	0.5787	0.6077	0.6381
0.6695	0.7019	0.7354	0.7699	0.8055
0.8421	0.8797	0.9185	0.9586	1.0000

Hrad:

0.0439	0.0784	0.1169	0.1600	0.2149
0.2771	0.3374	0.3949	0.4523	0.5075
0.5611	0.6132	0.6640	0.7137	0.7620
0.8054	0.8484	0.8912	0.9337	0.9723
0.9801	1.0115	1.0497	1.0882	1.1268
1.1656	1.2075	1.2511	1.2946	1.3380
1.3842	1.4302	1.4758	1.5212	1.5663
1.6056	1.6451	1.6692	1.6678	1.6891
1.7156	1.7430	1.7713	1.8004	1.8302
1.8607	1.8918	1.9130	1.9355	1.0000

Width:

0.0272	0.0632	0.1025	0.1394	0.1631
0.1778	0.1913	0.2046	0.2167	0.2288
0.2408	0.2529	0.2650	0.2771	0.2894
0.3036	0.3178	0.3320	0.3462	0.3619
0.3912	0.4118	0.4296	0.4473	0.4651
0.4829	0.4993	0.5148	0.5304	0.5458
0.5598	0.5739	0.5879	0.6020	0.6160
0.6325	0.6491	0.6724	0.7082	0.7349
0.7597	0.7846	0.8094	0.8343	0.8591
0.8840	0.9088	0.9392	0.9696	1.0000

Shape 1.030_3

Area:

0.0028	0.0081	0.0149	0.0226	0.0310
0.0401	0.0498	0.0600	0.0709	0.0824
0.0943	0.1068	0.1199	0.1335	0.1476
0.1624	0.1777	0.1937	0.2102	0.2274
0.2451	0.2634	0.2823	0.3018	0.3219
0.3425	0.3637	0.3855	0.4079	0.4308
0.4543	0.4784	0.5030	0.5282	0.5540

0.5804	0.6073	0.6348	0.6628	0.6913
0.7203	0.7496	0.7794	0.8096	0.8402
0.8711	0.9025	0.9343	0.9668	1.0000

Hrad:

0.0451	0.0901	0.1398	0.1923	0.2412
0.2899	0.3377	0.3838	0.4285	0.4737
0.5176	0.5606	0.6026	0.6435	0.6817
0.7195	0.7569	0.7939	0.8306	0.8670
0.9031	0.9390	0.9747	1.0109	1.0473
1.0834	1.1193	1.1550	1.1906	1.2260
1.2612	1.2964	1.3313	1.3662	1.4010
1.4356	1.4702	1.5050	1.5431	1.5809
1.6213	1.6633	1.7049	1.7462	1.7871
1.8279	1.8683	1.8978	1.9230	1.0000

Width:

0.1283	0.1844	0.2182	0.2395	0.2610
0.2801	0.2978	0.3155	0.3330	0.3490
0.3651	0.3811	0.3971	0.4134	0.4311
0.4488	0.4666	0.4843	0.5020	0.5197
0.5374	0.5552	0.5729	0.5901	0.6071
0.6242	0.6412	0.6582	0.6752	0.6922
0.7092	0.7262	0.7432	0.7603	0.7773
0.7943	0.8113	0.8281	0.8427	0.8574
0.8703	0.8821	0.8939	0.9057	0.9174
0.9292	0.9410	0.9589	0.9794	1.0000

Shape 1170_1
Area:

0.0018	0.0072	0.0137	0.0215	0.0304
0.0401	0.0506	0.0624	0.0759	0.0914
0.1075	0.1242	0.1414	0.1591	0.1773
0.1960	0.2153	0.2350	0.2553	0.2761
0.2975	0.3193	0.3417	0.3646	0.3881
0.4121	0.4366	0.4616	0.4882	0.5202
0.5669	0.6113	0.6533	0.6929	0.7301
0.7649	0.7973	0.8273	0.8548	0.8800
0.9028	0.9232	0.9412	0.9568	0.9700
0.9808	0.9892	0.9952	0.9988	1.0000

Hrad:

0.0375	0.1240	0.1851	0.2523	0.3182
0.3831	0.4393	0.4740	0.4912	0.5519
0.6223	0.6900	0.7553	0.8185	0.8798
0.9393	0.9973	1.0539	1.1093	1.1635
1.2166	1.2688	1.3201	1.3700	1.4193
1.4680	1.5160	1.5558	1.5322	0.9940
1.0362	1.0707	1.0984	1.1200	1.1364
1.1479	1.1552	1.1587	1.1586	1.1554
1.1494	1.1407	1.1297	1.1165	1.1013
1.0842	1.0654	1.0450	1.0232	1.0000

Width:

0.1024	0.1194	0.1520	0.1734	0.1922
0.2082	0.2276	0.2610	0.3080	0.3282
0.3390	0.3498	0.3606	0.3713	0.3821
0.3929	0.4037	0.4144	0.4252	0.4360
0.4468	0.4575	0.4684	0.4795	0.4906
0.5017	0.5128	0.5273	0.5728	0.9926
0.9429	0.8933	0.8437	0.7940	0.7444
0.6948	0.6452	0.5955	0.5459	0.4963
0.4467	0.3970	0.3474	0.2978	0.2481
0.1985	0.1489	0.0993	0.0496	0.0000

Shape 1170_2
Area:

0.0005	0.0018	0.0041	0.0074	0.0117
0.0169	0.0230	0.0298	0.0374	0.0459
0.0551	0.0652	0.0762	0.0879	0.1005
0.1144	0.1311	0.1544	0.1817	0.2092
0.2367	0.2642	0.2917	0.3192	0.3467
0.3742	0.4017	0.4292	0.4567	0.4842
0.5117	0.5393	0.5668	0.5943	0.6218
0.6493	0.6768	0.7043	0.7318	0.7593
0.7868	0.8143	0.8418	0.8693	0.8968
0.9244	0.9519	0.9780	0.9945	1.0000

Hrad:

0.0316	0.0626	0.0953	0.1241	0.1548
0.1901	0.2251	0.2588	0.2916	0.3223
0.3530	0.3837	0.4152	0.4465	0.4776
0.4832	0.4225	0.4104	0.4516	0.5088
0.5636	0.6161	0.6665	0.7149	0.7614
0.8061	0.8492	0.8907	0.9307	0.9692
1.0065	1.0424	1.0772	1.1108	1.1433
1.1747	1.2052	1.2347	1.2633	1.2911
1.3180	1.3441	1.3695	1.3942	1.4182
1.4415	1.4642	1.3515	1.1540	1.0000

Width:

0.0333	0.0679	0.0983	0.1370	0.1758
0.2064	0.2344	0.2623	0.2904	0.3214
0.3523	0.3833	0.4129	0.4424	0.4718
0.5431	0.7533	0.9431	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	0.8000	0.4000	0.0000

Shape 2961
Area:

0.0057	0.0121	0.0191	0.0264	0.0341
0.0422	0.0506	0.0593	0.0684	0.0778
0.0876	0.0978	0.1082	0.1257	0.1448
0.1647	0.1849	0.2052	0.2257	0.2463
0.2672	0.2881	0.3093	0.3306	0.3521
0.3741	0.4001	0.4262	0.4523	0.4784
0.5045	0.5305	0.5566	0.5827	0.6088
0.6349	0.6609	0.6870	0.7131	0.7392
0.7653	0.7914	0.8174	0.8435	0.8696
0.8957	0.9218	0.9478	0.9739	1.0000

Hrad:

0.0599	0.1132	0.1636	0.2129	0.2593
0.3031	0.3448	0.3846	0.4229	0.4598
0.4956	0.5303	0.5641	0.4010	0.4344
0.4810	0.5308	0.5795	0.6270	0.6734
0.7189	0.7633	0.8069	0.8496	0.8908
0.8013	0.8477	0.8930	0.9374	0.9808
1.0233	1.0649	1.1057	1.1456	1.1847
1.2230	1.2605	1.2973	1.3334	1.3688
1.4035	1.4375	1.4709	1.5037	1.5359
1.5674	1.5984	1.6289	1.6588	1.0000

Width:

0.2320	0.2558	0.2754	0.2887	0.3020
0.3153	0.3286	0.3419	0.3552	0.3685
0.3818	0.3951	0.4084	0.7054	0.7522
0.7696	0.7759	0.7822	0.7886	0.7949
0.8012	0.8075	0.8138	0.8201	0.8274
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

Shape 3235
Area:

0.0097	0.0196	0.0299	0.0405	0.0513
0.0625	0.0740	0.0857	0.0978	0.1101
0.1228	0.1357	0.1490	0.1625	0.1764
0.1905	0.2141	0.2379	0.2617	0.2855
0.3094	0.3332	0.3570	0.3808	0.4046
0.4284	0.4523	0.4761	0.4999	0.5237
0.5475	0.5713	0.5951	0.6190	0.6428
0.6666	0.6904	0.7142	0.7380	0.7618
0.7857	0.8095	0.8333	0.8571	0.8809
0.9047	0.9286	0.9524	0.9762	1.0000

Hrad:

0.0581	0.1132	0.1656	0.2157	0.2636
0.3097	0.3541	0.3970	0.4385	0.4788
0.5179	0.5560	0.5931	0.6294	0.6648
0.6995	0.4904	0.5388	0.5861	0.6324
0.6776	0.7219	0.7652	0.8076	0.8492
0.8898	0.9296	0.9687	1.0069	1.0444
1.0811	1.1171	1.1525	1.1871	1.2211
1.2545	1.2872	1.3193	1.3509	1.3819
1.4123	1.4422	1.4715	1.5003	1.5287
1.5565	1.5839	1.6108	1.6373	1.0000

Width:

0.4124	0.4250	0.4375	0.4500	0.4625
0.4750	0.4875	0.5000	0.5125	0.5250
0.5375	0.5500	0.5625	0.5750	0.5876
0.6001	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000

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

****
Analysis Options
****

```
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 07/23/2009 00:01:00
Ending Date .............. 07/24/2009 00:01:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 20
Number of Threads ........ 2
Head Tolerance ........... 0.001500 m
```

************************** Runoff Quantity Continuity **************************	Volume hectare-m ---------	Depth mm -------
Total Precipitation	1.155	71.677
Evaporation Loss	0.000	0.000
Infiltration Loss	0.198	12.295
Surface Runoff	0.945	58.617
Final Storage	0.019	1.208
Continuity Error (%)	-0.617	

************************** Flow Routing Continuity **************************	Volume hectare-m ---------	Volume 10^6 ltr ---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.945	9.448
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.602	6.023
Flooding Loss	0.001	0.006
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.003
Final Stored Volume	0.296	2.958
Continuity Error (%)	4.906	

****
Highest Continuity Errors
****
Node BASIN1 (7.88%)
Node J40 (4.57%)
Node CBA1 (1.42%)
Node J32 (-1.32%)

****
Time-Step Critical Elements
****
Link C73 (4.77%)
Link C28 (1.37%)

****
Highest Flow Instability Indexes
****
Link C27_1 (86)
Link C26 (32)
Link C31 (26)
Link C28 (26)
Link C51 (25)

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

Minimum Time Step	:	0.23 sec
Average Time Step	:	0.98 sec
Maximum Time Step	:	1.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	4.74
Percent Not Converging	:	8.36
Time Step Frequencies	:	
1.000 - 0.871 sec	:	92.95 %
0.871 - 0.758 sec	:	2.61 %
0.758 - 0.660 sec	:	0.94 %
0.660 - 0.574 sec	:	0.70 %
0.574 - 0.500 sec	:	2.80 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
102	71.68	0.00	0.00	20.12	45.43	28.48	51.20	0.23	0.11	0.714
107AA	71.68	0.00	0.00	5.97	60.78	4.19	64.97	0.18	0.13	0.906
108	71.68	0.00	0.00	14.03	48.26	8.93	57.20	0.20	0.15	0.798
109	71.68	0.00	0.00	5.49	61.69	3.77	65.46	0.13	0.10	0.913
A	71.68	0.00	0.00	32.96	33.53	38.44	38.44	0.28	0.08	0.536
A1	71.68	0.00	0.00	0.63	69.68	0.48	70.15	0.67	0.47	0.979
A2	71.68	0.00	0.00	0.91	69.24	0.67	69.91	1.10	0.78	0.975
A3	71.68	0.00	0.00	0.00	70.69	0.00	70.69	0.54	0.38	0.986
A4	71.68	0.00	0.00	0.00	70.50	0.00	70.50	0.44	0.31	0.984
A5	71.68	0.00	0.00	0.03	70.69	0.02	70.71	0.17	0.12	0.987
A6	71.68	0.00	0.00	26.71	31.04	13.66	44.70	0.03	0.02	0.624
AA	71.68	0.00	0.00	23.96	38.42	28.30	47.51	0.18	0.10	0.663
BB	71.68	0.00	0.00	36.89	29.04	34.55	34.55	0.31	0.08	0.482
BLDG-A	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.18	0.13	0.981
BLDG-B	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.25	0.18	0.981
BLDG-C	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.21	0.15	0.981
BLDG-D	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.10	0.07	0.981
BLDGG	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.17	0.12	0.981
BLDGH	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.26	0.18	0.981
BLDG-I	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.16	0.11	0.981
BLDG-J	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.43	0.30	0.981
BLDG-J1	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.07	0.05	0.981
BLDG-J2	71.68	0.00	0.00	0.00	70.32	0.00	70.32	0.06	0.04	0.981
BLDG-K	71.68	0.00	0.00	0.00	70.31	0.00	70.32	0.17	0.12	0.981
D	71.68	0.00	0.00	38.21	19.08	33.49	33.49	0.06	0.03	0.467
D_2	71.68	0.00	0.00	42.24	13.43	29.48	29.48	0.06	0.02	0.411
D1	71.68	0.00	0.00	39.91	10.67	26.82	32.16	0.16	0.11	0.449
EE	71.68	0.00	0.00	46.51	10.77	25.15	25.15	0.09	0.03	0.351
Great-Lawn_1	71.68	0.00	0.00	40.86	11.95	18.87	30.82	0.11	0.06	0.430
Great-Lawn_2	71.68	0.00	0.00	42.23	10.53	29.65	29.65	0.04	0.02	0.414
Great-Lawn_3	71.68	0.00	0.00	47.25	6.32	24.52	24.52	0.06	0.02	0.342
Great-Lawn_4	71.68	0.00	0.00	43.48	9.13	28.38	28.38	0.05	0.02	0.396
Great-Lawn_5	71.68	0.00	0.00	38.28	16.15	33.64	33.64	0.04	0.02	0.469
Great-Lawn_6	71.68	0.00	0.00	41.45	12.64	30.36	30.36	0.05	0.02	0.424
NEC1	71.68	0.00	0.00	0.43	69.49	0.33	69.82	0.34	0.24	0.974
NEC2	71.68	0.00	0.00	0.43	69.49	0.33	69.82	0.34	0.24	0.974
NSTANDS	71.68	0.00	0.00	0.01	70.69	0.01	70.69	0.33	0.23	0.986
OPGG_1	71.68	0.00	0.00	7.48	58.50	5.04	63.54	0.06	0.04	0.886
OPGG_2	71.68	0.00	0.00	3.06	65.71	2.14	67.84	0.19	0.13	0.946
OPGG_3	71.68	0.00	0.00	7.03	59.20	4.77	63.97	0.09	0.07	0.892
OPGG_4	71.68	0.00	0.00	0.43	69.78	0.33	70.12	0.06	0.04	0.978
OPGG5	71.68	0.00	0.00	0.73	69.90	69.93	69.93	0.08	0.05	0.976
SSTANDS	71.68	0.00	0.00	0.00	70.33	0.00	70.33	0.55	0.39	0.981
T1	71.68	0.00	0.00	33.56	17.13	21.71	38.84	0.02	0.02	0.542
T2	71.68	0.00	0.00	32.28	19.48	20.36	39.84	0.03	0.03	0.556
V_1	71.68	0.00	0.00	1.48	67.86	1.13	68.99	0.04	0.03	0.963
V_2	71.68	0.00	0.00	1.48	67.82	1.13	68.95	0.07	0.05	0.962

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CBA1	JUNCTION	0.09	0.80	64.87	0 01:12	0.76
CBMH210	JUNCTION	0.52	1.29	64.47	0 06:34	1.29
CBMHA2	JUNCTION	0.13	0.73	64.62	0 01:16	0.69
CBMHU	JUNCTION	0.37	1.84	65.20	0 01:09	1.84
J1	JUNCTION	0.27	1.66	65.22	0 01:10	1.66
J14	JUNCTION	0.12	0.63	64.58	0 01:10	0.61
J19	JUNCTION	0.24	1.15	64.77	0 01:09	1.15
J23	JUNCTION	1.08	2.06	64.65	0 06:43	1.92
J26	JUNCTION	1.31	2.23	64.52	0 06:56	2.19
J27	JUNCTION	1.35	2.27	64.52	0 06:56	2.22
J32	JUNCTION	0.91	1.72	64.48	0 06:28	1.72
J37	JUNCTION	0.23	1.55	65.23	0 01:10	1.55
J40	JUNCTION	0.83	1.64	64.49	0 06:32	1.63
J41	JUNCTION	1.03	2.22	64.81	0 06:06	1.91
J48	JUNCTION	0.02	0.19	64.88	0 01:28	0.18
J49	JUNCTION	0.49	0.65	64.47	0 06:35	0.65
J50	JUNCTION	0.01	0.13	65.21	0 01:21	0.13
J51	JUNCTION	0.03	0.28	65.16	0 01:39	0.28
J52	JUNCTION	0.01	0.17	65.48	0 01:10	0.17
J53	JUNCTION	0.01	0.14	65.39	0 01:10	0.14
J54	JUNCTION	0.00	0.08	65.33	0 01:11	0.08
J55	JUNCTION	0.00	0.09	65.29	0 01:11	0.09
J56	JUNCTION	0.01	0.29	65.24	0 01:09	0.29
J57	JUNCTION	0.01	0.18	65.48	0 01:10	0.18
J58	JUNCTION	0.00	0.13	65.48	0 01:10	0.13
J59	JUNCTION	0.00	0.05	65.63	0 01:10	0.05
J60	JUNCTION	0.00	0.00	64.65	0 00:00	0.00
J61	JUNCTION	0.03	0.17	64.47	0 06:34	0.17
J62	JUNCTION	0.00	0.00	64.70	0 00:00	0.00
J63	JUNCTION	0.01	0.15	64.65	0 01:21	0.14
J64	JUNCTION	0.01	0.14	64.79	0 01:21	0.14
J65	JUNCTION	0.00	0.00	65.10	0 00:00	0.00
J66	JUNCTION	0.00	0.12	64.62	0 01:10	0.12
J67	JUNCTION	0.02	0.22	65.39	0 01:10	0.22
J68	JUNCTION	0.00	0.10	65.10	0 01:10	0.10
J69	JUNCTION	0.00	0.00	65.43	0 00:00	0.00
J70	JUNCTION	0.00	0.00	65.20	0 00:00	0.00
J71	JUNCTION	0.00	0.05	65.23	0 01:10	0.04
J72	JUNCTION	0.01	0.33	65.08	0 01:14	0.32
J73	JUNCTION	0.00	0.01	65.46	0 01:10	0.01
STM102	JUNCTION	1.26	2.17	64.51	0 06:56	2.14
STM104	JUNCTION	1.14	2.05	64.52	0 06:56	2.00
STM105	JUNCTION	1.10	2.00	64.52	0 06:28	1.96
STM107	JUNCTION	0.95	1.76	64.48	0 06:57	1.76
STM108	JUNCTION	1.66	2.47	64.47	0 06:57	2.47
STM109	JUNCTION	0.72	1.52	64.48	0 06:40	1.51
STM110	JUNCTION	0.59	1.40	64.50	0 06:52	1.38
STM111A	JUNCTION	0.18	1.54	65.30	0 01:05	1.54
STM112	JUNCTION	0.65	1.45	64.48	0 06:37	1.45
STM114	JUNCTION	0.18	0.80	64.57	0 01:10	0.79
STM117	JUNCTION	0.14	0.56	64.47	0 06:28	0.56
STM118	JUNCTION	0.12	0.54	64.50	0 01:12	0.51
STM119	JUNCTION	0.11	1.75	65.86	0 01:12	1.67
STM120	JUNCTION	0.06	1.60	65.86	0 01:12	1.52
STM121	JUNCTION	0.38	1.17	64.48	0 06:11	1.17
STM122	JUNCTION	0.19	0.81	64.49	0 06:25	0.81
STM203	JUNCTION	0.52	1.30	64.49	0 06:01	1.28
STM204	JUNCTION	0.47	1.26	64.50	0 06:28	1.23
STM205	JUNCTION	0.43	1.20	64.49	0 06:42	1.17
STM206	JUNCTION	0.37	1.13	64.48	0 06:01	1.12
STM207	JUNCTION	0.33	1.07	64.47	0 06:28	1.07
STM208	JUNCTION	0.31	1.03	64.47	0 06:27	1.03
STM209	JUNCTION	0.25	0.91	64.49	0 01:10	0.90
STM211	JUNCTION	0.47	1.28	64.50	0 06:44	1.25
STM212	JUNCTION	0.41	1.18	64.47	0 06:46	1.18
STM213	JUNCTION	0.60	1.40	64.49	0 06:20	1.38
STMA	JUNCTION	0.24	0.91	64.47	0 06:22	0.91
STMAA	JUNCTION	0.17	0.77	64.53	0 01:16	0.72
STMB	JUNCTION	0.29	1.03	64.47	0 06:22	1.03

STMBB	JUNCTION	0.24	0.91	64.48	0	07:07	0.90
STMC	JUNCTION	0.36	1.12	64.47	0	06:34	1.12
STMCC	JUNCTION	0.29	1.06	64.48	0	06:38	1.05
STMD	JUNCTION	0.47	1.23	64.47	0	06:23	1.23
STMDD	JUNCTION	0.57	1.36	64.48	0	06:32	1.35
STMFF	JUNCTION	0.59	1.39	64.48	0	06:32	1.38
STMGG	JUNCTION	0.65	1.44	64.47	0	06:47	1.44
STMH202	JUNCTION	0.64	1.43	64.49	0	06:25	1.41
SWMCCN1	JUNCTION	0.38	1.23	64.55	0	01:10	1.23
SWMCCN2	JUNCTION	0.16	0.83	64.62	0	01:10	0.83
TD2_1	JUNCTION	0.00	0.13	65.51	0	01:10	0.13
TD2_2	JUNCTION	0.09	0.46	64.47	0	06:23	0.46
TD3_1	JUNCTION	0.01	0.24	66.22	0	01:15	0.24
TD3_2	JUNCTION	0.05	0.28	64.47	0	06:33	0.27
TD5_1	JUNCTION	0.01	0.32	64.96	0	01:10	0.32
TD5_2	JUNCTION	0.17	0.74	64.48	0	06:47	0.73
TD6_1	JUNCTION	0.01	0.34	65.05	0	01:10	0.34
TD6_2	JUNCTION	0.17	0.72	64.48	0	06:32	0.71
TD7_1	JUNCTION	0.01	0.14	64.85	0	01:15	0.14
TD7_2	JUNCTION	0.18	0.78	64.47	0	06:35	0.78
TD8_1	JUNCTION	0.01	0.13	64.83	0	01:20	0.13
TD8_2	JUNCTION	0.50	1.28	64.47	0	06:23	1.28
J28	OUTFALL	1.61	2.98	65.20	0	03:00	2.98
OFCanal	OUTFALL	0.00	0.00	64.50	0	00:00	0.00
BASIN1	STORAGE	0.85	1.65	64.46	0	06:29	1.65
BASIN2	STORAGE	0.73	1.53	64.48	0	07:10	1.52
BASIN3	STORAGE	0.82	1.61	64.47	0	06:34	1.61
S-BLDG-A	STORAGE	0.01	0.07	100.07	0	01:52	0.07
S-BLDG-B	STORAGE	0.02	0.08	100.08	0	01:54	0.08
S-BLDG-C	STORAGE	0.01	0.07	100.07	0	01:52	0.07
S-BLDG-D	STORAGE	0.02	0.08	100.08	0	01:53	0.08
S-BLDG-G	STORAGE	0.02	0.09	100.09	0	02:11	0.09
S-BLDG-H	STORAGE	0.02	0.08	100.08	0	01:54	0.08
S-BLDG-I	STORAGE	0.01	0.07	100.07	0	01:50	0.07
S-BLDG-J1	STORAGE	0.01	0.11	100.11	0	01:30	0.11
S-BLDG-J2	STORAGE	0.01	0.11	100.11	0	01:31	0.11
S-BLDG-K	STORAGE	0.03	0.10	100.10	0	02:20	0.10

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CBA1	JUNCTION	0.000	0.112	0	01:10	0	0.24	1.439
CBMH210	JUNCTION	0.022	0.255	0	01:17	0.0462	0	
CBMHA2	JUNCTION	0.000	0.102	0	01:11	0	0.256	-0.369
CBMHU	JUNCTION	0.000	0.147	0	01:07	0	0.365	-0.009
J1	JUNCTION	0.000	0.062	0	01:06	0	0.122	0.007
J14	JUNCTION	0.119	0.132	0	01:10	0.174	0.507	-0.084
J19	JUNCTION	0.000	0.037	0	01:09	0	0.056	-0.000
J23	JUNCTION	0.131	0.570	0	08:00	0.176	6.34	0.576
J26	JUNCTION	0.000	0.581	0	08:00	0	6.05	0.135
J27	JUNCTION	0.000	0.581	0	08:00	0	6.04	0.082
J32	JUNCTION	0.000	1.279	0	01:10	0	8.57	-1.302
J37	JUNCTION	0.102	0.102	0	01:10	0.176	0.179	0.219
J40	JUNCTION	0.000	1.698	0	01:15	0	9.86	4.789
J41	JUNCTION	0.000	0.570	0	08:00	0	6.18	0.601
J48	JUNCTION	0.053	0.077	0	01:24	0.125	0.32	0.276
J49	JUNCTION	0.000	0.087	0	04:42	0	0.35	0.449
J50	JUNCTION	0.081	0.081	0	01:20	0.282	0.282	-0.486
J51	JUNCTION	0.000	0.047	0	01:21	0	0.196	0.765
J52	JUNCTION	0.776	0.986	0	01:10	1.1	1.37	0.000
J53	JUNCTION	0.000	0.849	0	01:10	0	1.16	0.002
J54	JUNCTION	0.000	0.745	0	01:11	0	0.935	0.000
J55	JUNCTION	0.000	0.702	0	01:11	0	0.877	-0.002
J56	JUNCTION	0.066	0.710	0	01:10	0.0887	0.946	0.003
J57	JUNCTION	0.000	0.358	0	01:10	0	0.545	0.001
J58	JUNCTION	0.000	0.451	0	01:10	0	0.639	0.001
J59	JUNCTION	0.472	0.472	0	01:10	0.672	0.672	-0.005
J60	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J61	JUNCTION	0.113	0.135	0	06:34	0.159	0.224	0.243
J62	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J63	JUNCTION	0.000	0.115	0	01:20	0	0.358	0.004
J64	JUNCTION	0.082	0.082	0	01:20	0.308	0.308	-0.005
J65	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J66	JUNCTION	0.000	0.087	0	01:10	0	0.0642	0.000
J67	JUNCTION	0.113	0.113	0	01:10	0.228	0.228	0.000
J68	JUNCTION	0.000	0.113	0	01:10	0	0.228	-0.002
J69	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J70	JUNCTION	0.000	0.000	0	00:00	0	0	0.000 ltr
J71	JUNCTION	0.133	0.465	0	01:10	0.185	0.306	-0.011
J72	JUNCTION	0.000	0.459	0	01:10	0	0.296	0.005
J73	JUNCTION	0.043	0.043	0	01:10	0.0569	0.0569	-0.005
STM102	JUNCTION	0.000	0.580	0	08:00	0	6.09	0.588
STM104	JUNCTION	0.000	0.579	0	08:00	0	6.12	0.529
STM105	JUNCTION	0.000	0.574	0	08:00	0	6.15	0.456
STM107	JUNCTION	0.000	0.568	0	08:00	0	7.35	0.179
STM108	JUNCTION	0.000	1.097	0	01:15	0	8.59	0.479
STM109	JUNCTION	0.096	0.883	0	01:11	0.13	1.93	0.798
STM110	JUNCTION	0.000	0.560	0	01:10	0	1.4	0.061
STM111A	JUNCTION	0.000	0.143	0	01:10	0	0.281	0.232
STM112	JUNCTION	0.042	0.083	0	01:05	0.0593	0.11	6.216
STM114	JUNCTION	0.381	0.496	0	01:10	0.544	1.05	0.063
STM117	JUNCTION	0.000	0.447	0	01:13	0	1.13	-0.043
STM118	JUNCTION	0.000	0.416	0	01:13	0	1.09	-0.118
STM119	JUNCTION	0.699	0.699	0	01:10	0.992	1.04	0.828
STM120	JUNCTION	0.000	0.021	0	01:02	0	0.0146	0.119
STM121	JUNCTION	0.000	0.266	0	01:10	0	1.17	0.076
STM122	JUNCTION	0.000	0.165	0	01:10	0	0.952	0.087
STM203	JUNCTION	0.000	1.488	0	01:10	0	3.11	0.538
STM204	JUNCTION	0.481	1.490	0	01:10	0.679	3.11	0.159
STM205	JUNCTION	0.000	1.076	0	01:12	0	2.44	0.141
STM206	JUNCTION	0.021	1.072	0	01:11	0.0327	2.43	-0.140
STM207	JUNCTION	0.000	1.053	0	01:11	0	2.4	-0.010
STM208	JUNCTION	0.000	1.050	0	01:11	0	2.45	-0.547
STM209	JUNCTION	0.233	0.705	0	01:10	0.333	1.38	0.180
STM211	JUNCTION	0.000	0.561	0	01:10	0	1.4	-0.014
STM212	JUNCTION	0.000	0.560	0	01:08	0	1.4	0.246
STM213	JUNCTION	0.000	0.022	0	01:18	0	0.0636	0.290
STMA	JUNCTION	0.000	0.078	0	01:09	0	0.103	0.329
STMAA	JUNCTION	0.000	0.097	0	01:12	0	0.266	0.468
STMB	JUNCTION	0.000	0.113	0	01:08	0	0.158	-0.066
STMBB	JUNCTION	0.000	0.171	0	01:12	0	0.335	-0.609
STMC	JUNCTION	0.000	0.154	0	01:14	0	0.412	-0.095
STMCC	JUNCTION	0.000	0.257	0	01:16	0	0.704	0.077
STMD	JUNCTION	0.000	0.207	0	01:17	0	0.679	-0.106
STMDD	JUNCTION	0.028	0.287	0	01:18	0.0888	0.817	0.357
STMFF	JUNCTION	0.000	0.345	0	01:11	0	0.985	0.913
STMGG	JUNCTION	0.000	0.447	0	01:10	0	1.17	0.619
STMH202	JUNCTION	0.000	1.612	0	01:12	0	3.83	-0.033
SWMCCN1	JUNCTION	0.300	0.559	0	01:08	0.425	1.4	-0.131
SWMCCN2	JUNCTION	0.000	0.032	0	01:10	0	0.172	0.137
TD2_1	JUNCTION	0.023	0.023	0	01:10	0.0386	0.0386	0.000
TD2_2	JUNCTION	0.000	0.023	0	01:10	0	0.0403	0.033
TD3_1	JUNCTION	0.054	0.054	0	01:15	0.0762	0.0762	-0.000
TD3_2	JUNCTION	0.000	0.054	0	01:15	0	0.0766	0.002
TD5_1	JUNCTION	0.079	0.079	0	01:10	0.135	0.135	-0.000
TD5_2	JUNCTION	0.030	0.108	0	01:10	0.042	0.181	0.000
TD6_1	JUNCTION	0.096	0.096	0	01:10	0.142	0.142	-0.000
TD6_2	JUNCTION	0.000	0.096	0	01:10	0	0.144	0.001
TD7_1	JUNCTION	0.024	0.024	0	01:15	0.0523	0.0523	0.000
TD7_2	JUNCTION	0.000	0.024	0	01:15	0	0.0555	0.031
TD8_1	JUNCTION	0.022	0.022	0	01:20	0.0614	0.0614	0.000
TD8_2	JUNCTION	0.000	0.022	0	01:20	0	0.0625	0.435
J28	OUTFALL	0.000	0.581	0	08:00	0	6.02	0.000

OFCanal	OUTFALL	0.000	0.000	0	00:00	0	0	0.000 ltr
BASIN1	STORAGE	0.151	1.409	0	01:10	0.197	1.81	8.551
BASIN2	STORAGE	0.000	1.843	0	01:15	0	7.73	0.103
BASIN3	STORAGE	0.000	1.685	0	01:12	0	5.39	-0.055
S-BLDG-A	STORAGE	0.126	0.126	0	01:10	0.179	0.179	0.007
S-BLDG-B	STORAGE	0.180	0.180	0	01:10	0.255	0.255	0.007
S-BLDG-C	STORAGE	0.148	0.148	0	01:10	0.211	0.211	0.007
S-BLDG-D	STORAGE	0.068	0.068	0	01:10	0.0971	0.0971	0.007
S-BLDG-G	STORAGE	0.120	0.120	0	01:10	0.171	0.171	0.007
S-BLDG-H	STORAGE	0.184	0.184	0	01:10	0.261	0.261	0.007
S-BLDG-I	STORAGE	0.112	0.112	0	01:10	0.159	0.159	0.007
S-BLDG-J1	STORAGE	0.052	0.052	0	01:10	0.0731	0.0731	0.008
S-BLDG-J2	STORAGE	0.044	0.044	0	01:10	0.0627	0.0627	0.008
S-BLDG-K	STORAGE	0.123	0.123	0	01:10	0.174	0.174	0.006

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J23	JUNCTION	6.20	0.625	0.235
J26	JUNCTION	22.99	1.216	0.609
J27	JUNCTION	23.01	1.274	0.611
J40	JUNCTION	3.69	0.137	0.625
J41	JUNCTION	6.90	1.213	0.085
STM102	JUNCTION	22.97	1.155	0.150
STM104	JUNCTION	6.95	1.034	0.851
STM105	JUNCTION	6.92	0.995	1.050
STM109	JUNCTION	4.08	0.166	0.274
STM110	JUNCTION	4.76	0.301	0.949
STM111A	JUNCTION	0.15	0.540	0.000
STM203	JUNCTION	4.46	0.231	3.769
STM204	JUNCTION	4.11	0.189	7.001
STM205	JUNCTION	3.63	0.126	3.564
STM206	JUNCTION	2.35	0.046	4.234
STM211	JUNCTION	4.63	0.276	0.951
STM213	JUNCTION	22.70	1.133	0.547
STMH202	JUNCTION	4.74	0.284	0.900
SWMCCN1	JUNCTION	4.12	0.226	0.804

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Node Flooding Summary
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
STM111A	0.10	0.026	0 01:10	0.006	0.000

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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 CMS
BASIN1	0.382	60	0	0	0.630	99	0 06:29	0.514
BASIN2	1.227	55	0	0	2.237	100	0 07:10	0.774
BASIN3	2.466	52	0	0	4.649	97	0 06:34	0.409
S-BLDG-A	0.019	4	0	0	0.121	24	0 01:52	0.009
S-BLDG-B	0.030	5	0	0	0.176	27	0 01:54	0.011
S-BLDG-C	0.022	4	0	0	0.142	24	0 01:52	0.011
S-BLDG-D	0.011	4	0	0	0.066	25	0 01:53	0.005
S-BLDG-G	0.026	8	0	0	0.125	38	0 02:11	0.006
S-BLDG-H	0.030	4	0	0	0.179	27	0 01:54	0.012
S-BLDG-I	0.016	3	0	0	0.106	23	0 01:50	0.008
S-BLDG-J1	0.004	5	0	0	0.040	52	0 01:30	0.008
S-BLDG-J2	0.003	5	0	0	0.036	53	0 01:31	0.006
S-BLDG-K	0.029	10	0	0	0.130	42	0 02:20	0.005

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J28	32.22	0.223	0.581	6.023
OFCanal	0.00	0.000	0.000	0.000
System	16.11	0.223	0.581	6.023

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.136	0 01:11	0.48	0.21	0.85
C10	CONDUIT	1.612	0 01:12	2.32	2.67	1.00
C10_1	CONDUIT	0.158	0 01:14	0.56	0.83	1.00
C11	CONDUIT	0.210	0 01:17	0.76	1.07	1.00
C12	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C13	CONDUIT	0.034	0 01:10	0.85	0.79	1.00
C14	CONDUIT	0.130	0 01:05	2.65	3.09	1.00
C15	CONDUIT	0.558	0 01:08	1.97	1.84	1.00
C16	CONDUIT	0.560	0 01:10	1.98	2.23	1.00
C17	CONDUIT	0.560	0 01:10	1.98	2.17	1.00
C18	CONDUIT	0.292	0 01:18	0.46	0.51	1.00
C18_1	CONDUIT	0.885	0 01:11	0.71	0.33	1.00
C18_2	CONDUIT	1.092	0 01:15	0.78	1.11	1.00
C19	CONDUIT	0.365	0 01:15	0.57	0.88	1.00
C2	CONDUIT	0.021	0 01:02	0.16	0.17	1.00
C20	CONDUIT	0.447	0 01:10	0.70	0.10	1.00
C21	CONDUIT	0.260	0 01:18	1.20	1.28	1.00
C21_1	CONDUIT	0.811	0 01:11	0.60	0.62	1.00
C21_2	CONDUIT	0.560	0 08:00	0.64	0.44	1.00
C22	CONDUIT	0.037	0 01:09	1.18	1.60	1.00
C23	CONDUIT	0.100	0 01:09	2.04	2.37	1.00
C24	CONDUIT	0.185	0 01:15	0.98	0.36	1.00
C25	CONDUIT	0.283	0 01:15	1.09	0.54	1.00
C26	CONDUIT	0.570	0 08:00	0.77	0.24	1.00
C27	CONDUIT	0.165	0 01:12	0.76	0.79	1.00
C27_2	CONDUIT	0.574	0 08:00	0.78	0.87	1.00
C28	CONDUIT	0.579	0 08:00	0.77	0.82	1.00
C29	CONDUIT	0.580	0 08:00	0.78	0.69	1.00
C3	CONDUIT	0.416	0 01:13	2.62	3.28	1.00
C30	CONDUIT	0.581	0 08:00	0.78	0.77	1.00
C31	CONDUIT	0.581	0 08:00	0.78	0.39	1.00
C32	CONDUIT	0.581	0 08:00	0.78	0.43	1.00
C33	CONDUIT	0.062	0 01:06	1.27	1.53	1.00
C34	CONDUIT	0.042	0 01:06	0.93	0.97	1.00
C35	CONDUIT	0.065	0 01:09	0.48	0.34	1.00
C36	CONDUIT	0.113	0 01:08	0.64	0.67	1.00
C37	CONDUIT	0.222	0 01:11	0.17	0.02	0.17
C38	CONDUIT	0.093	0 01:13	0.74	0.85	1.00
C39	CONDUIT	0.097	0 01:12	0.99	1.48	1.00
C4	CONDUIT	0.447	0 01:13	1.78	1.53	0.86
C40	CONDUIT	0.102	0 01:11	0.93	1.49	1.00
C41	CONDUIT	0.075	0 01:29	0.41	0.02	0.13
C43	CONDUIT	0.047	0 01:21	0.26	0.01	0.20
C44	CONDUIT	0.038	0 01:39	0.86	1.27	0.87
C45	CONDUIT	0.849	0 01:10	0.68	0.06	0.16
C46	CONDUIT	0.745	0 01:11	0.77	0.07	0.12
C47	CONDUIT	0.702	0 01:11	1.04	0.02	0.08
C48	CONDUIT	0.653	0 01:11	0.45	0.02	0.19
C49	CONDUIT	0.451	0 01:10	0.64	0.01	0.09
C5	CONDUIT	0.454	0 01:13	1.90	1.91	0.94
C50	CONDUIT	0.358	0 01:10	0.28	0.01	0.16
C51	CONDUIT	0.022	0 01:18	0.96	0.38	1.00
C52	CONDUIT	0.000	0 00:00	0.00	0.00	0.08
C53	CONDUIT	0.000	0 00:00	0.00	0.00	0.07
C54	CONDUIT	0.081	0 01:21	0.41	0.02	0.14
C55	CONDUIT	0.000	0 00:00	0.00	0.00	0.06
C56	CONDUIT	0.113	0 01:10	1.50	0.02	0.16
C57	CONDUIT	0.000	0 00:00	0.00	0.00	0.05
C58	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C59	CONDUIT	1.055	0 01:11	1.32	1.35	1.00
C6	CONDUIT	0.693	0 01:10	1.10	1.27	0.99
C60	CONDUIT	1.076	0 01:12	1.35	1.18	1.00
C61	CONDUIT	1.080	0 01:12	1.38	1.24	1.00
C62	CONDUIT	1.488	0 01:10	1.89	1.64	1.00
C63	CONDUIT	1.485	0 01:10	2.10	1.75	1.00
C64	CONDUIT	0.047	0 01:09	0.13	0.04	1.00
C65	CONDUIT	0.560	0 01:10	1.16	0.51	1.00
C66	CONDUIT	0.023	0 01:10	0.94	0.42	0.43
C67	CONDUIT	0.023	0 01:10	1.10	0.40	1.00
C68	CONDUIT	0.054	0 01:15	1.23	0.76	0.60
C69	CONDUIT	0.054	0 01:15	1.36	0.91	1.00
C7	CONDUIT	0.475	0 01:10	0.90	0.74	0.98
C70	CONDUIT	0.079	0 01:10	1.39	1.32	0.87
C71	CONDUIT	0.108	0 01:10	2.21	1.81	1.00
C72	CONDUIT	0.096	0 01:10	1.54	0.87	0.78
C73	CONDUIT	0.095	0 01:10	1.94	1.54	1.00
C74	CONDUIT	0.024	0 01:15	0.94	0.40	0.41
C75	CONDUIT	0.025	0 01:15	0.69	0.41	1.00
C76	CONDUIT	0.022	0 01:20	0.91	0.35	0.37
C77	CONDUIT	0.022	0 01:18	1.07	0.37	1.00
C78	CONDUIT	0.425	0 01:10	0.40	0.01	0.19
C79	CONDUIT	0.337	0 01:10	0.25	0.01	0.17
C8	CONDUIT	1.053	0 01:11	1.30	1.17	0.99
C80	CONDUIT	0.039	0 01:10	0.09	0.00	0.17
C9	CONDUIT	0.258	0 01:17	0.91	1.14	1.00
W24	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
W25	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
W27	CONDUIT	0.000	0 00:00	0.00	0.00	0.50
W28	CONDUIT	0.000	0 00:00	0.00	0.00	0.27
W29	CONDUIT	0.000	0 00:00	0.00	0.00	0.28

W30	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W31	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W4	CONDUIT	0.642	0	01:24	1.86	0.35	1.00
C27_1	ORIFICE	0.570	0	08:00			1.00
OR1	ORIFICE	0.204	0	09:45			1.00
OR2	ORIFICE	0.066	0	01:14			1.00
W1	WEIR	0.484	0	01:14			1.00
W10	WEIR	0.000	0	00:00			0.00
W11	WEIR	0.000	0	00:00			0.00
W12	WEIR	0.033	0	01:21			0.07
W13	WEIR	0.001	0	01:10			0.01
W14	WEIR	0.000	0	00:00			0.00
W15	WEIR	0.000	0	00:00			0.00
W16	WEIR	0.129	0	01:10			0.17
W17	WEIR	0.101	0	01:10			0.14
W18	WEIR	0.042	0	01:11			0.08
W19	WEIR	0.048	0	01:11			0.09
W2	WEIR	1.695	0	01:15			1.00
W20	WEIR	0.283	0	01:09			0.29
W21	WEIR	0.020	0	01:10			0.05
W22	WEIR	0.091	0	01:10			0.13
W23	WEIR	0.143	0	01:10			0.18
W26	WEIR	0.001	0	01:10			0.01
W3	WEIR	1.271	0	01:10			1.00
W33	WEIR	0.000	0	00:00			0.00
W34	WEIR	0.000	0	00:00			0.00
W35	WEIR	0.000	0	00:00			0.00
W36	WEIR	0.000	0	00:00			0.00
W37	WEIR	0.123	0	01:09			0.24
W38	WEIR	0.055	0	01:10			0.10
W39	WEIR	0.000	0	00:00			0.00
W41	WEIR	0.348	0	01:14			0.33
W42	WEIR	0.020	0	01:10			0.05
W43	WEIR	0.001	0	01:10			0.01
W5	WEIR	0.037	0	01:09			0.07
W6	WEIR	0.000	0	00:00			0.00
W7	WEIR	0.000	0	00:00			0.00
W8	WEIR	0.000	0	00:00			0.00
W9	WEIR	0.087	0	01:10			0.13
C42	DUMMY	0.086	0	04:42			
OL1	DUMMY	0.135	0	06:34			
OL10	DUMMY	0.012	0	01:06			
OL11	DUMMY	0.006	0	01:04			
OL12	DUMMY	0.008	0	01:07			
OL13	DUMMY	0.005	0	01:03			
OL14	DUMMY	0.008	0	01:12			
OL15	DUMMY	0.006	0	01:12			
OL2	DUMMY	0.115	0	01:21			
OL3	DUMMY	0.084	0	01:10			
OL4	DUMMY	0.057	0	01:10			
OL5	DUMMY	0.000	0	00:00			
OL6	DUMMY	0.009	0	01:07			
OL7	DUMMY	0.011	0	01:06			
OL8	DUMMY	0.011	0	01:07			
OL9	DUMMY	0.005	0	01:06			

****
Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.01	0.00	0.00	0.37	0.00	0.00	0.61	0.08	0.00
C10	1.00	0.01	0.00	0.00	0.94	0.00	0.00	0.05	0.00	0.00
C10_1	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C11	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	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
C13	1.00	0.01	0.00	0.00	0.36	0.00	0.00	0.63	0.01	0.00
C14	1.00	0.02	0.00	0.00	0.35	0.00	0.00	0.63	0.01	0.00
C15	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.01	0.00	0.00
C16	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.03	0.00	0.00
C17	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.03	0.00	0.00
C18	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C18_1	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C18_2	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C2	1.00	0.02	0.01	0.00	0.34	0.00	0.00	0.63	0.07	0.00
C20	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.02	0.00
C21	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.50	0.00
C21_1	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C21_2	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C22	1.00	0.04	0.00	0.00	0.42	0.00	0.00	0.53	0.61	0.00
C23	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C24	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.02	0.62	0.00
C25	1.00	0.01	0.00	0.00	0.96	0.00	0.00	0.03	0.00	0.00
C26	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C27	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.29	0.00
C27_2	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C28	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C29	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.27	0.00	0.00	0.71	0.03	0.00
C30	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C31	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C32	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C33	1.00	0.01	0.00	0.00	0.36	0.00	0.00	0.62	0.01	0.00
C34	1.00	0.02	0.00	0.00	0.50	0.00	0.00	0.48	0.20	0.00
C35	1.00	0.05	0.00	0.00	0.49	0.00	0.00	0.46	0.06	0.00
C36	1.00	0.02	0.32	0.00	0.67	0.00	0.00	0.00	0.47	0.00
C37	1.00	0.02	0.85	0.00	0.13	0.00	0.00	0.00	0.86	0.00
C38	1.00	0.02	0.00	0.00	0.35	0.00	0.00	0.63	0.01	0.00
C39	1.00	0.02	0.00	0.00	0.33	0.00	0.00	0.65	0.01	0.00
C4	1.00	0.02	0.00	0.00	0.29	0.00	0.00	0.70	0.00	0.00
C40	1.00	0.02	0.00	0.00	0.32	0.00	0.00	0.66	0.04	0.00
C41	1.00	0.04	0.00	0.00	0.12	0.00	0.00	0.84	0.12	0.00
C43	1.00	0.04	0.09	0.00	0.87	0.00	0.00	0.00	0.95	0.00
C44	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.11
C45	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.94	0.00
C46	1.00	0.02	0.83	0.00	0.00	0.00	0.15	0.00	0.00	0.00
C47	1.00	0.75	0.09	0.00	0.13	0.03	0.00	0.00	0.94	0.00
C48	1.00	0.02	0.74	0.00	0.25	0.00	0.00	0.00	0.97	0.00
C49	1.00	0.03	0.26	0.00	0.68	0.03	0.00	0.00	0.78	0.00
C5	1.00	0.02	0.00	0.00	0.27	0.00	0.00	0.70	0.00	0.00
C50	1.00	0.02	0.03	0.00	0.95	0.00	0.00	0.00	0.95	0.00
C51	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.01	0.00	0.00
C52	1.00	0.68	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53	1.00	0.77	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C54	1.00	0.52	0.00	0.00	0.48	0.00	0.00	0.00	0.04	0.00
C55	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	0.01	0.00	0.00	0.46	0.53	0.00	0.00	0.00	0.00
C57	1.00	0.58	0.42	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	0.02	0.00	0.00	0.97	0.00	0.00	0.01	0.42	0.00
C6	1.00	0.01	0.00	0.00	0.47	0.00	0.00	0.52	0.03	0.00
C60	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.01	0.00	0.00
C61	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C62	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.01	0.00	0.00
C63	1.00	0.01	0.00	0.00	0.95	0.00	0.00	0.04	0.00	0.00
C64	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
C65	1.00	0.02	0.00	0.00	0.96	0.00	0.00	0.02	0.00	0.00
C66	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
C67	1.00	0.04	0.00	0.00	0.27	0.00	0.00	0.69	0.02	0.00
C68	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
C69	1.00	0.02	0.00	0.00	0.22	0.00	0.00	0.76	0.02	0.00
C7	1.00	0.01	0.00	0.00	0.43	0.00	0.00	0.55	0.05	0.00
C70	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
C71	1.00	0.01	0.00	0.00	0.34	0.00	0.00	0.64	0.00	0.00
C72	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
C73	1.00	0.01	0.00	0.00	0.34	0.00	0.00	0.64	0.00	0.00
C74	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
C75	1.00	0.54	0.04	0.00	0.42	0.00	0.00	0.00	0.59	0.00
C76	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
C77	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.01	0.00	0.00
C78	1.00	0.01	0.52	0.00	0.47	0.00	0.00	0.00	0.97	0.00
C79	1.00	0.01	0.52	0.00	0.47	0.00	0.00	0.00	0.97	0.00
C8	1.00	0.01	0.00	0.00	0.55	0.00	0.00	0.44	0.02	0.00

C80	1.00	0.01	0.73	0.00	0.25	0.01	0.00	0.00	0.76	0.00
C9	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
W24	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W25	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W27	1.00	0.01	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W28	1.00	0.02	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W29	1.00	0.02	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W30	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W31	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W4	1.00	0.05	0.00	0.00	0.94	0.00	0.00	0.01	0.00	0.00

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Conduit Surcharge Summary
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	--------- Hours Full --------			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C10	5.47	5.47	5.54	0.47	0.58
C10_1	6.67	6.67	6.83	0.01	0.01
C11	7.50	7.50	7.75	0.15	0.11
C13	6.46	6.46	7.49	0.01	0.01
C14	6.77	6.80	7.49	0.41	0.38
C15	7.48	7.49	7.55	0.20	0.23
C16	7.57	7.58	7.72	0.22	0.19
C17	8.00	8.01	8.05	0.21	0.37
C18	6.42	6.42	6.69	0.01	0.01
C18_1	4.08	4.08	4.77	0.01	0.01
C18_2	4.77	4.77	4.92	0.11	0.10
C19	6.69	6.69	6.95	0.01	0.03
C2	0.44	0.44	0.50	0.01	0.01
C20	7.39	7.39	23.37	0.01	0.01
C21	7.36	7.36	7.74	0.30	0.32
C21_1	5.15	5.15	5.53	0.01	0.01
C21_2	5.53	5.53	5.60	0.01	0.38
C22	7.78	7.78	8.22	0.38	0.01
C23	8.35	8.35	12.36	0.71	0.72
C24	3.67	3.67	6.37	0.01	0.01
C25	6.68	6.68	7.51	0.01	0.01
C26	5.86	5.86	6.19	0.01	0.76
C27	5.97	5.97	7.36	0.01	0.01
C27_2	6.90	6.90	6.92	0.01	0.44
C28	6.95	6.95	6.95	0.01	1.26
C29	7.38	7.38	22.97	0.01	0.01
C3	0.15	0.52	2.25	0.64	0.15
C30	22.98	22.98	22.99	0.01	0.32
C31	23.00	23.00	23.01	0.01	0.41
C32	23.02	23.02	24.00	0.01	0.01
C33	7.45	7.45	7.73	0.06	0.06
C34	7.82	7.82	8.22	0.01	0.01
C35	5.09	5.09	5.84	0.01	0.01
C36	5.99	5.99	6.60	0.01	0.01
C38	5.03	5.03	5.93	0.01	0.01
C39	4.73	4.73	5.00	0.34	0.34
C4	0.01	0.01	0.01	0.31	0.01
C40	2.21	2.21	4.44	0.31	0.26
C44	0.01	0.51	0.01	0.70	0.01
C5	0.01	0.01	0.01	0.41	0.01
C51	22.71	22.71	22.73	0.01	0.07
C59	1.78	1.78	2.35	0.18	0.01
C6	0.01	0.02	2.63	0.13	0.01
C60	3.03	3.03	3.63	0.13	0.01
C61	3.83	3.83	4.10	0.15	0.01
C62	4.26	4.26	4.45	0.23	0.06
C63	4.56	4.56	4.79	0.26	0.02
C64	4.61	4.61	4.93	0.01	0.01
C65	4.64	4.64	4.76	0.01	0.47
C67	4.46	4.46	4.74	0.01	0.01
C69	2.09	2.09	3.62	0.01	0.01
C7	0.01	0.01	2.00	0.01	0.01
C70	0.01	0.01	0.01	0.10	0.01
C71	6.69	6.73	6.95	0.18	0.11
C73	6.52	6.52	6.69	0.15	0.10
C75	6.72	6.72	8.10	0.01	0.01
C77	11.61	11.61	22.70	0.01	0.01
C8	0.01	0.01	0.01	0.13	0.01
C9	7.99	8.00	8.26	0.21	0.13
W4	6.39	6.39	6.89	0.01	0.01

Analysis begun on: Fri Sep 13 15:40:13 2024
Analysis ended on: Fri Sep 13 15:40:23 2024
Total elapsed time: 00:00:10

C-3 ADS Treatment Train Sizing

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

LANSDOWNE 2.0 ADS

OTTAWA, ON, CANADA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

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

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

NOTES FOR CONSTRUCTION EQUIPMENT

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

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

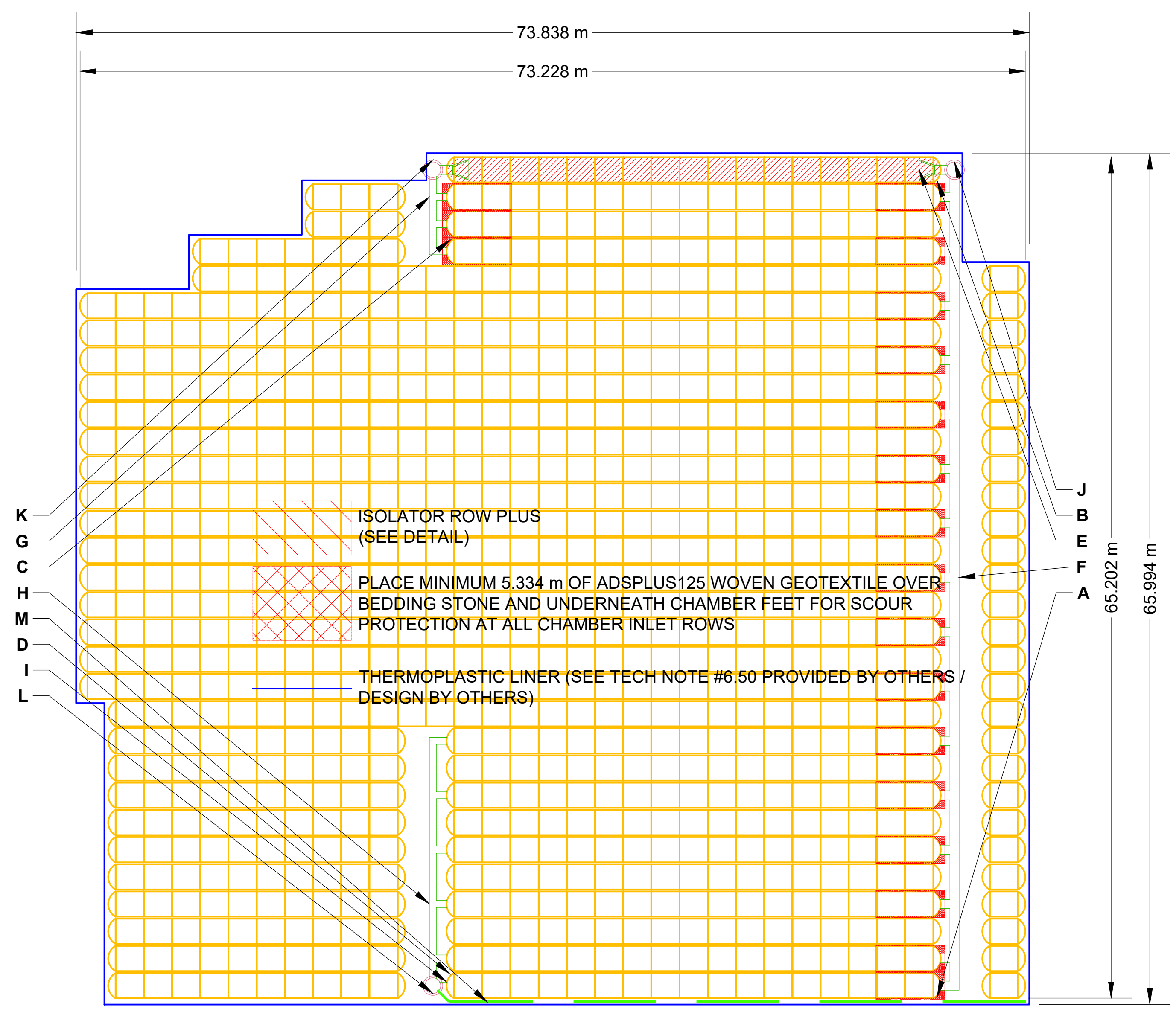
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
883	STORMTECH MC-3500 CHAMBERS
142	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	STONE VOID
4777.1	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
4610.4	SYSTEM AREA (m^2)
279.7	SYSTEM PERIMETER (m)
6096	THERMOPLASTIC LINER (m^2) (20% OVERAGE)

PROPOSED ELEVATIONS:	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	66.670
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	64.841
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	64.689
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	64.689
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	64.689
TOP OF STONE:	64.537
TOP OF MC-3500 CHAMBER:	64.232
450 mm x 450 mm TOP MANIFOLD INVERT:	63.597
600 mm x 600 mm TOP MANIFOLD INVERT:	63.457
600 mm ISOLATOR ROW PLUS INVERT:	63.141
600 mm ISOLATOR ROW PLUS INVERT:	63.141
450 mm x 450 mm BOTTOM MANIFOLD INVERT:	63.134
450 mm BOTTOM CONNECTION INVERT:	63.134
BOTTOM OF MC-3500 CHAMBER:	63.089
UNDERDRAIN INVERT:	62.860
BOTTOM OF STONE:	62.860

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm TOP CORED END CAP, PART#: MC3500IEPP24TC / TYP OF ALL 600 mm TOP CONNECTIONS	368 mm	
PREFABRICATED END CAP	B	600 mm BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
PREFABRICATED END CAP	C	450 mm TOP CORED END CAP, PART#: MC3500IEPP18TC / TYP OF ALL 450 mm TOP CONNECTIONS	509 mm	
PREFABRICATED END CAP	D	450 mm BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	45 mm	
FLAMP	E	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP (TYP 2 PLACES)		
MANIFOLD	F	600 mm x 600 mm TOP MANIFOLD, ADS N-12	368 mm	
MANIFOLD	G	450 mm x 450 mm TOP MANIFOLD, ADS N-12	509 mm	
MANIFOLD	H	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	45 mm	
PIPE CONNECTION	I	450 mm BOTTOM CONNECTION	45 mm	
CONCRETE STRUCTURE	J	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		
CONCRETE STRUCTURE	K	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		
CONCRETE STRUCTURE	L	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		227 L/s OUT
UNDERDRAIN	M	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



NOTES

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

LANSDOWNE 2.0 ADS

OTTAWA, ON, CANADA

DATE: 08/21/2024 DRAWN: HN

PROJECT #: CHECKED: N/A

DATE DRW CHK DESCRIPTION

StormTech® Chamber System

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

ADS

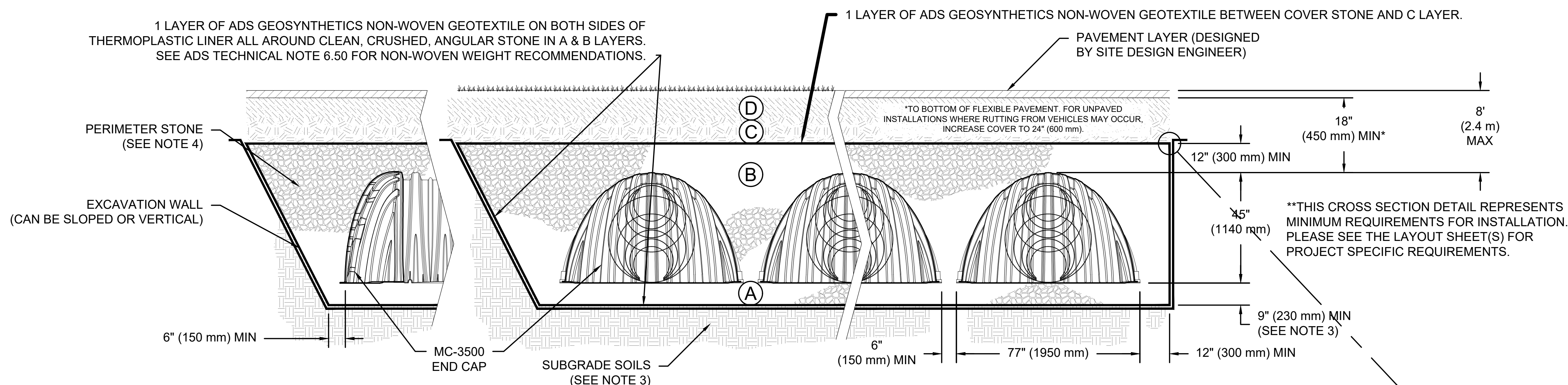
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

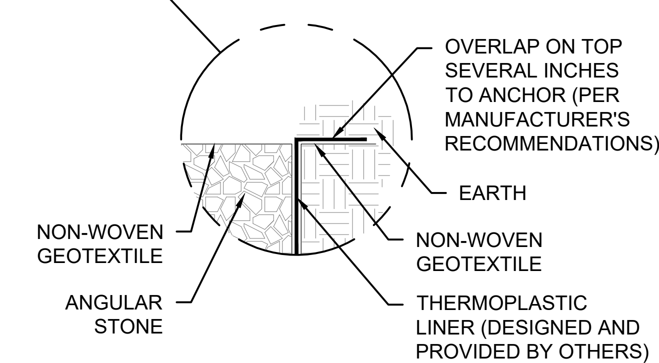
SCALE = 1 : 500

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

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

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".





THERMOPLASTIC LINER DETAIL

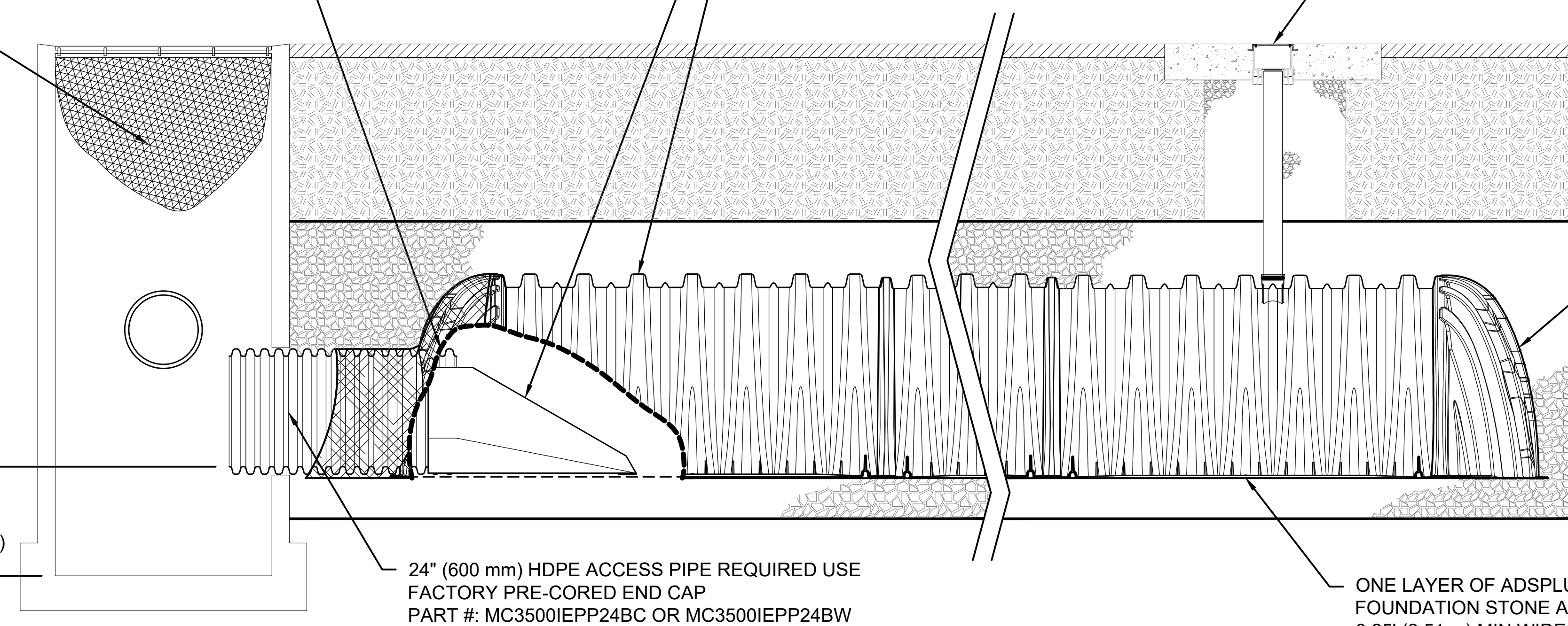
NOTES:
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA
DATE: 08/21/2024
DRAWN: HN
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

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

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



MC-3500 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

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

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

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

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

NOTES

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

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

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA

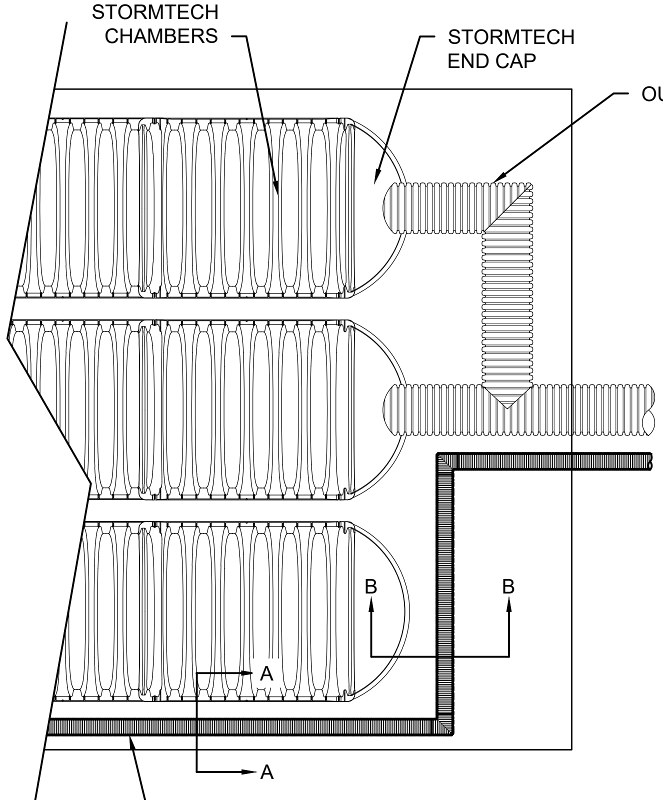
DATE: 08/21/2024 | DRAWN: HN
PROJECT #: | CHECKED: N/A

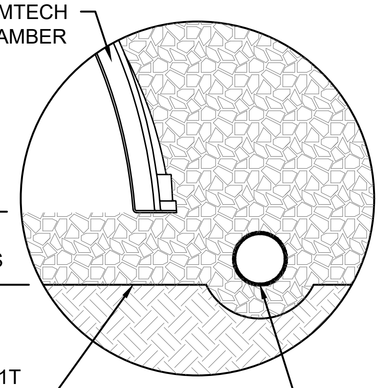
DATE	DRW	CHK	DESCRIPTION

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

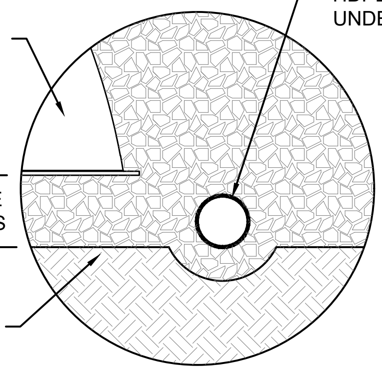
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

UNDERDRAIN DETAIL
NTS





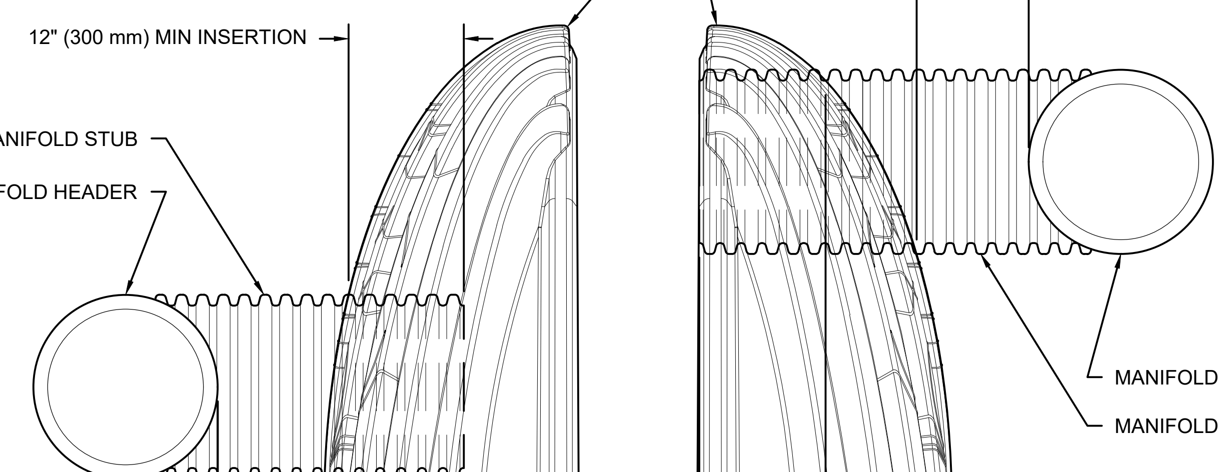
SECTION A-A



SECTION B-B

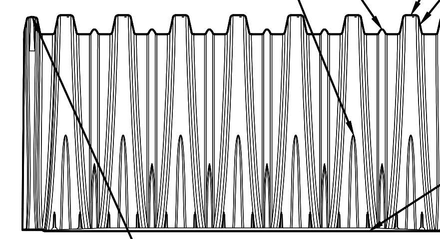
NUMBER AND SIZE OF UNDERDRAINS PER SITE DESIGN ENGINEER
4" (100 mm) TYP FOR SC-310 & SC-160LP SYSTEMS
6" (150 mm) TYP FOR SC-740, SC-800, DC-780, MC-3500, MC-4500 & MC-7200 SYSTEMS

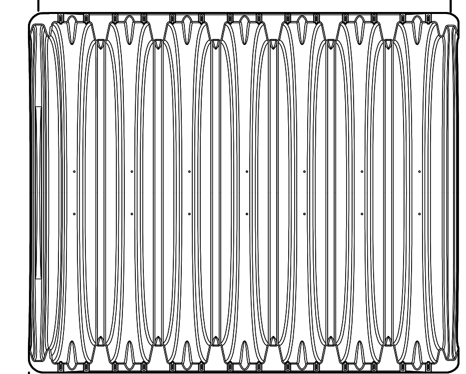
MC-SERIES END CAP INSERTION DETAIL
NTS

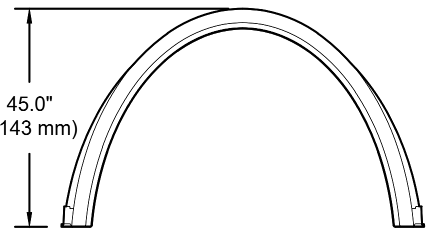


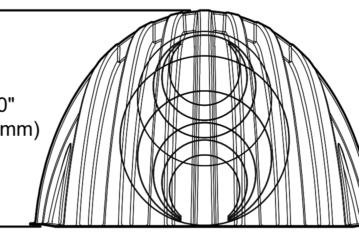
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

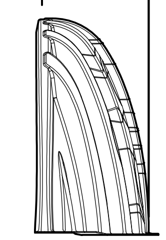
MC-3500 TECHNICAL SPECIFICATION
NTS











NOMINAL CHAMBER SPECIFICATIONS

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

NOMINAL END CAP SPECIFICATIONS

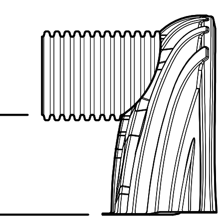
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

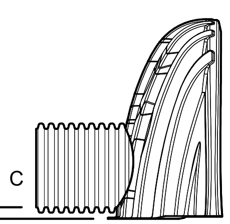
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

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

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

NOTE: ALL DIMENSIONS ARE NOMINAL





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

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA

DATE: 08/21/2024 | DRAWN: HN
PROJECT #: | CHECKED: N/A

DATE | DRW | CHK | DESCRIPTION

StormTech® Chamber System
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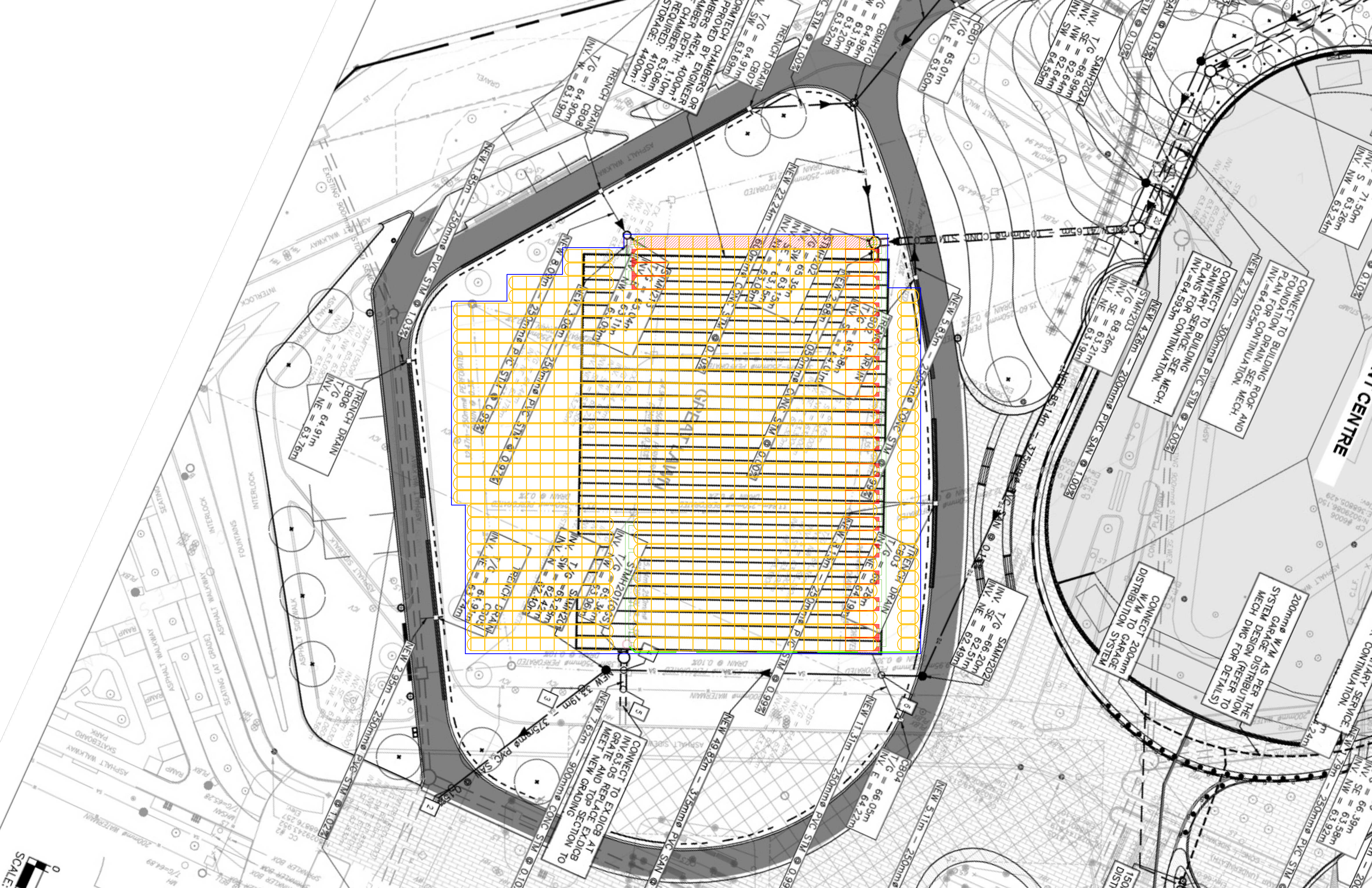


TRENCH DRAIN
CB06
T/G = 64.91m
INV. NE = 63.76m
TRENCH DRAIN
CB08
T/G = 64.90m
INV. W = 63.19m
CB801
T/G = 65.01m
INV. E = 63.60m
SAMH202A
T/G =68.99m
INV. NW = 62.64m
INV. SW = 62.64m
STMH203
T/G = 68.26m
INV. SE = 63.21m
INV. NE = 63.19m
SAMH202
T/G =66.20m
INV. SE =62.51m
INV. NE =62.49m
CB804
T/G = 66.05m
INV. E = 64.22m
CONNECT 200mm W/M TO GARAGE DISTRIBUTION SYSTEM
ASPHALT WALKWAY
INTERLOCK
FOUNTAINS
SKATEBOARD PARK
SCALE

ADS Treatment Train Sizing

Project Name:	Lansdowne 2.0
Consulting Engineer:	WSP
Location:	Ottawa, Ontario
Sizing Completed By:	Haider Nasrullah
Email:	haider.nasrullah@adspipe.com

Summary of Results	
Isolator Row PLUS TSS Removal:	80.1%
FD-8HC TSS Removal:	29.0%
Combined TSS Removal:	**85.5%**
Total Volume Treated:	**>90%**

Site Details	
Site Area (ha):	6.94
Rational C:	0.61
Particle Size Distribution:	ETV
Rainfall Station:	Ottawa, ONT

Notes: OGS results based on ETV PSD and results from ETV testing protocols.

Individual OGS Results

Model	TSS Removal	Volume Treated
FD-4HC	23.0%	>90%
FD-5HC	25.0%	>90%
FD-6HC	27.0%	>90%
FD-8HC	29.0%	>90%
FD-10HC	31.0%	>90%

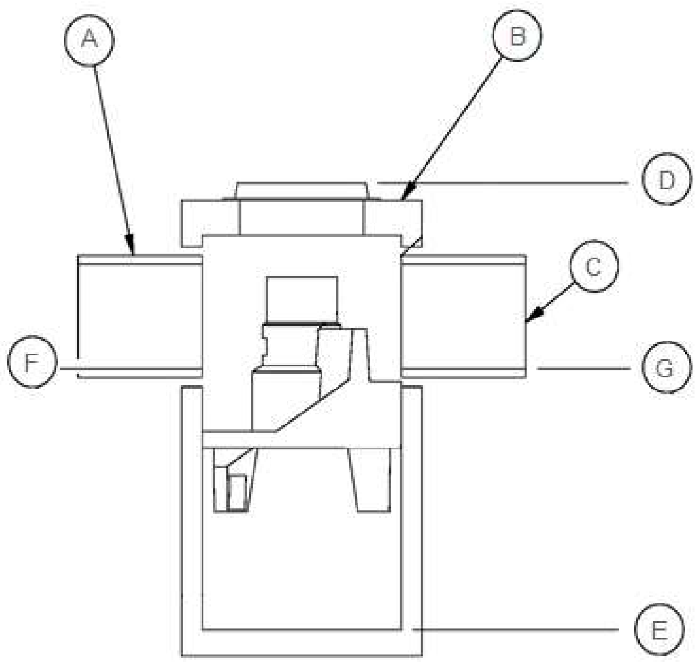
Stormtech Details	
Chamber Model:	MC-7200
No. Chambers in Isolator Row PLUS:	25
Volume Treated by Isolator Row PLUS:	98.6%

Notes: Refer to Stormtech drawings for full IR+ configuration.

Isolator Row PLUS must include Flared End Ramp (FLAMP) for proper performance.

Overall System Capacities	
Total Sediment Storage Capacity:	12.37 m³
Oil Storage Capacity:	4,239 L
Max. OGS Pipe Diameter:	1,200 mm
Peak OGS Flow Capacity:	1,415 L/s
Peak Stormtech Inlet Flow Capacity:	311 L/s
Peak IR PLUS Water Quality Flow:	323.8 L/s

OGS Specifications	
Inlet Pipe Diameter (A):	450 mm
Unit Diameter (B):	2,400 mm
Outlet Pipe Diameter (C):	450 mm
Rim Elevation (D):	100.00 m
Bottom of Sump Elevation (E):	#N/A
Inlet Pipe Elevation (F):	98.00 m
Outlet Pipe Elevation (G):	98.00 m



Notes:

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.

Project Name: Lansdowne 2.0
Consulting Engineer: WSP
Location: Ottawa, Ontario

Net Annual Removal Efficiency Summary

Rainfall Intensity	Fraction of Rainfall	Removal Efficiency		Combined Removal Efficiency	Combined Weighted Removal Efficiency
		FD-8HC	IR PLUS[(2)]		
mm/hr	%	%	%	%	%
0.50	0.1%	60.0%	81.2%	92.5%	0.1%
1.00	14.1%	55.0%	81.2%	91.5%	12.9%
1.50	14.2%	52.1%	81.2%	91.0%	12.9%
2.00	14.1%	50.0%	81.2%	90.6%	12.8%
2.50	4.2%	48.4%	81.2%	90.3%	3.8%
3.00	1.5%	47.1%	81.2%	90.1%	1.3%
3.50	8.5%	46.0%	81.2%	89.8%	7.7%
4.00	5.4%	0.0%	81.2%	81.2%	4.4%
4.50	1.2%	0.0%	81.2%	81.2%	0.9%
5.00	5.5%	0.0%	81.2%	81.2%	4.5%
6.00	4.3%	0.0%	81.2%	81.2%	3.5%
7.00	4.5%	0.0%	81.2%	81.2%	3.7%
8.00	3.1%	0.0%	81.2%	81.2%	2.5%
9.00	2.3%	0.0%	81.2%	81.2%	1.9%
10.00	2.6%	0.0%	81.2%	81.2%	2.1%
20.00	9.2%	0.0%	81.2%	81.2%	7.5%
30.00	2.6%	0.0%	74.5%	74.5%	2.0%
40.00	1.2%	0.0%	55.9%	55.9%	0.7%
50.00	0.5%	0.0%	44.7%	44.7%	0.2%
100.00	0.7%	0.0%	22.4%	22.4%	0.2%
150.00	0.1%	0.0%	14.9%	14.9%	0.0%
200.00	0.0%	0.0%	11.2%	11.2%	0.0%
		Total Net Annual Removal Efficiency			**85.5%**
		Total Runoff Volume Treated			**>90%**

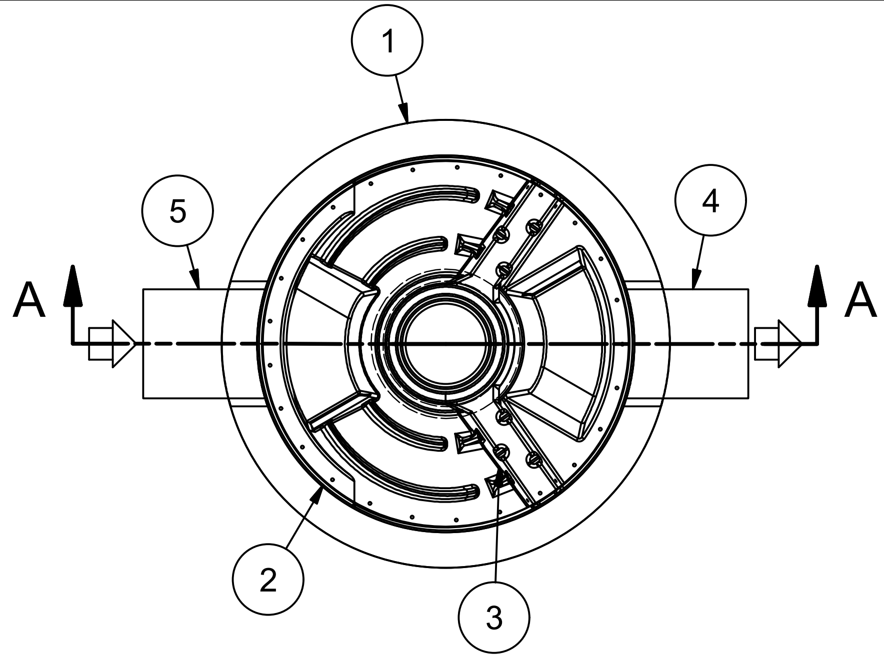
Notes:

(1) Rainfall Data: 1960:2007, HLY03, Ottawa, ONT, 6105976 & 6105978.

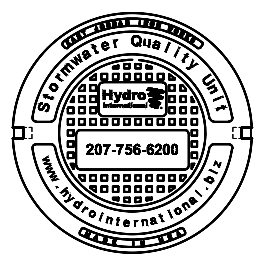
(2) IR PLUS removal based on ETV PSD and ETV protocols.

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

(4) Combined removal efficiencies calculated based on NCDENR Stormwater BMP Manual, Section 3.9.4, where Total Removal Efficiency = 1st BMP Efficiency + 2nd BMP Efficiency - (1st BMP Efficiency x 2nd BMP Efficiency)

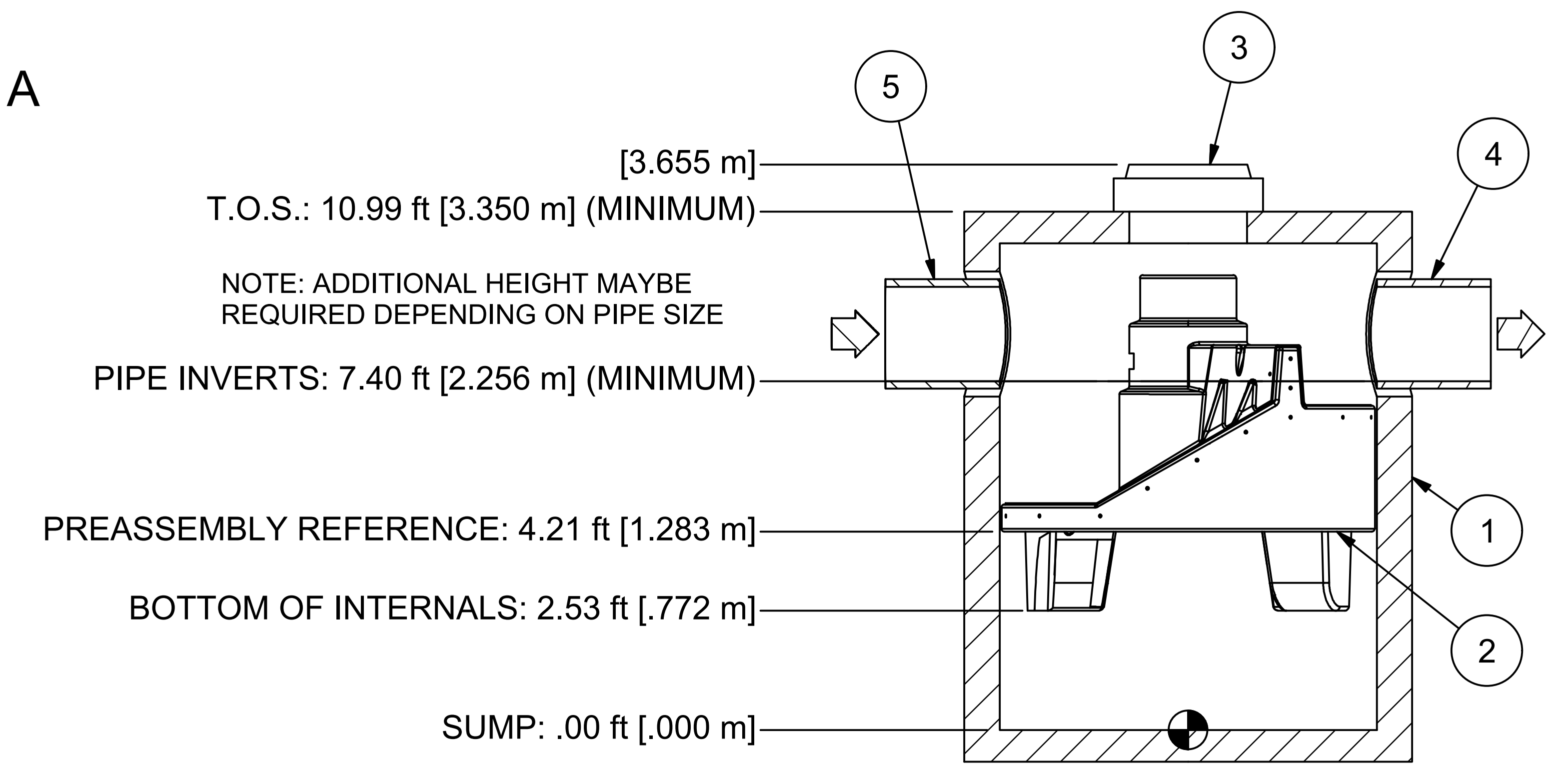


PLAN VIEW



HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS
AS REQUIRED



SECTION A-A

PRODUCT SPECIFICATION:

1. PEAK HYDRAULIC FLOW: 50.0 cfs (1415 l/s)
2. MIN SEDIMENT STORAGE CAPACITY: 2.8 cu. yd. (2.1 cu. m.)
3. OIL STORAGE CAPACITY: 1002 gal. (3793 liters)
4. MAXIMUM INLET/OUTLET PIPE DIAMETERS: 48 in. (1200 mm)
5. THE TREATMENT SYSTEM SHALL USE AN INDUCED VORTEX TO SEPARATE POLLUTANTS FROM STORMWATER RUNOFF.
6. FOR MORE PRODUCT INFORMATION INCLUDING REGULATORY ACCEPTANCES, PLEASE VISIT https://hydro-int.com/en/products/first-defense

GENERAL NOTES:
1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 48".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plan.s)
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST

ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	96	2400	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	48 (MAX)	1200 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	48 (MAX)	1200 (MAX)	INLET PIPE (BY OTHERS)

PROJECTION

IF IN DOUBT ASK

COMMENTS:

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.

2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.

3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA. AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

DATE: 11/8/2019
SCALE: 1:50
DRAWN BY: JLL3
CHECKED BY: -
APPROVED BY

Title
8-ft DIAMETER
FIRST DEFENSE HIGH CAPACITY

GENERAL ARRANGEMENT

Hydro International
hydro-int.com
HYDRO INTERNATIONAL

DO NOT SCALE DRAWING
STEEL FABRICATION TOLERANCES
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.

LINEAR
000 - 012in = ±0.04in
012 - 024in = ±0.06in
024 - 048in = ±0.08in
048 - 120in = ±0.12in
120in >>>> = ±0.20in

ANGULAR
000 - 120in = ±1°
120 - 240in = ±0.5°
240in >>>> = ±0.25°

WEIGHT: N/A
MATERIAL:
STOCK NUMBER:
DRAWING NO.: FDHC GA-8
SHEET SIZE: B
SHEET: 1 OF 1
Rev: -