REPORT
Project: 122764-6.2.3

DESIGN BRIEF
ORLEANS GARDENS RESIDENTIAL
1615 Orleans Boulevard

Development Application File No. **D07-XX-XX-00XX**

Prepared for North American Development Group
by IBI GROUP
February 2023

Table of Contents

List of Appendices

Appendix A

- Site Plan
- Site Servicing Plan 122764-C-001
- Preconsultation Meeting City Comments
- Preconsultation Meeting City Engineering Comments
- CCL Original Development Servicing Plan (Circa 1988)
- CCL Original Development Grading Plan (Circa 1988)
- Development Checklist

Appendix B

- Watermain Demand Calculation Sheet
- Fire Flow Calculations
- Water Model Schematic and Results
- City Correspondence regarding Boundary Conditions

Appendix C

- Sanitary Sewer Design Sheet
- Sanitary Drainage Area Plan 122764-C-400
- Sanitary External Drainage Area Plan (Whole Site) 122764-C-401

Appendix D

- Storm Sewer Design Sheet
- Storm Drainage Area Plan 122764-C-500
- Storm External Drainage Area Plan 122764-C-501
- Ponding Plan 122764-C-600
- Stormwater Management Design Sheet – Modified Rational Method
- Underground Storage Calculation Sheet
- ADS Stormtech Underground Storage System @ MH21
- ADS Stormtech Underground Storage System @ MH25
- Stress Test Overflow Calculation
- Orifice Sizing Sheet

Appendix E

- Grading Plan 122764-C-200
- Erosion and Sediment Control Plan 122764-C-900

1 INTRODUCTION

1.1 Scope

IBI Group Professional Services Inc. (IBI Group) has been retained by North American Development Group to prepare the necessary engineering plans, specifications and documents to support the proposed Site Plan Application for the subject lands in accordance with the policies set out by the Planning and Development Branch of the City of Ottawa. This Brief will present a detailed servicing scheme to support development of the property, and will include sections on water supply, wastewater disposal, minor and major stormwater management, grading and with erosion and sediment control.

1.2 Subject Property

The subject property, currently known as Orleans Gardens, is located on the southeast corner of the intersection of Jean D'Arc Boulevard and Orleans Boulevard, in Orleans. The site is bound by Jean D'Arc Boulevard to the North, existing residential to the east, Beausejour Drive to the South and Orleans Boulevard to the West. Refer to key plan Figure 1.1 below.

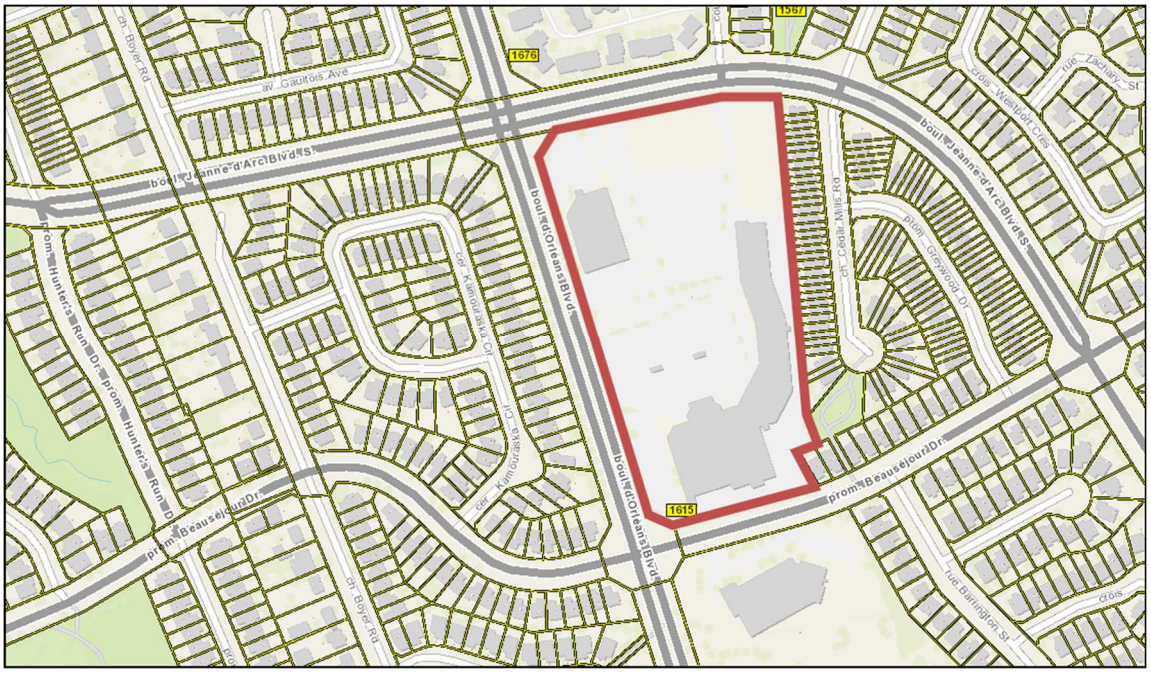


Figure 1.1 – Key Plan
Key Plan taken from City of Ottawa GeoOttawa

The existing site is currently entirely commercial use, with development being completed for the site in various stages from the late 1980's through to the 2000's. Previous site plan approval for the site included commercial development concepts for the northern lands, which have remained undeveloped for the last 30+ years. The client previously received permission rezone this portion of the existing site to allow for and residential use. A copy of the Architectural Site Plan upon which this report is based has been provided in **Appendix A**. The plan identifies 60 units which consist of 1 and 2 bedroom stacked townhouse units with attached garages. The site will share services and roads with the existing commercial site and will consist of new on-site private roadways, on-site dedicated private parking areas and a private amenity area.

1.3 Previous Studies

- **Design Brief, Orleans Gardens Pads A & B, prepared by IBI Group July 2013**
  This report was not approved, and the application was ceased. The report demonstrated that storm, sanitary and water service allocations for commercial buildings which differed from the original site plan from 1988.

Servicing reports or memorandums were unable to tracked through the City's archive database, nor through CCL records for which IBI maintains access to. Various servicing, and grading plan drawings from original site plan application and design are included in **Appendix A**.

1.4 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, and the 2018 Technical Bulleting 2018-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications, and drawings.

1.5 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on September 27th, 2022. Notes of the meeting are provided in **Appendix A**. There were no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

1.6 Environmental Issues

There are no environmental issues related to this site.

There are no existing watercourses or drainage features associated with this site.

1.7 Geotechnical Considerations

Paterson Group Inc. was retained to prepare a geotechnical investigation for the site. The objectives of the investigation were to prepare a report to:

- To provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations.

The geotechnical investigation report PG3068-1 Dated September 13, 2013 confirmed that the site consists a stiff clay crust over a deep sensitive silty clay deposit. These conditions will provide a suitable base for construction. The subject site is subject to a 1.0m grade raise restrictions.

The report contains recommendations which include but are not limited to the following:

- Fill for roads to be suitable native material in 300mm lifts compared to 95% SPMDD

Pavement Structure – Car Parking Areas:

LOCAL ROAD	THICKNESS
Asphaltic Concrete	50mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	300mm

Pavement Structure – Private Roadways and Main Drive Aisles:

LOCAL ROAD	THICKNESS
Asphaltic Concrete	90mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	450mm

- Pipe bedding and cover: The pipe bedding for sewer and water pipes placed on a relatively dry, undisturbed subgrade surface should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located within the firm grey silty clay, the thickness of the bedding material should be increased to a minimum of 300 mm. The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to 300 mm above the obvert of the pipe. The material should be placed in 225 mm thick lifts and compacted to a minimum of 95% of its SPMDD.

2 WATER SUPPLY

2.1 Existing Conditions

The subject site is located within Pressure Zone 2E of the City of Ottawa's water distribution system.

The plaza is serviced by a 200 mm diameter watermain that connects to the 400 mm diameter watermain on Orleans Blvd and a 200 mm diameter watermain connection to the 600 mm diameter watermain on Jeanne D'Arc Blvd. The Orleans Gardens Plaza has several 150 mm and 200 mm diameter watermains that run throughout the site to service the different commercial buildings located within.

2.2 Design Criteria

2.2.1 Water Demands

The subject lands are proposed to consist of 4 buildings of Back-to-Back townhouses with a of 60 units. A water demand has been calculated using the following data as per table 4.2 of the Ottawa Design Guidelines – Water Distribution.

- Townhouses 2.7 person per unit
- Residential Average Day Demand 350 l/cap/day

A watermain demand calculation sheet is included in **Appendix B** and the total demands are summarized as follows;

- Average Day 0.66 l/s
- Maximum Day 1.64 l/s
- Peak Hour 3.61 l/s

2.2.2 System Pressures

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

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

2.2.3 Fire Flow Rate

The fire flow rate for the subject building is determined by the Fire Underwriters Survey (FUS) method in which the building construction type, type of occupancy, sprinkler system and separation from adjacent building is considered. A calculation has been conducted and the resulting in a fire flow rate of 13,000 l/min. A copy of the FUS calculations is included in **Appendix B.** 3 new hydrants are required to provide adequate coverage for the site.

2.3 Proposed Water Plan

The water boundary condition request was made during the preliminary engineering phase and new watermain connection locations and the addition of a third location have been determined necessary which will require new boundary conditions in submission 2. A new water model that reflects the updated boundary conditions will also be completed for submission 2. An assumption was made for the additional connection point that was not included in the initial boundary request. That the proposed westerly Jean D'Arc Blvd. connection point would have similar boundary conditions to the easterly Jean D'Arc connection.

The watermain layout for this site is shown on Drawing C-001 General Plan of Services. As stated in Section 2.1 the plaza is serviced by existing 100 mm, 150 mm diameter and 200 mm diameter watermains. The 200 diameter watermain that runs along the eastern edge of the site will be able to adequately service the 'Block D' building.

To service Blocks A, B & C, two watermain connections will need to be made within the site to existing 100 mm and 150 mm diameter watermains to create a loop that will run along the access roads inside the new development area. One watermain connection will need to be made to the 600 mm watermain in Jean D'Arc Blvd.

Rational method hydraulic modeling of the watermains in this area was conducted by IBI Group for this report. As stated above the water model includes outdated boundary conditions, a new water model will be run for submission with updated boundary conditions.

Results of the analysis is summarized as follows for each scenario and output from the water model is included in **Appendix B**.

Basic Day (Maximum Pressure)

The maximum basic day pressure is 430.52 kPa at Node J02. As this does not exceed 553 kPa (80 psi) pressure reducing control in the form of pressure reducing valves at the building in accordance with Technical Bulletin ISDTB-2014-02 is not recommended for all buildings.

Peak Hour (Minimum Pressure)

The peak hour pressure at node J01 is 402.06 which exceeds the minimum requirement of 278 kPa (40 psi).

Max Day and Fire (Fire Flows)

The fire flow at node J04 is 245.72 l/s. The maximum required fire flow for the subject site is 13,000 l/s or 216.67 l/s per Section 2.2.3 which represents the internal hydrant in the internal north parking lot between Block A and Block B. The minimum FUS calculated flow of 13,000 l/min has been met.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

As previously noted, the existing site was developed in the late 1980s through the 2000's. The wastewater disposal system was previously constructed to service the entire commercial parcels lands, and is currently operational.

3.2 Design Criteria

The sanitary sewers for the subject site will be based on the City of Ottawa design criteria. It should be noted that the sanitary sewer design for new sewers in this study incorporates the latest City of Ottawa design parameters identified in Technical Bulletin ISTB-2018-01. Some of the key criteria will include the following:

- Demand per capital 280 litres/person/day
- Peaking factor Harmon formula where K=0.8
- Infiltration allowance 0.33 l/s/ha
- Velocities 0.60 m/s min. to 3.0 m/s max.
- Minimum Pipe Size Residential 200mm @ 0.35%
- Minimum Pipe Size Commercial 250mm @ 0.25%
- Pre-Dev Commercial Flow 35,000 L/Ha/Day (based on OSDG prior to 2018)
- Pre-Dev Commercial Peak Factor 1.5

3.3 Recommended Wastewater Plan

The sanitary system will consist of a new 250mm sewer through the redevelopment plan to service the commercial site to the west. This service required relocation due to conflict with proposed Block 'C'. The remainder of the sewers within the redevelopment plan servicing only residential blocks will be 200mm. Sewers will be installed at normal depth and slope and have been designed using the criteria noted above in section 3.2.

The predevelopment wastewater allocation for the redevelopment lands can be calculated based using the 1988 Servicing Plan "FUTURE DEV" building Area of 0.13Ha at a commercial flow of 35,000 L/Ha/Day (OSDG prior to 2018), with a peaking factor of 1.5, for a total peak flow average allocation of 0.5 L/s.

The proposed redevelopment will have a peak flow of 2.06 L/s. Since the infiltration allowance is unchanged, with no new areas being added, the total increase in flow from the site is 1.56 L/s. This flow increase is well within the residual capacity of all existing on-site sewers and will have no impact on the on-site wastewater disposal system. It is expected that this marginal increase in flow will have a negligible impact on the downstream wastewater system.

A copy of the sanitary sewer design sheet and the sanitary drainage area plan can be found in **Appendix C.** Please refer to the site servicing plan 122764-C-001 in **Appendix A** for further details.

In order to maintain service to the existing commercial block to the west of the redevelopment area, the realigned 250mm privately owned sanitary sewer configuration required a longer length than previously constructed. Invert changes at the manholes on the 250mm run through the

redevelopment are designed at 0.02m, regardless of angle, which is less than the minimum stipulated in Section 6.2.12 of the OSDG.

4 SITE STORMWATER MANAGEMENT

4.1 Existing Conditions

As previously noted, the subject lands are part of an existing development plan, and remained undeveloped through the years due to market considerations. The area of redevelopment has been allocated to the existing storm sewer system, where the majority of the area exists as asphalt parking lot with some grassy soft scape along Jean D'Arc Boulevard. A stormwater management report was not available for the existing development.

4.2 Design Criteria

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

Some of the key criteria include the following:

- Design Storm — 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients for new areas
  - Townhouse Private Road — C = 0.85
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

4.3 System Concept

The redevelopment configuration requires to the relocation of some of the existing on-site storm sewers.

Where existing drainage is captured, unaltered by grading adjustments, new sewers have been sized to convey those flows uncontrolled to a 5-year design storm, with an anticipated starting time of concentration of 15minutes plus the length of the existing sewer network at an assumed velocity of 1.0m/s. The 15minute starting Tc is consistent with sewer design principles of the era.

Where redeveloped areas are provided with a new storm sewer, the sewer has been sized to the 2-year flow.

In some instances, the existing pipes are demonstrated in the new storm sewer design sheet with negative capacity to convey existing development flows. Without access to the 1988 site development calculations, we are unable to determine the reasoning for this. It is possible that the existing site had a stormwater management plan implemented with restricted flow rates, which in turn may have been used for sewer sizing, or that a higher 20 minute starting Tc may have been used for sewer sizing, both of these possibilities would reduce the design flow solving the theoretical negative capacity issues which are presented in the new storm sewer design sheet.

4.4 Stormwater Management

4.4.1 Restricted Flowrate

An offsite dual drainage release was not provided by the downstream system. In pre-consultation with the City of Ottawa, a restricted flow rate for the new development area was determined to be a 5yr release, based on a runoff coefficient of 0.5 and a Tc of 10minutes.

STORM EVENT	CRITERIA AND FORMULAS
Redevelopment Area (ha), A	1.54Ha
Runoff Coefficient, C	0.50
Time of Concentration, Tc	10min
5yr Storm Intensity, I	$=998.071 / (Tc + 6.053)^{0.814}$ $=998.071 / (10 + 6.053)^{0.814}$ =104.19
Restricted Flowrate, Qr	=2.78 x A x C x I =2.78 x 1.54 x 0.50 x 104.19 =223.04 L/s

Therefore, the maximum allowable release from the redevelopment area is 223.04 L/s.

4.4.2 Uncontrolled Release

There are several areas which tie into existing storm sewers, where existing catchbasin are maintained, however the drainage area and grading conditions have changed from pre-development. As a result, we have designed these areas to be uncontrolled release for the 100 year rainfall event is used for the uncontrolled areas.

STORM EVENT	CRITERIA AND FORMULAS
Uncontrolled Area (ha), A	0.08
Runoff Coefficient, C	0.85
Time of Concentration, Tc	10min
100yr Storm Intensity, I	$=1735.688 / (Tc + 6.014)^{0.820}$ $=1735.688 / (10 + 6.014)^{0.820}$ =178.56
Uncontrolled Flowrate, Qu	=2.78 x A x C x I =2.78 x 0.08 x 0.85 x 178.56 =33.75 L/s

Therefore, the uncontrolled release from site can be quantified as 33.75L/s.

4.4.1 Maximum Allowable Release Rate

The maximum allowable release rate to the storm sewer system is the restricted flowrate less the uncontrolled release.

Qmax	=	Qr	-	Qu
Qmax	=	223.04 L/s	-	(33.75 L/s)
Qmax	=	189.28 L/s		

Therefore, the maximum allowable release rate to the sewer system is **189.28 L/s**.

Surface flows in excess of the site's allowable release rate will be stored on site in strategic surface storage areas and underground storage system or pipes, and gradually released into the minor system to respect the site's allowable release rate. The maximum static surface retention depth located within the redeveloped areas is limited to 300mm as shown on the **Ponding Plan** located in **Appendix D**. Overland flow routes will be provided in the grading to permit emergency overland flow. Each building entrance is provided with a minimum of 300mm freeboard from adjacent ponding areas.

The modified rational method was used to evaluate the on-site stormwater management. The total restricted flow rate through the minor system will be the maximum allowable release rate of **189.28 l/s**. This will be achieved by the used of Inlet Control Devices (ICD's) placed strategically in site catchbasins or maintenance holes. A summary of the ICD's, their corresponding storage requirements, storage availability, and associated drainage areas has been provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100 YEAR STORAGE REQUIRED (m^3)	SURFACE STORAGE PROVIDED (m^3)	Underground Storage *Provided (m3)	100yr OVERFLOW
MH10	84	97.62	98.52	0	0
MH11	40	14.69	15.08	0	0
CBMH05	10	97.19	108.87	0	0
CB09	20	37.14	37.83	0	0
MH12	15	77.61	6.32	89.45	0
EXMH49-1	20	32.90	2.61	38.34	0
TOTAL	**189**	**357.15**	**269.23**	**127.79**	**0**

*Underground storage provided within storm sewers, dedicated storage system, or combination.

Where underground storage is required, a summary of the underground storage calculations, including dedicated storage system sizing information has been provided in **Appendix D**.

The total controlled release rates from the redevelopment areas are less than the maximum allowable, therefore the stormwater management objective have been met.

4.4.2 2 Year Ponding

A review of the 2 year ponding has been completed using the modified rational method. A minimum Tc of 10min has been used. Where volumes are calculated as a negative value, 0.0m3 has been shown. A summary of each drainage area has been provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m3)	2-year Ponding Depth (m)	Comment
MH10	11.67	0.15	Minimal Ponding During 2year event
MH11	0	-	
CBMH05	26.74	0.14	Minimal Ponding During 2year event
CB09	7.60	0.14	Minimal Ponding during 2year event
MH12	19.46	0	Contained within U/G Storage
EXMH49-1	8.16	0	Contained within U/G Storage

4.4.3 100 year + 20% Stress Test

A cursory review of the 100yr event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100year event has been increased by 20%. The calculations have been included in **Appendix D.**

A summary of the required storage volumes, and overflow balances is provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100yr20 STORAGE REQUIRED (m^3)	STORAGE PROVIDED (m^3)	100yr20 OVERFLOW (m3)
MH10	84.18	132.26	95.82	33.74
MH11	39.50	21.47	15.08	6.39
CBMH05	10.06	123.58	108.87	14.71
CB09	19.76	48.65	37.83	10.82
MH12	15.04	98.53	95.77	2.76
EXMH49-1	20.22	42.72	40.95	1.77
TOTAL	**188.76**	**467.21**	**394.32**	**70.19**

*Overflow from R3 to R4, and from S2 to S5.

**Storage provided in R4 and S5 reduces the total overflow.

Where overflow is noted, the peak overflow volume can be reverse calculated using the peaking time of concentration to determine a flow rate. Once the flow rate is established an open channel flow depth calculation was performed at each spill location to determine the depth of the stress test overflow. A copy of the calculations has been provided in **Appendix** D. A summary of the overflow rates and depths is provided below.

DRAINAGE AREA	100yr20 OVERFLOW (m3)	Peaking Time of Concentration (Tc)	OVERFLOW (L/s)	OVERFLOW DEPTH (m)
MH10	33.74	15	37.49	0.015
MH11	6.39	8	13.31	0.016
CBMH05	14.71	58	4.23	0.035
CB09	10.82	17	10.61	0.017
MH12	2.76	60	0.77	0.010
EXMH49-1	1.77	27	1.09	0.010
TOTAL	**70.19**		**66.41**	

Where stress test overflow occurs, the overflow does not touch the building, or the building openings, and is well within the 300mm provided freeboard over the static ponding elevation.

5 SOURCE CONTROLS

5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- split lot drainage;
- Roof-leaders to vegetated areas where possible;
- vegetation planting

5.2 Lot Grading

In accordance with local municipal standards, the parking lots will be graded between 1.5% and 5.0%. Private roadways will have a minimum gradient of 0.5% along barrier curbs. Most landscaped area drainage will be directed into a dedicated drainage system, and connects to the storm sewer system. Copies of the grading plans have been included in **Appendix E.**

5.3 Roof Leaders

This development will consist of stacked homes and apartments. It is proposed that roof leaders from these units be constructed such that runoff is directed to grass areas adjacent to the units. This will promote water quality treatment through settling, absorption, filtration and infiltration and a slower release rate to the conveyance network.

5.4 Vegetation

As with most site plan agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within landscape and amenity areas provide the opportunity to improve vegetation.

6 CONVEYANCE CONTROLS

6.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- catchbasin and maintenance hole sumps; and

6.2 Catchbasins

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be fabricated to OPSD 705.010 or 705.020. All storm sewer maintenance holes servicing local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

7 SEDIMENT AND EROSION CONTROL PLAN

7.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

7.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

7.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment-carrying flows, thus preventing any construction–related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

7.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

7.5 Surface Structure Filters

All catch basins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and until it is appropriate to remove them.

7.6 Stockpile Management

During construction of any development similar to that being proposed both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction and rear yard catchbasins are usually installed after base course asphalt is placed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern since these materials are quickly used and the mitigative measures stated previously, especially the use of filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

8 ROADS AND NOISE ATTENUATION

Vehicular access to the redevelopment area is provided by two private entrances from within the existing Orleans Gardens commercial development. The Orleans Gardens commercial development has multiple private entrances, some signalized, others unsignalized off Orleans Boulevard, and Jean D'Arc Boulevard.

There are sidewalks proposed within the redevelopment. They vary from 1.2 to 1.8m in width. Pedestrian access to the site will be via the existing private roadway, each with sidewalks connecting to Jean D'Arc Boulevard.

The site has been designed in order to provide curbside municipal waste disposal.

There are no bus routes proposed within the redevelopment area.

Jean D'Arc is an Arterial Road which would generate significant noise. An environmental noise impact assessment is required for this site.

9 RECOMMENDATIONS

Water, wastewater and stormwater systems required to redevelop a portion of the 1615 Orleans Boulevard site will be designed in accordance with MOE and City of Ottawa's current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- Commence Work Order: City of Ottawa
- ECA for Sewage Works: MOECP Transfer of Review by City of Ottawa
- Watermain Approval: City of Ottawa

Report prepared by:

Demetrius Yannoulopoulos, P.Eng.
Director

Ryan Magladry, C.E.T.
Project Manager

APPENDIX A

- Site Plan
- Site Servicing Plan 122764-C-001
- Preconsultation Meeting City Comments
- Preconsultation Meeting City Engineering Comments
- CCL Original Development Servicing Plan (Circa 1988)
- CCL Original Development Grading Plan (Circa 1988)
- Development Checklist

PROJECT INFO

LEGAL ADDRESS: LOTS 3 AND 5 CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER now CITY OF OTTAWA

PIN:04419-0428

MUNICIPAL ADDRESS : 1615 Orleans Boulevard

ZONING: GM12 F(0.6) H(22)

CALCULATED PARCEL AREA: 55424.29 m² (596581.52 ft²) (5.54 ha)

PROJECT STATISTICS

TOTAL OVERALL SITE AREA	55,424.29 m² (596581.52 ft²) (5.54 ha)
TOTAL OVERALL SITE DEPTH	+/-336m
TOTAL PROJECT SITE AREA	11,159.8m²
TOTAL PROJECT SITE DEPTH	91.6m
TOTAL BUILDING AREA	2,928m²

BUILDING STATISTICS

BUILDING GFA	9,764.64m²
TOTAL BUILDING AREA	2,928m²
FLOOR AREA INDEX (GFA / SITE AREA)	0.36
MAXIMUM BUILDING HEIGHT (PROPOSED)	4 Storey (12.5m)

SITE ZONING

ZONING BY-LAW	GM12 F(0.6) H(22)
PERMITTED USE	Plan Unit Development

SITE SETBACKS	**REQUIRED**	**PROVIDED**
FRONT YARD AND CORNER SIDE YARD	3m	3m
-	-	-
INTERIOR SIDE YARD	5m	5m
REAR YARD	3m	3m

PARKING STATISTICS	**REQUIRED**	**PROVIDED**
RESIDENTIAL PARKING RATE: 1 SPACE PER DWELLING	60 Spaces	60 Spaces (Garage)
ACCESSIBLE PARKING - TYPE 'A'	1 Space	1 Space
ACCESSIBLE PARKING - TYPE 'B'	1 Space	1 Space
VISITOR PARKING RATE: 0.2 SPACE PER DWELLING	12 Spaces	25 Spaces
TOTAL # OF PARKING SPACES	72 Spaces	85 Spaces

BICYCLE PARKING STATISTICS	**REQUIRED**	**PROVIDED**
RATE: TOWHOME	None	-

PROJECT STATISTICS

B2B TOWNHOMES	GFA SqM
BLOCK A 16 B2B UNITS - 3 STOREYS	2,531.6
BLOCK B 16 B2B UNITS - 4 STOREYS	2,796.0
BLOCK C 16 B2B UNITS - 3 STOREYS	2,531.6
BLOCK D 12 B2B UNITS - 3 STOREYS	1,905.4

BLOCK A - 16 B2B TOWN HOMES RESIDENT PARK REQUIRED @ 1/UNIT= 16 VISITOR PARKING REQUIRED @ 0.20 = 3 PARK. REQUIRED @1.2 = 19 PARK. PROVIDED= 23	BLOCK B - 16 B2B TOWN HOMES RESIDENT PARK REQUIRED @ 1/UNIT= 16 VISITOR PARKING REQUIRED @ 0.20 = 3 PARK. REQUIRED @1.2 = 19 PARK. PROVIDED= 23
BLOCK C - 16 B2B TOWN HOMES RESIDENT PARK REQUIRED @ 1/UNIT= 16 VISITOR PARKING REQUIRED @ 0.20 = 3 PARK. REQUIRED @1.2 = 19 PARK. PROVIDED= 23	BLOCK D - 12 B2B TOWN HOMES RESIDENT PARK REQUIRED @ 1/UNIT= 12 VISITOR PARKING REQUIRED @ 0.20 = 2 PARK. REQUIRED @1.2 = 14 PARK. PROVIDED= 17

1 SPA SITE PLAN
1 : 250

2022-12-02 11:58:19 AM\\Users\cgonzalez\Documents\17047_Orleans Gardens_SPA_cgonzalezASTWL.rvt

Q4A ARCHITECTS

Q4 ARCHITECTS INC.
4110 Yonge Street
Suite 602,Toronto,ON.
M2P 2B7
T. 416.322.6334
F. 416.322.7294
E. info@q4architects.com

PN
TN

TN = TRUE NORTH
PN = PROJECT NORTH

The contractor / builder must verify all dimensions on the job and report any discreapancy to the desiginer before proceeding with the work.

Drawings are NOT to be scaled. All drawings and specifications are Instruments of service and the copyright property of the designer and must be returned upon request.

Issued For:

ISSUED FOR SPA	12/20/2022

No	Description	Date

Revision Schedule

Project Title

Project Description

ORLEANS GARDENS

Location
1615 Orléans Blvd. Orléans, ON K1C 7E2

Client
NORTH AMERICAN DEVELOPMENT GROUP

Project No.	17047
Scale	As indicated
Drawn By	CG
Checked By	Checker

SPA SITE PLAN

Sheet Title

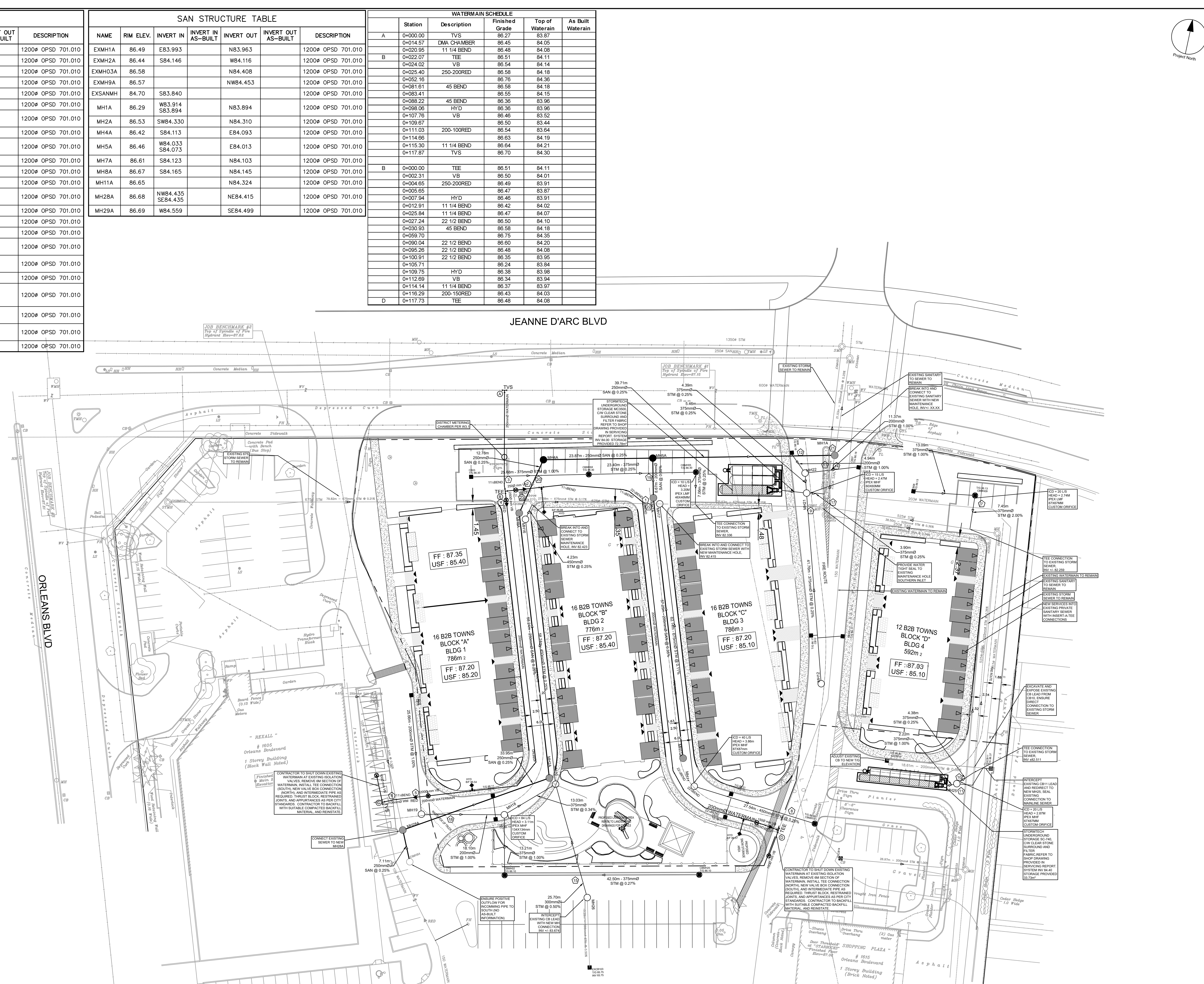
BLOCKS A, B, C & D

A0-2 3
Page Number

STM STRUCTURE TABLE						
NAME	RIM ELEV.	INVERT IN	INVERT IN AS–BUILT	INVERT OUT	INVERT OUT AS–BUILT	DESCRIPTION
CBMH02	86.12	E83.843		N83.374		1200ø OPSD 701.010
CBMH04	86.30	W84.643		E83.350		1200ø OPSD 701.010
CBMH05	86.30	W83.292		S83.232		1200ø OPSD 701.010
CBMH09	86.13	W84.599		S83.500		1200ø OPSD 701.010
CBMH14	86.40			W82.794		1200ø OPSD 701.010
CBMH20	86.13			W83.956		1200ø OPSD 701.010
EXCBMH11	86.58	W82.454 S82.423		E82.423		1200ø OPSD 701.010
EXCBMH12	83.92			E82.621		1200ø OPSD 701.010
EXMH1	86.45	W82.266 E82.145		N82.015		1200ø OPSD 701.010
EXMH49	86.63	W84.590		N82.577		1200ø OPSD 701.010
EXMH50	86.48	S82.315		W82.285		1200ø OPSD 701.010
EXMH51	83.19	S81.821				1200ø OPSD 701.010
MH10	86.68	SW83.168 SE83.213		N83.063		1200ø OPSD 701.010
MH11	86.53	E82.740		N82.485		1200ø OPSD 701.010
MH12	86.39			N83.774		1200ø OPSD 701.010
MH16	86.65	S82.917		N82.434		1200ø OPSD 701.010
MH17	86.60	S82.415 W82.375		E82.355		1200ø OPSD 701.010
MH18	86.19	W83.417 S83.242		NE83.212		1200ø OPSD 701.010
MH19	86.53	N83.658		E83.598		1200ø OPSD 701.010
MH21	86.28	S83.670 W83.986 N83.670		E83.610		1200ø OPSD 701.010
MH22	86.25	E84.666 NW84.711		S83.681		1200ø OPSD 701.010
MH25	86.55	SW84.378		E84.170 NE83.461		1200ø OPSD 701.010
MH26	86.23	S83.674		NW83.341		1200ø OPSD 701.010

SAN STRUCTURE TABLE						
NAME	RIM ELEV.	INVERT IN	INVERT IN AS–BUILT	INVERT OUT	INVERT OUT AS–BUILT	DESCRIPTION
EXMH1A	86.49	E83.993		N83.963		1200ø OPSD 701.010
EXMH2A	86.44	S84.146		W84.116		1200ø OPSD 701.010
EXMH03A	86.58			N84.408		1200ø OPSD 701.010
EXMH9A	86.57			NW84.453		1200ø OPSD 701.010
EXSANMH	84.70	S83.840				1200ø OPSD 701.010
MH1A	86.29	W83.914 S83.894		N83.894		1200ø OPSD 701.010
MH2A	86.53	SW84.330		N84.310		1200ø OPSD 701.010
MH4A	86.42	S84.113		E84.093		1200ø OPSD 701.010
MH5A	86.46	W84.033 S84.073		E84.013		1200ø OPSD 701.010
MH7A	86.61	S84.123		N84.103		1200ø OPSD 701.010
MH8A	86.67	S84.165		N84.145		1200ø OPSD 701.010
MH11A	86.65			N84.324		1200ø OPSD 701.010
MH28A	86.68	NW84.435 SE84.435		NE84.415		1200ø OPSD 701.010
MH29A	86.69	W84.559		SE84.499		1200ø OPSD 701.010

WATERMAIN SCHEDULE					
	Station	Description	Finished Grade	Top of Waterain	As Built Waterain
A	0+000.00	TVS	86.27	83.87	
	0+014.57	DMA CHAMBER	86.45	84.05	
	0+020.95	11 1/4 BEND	86.48	84.08	
B	0+022.07	TEE	86.51	84.11	
	0+024.02	VB	86.54	84.14	
	0+025.40	250-200RED	86.58	84.18	
	0+052.16		86.76	84.36	
	0+081.61	45 BEND	86.58	84.18	
	0+083.41		86.55	84.15	
	0+088.22	45 BEND	86.36	83.96	
	0+098.06	HYD	86.36	83.96	
	0+107.76	VB	86.46	83.52	
	0+109.67		86.50	83.44	
	0+111.03	200-100RED	86.54	83.64	
	0+114.66		86.63	84.19	
	0+115.30	11 1/4 BEND	86.64	84.21	
	0+117.87	TVS	86.70	84.30	
B	0+000.00	TEE	86.51	84.11	
	0+002.31	VB	86.50	84.01	
	0+004.65	250-200RED	86.49	83.91	
	0+005.65		86.47	83.87	
	0+007.94	HYD	86.46	83.91	
	0+012.91	11 1/4 BEND	86.42	84.02	
	0+025.84	11 1/4 BEND	86.47	84.07	
	0+027.24	22 1/2 BEND	86.50	84.10	
	0+030.93	45 BEND	86.58	84.18	
	0+059.70		86.75	84.35	
	0+090.04	22 1/2 BEND	86.60	84.20	
	0+095.26	22 1/2 BEND	86.48	84.08	
	0+100.91	22 1/2 BEND	86.35	83.95	
	0+105.71		86.24	83.84	
	0+109.75	HYD	86.38	83.98	
	0+112.69	VB	86.34	83.94	
	0+114.14	11 1/4 BEND	86.37	83.97	
	0+116.29	200-150RED	86.43	84.03	
D	0+117.73	TEE	86.48	84.08	



REFER TO DWG C-002 FOR REMOVALS PLAN

(REMOVALS/ABANDONMENTS HAVE BEEN TURNED OFF FROM THE SERVICING PLAN)

CLIENT

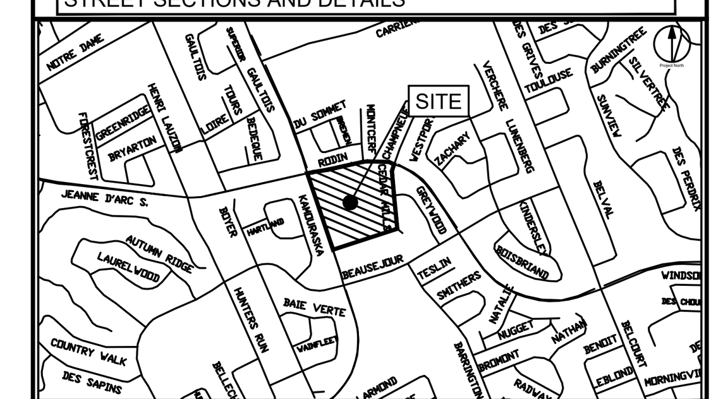
NORTH AMERICAN PROPERTIES

COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-06

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO:
122764

DRAWN BY:	CHECKED BY:
A.B. / E.H.	D.G.Y.
PROJECT MGR:	APPROVED BY:
R.M.	D.G.Y.

SHEET TITLE

GENERAL PLAN OF SERVICES

SHEET NUMBER	ISSUE
C-001	1

CITY PLAN No. xxxxx

SCALE CHECK 1 in 10mm

CITY FILE No. D07-XX-XX-XXXX

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-001 GENERAL PLAN OF SERVICES.dwg Last Saved: February 7, 2023, by Ehenrie Plotted: Tuesday, February 7, 2023 4:15:40 PM by Eric Henrie

Pre-Application Consultation Meeting – City Comments

Property Address: 1615 Orleans Boulevard
File Number: PC2022-0222
Description: Application for Site Plan Control to build 60 back-to-back stacked townhouses, including required parking spaces and outdoor amenity space.

Meeting Location: Virtual – Microsoft Teams
Meeting Date: September 27, 2022

Submission Requirements

Documents required in support of this application are highlighted in the attached Study and Plan Identification List.

When checking for Application Completeness the City refers to the requirements provided in Ottawa's Guide to preparing studies and plans. Additional information is also available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-application consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change.

Application Type and Fees

The application fees (2022 rates) for the proposed applications are as follows. Application fees may vary from now to time of submission:

Application Type	**Planning / Legal Fee**	**Initial Engineering Design Review and Inspection Fee**	**Conservation Authority Fee (Initial)**	**Total** (HST may apply to part or all)
Site Plan Control - Complex	$46,037.00	$10,000	n/a (not in regulated area)	$56,037.00

Staff Comments

Planning Comments – Kelly Livingstone

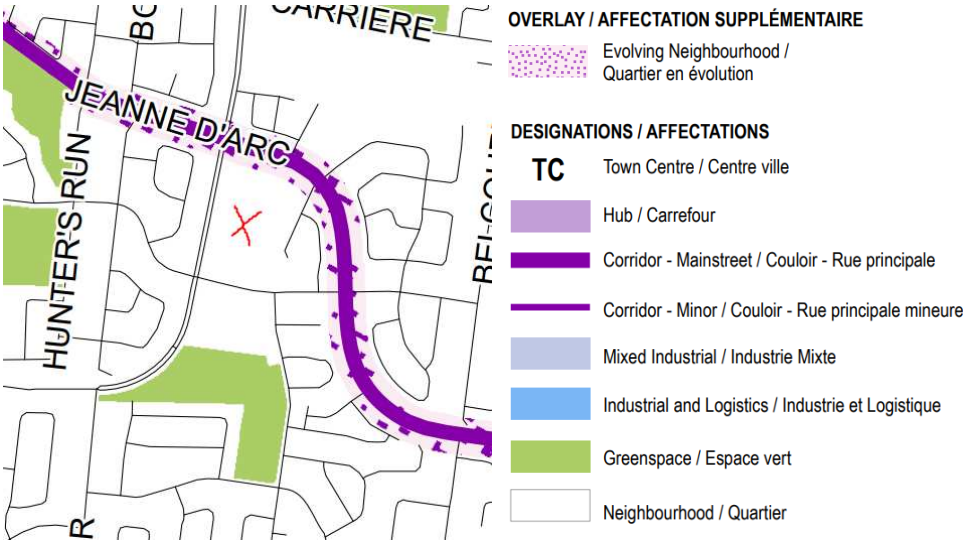
Policy Comments

2003 Official Plan

- Site designated General Urban Area
- Jeanne d'Arc is a Spine Route, Transit Priority Corridor, and an Existing Arterial road

2021 (New) Official Plan

- Ottawa's New Official Plan was adopted by Council in November 2021.
- With the new Official Plan the site received some new planning policy.
- The Site is in the **Suburban Transect**, and is designated **Neighbourhood**, with an **Evolving Neighbourhood** designation along the frontage to Jeanne d'Arc.
- Jeanne d'Arc is now a **Minor Corridor** as well. It is still considered a transit priority corridor and existing arterial.



- Staff would encourage the exploration of a revised layout that is more in keeping with the minor corridor and evolving neighbourhood designations in the new Official Plan. These designations speak about a gradual evolution to more urban built form patterns. The orientation of the townhouse units, with parking abutting the street is not desirable and may not achieve these objectives. The design suggestions provided by Urban Design may better accomplish these goals and could be preferable if you are willing to explore them. I'm happy to arrange for another pre-consultation meeting to discuss.

Zoning Comments

- The site is zoned GM12, F(0.6), H(22)
- GM12 - Permitted residential uses include: apartment dwellings low and medium rise, planned unit development, stacked dwelling, and townhouse dwellings.
- F(0.6) – Max FSI is 0.6, about 33,000 sq.m. based on site area. Confirmed in a previous pre-consultation that FSI is calculated over the entire site, so this also includes the commercial uses. Future plans will have to show the full site in a calculation.
- H(22) – Max height is 22m
- Any development would be a Planned Unit Development over the entire site. Information is limited on the plans submitted, which is fine, but I can't confirm

zoning complies at this point. There didn't seem to be glaring concerns however so long as FSI is less than 0.6.

Additional Items

- I encourage you to reach out to the local ward councillor before making a submission – this is Ward 2, Laura Dudas – this may change with the municipal election in less than a month.
- The City will soon be changing its Site Plan and Zoning By-law Amendment processes in response to Bill 109. A follow up pre-application consultation, and integration into this new planning process will be required if your application is submitted on or after January 1, 2023. More details can be shared at a future date.
- The High Performance Development Standards have been approved by Council and will apply once the New Official Plan is officially in effect. Site Plan metrics include such things like Building Energy Efficiency, Accessibility, Tree Planting and Species requirements. You can view them all by searching it up on the City's website.
    - The current Tier 1 High Performance Development Standard Requirements are provided on the linked page: https://engage.ottawa.ca/ottawa-high-performance-development-standard1/news_feed/hpds-requirements-site-plan
    - These will be design standards required to be shown on plans and met through Site Plan review and approval.

Transportation Planning – Mike Giampa

- TIA is not required
- A Noise Study is required.
- Jeanne D'Arc has a ROW protection of 37.5m.
- Regarding the internal private street layout, an appropriate throat length needs to be maintained at the signalized access. Refer to TAC guidelines.

Engineering – Rubina Rasool

- Engineering comments are provided in the attached "Preconsultation Engineering Comments 1615 Orleans" document.
- Engineering plan and report requirements are included in the "Preconsultation Required Plans 1615 Orleans" document.

Parks Planning – Phil Castro

Parks & Facilities Planning's (PFP) comments on the above-noted development application are below:

- Please note that PFP has recently undertaken a legislated replacement of the Parkland Dedication By-law, with the new by-law approved by City Council on August 31, 2022. To ensure you are aware of the parkland dedication requirements for your proposed development, we encourage you to familiarize

yourself with the staff report and By-Law that were approved by Council on August 31, 2022.

- In accordance with the City of Ottawa's Parkland First Policy, on development or redevelopment sites that generate a minimum of 400m2 of parkland, PFP will take the maximum amount of parkland permitted as specified by the Parkland Dedication By-law. The land dedicated as parkland will meet the requirements of the Parkland Dedication By-law and Park Development Manual, to the satisfaction of PFP in consultation with Planning, Real Estate and Economic Development (PRED).

Please provide PFP with a surveyor's note (or equivalent) which specifies the gross land area of the property as well as the area to be redeveloped with your application.

Urban Design – Selma Hassan

1. A Design Brief is required with the submission. A Terms of Reference for the Brief is attached; all items highlighted in yellow must be included in the Brief.

2. Pedestrian connections, from the Jeanne D'Arc sidewalk, across the frontages of all the new units are important. These were shown on the applicant's pre-consultation drawings and should all be retained.

3. Understanding the site's limitations, we feel that there are still opportunities to explore alternative layouts that improve the interface with Jeanne D'Arc, consolidate open space for greater resident benefit and don't reduce unit counts.
    a. The attached PDF is a very rough illustration of one possibility. On the PDF, the red lines are roads, the yellow and blue blocks are the proposed residential blocks pushed further into the site, the orange is visitor parking and the green is open space. While, surface parking is still visible from Jeanne D'Arc, a landscaped open space would be the primary impression from the street. The open space would also create a reasonable sized area for play for the children who are likely to be living in these family sized units.

4. The infill is primarily surrounded by commercial buildings and parking. To help establish a more residential feel to the development, planting in front of and around the units, as well as in the open space, is important. As illustrated in the applicant's package, the fronts of the units will essentially be hardscape (image below as example). The frontages need to include soft surface areas. While, the driveways and walkways can't be soft surface, the area between the stoop and street can be, and should include trees wherever there is enough soil volume.

The landscape plan should show trees:

- In the green areas shown in the PDF adjacent to Street B.
- For Block D, along the unit fronts, in the area to the west adjacent to Jeanne D'Arc, and along the rear property line abutting the existing residential. Low planting should screen the surface parking from Jeanne D'Arc.
- Along the frontage of Jeanne D'Arc, streets 1 and 2. The visitor parking should be screened with vegetation.
- In the open space are shown in the PDF. The planting should create park like area for residents and patrons of the commercial uses. The area would also benefit from seating opportunities

5. Architecture – a slight simplification of the colours and / or material selection is suggested.

6. Questions:
   a. As part of the redevelopment, will the pylon sign at the southern entrance to the plaza be relocated?
   b. How will residential garbage be handled? Will there be a common garbage area? If yes, where?

Forestry – Mark Richardson

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

Site Plan Pre- Application Consultation Notes

Date: Tuesday, September 27, 2022.
Site Location: 1615 Orleans Blvd
Type of Development: ☒ **Residential (**☒ **townhomes,** ☒ **stacked,** ☐ **singles,** ☐ **apartments),** ☐ **Office Space,** ☒ **Commercial,** ☐ **Retail,** ☐ **Institutional,** ☐ **Industrial, Other:** N/A

Infrastructure

Water

Existing public services:

- Jeanne D'Arc Blvd – 610mm backbone (existing service connection to remain)
- Orleans Blvd – 406 DI watermain (existing service connection)

Watermain Frontage Fees to be paid ($190.00 per metre) ☐ **Yes** ☒ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 1999)
  - Average daily demand: ___ L/s
  - Maximum daily demand: ___ L/s
  - Maximum hourly daily demand: ___ L/s
- Fire protection (Fire demand, Hydrant Locations)
- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station

General comments

- Service areas with a basic demand greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

Sanitary Sewer

Existing public services:

- Jeanne D'Arc Blvd – 250mm Conc. (existing service connection)
- Orleans Blvd – 375mm unknown

Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

General comments

- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station.
- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.

Storm Sewer

Existing public services:

- Jeanne D'Arc Blvd – 1350mm Conr. (existing service connection)
- Orleans Blvd – 1050 Conr. mm unknown

Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

General comments

- Building foundation drains must be connected to a storm sewer that is operating in a free-flow state

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within the Billberry Creek Area Subwatershed Study Area draining to the Ottawa River. Please contact the RVCA for subwatershed study area requirements.
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient: post-development to pre-development, max C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 5-year storm event.
- The stormwater management for the entire site must be provided to demonstrate adequate capacity in the private on-site network and that the site is within the overall site release rate requirement.

General Service Design Comments

- All structure must be a minimum of 1.0m from existing mains on-site. Sewer mains within 6.0m of the building foundation must provide include a section within the geotechnical report discussing the minimum separation distance between the mains and the building foundations for future maintenance and repair.

Other

Capital Works Projects within proximity to application? ☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines

- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
  (613) 580-2424 ext. 44455
- geoOttawa
  http://maps.ottawa.ca/geoOttawa/

SITE PLAN APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/Z	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Brief	**S**	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study	**S**	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	**S**	
S		11. Storm water Management Brief	12. Hydro-geological and Terrain Analysis		
		13. Water main Analysis	14. Noise / Vibration Study	**S**	
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

S – Required for Site Plan Control/Subdivision

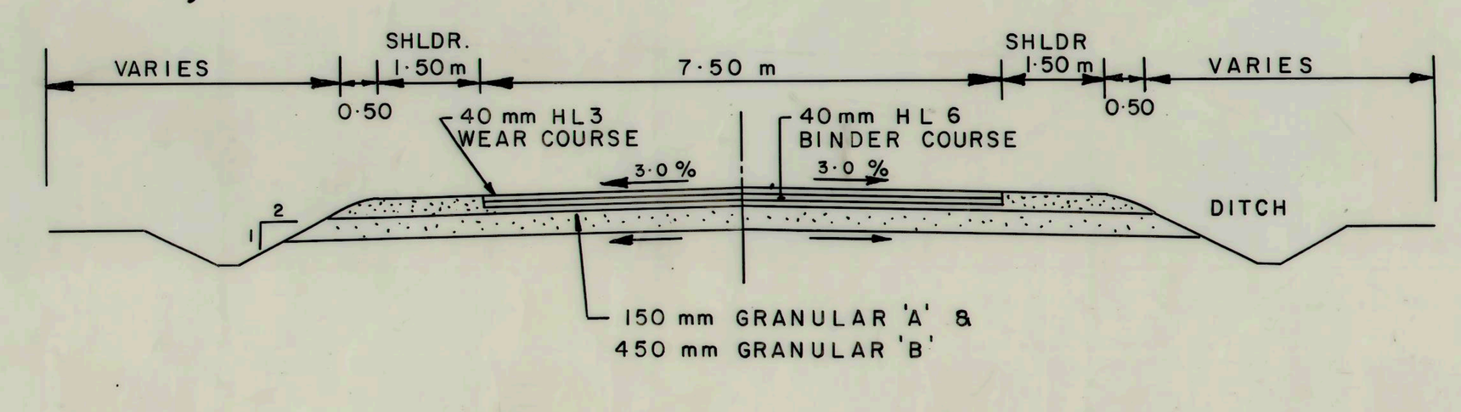
It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.



NOTES :

1. BOTTOM OF DITCH TO BE MINIMUM 300 mm BELOW GRANULAR SUBGRADE.
2. SUB-EXCAVATE SOFT AREAS IN SUBBASE AND FILL WITH GRANULAR 'B' COMPACTED IN 150 mm LAYERS.
3. ALL MATERIALS TO BE SUPPLIED AND PLACED AS PER M.T.C. STANDARDS AND SPECIFICATIONS.
4. DEPTH OF GRANULAR 'B' TO BE INCREASED AS REQUIRED BY SOIL CONDITIONS.

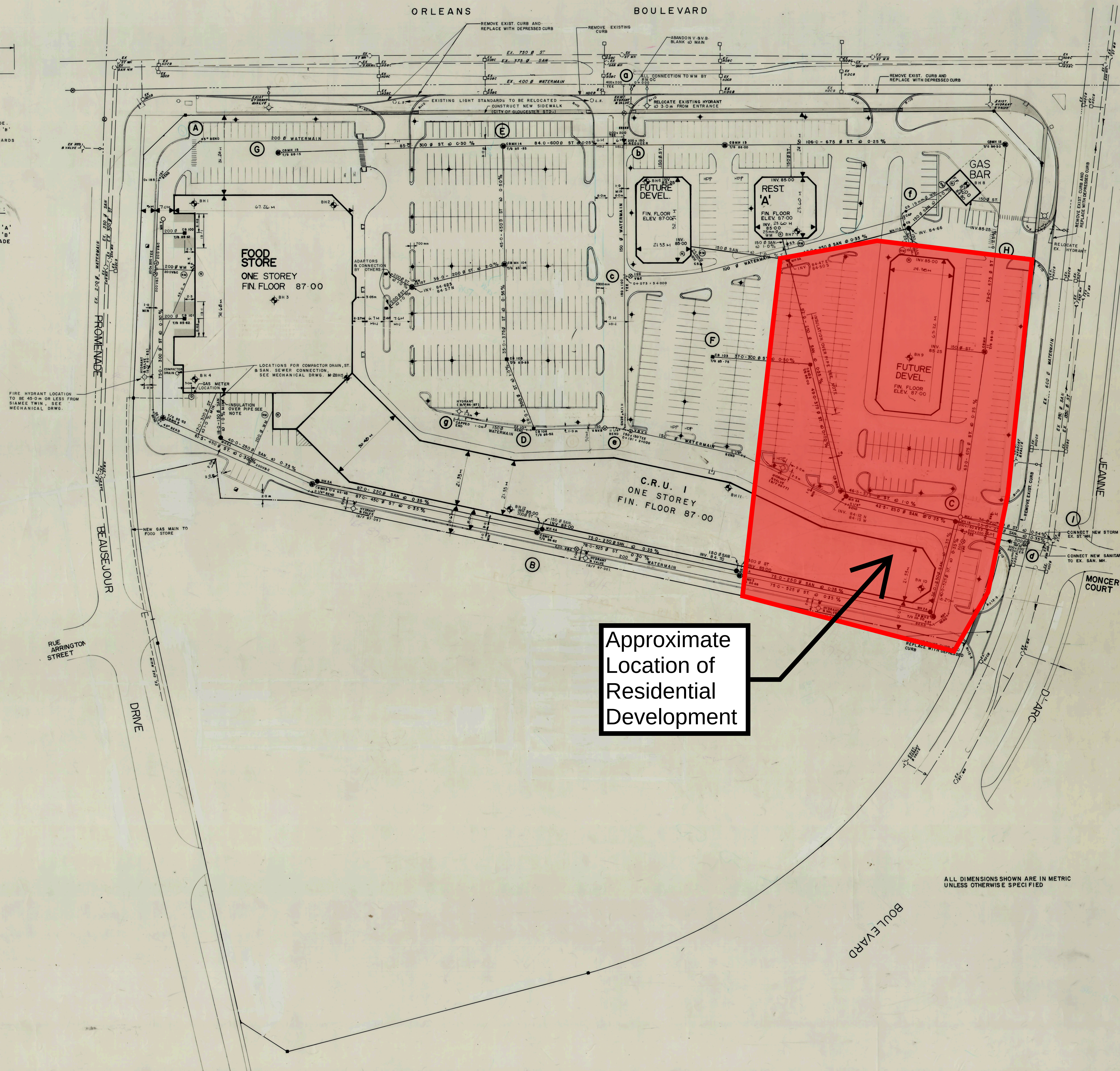
TEMPORARY ROAD CROSS - SECTION

ROAD STRUCTURE :

80 mm HL 3
150 mm GRANULAR 'A'
450 mm GRANULAR 'B'
COMPACTED SUBGRADE

PARKING SPACE STRUCTURE :

50 mm HL 3
150 mm GRANULAR 'A'
380 mm GRANULAR 'B'
COMPACTED SUBGRADE



WATERMAIN SCHEDULE

	STATION	DESCRIPTION	PROPOSED SURFACE GRADE	TOP OF WATERMAIN	AS BUILT
a	0+000	EX. 400 Ø WM 400 x 200 TEE			
	0+011	VALVE & V.C.	86·60	~~84·20~~	83·98
b	0+020	200x200 TEE, 200x150 REDUCER	86·74	~~84·34~~	84·15
c	0+073	150 x 100 TEE	86·74	~~84·34~~	84·31
	0+100		86·63	~~84·23~~	84·21
	0+128·5	11 1/4° BEND	86·68	~~84·28~~	84·19
e	0+131	150 x 150 TEE	86·68	~~84·28~~	84·19
	0+134	VALVE & V.C.	86·68	~~84·28~~	84·19
	0+176	11 1/4° BEND	86·57	~~84·17~~	84·22
	0+192	HYDRANT & VALVE	86·57	~~84·17~~	84·22
	0+220	11 1/4° BEND	86·65	~~84·25~~	84·34
	0+266	200x150 REDUCER 200 x 200 TEE	86·64	~~84·24~~	84·28
	0+284	300x200 REDUCER & EXIST. PLUG	86·16	83·76	
d	0+290	EX. WM			
e	2+000	150x 150 TEE	86·68	~~84·28~~	84·19
	2+004	11 1/4° BEND	86·70	~~84·30~~	84·19
	2+008	150 V& V.B.	86·65	~~84·25~~	84·19
	2+037	22 1/2° BEND	86·52	~~84·12~~	84·19
g	2+064	HYDRANT	86·62	~~86·42~~	84·26
	2+065	CAPPED END	86·62	~~86·42~~	84·27
c	3+000	150 x 100 TEE V.&V.C.	86·74	~~84·34~~	84·31
	3+050		86·66	~~84·26~~	84·19
f	3+107	CAPPED END	86·85	~~84·45~~	84·48

GENERAL NOTES

1. DO NOT SCALE DRAWINGS. FIGURED DIMENSIONS ONLY TO BE USED.
2. EXISTING GROUND ELEVATIONS SHOWN ON ALL DRAWINGS TAKEN FROM WEBSTER & SIMMONDS SURVEYING DRAWING DATED OCT. 23/87

- SANITARY SEWER PVC PIPES DR 35
- STORM SEWER CONC. CL. III & CL. IV.
- ALL WATERMAIN TO BE D.I.T.J. OR P.V.C. MIN. 2·4 m COVER (HORT. & VERT.)
- WATER SERVICE TO BE MIN. 2·4 m COVER
- CONNECTIONS TO STORM & SANITARY TO BE MACHINE CUT
- GRAN. 'B' TO EXTEND MIN. 0·6 m BACK OF CURB OR TO FOUNDATION WHERE CURB ADJACENT TO BUILDING
- SANITARY MH PER CITY OF GLOUCESTER STANDARD S-1 FLAT TOP WHERE REQUIRED
- C.B.'S PER CITY OF GLOUCESTER STANDARD S-9
- ALL INSTALLATIONS TO CURRENT CITY OF GLOUCESTER AND R.M.O.C. WORKS DEPT. STANDARDS AND SPECIFICATIONS
- ALL CURB TO CITY OF GLOUCESTER STANDARD R-18
- FOR BOREHOLE DETAILS SEE GOLDER'S SOILS REPORT DATED AUG /88.
- PERFORATED PIPE TO BE LAID IN GRANULAR FILL AROUND CATCHBASINS.
- 1·2 m x 75mm STYROFOAM SM H·1·35 INSULATION OVER SAN. SEWER WITH COVER 1·50m OR LESS

SIDEWALK TO BE DEPRESSED AND CONTINUOUS ACROSS THE ENTRANCE

LEGEND :

- LIGHT STANDARD
- TRANSFORMER
- B·H · BORE HOLE
- METER
- REMOTE METER
- IMPERMEABLE CUT OFF WALL

No	DATE	REVISION
12	89/04/05	AS BUILT- WATERMAIN F.D.
11	88/12/23	REVISE SERVICE PIPE ELEV. TO C.R.U. I DY
10	88/12/23	REVISE ST DRAIN FROM 200Ø TO 300Ø FOR C.R.U. I AS PER R.J. McKEE CONSULTANTS DY
9	88/10/31	REVISE RADIUS AT ENTRANCES DY
8	88/10/27	REVISE CBMH T/G'S DY
7	88/10/24	REVISE INVERTS CBMH 107 & ISSUE FOR CONSTRUCTION DY
6	88/10/07	REVISE CURB NOTES AND TURNING LANES
5	88/09/28	REVISE ISLAND
4	88/09/26	REVISE AS PER FIRE DEPT. AND RMOC D.Y
3	88/09/12	ADD IMPERMEABLE CUT OFF WALL DY
2	88/09/12	REVISE SAN FROM 200Ø TO 250Ø, CHANGE CB 107 TO MHCB, REVISE SIDEWALK LOCATION ON JEANNE D'ARC DY
1	29/08/88	ISSUED FOR TENDER

NORTH

REGISTERED PROFESSIONAL ENGINEER
W. BENNETT
29/8/88
PROVINCE OF ONTARIO

ORLEANS GARDENS SHOPPING CENTRE

STEINBERG PLUS STORE # 173

JEANNE D'ARC BLVD., ORLEANS

BASE INFORMATION BY

MARCUS BERNS ARCH.

FIRST CITY
SHOPPING CENTRE GROUP

Cumming Cockburn Limited
Consulting Engineers and Planners
Hull, Ottawa, Brockville, Kingston, Toronto, Waterloo, London

GENERAL PLAN OF SERVICES

DATE	DRAWN	JOB No	DRAWING No
JULY 1988			
SCALE 1=500	CHECKED	3100-87	100

ORLEANS BOULEVARD

PHASE 1 — PHASE 2

BEAUSEJOUR PROMENADE

JEANNE D'ARC BOULEVARD

RIGHT TURN TAPER

DEPRESSED CURB

PROPOSED 1.5m SIDEWALK

STEINBERG
FINISHED FLOOR ELEVATION 87.00

RECEIVING DOCK CONCRETE SLAB DETAILS, SEE DRAWING No. ST-6-1/2

FUTURE DEVEL. A
F.F. ELEVATION 87.00

FUTURE DEVEL. B
F.F. ELEVATION 87.00

FUTURE GAS BAR
F.F. ELEV. 87.00

FUTURE DEVEL. C
FINISHED FLOOR ELEVATION 87.00

B.N.S.

UNIT 2

JUMBO VIDEO

UNIT 6

C.I.B.C.

UNIT 9 · UNIT 10 · UNIT 11 · UNIT 12 · UNIT 13 · UNIT 14 · UNIT 15 · UNIT 16 · UNIT 17 · UNIT 18 · UNIT 19 · UNIT 20 · UNIT 21 · UNIT 22 · UNIT 23 · UNIT 24 · UNIT 25 · UNIT 26 · UNIT 27

C.R.U. FINISHED FLOOR ELEVATION 87.00

CONSTRUCT TEMPORARY PAVED ROAD FOR PHASE 2 DEVELOPMENT IN

C.R.U. PHASE

FINISHED FLOOR ELEVATION 87.00

DITCH

PROPOSED 1.5m SIDEWALK

Approximate Location of Residential Development

GENERAL NOTES :

1. DO NOT SCALE DRAWINGS. FIGURED DIMENSIONS ONLY TO BE USED.
2. GENERAL GRADING, TOPSOIL, SEEDING AND SWALES REQUIRED TO DIRECT WATER TO CBMH'S 1,2,3,8,11, 12,13,CBTO2,AND CBTO3 DURING PHASE 1 DEVELOPMENT.

LEGEND

- 86.80 — PROPOSED GRADE
- DRAINAGE ARROWS
- TRAFFIC DIRECTION
- STOP SIGN
- (T/G 85.50) — T/G ELEVATION SET DURING PHASE 1 CONSTRUCTION
- DEPRESSED CURB
- RAMP

NOTE: FOR ROAD STRUCTURE SEE DRAWING 3100-87-100

NO.	REVISIONS	DATE	INITIAL

ORLEANS GARDENS SHOPPING CENTRE
FIRST CITY
SHOPPING CENTRE GROUP

GRADING PLAN

Cumming Cockburn Limited
Consulting Engineers and Planners

SCALE	1:500
DRAWN BY	M.M./CAD
DESIGN D.Y.	CHECKED D.Y.
DATE	JULY 1988
FIELD BOOK	
DRWG No.	3100-87-200

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☒ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☒ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☒ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☒ Analysis of available capacity in existing public infrastructure.
- ☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☒ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX B

- Watermain Demand Calculation Sheet
- Fire Flow Calculations
- Water Model Schematic and Results
- City Correspondence regarding Boundary Conditions

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 1615 Orleans Blvd
CLIENT : Q4 Architects Inc.

FILE: 122764-6.2.4
DATE PRINTED: 16-Dec-22
DESIGN: AB
PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	TOWNHOUSE UNITS	MEDIUM DENSITY UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
Site		60.00		162.00				0.66		0.66	1.64		1.64	3.61		3.61	10,000

POPULATION DENSITY		WATER DEMAND RATES		PEAKING FACTORS		FIRE DEMANDS	
Single Family	3.4 persons/unit	Residential	350 l/cap/day	Maximum Daily		Single Family	10,000 l/min (166.7 l/s)
				Residential	2.5 x avg. day		
		Commercial Shopping Center		Commercial	1.5 x avg. day	Semi Detached &	
Townhouse	2.7 persons/unit		2,500 L/(1000m2)/day	Maximum Hourly		Townhouse	10,000 l/min (166.7 l/s)
				Residential	2.2 x avg. day		
Medium Denisity	1.8 persons/unit			Commercial	1.8 x avg. day	Medium Density	15,000 l/min (250 l/s)

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block A

Building Floor Area

width	27.0	m
depth	15.5	m
stories	3	
Area	1,250.6	m^2

$F = 220C\sqrt{A}$

C	1.5	
A	1,251	m^2
F	11,670	l/min
use	12,000	l/min

C = 1.5 wood frame
1.0 ordinary
0.8 non-combustile
0.6 fire-resistive

Occupancy Adjustment

Use	-15%	
Adjustment	-1800	l/min
Fire flow	10,200	l/min

-25% non-combustile
-15% limited combustile
0% combustile
+15% free burning
+25% rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	15.2	27.0	3	81	14%
south	0.0	0.0	0	0	0%
west	0.0	0.0	0	0	0%
Total					14%

Adjustment	1,428	l/min
Total adjustments	1,428	l/min
Fire flow	11,628	l/min
Use	12,000	**l/min**
	200.0	**l/s**

* Exposure charges from Water Supply For Public Protection in Canada 2020
Techinical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block B

Building Floor Area

width	27.6	m
depth	12.8	m
stories	4	
Area	1,411.6	m^2

$F = 220C\sqrt{A}$

C	1.5	
A	1,412	m^2
F	12,398	l/min
use	12,000	l/min

C = 1.5 wood frame
1.0 ordinary
0.8 non-combustile
0.6 fire-resistive

Occupancy Adjustment

Use	-15%	
Adjustment	-1800	l/min
Fire flow	10,200	l/min

-25% non-combustile
-15% limited combustile
0% combustile
+15% free burning
+25% rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall Length	Stories	L*H Factor	Exposure Charge *
north	0.0	0.0	0	0	0%
east	15.2	23.4	3	70	13%
south*	0.0	0.0	0	0	0%
west	15.2	27.6	3	83	14%
Total					27%

Adjustment	2,754	l/min
Total adjustments	2,754	l/min
Fire flow	12,954	l/min
Use	13,000	**l/min**
	216.7	**l/s**

* Exposure charges from Water Supply For Public Protection in Canada 2020
Techinical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block C

Building Floor Area

width	26.9	m
depth	14.9	m
stories	3	
Area	1,200.8	m^2

$F = 220C\sqrt{A}$

C	1.5		C =	1.5 wood frame
A	1,201	m^2		1.0 ordinary
				0.8 non-combustile
F	11,435	l/min		0.6 fire-resistive
use	11,000	l/min		

Occupancy Adjustment

Use	-15%	
Adjustment	-1650	l/min
Fire flow	9,350	l/min

-25% non-combustile
-15% limited combustile
0% combustile
+15% free burning
+25% rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	18.3	21.6	3	65	13%
south	35.6	2.1	2	4	0%
west	15.2	23.4	3	70	13%
Total					26%

Adjustment	2,431	l/min
Total adjustments	2,431	l/min
Fire flow	11,781	l/min
Use	12,000	**l/min**
	200.0	**l/s**

* Exposure charges from Water Supply For Public Protection in Canada 2020
Techinical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block D

Building Floor Area

width	40.5	m
depth	14.9	m
stories	3	
Area	1,807.3	m^2

$F = 220C\sqrt{A}$

C	1.5		C =	1.5 wood frame
A	1,807	m^2		1.0 ordinary
				0.8 non-combustile
F	14,029	l/min		0.6 fire-resistive
use	10,000	l/min		

Occupancy Adjustment

Use	-15%	
Adjustment	-1500	l/min
Fire flow	8,500	l/min

-25% non-combustile
-15% limited combustile
0% combustile
+15% free burning
+25% rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

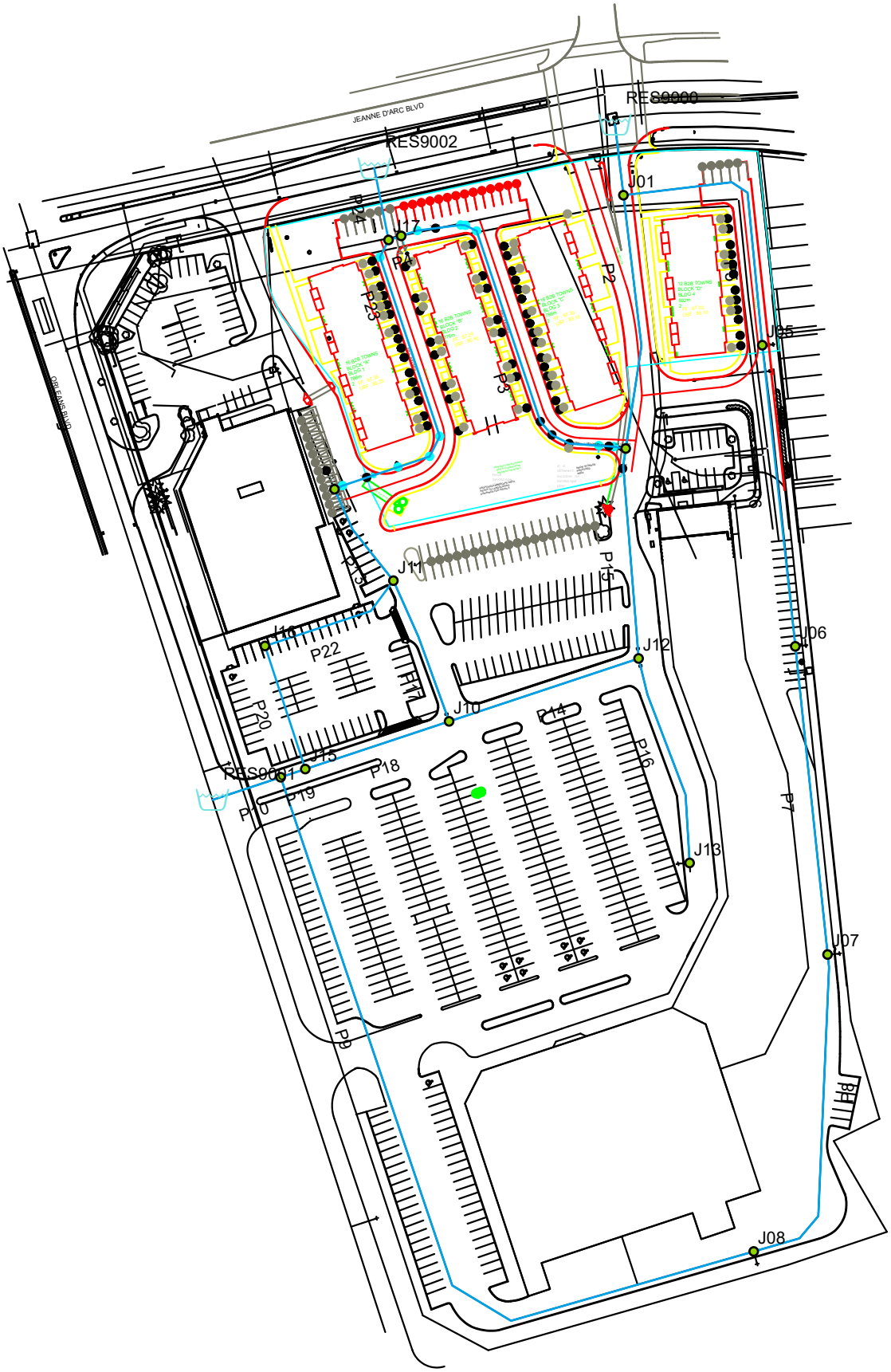
Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	21.3	38.0	2	76	6%
south	>45	11.0	2	22	0%
west	18.3	39.6	3	119	15%
Total					21%

Adjustment	1,785	l/min
Total adjustments	1,785	l/min
Fire flow	10,285	l/min
Use	10,000	**l/min**
	166.7	**l/s**

* Exposure charges from Water Supply For Public Protection in Canada 2020
Techinical Bulletin ISTB 2021-03

ORLEANS GARDENS WATER MODEL SCHEMATIC



Average Daily Demand Results

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J01	0.06	86.27	130.20	430.52
2	☐	J02	0.11	86.47	128.52	412.01
3	☐	J03	0.18	86.47	127.52	402.23
4	☐	J04	0.14	86.70	129.24	416.90
5	☐	J05	0.08	86.51	130.21	428.19
6	☐	J06	0.06	86.70	130.21	426.34
7	☐	J07	0.05	86.70	130.21	426.36
8	☐	J08	0.13	85.60	130.21	437.16
9	☐	J09	0.00	86.55	130.22	427.92
10	☐	J10	0.00	86.76	130.01	423.86
11	☐	J11	0.00	86.56	129.83	424.05
12	☐	J12	0.00	86.75	129.96	423.45
13	☐	J13	0.00	86.74	129.96	423.55
14	☐	J15	0.00	86.70	130.16	425.85
15	☐	J16	0.02	86.57	130.11	426.62
16	☐	J17	0.00	86.48	127.48	401.79

Max Daily Demand Results

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J01	0.34	86.27	127.30	402.06
2	☐	J02	0.58	86.47	127.30	400.10
3	☐	J03	0.96	86.47	127.30	400.10
4	☐	J04	0.65	86.70	127.30	397.84
5	☐	J05	0.43	86.51	127.30	399.70
6	☐	J06	0.11	86.70	127.30	397.84
7	☐	J07	0.09	86.70	127.30	397.84
8	☐	J08	0.23	85.60	127.30	408.62
9	☐	J09	0.00	86.55	127.30	399.32
10	☐	J10	0.00	86.76	127.30	397.26
11	☐	J11	0.00	86.56	127.30	399.22
12	☐	J12	0.00	86.75	127.30	397.36
13	☐	J13	0.00	86.74	127.30	397.45
14	☐	J15	0.00	86.70	127.30	397.85
15	☐	J16	0.04	86.57	127.30	399.12
16	☐	J17	0.00	86.48	127.30	400.01

Max Hourly Demand + Fireflow

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)
1	☐	J02	0.26	401.85	127.48	216.00	304.64	370.24
2	☐	J03	0.44	401.97	127.49	216.00	382.44	888.96
3	☐	J04	0.32	397.58	127.27	200.00	221.22	245.72
4	☐	J05	0.20	401.05	127.44	200.00	292.75	322.57
5	☐	J06	0.09	398.71	127.39	100.00	354.90	262.39
6	☐	J07	0.07	398.23	127.34	100.00	348.36	243.74
7	☐	J08	0.20	408.49	127.29	100.00	359.33	250.37
8	☐	J11	0.00	398.30	127.21	100.00	371.35	336.42
9	☐	J13	0.00	396.45	127.20	100.00	198.07	114.85

		ID	Hydrant Pressure at Available Flow (kPa)	Junctions with Pressure Violation	Node with the Lowest Pressure Violation	Lowest Pressure Violation (kPa)
1	☐	J02	139.96	0		
2	☐	J03	139.97	0		
3	☐	J04	139.96	0		
4	☐	J05	139.96	0		
5	☐	J06	139.96	0		
6	☐	J07	139.96	0		
7	☐	J08	139.96	0		
8	☐	J11	139.96	0		
9	☐	J13	139.96	0		

		ID	Average Pressure Violation (kPa)
1	☐	J02	
2	☐	J03	
3	☐	J04	
4	☐	J05	
5	☐	J06	
6	☐	J07	
7	☐	J08	
8	☐	J11	
9	☐	J13	

WATERMAIN DEMAND CALCULATION SHEET

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

PROJECT : Orleans Gardens
CLIENT : North Ameican Dev.

FILE: 122764-6.4.4
DATE PRINTED: 07-Feb-23
DESIGN: AB
PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	TOWNHOUSE / BACK TO BACK UNITS	MEDIUM DENSITY UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
J01		7		18.9				0.06		0.06	0.15		0.15	0.34		0.34	
J02		12		32.4				0.11		0.11	0.26		0.26	0.58		0.58	10,000
J03		20		54.0				0.18		0.18	0.44		0.44	0.96		0.96	10,000
J04 & REXALL		12		32.4		0.13		0.11	0.04	0.14	0.26	0.06	0.32	0.58	0.07	0.65	10,000
J05		9		24.3				0.08		0.08	0.20		0.20	0.43		0.43	10,000
J6 - NORTHSTRIP MALL						0.21			0.06	0.06		0.09	0.09		0.11	0.11	10,000
J7 - SOUTH STRIP MALL						0.17			0.05	0.05		0.07	0.07		0.09	0.09	10,000
J8 - GROCERY STORE						0.45			0.13	0.13		0.20	0.20		0.23	0.23	10,000
J16 - BLOCK W/ REXALL						0.07			0.02	0.02		0.03	0.03		0.04	0.04	
J09																	
J10																	
J11																	10,000
J12																	
J13																	10,000
J15																	
Total		**60**		**162.0**		**1.03**		**0.53**	**0.30**	**0.82**	**1.31**	**0.45**	**1.76**	**2.89**	**0.54**	**3.42**	

POPULATION DENSITY

Single Family	3.3 persons/unit
Townhouse Unit	2.7 persons/unit
Back to Back Un	2.7 persons/unit

***Note: Population Density as per MSS, not OSDG**

WATER DEMAND RATES

Residential	280 l/cap/day
Commercial Shopping Center	2,500 L/(1000m2)/day

PEAKING FACTORS

Maximum Daily	
Residential	2.5 x avg. day
Commercial	1.5 x avg. day
Maximum Hourly	
Residential	2.2 x max. day
Commercial	1.8 x avg. day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	10,000 l/min (166.7 l/s)
Medium Density	15,000 l/min (250 l/s)

Boundary Conditions
1615 Orleans Boulevard

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	39.6	0.66
Maximum Daily Demand	98.4	1.64
Peak Hour	216.6	3.61
Fire Flow Demand # 2	13000	217

Location

Results

Connection 1 - Jeanne D'Arc Blvd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.3	63.2
Peak Hour	127.3	59.0
Max Day plus Fire #1	127.5	59.2

[1] Ground Elevation = 85.9 m

Connection 2 - Orleans Blvd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.4	62.7
Peak Hour	127.3	58.5
Max Day plus Fire #1	127.1	58.2

[1] Ground Elevation = 86.2 m

Notes

Disclaimer

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

APPENDIX C

- Sanitary Sewer Design Sheet
- Sanitary Drainage Area Plan 122764-C-400
- Sanitary External Drainage Area Plan (Whole Site) 122764-C-401

IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

Orleans Gardens Redevelopment
CITY OF OTTAWA
North American Development Group

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	TH/SD	1 Bed APT	2 Bed APT	w/o Units (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	PEAK FACTOR	FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
	MH28A	EXMH-VET	MH9A							0.0	0.0	3.80	0.00			0.08	0.08			1.50	0.04	0.08	0.08	0.03	0.00	0.0	0.07	31.02	70.57	250	0.25	0.612	30.95	99.79%
		MH9A	MH28A							0.0	0.0	3.80	0.00			0.00	0.08			1.50	0.04	0.00	0.08	0.03	0.00	0.0	0.07	31.02	7.11	250	0.25	0.612	30.95	99.79%
	MH28A	REXALL	MH29A							0.0	0.0	3.80	0.00			0.12	0.12			1.50	0.06	0.12	0.12	0.04	0.00	0.0	0.10	31.02	6.57	250	0.25	0.612	30.92	99.68%
	EX04	MH29A	MH28A							0.0	0.0	3.80	0.00			0.00	0.12			1.50	0.06	0.38	0.50	0.17	0.00	0.0	0.22	31.02	25.66	250	0.25	0.612	30.80	99.28%
		MH28A	MH2A							0.0	0.0	3.80	0.00			0.00	0.20			1.50	0.10	0.00	0.58	0.19	0.00	0.0	0.29	31.02	33.95	250	0.25	0.612	30.73	99.07%
		MH2A	MH8A	0.32		24				64.8	64.8	3.63	0.76			0.00	0.20			1.50	0.10	0.32	0.90	0.30	0.00	0.0	1.16	31.02	58.24	250	0.25	0.612	29.86	96.27%
		MH8A	MH4A							0.0	64.8	3.63	0.76			0.00	0.20			1.50	0.10	0.00	0.90	0.30	0.00	0.0	1.16	31.02	12.78	250	0.25	0.612	29.86	96.27%
		MH4A	MH5A	0.10						0.0	64.8	3.63	0.76			0.00	0.20			1.00	0.06	0.10	1.00	0.33	0.00	0.0	1.16	31.02	23.87	250	0.25	0.612	29.86	96.27%
		MH11A	MH7A	0.25		24				64.8	64.8	3.63	0.76			0.00	0.00			1.00	0.00	0.25	0.25	0.08	0.00	0.0	0.85	20.24	57.25	200	0.35	0.624	19.40	95.82%
		MH7A	MH5A							0.0	64.8	3.63	0.76			0.00	0.00			1.00	0.00	0.00	0.25	0.08	0.00	0.0	0.85	20.24	8.67	200	0.35	0.624	19.40	95.82%
		MH5A	MH1A	0.06						0.0	129.6	3.57	1.50			0.00	0.20			1.00	0.06	0.06	1.31	0.43	0.00	0.0	2.00	31.02	39.71	250	0.25	0.612	29.02	93.57%
	EX01, EX02, EX03	*EXMH3A*	*EXMH2A*							*0.0*	*0.0*	*3.80*	*0.00*			*0.83*	*0.83*			*1.50*	*0.40*	*3.41*	*3.41*	*1.13*	*0.00*	*0.0*	*1.53*	*36.70*	*75.00*	*250*	*0.35*	*0.724*	*35.17*	*95.83%*
		EXMH2A	*EXMH1A*	*0.19*		*12*				*32.4*	*32.4*	*3.68*	*0.39*			*0.00*	*0.83*			*1.50*	*0.40*	*0.19*	*3.60*	*1.19*	*0.00*	*0.0*	*1.98*	*36.70*	*36.00*	*250*	*0.35*	*0.724*	*34.72*	*94.61%*
		EXMH1A	MH1A	0.07						0.0	32.4	3.68	0.39			0.00	0.83			1.50	0.40	0.07	3.67	1.21	0.00	0.0	2.00	31.02	13.13	250	0.25	0.612	29.02	93.55%
		MH1A	EXSANMH	0.07						0.0	162.0	3.54	1.86			0.00	1.03			1.50	0.50	0.07	5.05	1.67	0.00	0.0	4.03	31.02	21.49	250	0.25	0.612	26.99	87.02%
				1.06						162.00						1.03						5.05												

Design Parameters:

Residential			ICI Areas		
SF	3.4	p/p/u			
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day
1 Bed	1.4	p/p/u	COM	28,000	L/Ha/day
2 Bed	2.1	p/p/u	IND	35,000	L/Ha/day
Other	60	p/p/Ha		17000	L/Ha/day

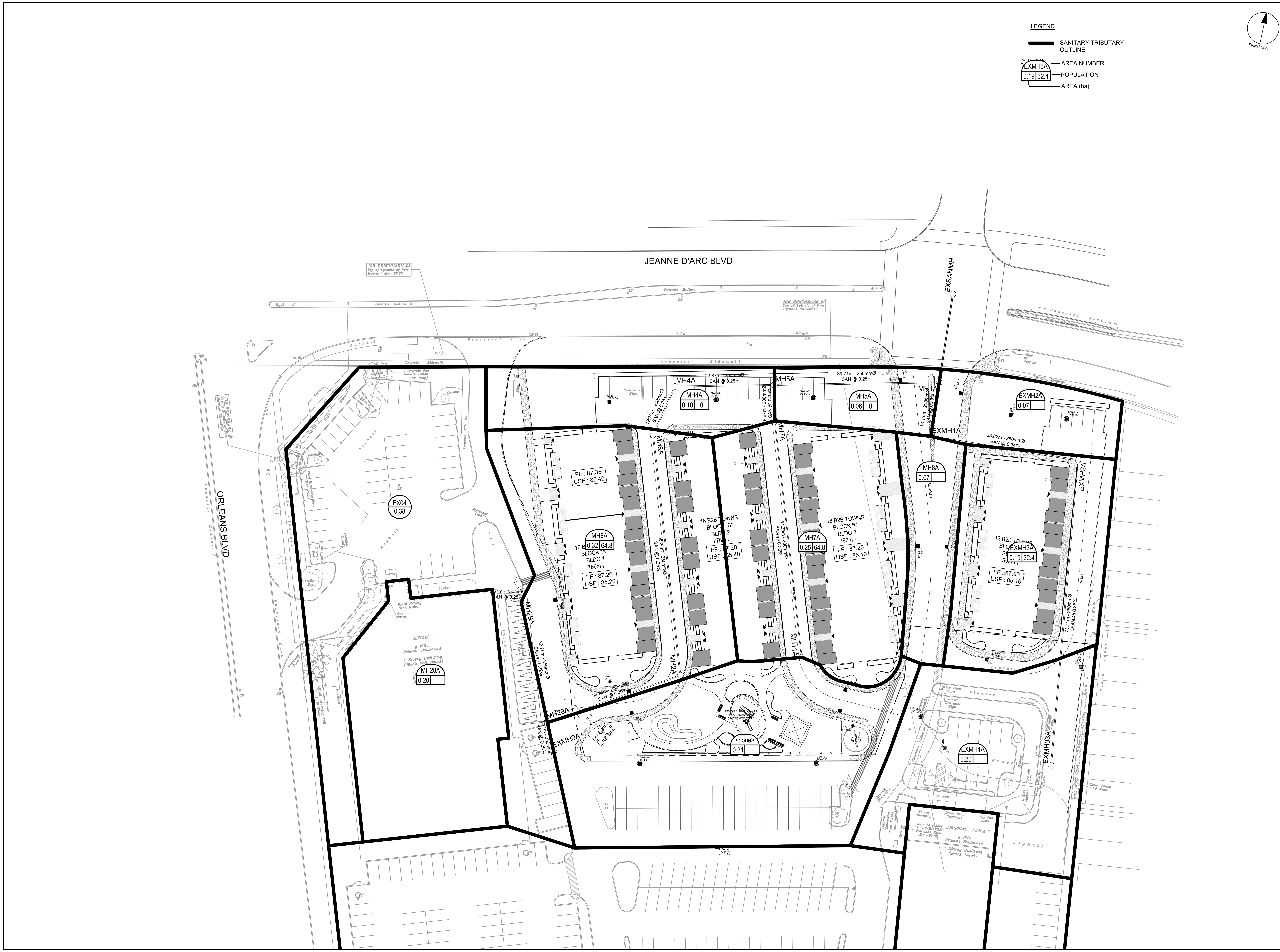
MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: AB
Checked: RM
Dwg. Reference: 122764-400

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2023-02-07

File Reference: 122764-6.04.04
Date: 2023-02-07
Sheet No: 1 of 1



CLIENT

NORTH AMERICAN PROPERTIES

COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-07

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER D. G. Yannoulopoulos 2023/02/07 PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO: 122764	
DRAWN BY: A.B. / E.H.	CHECKED BY: D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

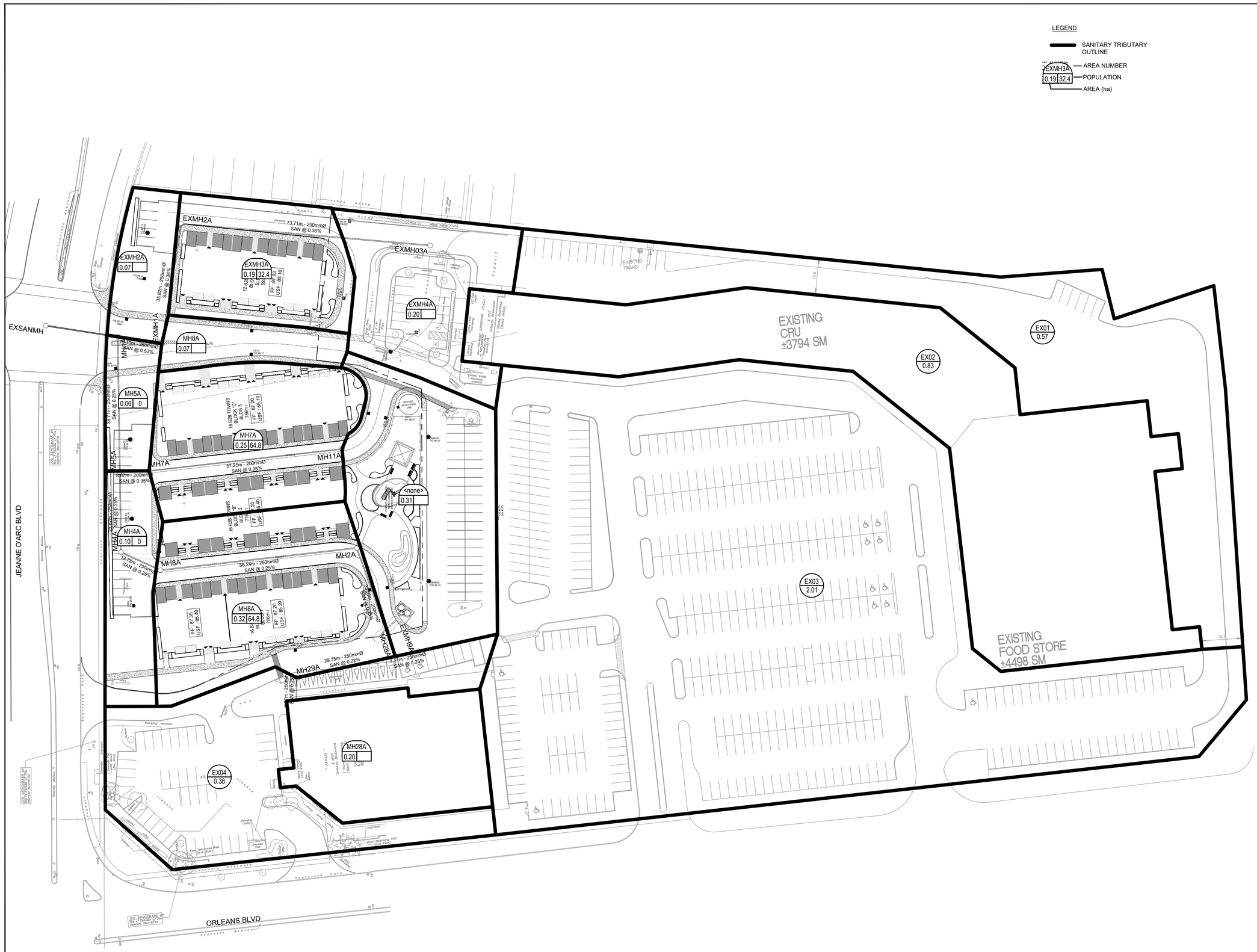
SHEET TITLE

SANITARY DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-400	1

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx



CLIENT

NORTH AMERICAN PROPERTIES

ISSUES

No.	DESCRIPTION	DATE
~~####~~	~~ISSUED~~ FOR CITY REVIEW	~~2023/02/02~~ 2023/02/07

NOT FOR CONSTRUCTION

010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
L.D. 45. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO:
122764

DRAWN BY:	CHECKED BY:
A.B. / E.H.	**D.G.Y.**
PROJECT MGR:	APPROVED BY:
R.M.	**D.G.Y.**

SHEET TITLE

EXTRENAL SANITARY DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-401	1

SCALE CHECK

CITY FILE No. D07-xx-xx-xxxx

File Location: J:\122764_OrlneGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-401 EXTRENAL SANITARY DRAINAGE AREA PLAN.dwg Last Saved: February 6, 2023, by Ehennie Plotted: Tuesday, February 7, 2023 4:18:23 PM by Eric Hennie

CITY PLAN No. xxxxx

APPENDIX D

- Storm Sewer Design Sheet
- Storm Drainage Area Plan 122764-C-500
- Storm External Drainage Area Plan 122764-C-501
- Ponding Plan 122764-C-600
- Stormwater Management Design Sheet – Modified Rational Method
- Underground Storage Calculation Sheet
- ADS Stormtech Underground Storage System @ MH21
- ADS Stormtech Underground Storage System @ MH25
- Stress Test Overflow Calculation
- Orifice Sizing Sheet

IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

STORM SEWER DESIGN SHEET

Orleans Gardens
City of Ottawa
North American Development Group

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														FIXED FLOW			SEWER DATA									
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.85	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	IND	CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
		CB19	MH19									0.17		0.40	0.40	10.00	0.41	10.41	76.81				30.85				0.00	0.00	30.85	34.22	25.66	200			1.00	1.055	3.36	9.83%
		MH19	MH18									0.19		0.45	**0.85**	10.41	0.29	10.69	75.28				64.04				0.00	0.00	64.04	34.22	18.10	200			1.00	1.055	-29.82	-87.17%
		CBMH20	CBMH02									0.21		0.50	0.50	10.00	0.94	10.94	76.81				38.11				0.00	0.00	38.11	91.46	45.20	375			0.25	0.802	53.34	58.33%
		CBMH02	MH18											0.00	**0.50**	10.94	0.14	11.08	73.38				36.41				0.00	0.00	36.41	182.91	13.21	375			1.00	1.604	146.50	80.09%
		MH18	MH10											0.00	**1.35**	11.08	0.23	11.31	72.91				98.20				0.00	0.00	98.20	106.65	13.03	375			0.34	0.935	8.46	7.93%
		EXCB103	*MH26*										*0.29*	*0.73*	*0.73*	*10.00*	*0.26*	*10.26*		*104.19*				*75.60*			*0.00*	*0.00*	*75.60*	*71.33*	*15.28*	*300*			*0.50*	*0.978*	*-4.27*	*-5.98%*
		MH26	MH10											0.00	0.73	10.26	0.44	10.70		102.84				74.62			0.00	0.00	74.62	71.33	25.70	300			0.50	0.978	-3.28	-4.60%
		MH10	MH16											0.00	1.35	11.31	1.07	12.38	72.12				97.14				0.00	0.00	168.07	148.72	58.24	450			0.25	0.906	-19.35	-13.01%
														0.00	0.73					97.75				70.93														
		MH16	EXCBMH11											0.00	**1.35**	20.27	0.08	20.35	51.60				69.50				0.00	0.00	120.05	148.72	4.23	450			0.25	0.906	28.67	19.28%
														0.00	**0.73**					69.66				50.55														
				EXTERNAL to EXBMH12: 2.29Ha, C=0.9, 5yr flow, Tc= 15+ 249m @ 1.0m/s																																				
		EXCBMH12	*EXCBMH11*										*2.29*	*5.73*	*5.73*	*19.15*	*1.12*	*20.27*		*72.17*				*413.53*				*0.00*	*0.00*	*413.53*	*438.47*	*79.82*	*675*			*0.25*	*1.187*	*24.94*	*5.69%*
		EXCBMH11	*MH17*											*0.00*	***1.35***	*20.35*	*0.39*	*20.74*	*51.48*		*81.32*	*118.65*	*69.34*		*109.53*	*159.81*	*0.00*	*0.00*	*517.94*	*438.47*	*27.58*	*675*			*0.25*	*1.187*	*-79.47*	*-18.12%*
														0.00	***6.46***					*69.50*				*448.60*														
		CB15	MAIN									0.06		0.14	0.14	10.00	0.01	10.01	76.81				10.89				0.00	0.00	10.89	34.22	0.89	200			1.00	1.055	23.33	68.18%
		CB16	MAIN									0.07		0.17	0.17	10.00	0.06	10.06	76.81				12.70				0.00	0.00	12.70	34.22	4.02	200			1.00	1.055	21.51	62.87%
		CBMH14	MH11									0.02		0.05	0.05	10.00	0.57	10.57	76.81				3.63				0.00	0.00	3.63	131.34	27.54	450			0.20	0.800	127.71	97.24%
		MH11	MH17											0.00	**0.35**	10.57	1.30	11.87	74.67				26.47				0.00	0.00	26.47	294.79	62.12	675			0.11	0.798	268.32	91.02%
		CB03	CBMH04									0.08		0.19	0.19	10.00	0.27	10.27	76.81				14.52				0.00	0.00	14.52	182.91	25.68	375			1.00	1.604	168.39	92.06%
		CBMH04	CBMH05									0.12		0.28	0.47	10.27	0.49	10.75	75.80				35.82				0.00	0.00	35.82	91.46	23.40	375			0.25	0.802	55.63	60.83%
		CBMH05	TEE									0.08		0.19	**0.66**	10.75	0.15	10.90	74.03				48.98				0.00	0.00	48.98	91.46	7.06	375			0.25	0.802	42.47	46.44%
		MH17	*EXMH1*											*0.00*	***2.36***	*20.74*	*0.50*	*21.24*	*50.88*				*120.22*				*0.00*	*0.00*	*563.54*	*438.47*	*35.63*	*675*			*0.25*	*1.187*	*-125.07*	*-28.52%*
														0.00	***6.46***					*68.68*				*443.32*														
		CB14	EXMH49									0.04		0.09	0.09	10.00	0.43	10.43	76.81	104.19			7.26	9.85			0.00	0.00	7.26	34.22	26.97	200			1.00	1.055	26.96	78.78%
		UGS02	MH25											*0.00*	0.00	10.00	0.02	10.02	76.81				0.00				0.00	0.00	0.00	182.91	2.22	375			1.00	1.604	182.91	100.00%
		EXCB11	*MH25*									*0.13*		*0.31*	*0.31*	*10.00*	*0.05*	*10.05*	*76.81*				*23.59*				*0.00*	*0.00*	*23.59*	*96.78*	*8.23*	*200*			*8.00*	*2.984*	*73.19*	*75.62%*
		MH25	MAIN											0.00	0.31	10.05	0.09	10.14	76.63				23.54				0.00	0.00	23.54	91.46	4.38	375			0.25	0.802	67.92	74.26%
		EXCB10	*MAIN*									*0.04*		*0.09*	*0.09*	*10.00*	*0.51*	*10.51*	*76.81*				*7.26*				*0.00*	*0.00*	*7.26*	*20.24*	*18.98*	*200*			*0.35*	*0.624*	*12.98*	*64.14%*
				EXTERNAL to EXBMH12: 1.40Ha, C=0.9, 5yr flow, Tc= 15+ 305m @ 1.0m/s																																				
		EXMH49	*EXMH50*									*0.06*		*0.14*	***0.64***	*20.08*	*1.04*	*21.12*	*51.90*				*33.11*				*0.00*	*0.00*	*77.82*	*265.43*	*73.78*	*525*			*0.35*	*1.19*	*187.61*	*70.68%*
													1.40	*3.50*	***3.50***					*70.08*				*44.71*														
		CB08	CBMH09									0.04		0.09	0.09	10.00	0.14	10.14	76.81				7.26				0.00	0.00	7.26	182.91	13.09	375			1.00	1.604	175.65	96.03%
		CBMH09	TEE									0.08		0.19	0.28	10.14	0.05	10.19	76.29				21.63				0.00	0.00	21.63	258.68	7.45	375			2.00	2.269	237.04	91.64%
		EXMH50	*EXMH1*											*0.00*	***0.92***	*21.12*	*0.54*	*21.66*	*50.30*				*46.36*				*0.00*	*0.00*	*108.93*	*265.43*	*38.50*	*525*			*0.35*	*1.19*	*156.50*	*58.96%*
														0.00	***3.50***					*67.89*				*62.57*														
		CB13	MAIN									0.09		0.21	0.21	10.00	0.08	10.08	76.81				16.33				0.00	0.00	16.33	34.22	5.09	200			1.00	1.055	17.88	52.26%
		CB12	MAIN									0.10		0.24	0.24	10.00	0.02	10.02	76.81				18.15				0.00	0.00	18.15	34.22	1.01	200			1.00	1.055	16.07	46.96%
		MH12	MH21											0.00	**0.45**	10.08	0.87	10.95	76.50				34.35				0.00	0.00	34.35	91.46	41.76	375			0.25	0.802	57.11	62.45%
		CB07	MH22									0.02		0.05	0.05	10.00	0.18	10.18	76.81								0.00	0.00	0.00	34.22	11.37	200			1.00	1.055	34.22	100.00%
		CB06	MH22									0.02		0.05	0.05	10.00	0.08	10.08	76.81								0.00	0.00	0.00	34.22	4.94	200			1.00	1.055	34.22	100.00%
		MH22	MH21											0.00	**0.09**	10.18	0.09	10.27	76.12								0.00	0.00	0.00	91.46	4.39	375			0.25	0.802	91.46	100.00%
		UGS01	MH21											0.00	0.00	10.00	0.11	10.11	76.81				0.00				0.00	0.00	0.00	91.46	5.46	375			0.25	0.802	91.46	100.00%
		MH21	MAIN											0.00	0.54	10.95	0.08	11.03	73.35				39.86				0.00	0.00	39.86	91.46	3.90	375			0.25	0.802	51.59	56.41%
		EXMH1	*EXMH51*										*0.04*	*0.10*	*3.93*	*21.66*	*0.31*	*21.97*	*49.51*				*194.49*				*0.00*	*0.00*	*456.95*	*861.33*	*35.25*	*750*			*0.55*	*1.89*	*404.38*	*46.95%*
														0.00	*9.96*					*66.82*				*262.46*														
												1.62	4.02	13.89	TRUE																								

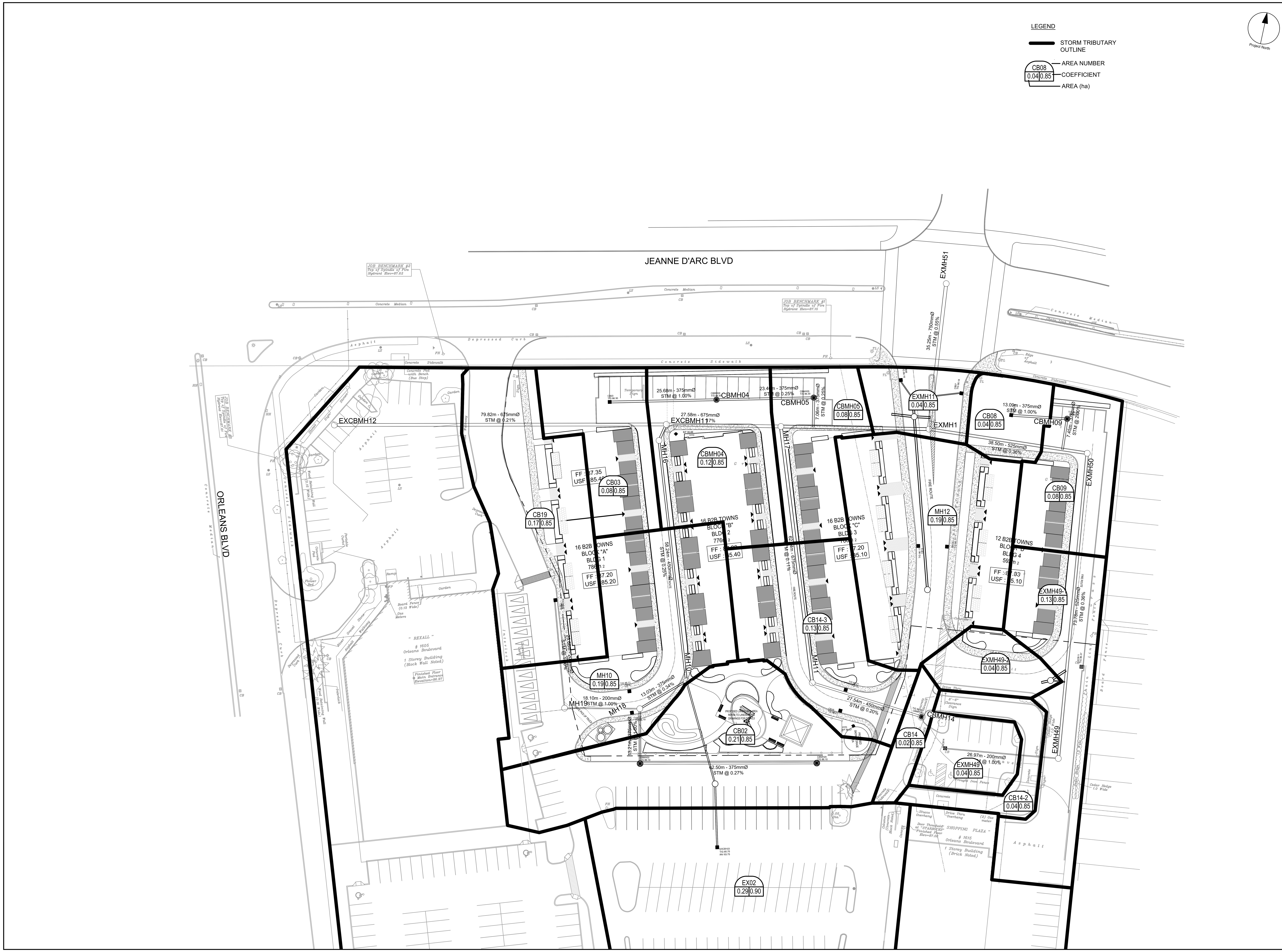
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: AB
Checked: RM
Dwg. Reference: 122764-500

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2023-02-07

File Reference: 122764-6.04.04
Date: 2023-02-07
Sheet No: 1 of 1



CLIENT

NORTH AMERICAN PROPERTIES

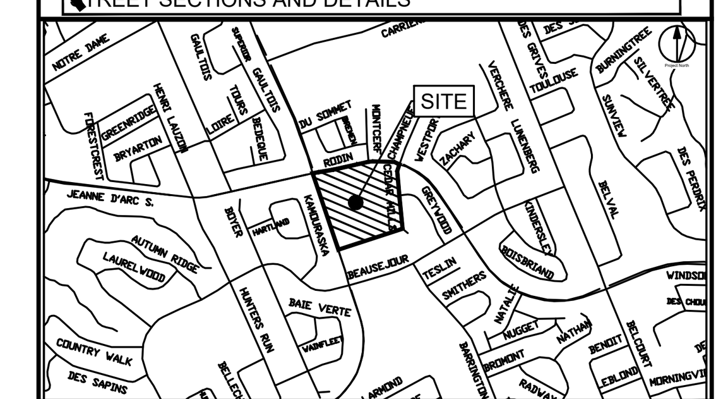
COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
####	ISSUED FOR CITY REVIEW	2023/02/06

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO:
122764

DRAWN BY:	CHECKED BY:
A.B. / E.H.	**D.G.Y.**
PROJECT MGR:	APPROVED BY:
R.M.	**D.G.Y.**

SHEET TITLE

STORM DRAINAGE AREA PLAN

SHEET NUMBER: C-500

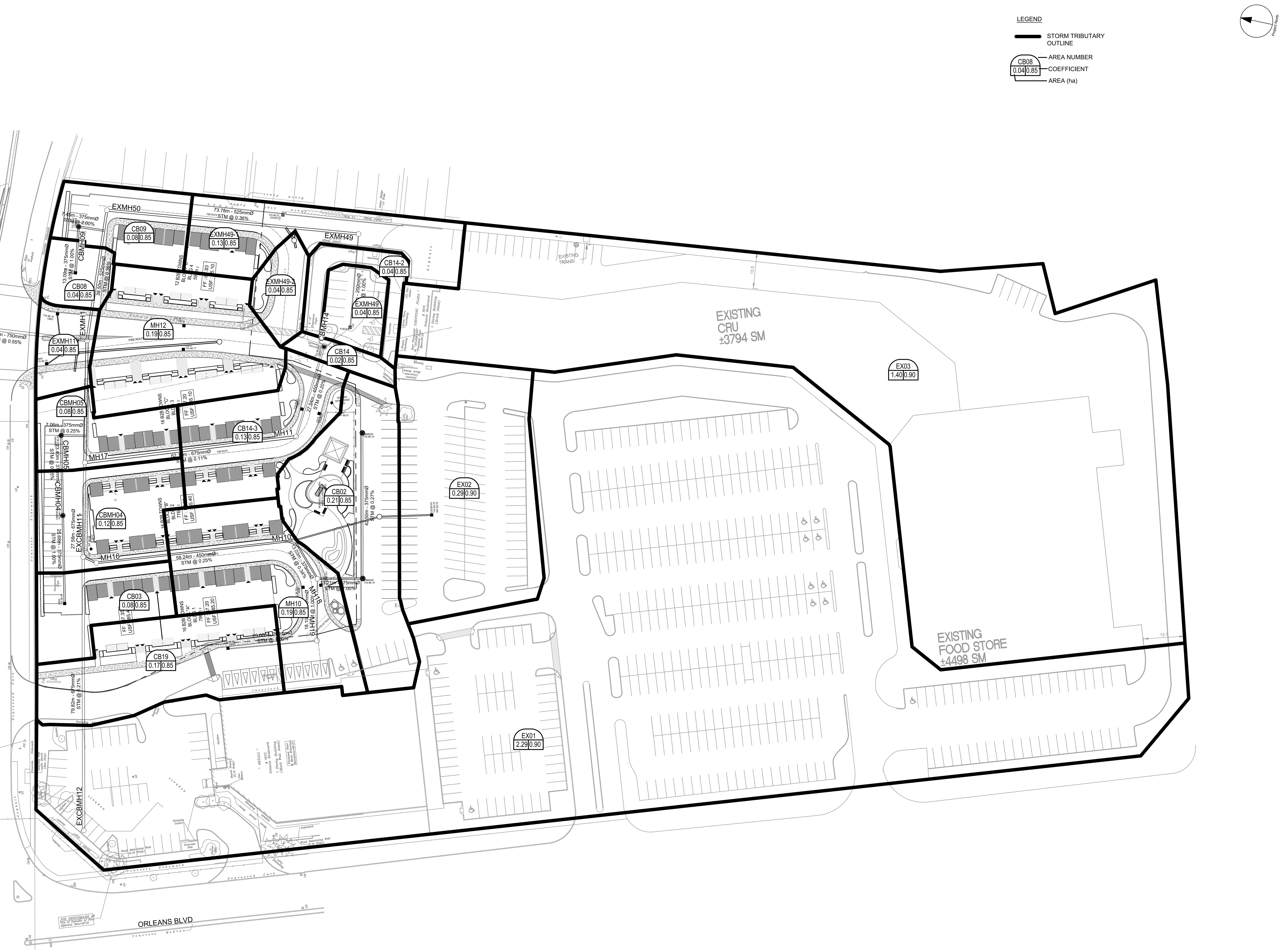
ISSUE: 1

CITY PLAN No. xxxxx

CITY FILE No. D07-xx-xx-xxxx

SCALE CHECK 1 in 10mm

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: February 7, 2023, by Ehenrie Plotted: Tuesday, February 7, 2023 4:18:47 PM by Eric Henrie



CLIENT

NORTH AMERICAN PROPERTIES

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-06

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

SITE

CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO:
122764

DRAWN BY:	CHECKED BY:
A.B. / E.H.	**D.G.Y.**
PROJECT MGR:	APPROVED BY:
R.M.	**D.G.Y.**

SHEET TITLE

EXTRENAL STORM DRAINAGE AREA PLAN

SHEET NUMBER
C-501

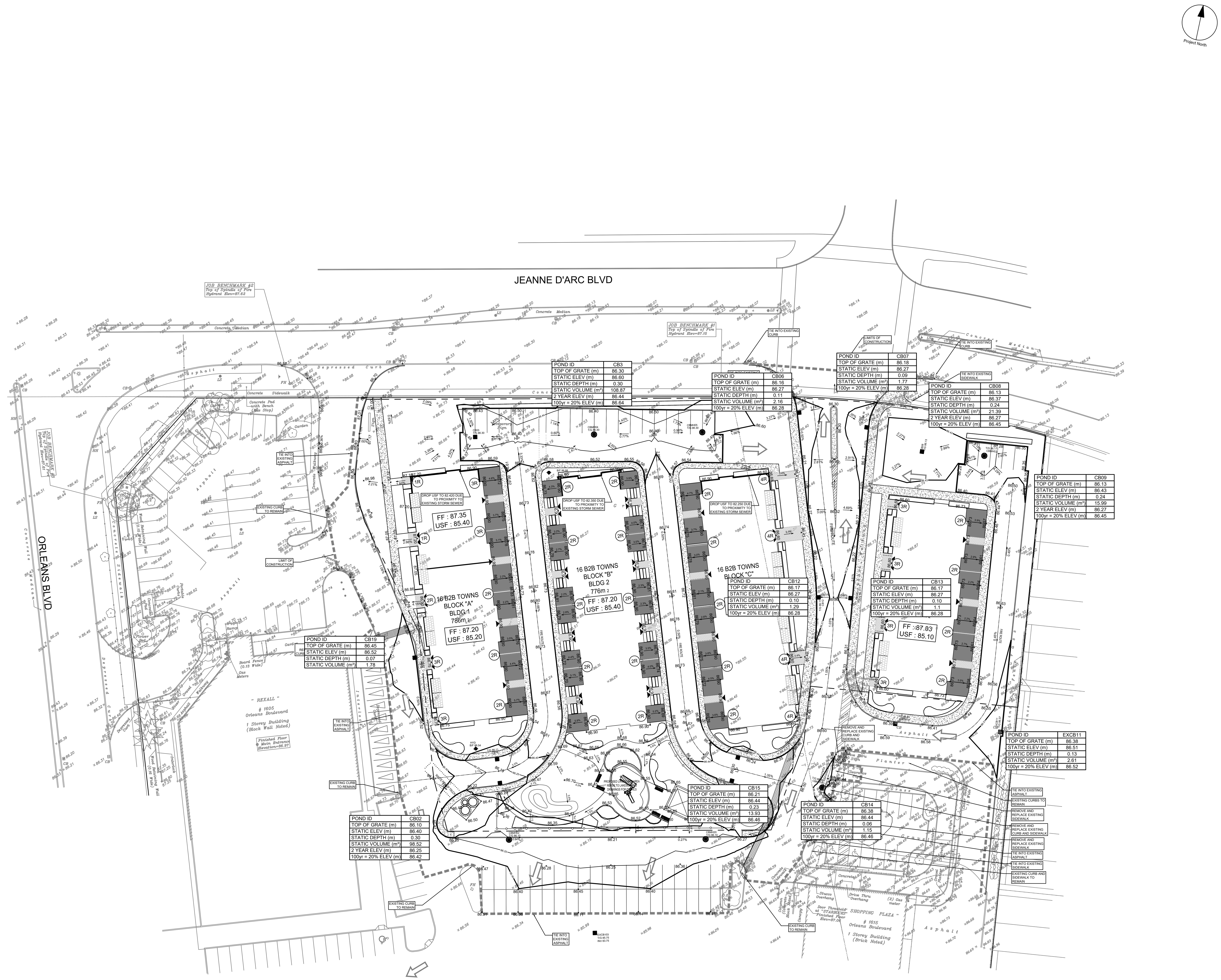
ISSUE
1

SCALE CHECK 1 in 10mm

CITY FILE No. D07-xx-xx-xxxx

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-501 EXTRENAL STORM DRAINAGE AREA PLAN.dwg Last Saved: February 6, 2023, by Ehenrie Plotted: Tuesday, February 7, 2023 4:19:12 PM by Eric Henrie

CITY PLAN No. xxxxx



POND ID	CB3
TOP OF GRATE (m)	86.30
STATIC ELEV (m)	86.60
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	108.87
2 YEAR ELEV (m)	86.44
100yr = 20% ELEV (m)	86.64

POND ID	CB06
TOP OF GRATE (m)	86.16
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.11
STATIC VOLUME (m³)	2.16
100yr = 20% ELEV (m)	86.28

POND ID	CB07
TOP OF GRATE (m)	86.18
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.09
STATIC VOLUME (m³)	1.77
100yr = 20% ELEV (m)	86.28

POND ID	CB08
TOP OF GRATE (m)	86.13
STATIC ELEV (m)	86.37
STATIC DEPTH (m)	0.24
STATIC VOLUME (m³)	21.39
2 YEAR ELEV (m)	86.27
100yr = 20% ELEV (m)	86.45

POND ID	CB09
TOP OF GRATE (m)	86.13
STATIC ELEV (m)	86.43
STATIC DEPTH (m)	0.24
STATIC VOLUME (m³)	15.99
2 YEAR ELEV (m)	86.27
100yr = 20% ELEV (m)	86.45

POND ID	CB12
TOP OF GRATE (m)	86.17
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.10
STATIC VOLUME (m³)	1.29
100yr = 20% ELEV (m)	86.28

POND ID	CB13
TOP OF GRATE (m)	86.17
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.10
STATIC VOLUME (m³)	1.1
100yr = 20% ELEV (m)	86.28

POND ID	CB19
TOP OF GRATE (m)	86.45
STATIC ELEV (m)	86.52
STATIC DEPTH (m)	0.07
STATIC VOLUME (m³)	1.78

POND ID	EXCB11
TOP OF GRATE (m)	86.38
STATIC ELEV (m)	86.51
STATIC DEPTH (m)	0.13
STATIC VOLUME (m³)	2.61
100yr = 20% ELEV (m)	86.52

POND ID	CB15
TOP OF GRATE (m)	86.21
STATIC ELEV (m)	86.44
STATIC DEPTH (m)	0.23
STATIC VOLUME (m³)	13.93
100yr = 20% ELEV (m)	86.46

POND ID	CB14
TOP OF GRATE (m)	86.38
STATIC ELEV (m)	86.44
STATIC DEPTH (m)	0.06
STATIC VOLUME (m³)	1.15
100yr = 20% ELEV (m)	86.46

POND ID	CB02
TOP OF GRATE (m)	86.10
STATIC ELEV (m)	86.40
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	98.52
2 YEAR ELEV (m)	86.25
100yr = 20% ELEV (m)	86.42

CLIENT

NORTH AMERICAN PROPERTIES

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-07

NOT FOR CONSTRUCTION

CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO:	
122764	
DRAWN BY: A.B. / E.H.	CHECKED BY: R.M./D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

SHEET TITLE

PONDING PLAN

SHEET NUMBER: C-600

ISSUE: 1

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-600 PONDING PLAN.dwg Last Saved: February 7, 2023, by Ehenrie Plotted: Tuesday, February 7, 2023 4:19:37 PM by Eric Henrie

IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT: Orleans Garden
DATE: 2023-01-24
FILE: 122764-5.11
REV #: -
DESIGNED BY: AB
CHECKED BY: RM

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / (T_c+6.199)$^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / (T_c+6.053)$^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / (T_c+6.014)$^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate ($Q_{controlled} = 2.78*C*i_{5yr}*A_{controlled}$)

C =	0.5	
T_c =	10	min
i_{5yr} =	104.19	mm/hr
A_{site} =	1.540	Ha
$Q_{restricted}$ =	223.04	L/s

Uncontrolled Release ($Q_{uncontrolled} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.85	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.08	Ha
$Q_{uncontrolled}$ =	33.75	L/s

Maximum Allowable Release Rate ($Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$)

$Q_{max\ allowable}$ =	189.28 L/s

SWM Statistics of Modified Site Areas

Controlled	Area	ICD Flow
MH10	0.570	84.000
MH11	0.150	40.000
CBMH05	0.280	10.000
CB09	0.180	20.000
MH12+11	0.19	15.00
EXMH49-1	0.13	20.00
Sum	**1.18**	**189.00**

Uncontrolled	Area	Flow
EXMH49-2	0.040	16.88
EXMH49	0.040	16.88
Sum	**0.08**	**33.75**

Total Sum	**1.260**	**222.755**
Allowable		**223.04**
		TRUE

MODIFIED RATIONAL METHOD (100-Year & 2-Year Ponding)

Drainage Area	MH10		
Area (Ha)	0.570	Restricted Flow ICD $_{Actual}$ (L/s)=	84.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	84.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
5	242.70	326.90	84.00	242.90	72.87			
10	178.56	240.50	84.00	156.50	93.90			
15	142.89	192.47	84.00	108.47	**97.62**	230.96	146.96	**132.26**
20	119.95	161.56	84.00	77.56	93.07			
25	103.85	139.87	84.00	55.87	83.81			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	97.62	98.52	0	0.00	0.00	132.26	33.74
					convert to flow with peak Tc (L/s)		37.49

overflows to: Existing

Drainage Area	MH10		
Area (Ha)	0.570		
C =	0.85	Restricted Flow Q_r (L/s)=	84.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	115.10	84.00	31.10	14.93
9	80.87	108.93	84.00	24.93	13.46
10	76.81	103.45	84.00	19.45	**11.67**
11	73.17	98.55	84.00	14.55	9.60
12	69.89	94.14	84.00	10.14	7.30

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	11.67	98.52	0	0.00

overflows to: Existing

Drainage Area	MH11		
Area (Ha)	0.150	Restricted Flow ICD $_{Actual}$ (L/s)=	40.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	40.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
-2	555.31	196.83	40.00	156.83	-18.82			
3	286.05	101.39	40.00	61.39	11.05			
8	199.20	70.61	40.00	30.61	**14.69**	84.73	44.73	**21.47**
13	155.11	54.98	40.00	14.98	11.68			
18	128.08	45.40	40.00	5.40	5.83			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	14.69	15.08	0	0.00	0.00	21.47	6.39
					convert to flow with peak Tc (L/s)		13.31

overflows to: CBMH05

Drainage Area	MH11		
Area (Ha)	0.150		
C =	0.85	Restricted Flow Q_r (L/s)=	40.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	30.29	40.00	-9.71	-4.66
9	80.87	28.67	40.00	-11.33	-6.12
10	76.81	27.22	40.00	-12.78	**-7.67**
11	73.17	25.93	40.00	-14.07	-9.28
12	69.89	24.77	40.00	-15.23	-10.96

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	0.00	15.08	0	0.00

overflows to: CBMH05

Drainage Area	CBMH05		
Area (Ha)	0.280	Restricted Flow ICD $_{Actual}$ (L/s)=	10.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	10.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
48	65.89	43.60	10.00	33.60	96.75			
53	61.28	40.54	10.00	30.54	97.13			
58	57.32	37.93	10.00	27.93	**97.19**	45.51	35.51	**123.58**
63	53.89	35.66	10.00	25.66	96.99			
68	50.89	33.67	10.00	23.67	96.58			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	97.19	108.87	0	0.00	0.00	123.58	14.71
					convert to flow with peak Tc (L/s)		4.23

overflows to: EXMH11/Offsite

Drainage Area	CBMH05		
Area (Ha)	0.280		
C =	0.85	Restricted Flow Q_r (L/s)=	10.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
11	73.17	48.41	10.00	38.41	25.35
12	69.89	46.24	10.00	36.24	26.10
13	66.93	44.28	10.00	34.28	**26.74**
14	64.23	42.50	10.00	32.50	27.30
15	61.77	40.87	10.00	30.87	27.78

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	26.74	108.87	0	0.00

overflows to: EXMH11/Offsite

Drainage Area	CB09		
Area (Ha)	0.180	Restricted Flow ICD $_{Actual}$ (L/s)=	20.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	20.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
7	211.67	90.03	20.00	70.03	29.41			
12	162.13	68.96	20.00	48.96	35.25			
17	132.63	56.41	20.00	36.41	**37.14**	67.69	47.69	**48.65**
22	112.88	48.01	20.00	28.01	36.98			
27	98.66	41.96	20.00	21.96	35.58			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	37.14	37.83	0	0.00	0.00	48.65	10.82
					convert to flow with peak Tc (L/s)		10.61

overflows to: EXMH11/Offsite

Drainage Area	CB09		
Area (Ha)	0.180		
C =	0.85	Restricted Flow Q_r (L/s)=	20.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	36.35	20.00	16.35	7.85
9	80.87	34.40	20.00	14.40	7.78
10	76.81	32.67	20.00	12.67	**7.60**
11	73.17	31.12	20.00	11.12	7.34
12	69.89	29.73	20.00	9.73	7.00

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	7.60	37.83	0	0.00

overflows to: EXMH11/Offsite

Drainage Area	MH12+11		
Area (Ha)	0.220	Restricted Flow ICD $_{Actual}$ (L/s)=	15.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	7.50

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
50	63.95	33.25	7.50	25.75	77.24			
55	59.62	31.00	7.50	23.50	77.54			
60	55.89	29.06	7.50	21.56	**77.61**	34.87	27.37	**98.53**
65	52.65	27.37	7.50	19.87	77.49			
70	49.79	25.88	7.50	18.38	77.21			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	77.61	6.32	89.45	0.00	0.00	98.53	2.76
					convert to flow with peak Tc (L/s)		0.77

overflows to: EXMH11/Offsite

Drainage Area	MH12+11		
Area (Ha)	0.220		
C =	0.85	Restricted Flow Q_r (L/s)=	7.50

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	44.43	7.50	36.93	17.72
9	80.87	42.04	7.50	34.54	18.65
10	76.81	39.93	7.50	32.43	**19.46**
11	73.17	38.04	7.50	30.54	20.15
12	69.89	36.33	7.50	28.83	20.76

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	19.46	6.32	89.45	0.00

overflows to: EXMH11/Offsite

Drainage Area	EXMH49-1		
Area (Ha)	0.130	Restricted Flow ICD $_{Actual}$ (L/s)=	20.00
C =	0.85	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	10.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
17	132.63	40.74	10.00	30.74	31.36			
22	112.88	34.68	10.00	24.68	32.57			
27	98.66	30.31	10.00	20.31	**32.90**	36.37	26.37	**42.72**
32	87.89	27.00	10.00	17.00	32.64			
37	79.42	24.40	10.00	14.40	31.96			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	32.90	2.61	38.34	0.00	0.00	42.72	1.77
					convert to flow with peak Tc (L/s)		1.09

overflows to: EXMH11/Offsite

Drainage Area	EXMH49-1		
Area (Ha)	0.130		
C =	0.85	Restricted Flow Q_r (L/s)=	10.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	26.25	10.00	16.25	7.80
9	80.87	24.84	10.00	14.84	8.02
10	76.81	23.59	10.00	13.59	**8.16**
11	73.17	22.48	10.00	12.48	8.23
12	69.89	21.47	10.00	11.47	8.26

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	8.16	2.61	38.34	0.00

overflows to: EXMH11/Offsite

IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT:	Orleans Gardens
DATE:	2023-02-07
FILE:	122764-6.2.4
REV #:	-
DESIGNED BY:	RM
CHECKED BY:	RM

UNDERGROUND STORAGE CALCULATIONS - ORLEANS GARDENS REDEVELOPMENT

Pipe Storage ***EXMH11***

From	To	Length	Diameter	X-sec Area	Volume
CB06	MH22	4.94	200	0.031	0.16
CB07	MH22	11.37	200	0.031	0.36
MH22	MH21	4.39	375	0.110	0.48
CB12	MAIN	1.01	200	0.031	0.03
CB13	MAIN	5.09	200	0.031	0.16
MH12	MH21	41.76	375	0.110	4.61
ADS Stormtech	MH21	5.46	375	0.110	0.60
				Total	6.40

Structure Storage ***EXMH11***

	Base	Top	Height	diameter	X-sec Area	Volume
CB06	84.760	86.16	1.40	600	0.283	0.40
CB07	84.780	86.18	1.40	600	0.283	0.40
MH22	83.681	86.20	2.52	1200	1.131	2.85
CB12	84.770	86.17	1.40	600	0.283	0.40
CB13	84.770	86.17	1.40	600	0.283	0.40
MH12	83.774	86.27	2.50	1200	1.131	2.82
MH21	83.610	86.27	2.66	1200	1.131	3.01
ADS Stormtech						72.78
					Total	83.04

TOTAL AREA EXMH11	**89.45**

Pipe Storage ***EXCBMH49-1***

From	To	Length	Diameter	X-sec Area	Volume
EXCB11	MH25	8.23	200	0.031	0.26
ADS Stormtech	MH25	2.22	375	0.110	0.25
				Total	0.50

Structure Storage ***EXCBMH49-1***

	Base	Top	Height	diameter	X-sec Area	Volume
EXCB11	84.170	86.51	2.34	600	0.283	0.66
MH25	83.461	86.51	3.05	1200	1.131	3.45
ADS Stormtech						33.73
					Total	37.84

TOTAL AREA EXCBMH49-1	**38.34**

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

ORLEANS GARDENS

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.

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

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

NOTES FOR CONSTRUCTION EQUIPMENT

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

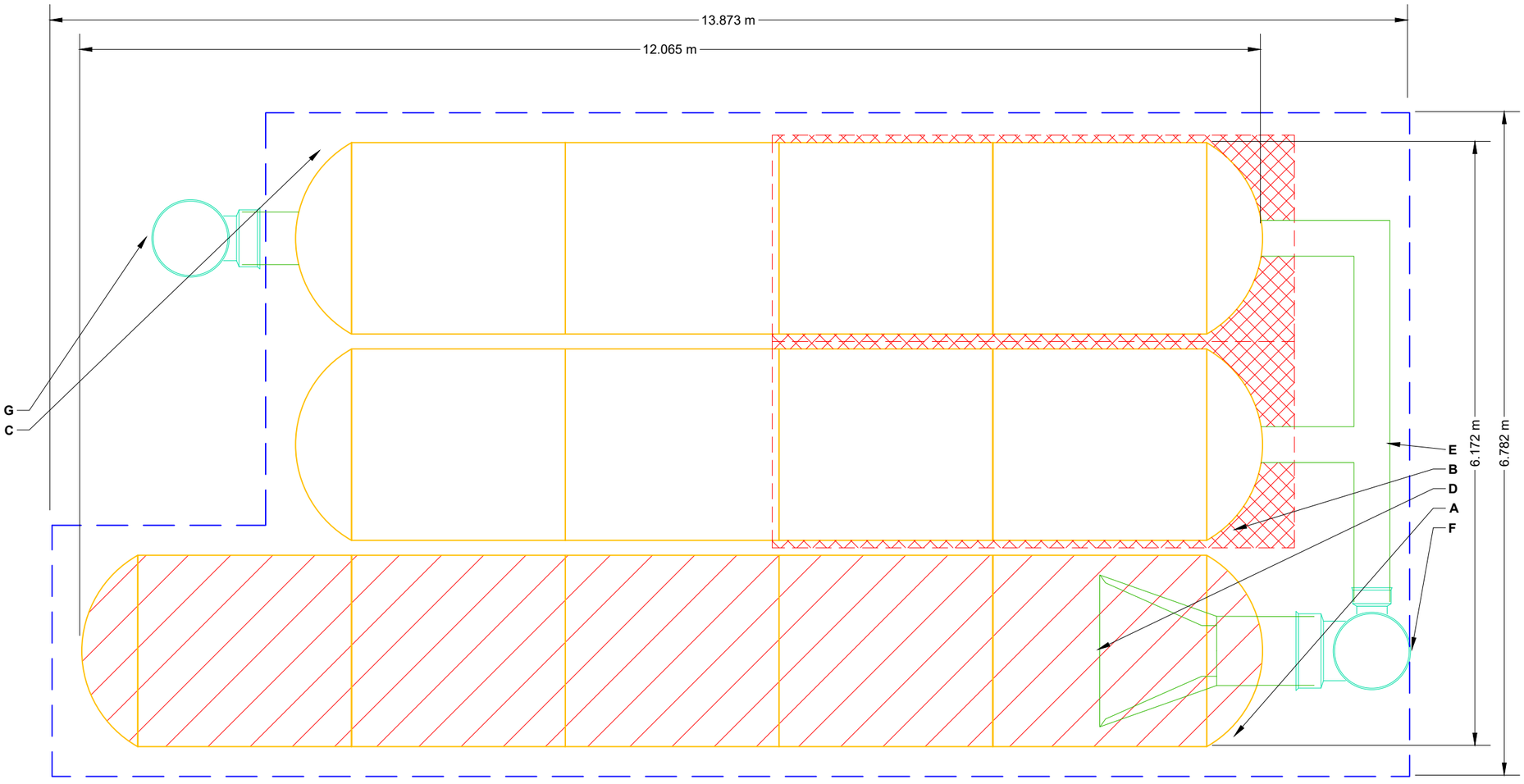
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

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

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
13	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.810
6	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.981
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.829
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.829
[illegible]	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.829
72.8	INSTALLED SYSTEM VOLUME (m) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	1.676
		TOP OF MC-3500 CHAMBER:	1.372
		300 mm x 300 mm TOP MANIFOLD INVERT:	0.898
		600 mm ISOLATOR ROW PLUS INVERT:	0.281
84.9	SYSTEM AREA (m)	450 mm BOTTOM CONNECTION INVERT:	0.274
41.3	SYSTEM PERIMETER (m)	BOTTOM OF MC-3500 CHAMBER:	0.229
		BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
PREFABRICATED END CAP	B	300 mm TOP CORED END CAP, PART#: MC3500IEPP12T / TYP OF ALL 300 mm TOP CONNECTIONS	670 mm	
PREFABRICATED END CAP	C	450 mm BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	45 mm	
FLAMP	D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MC350024RAMP		
MANIFOLD	E	300 mm x 300 mm TOP MANIFOLD, ADS N-12	670 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	F	750 mm DIAMETER (610 mm SUMP MIN)		140 L/s IN
NYLOPLAST (OUTLET)	G	750 mm DIAMETER (DESIGN BY ENGINEER)		113 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 5.334 m OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

ORLEANS GARDENS
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
CHECKED: N/A
PROJECT #:

DESCRIPTION	CHK	DRW	DATE

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
ADS

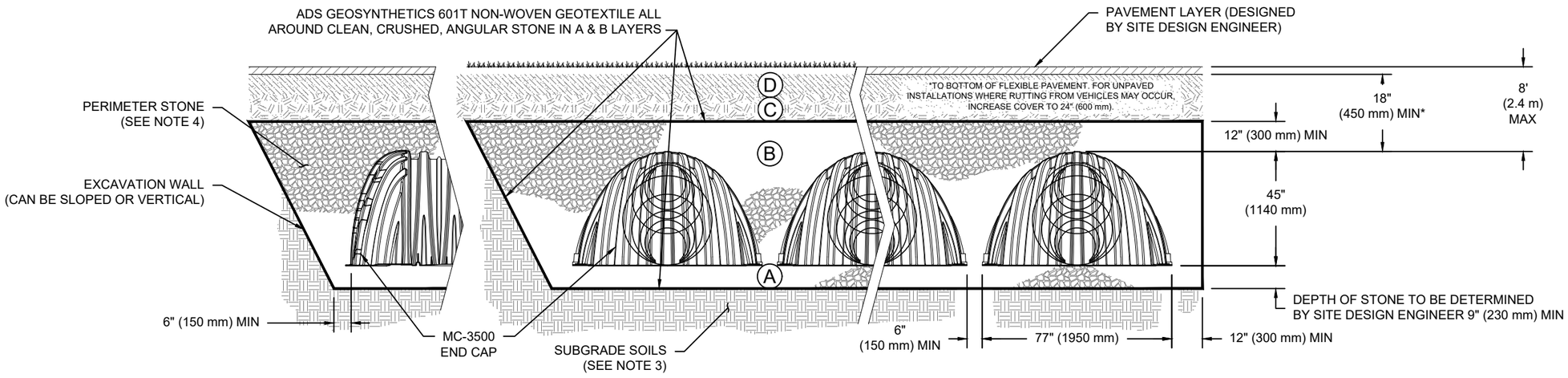
SCALE = 1 : 50

SHEET
2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

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

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



NOTES:

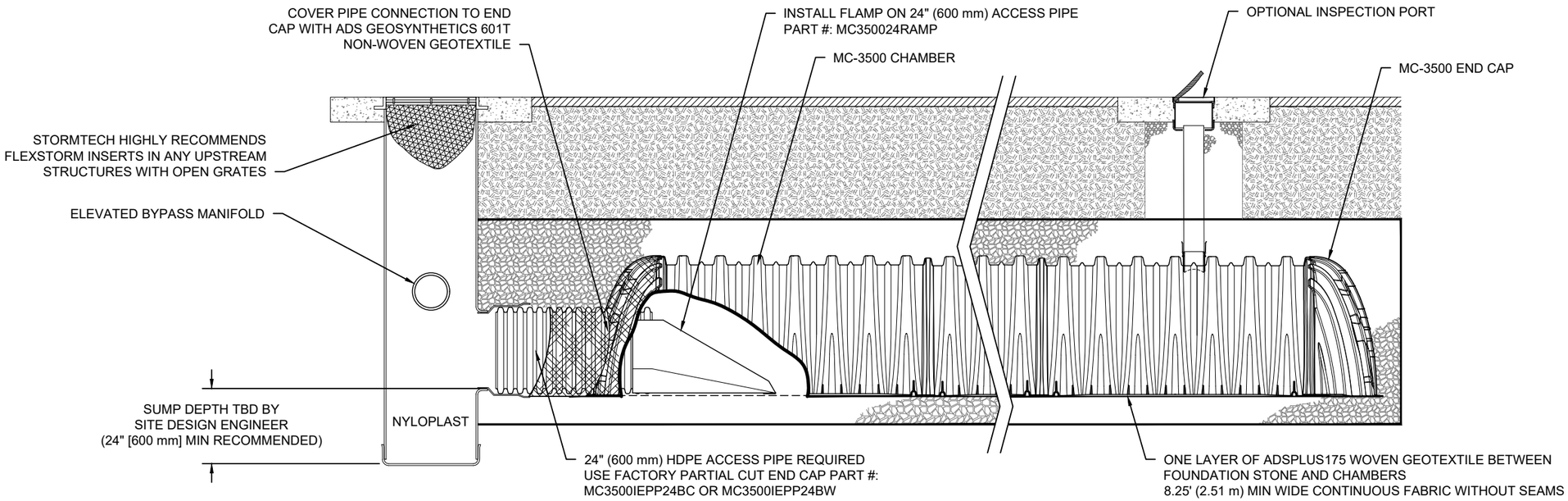
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT 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.

ORLEANS GARDENS
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

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.

ORLEANS GARDENS
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
PROJECT #:
CHECKED: N/A

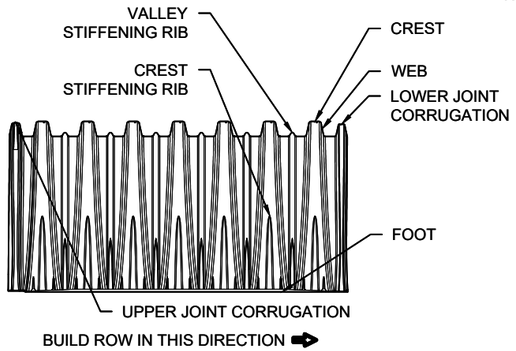
DATE	DRW	CHK	DESCRIPTION

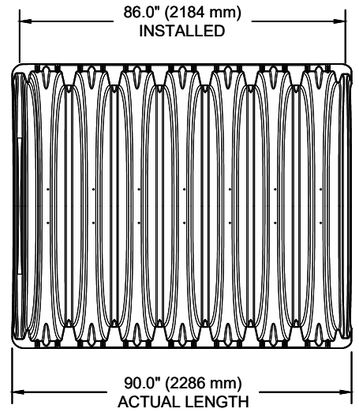
StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

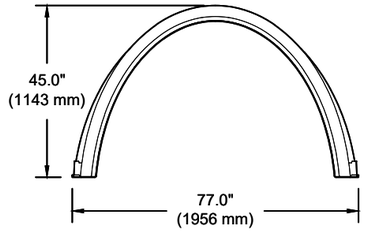
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

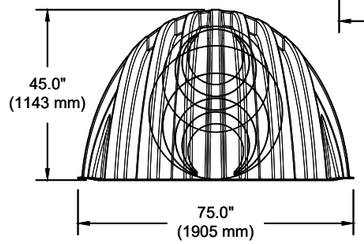
MC-3500 TECHNICAL SPECIFICATION

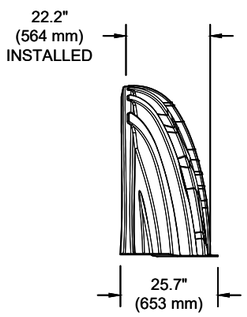
NTS











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)

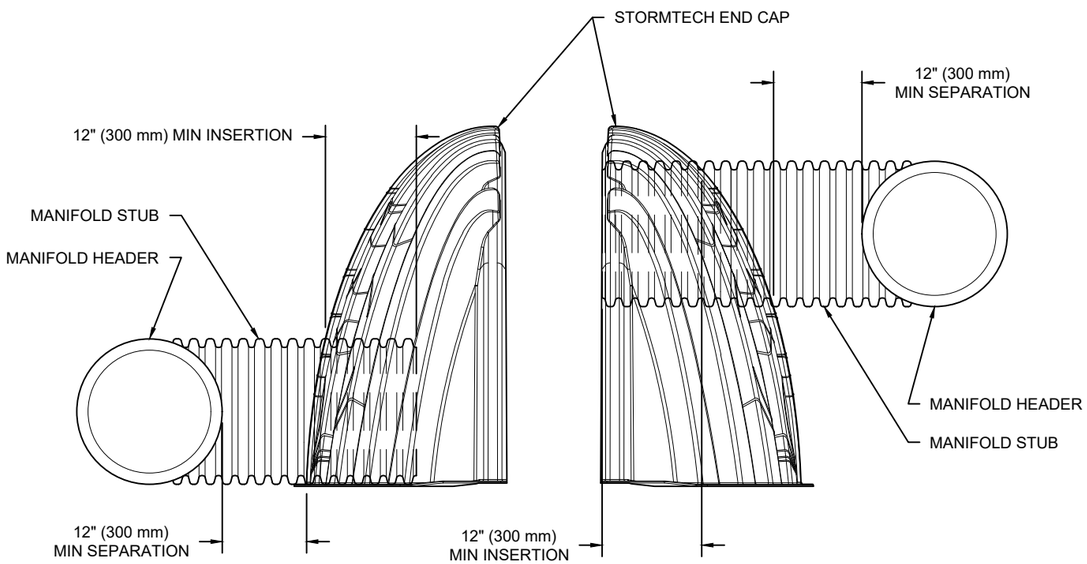
NOMINAL END CAP SPECIFICATIONS

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

MC-SERIES END CAP INSERTION DETAIL

NTS

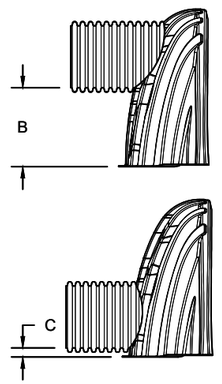


NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

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.

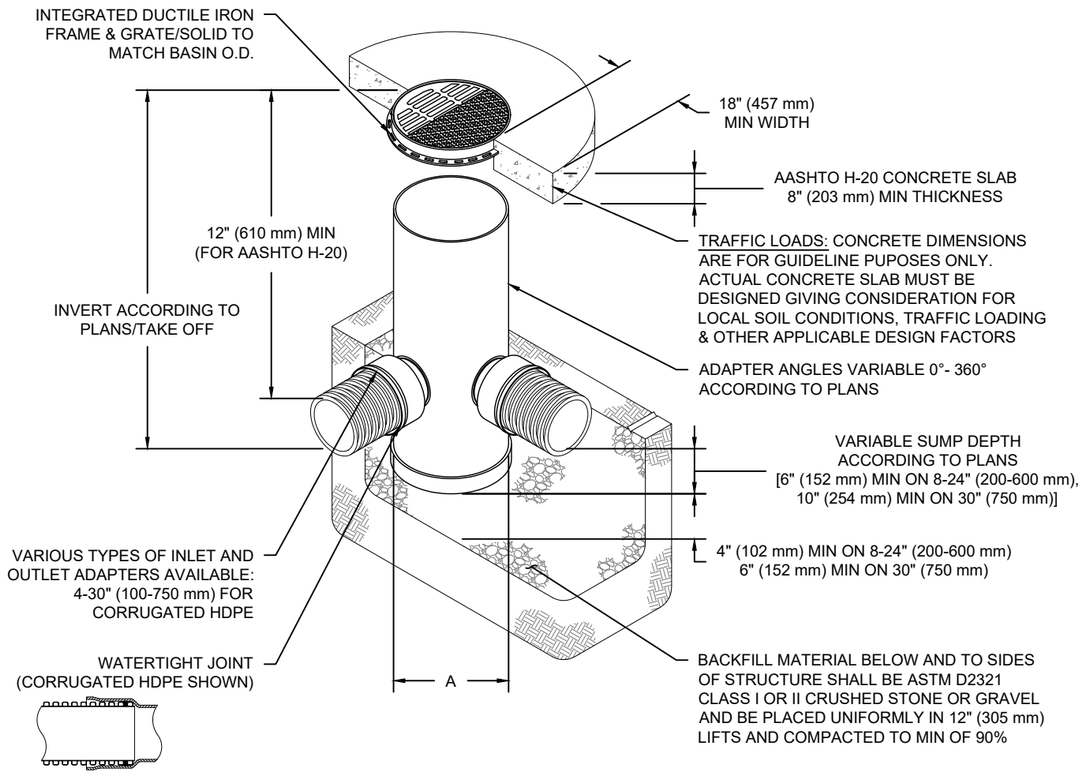
ORLEANS GARDENS
OTTAWA, ON, CANADA
DATE: | DRAWN: RM | PROJECT #: | CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
ADS.

NYLOPLAST DRAIN BASIN

NTS



NOTES

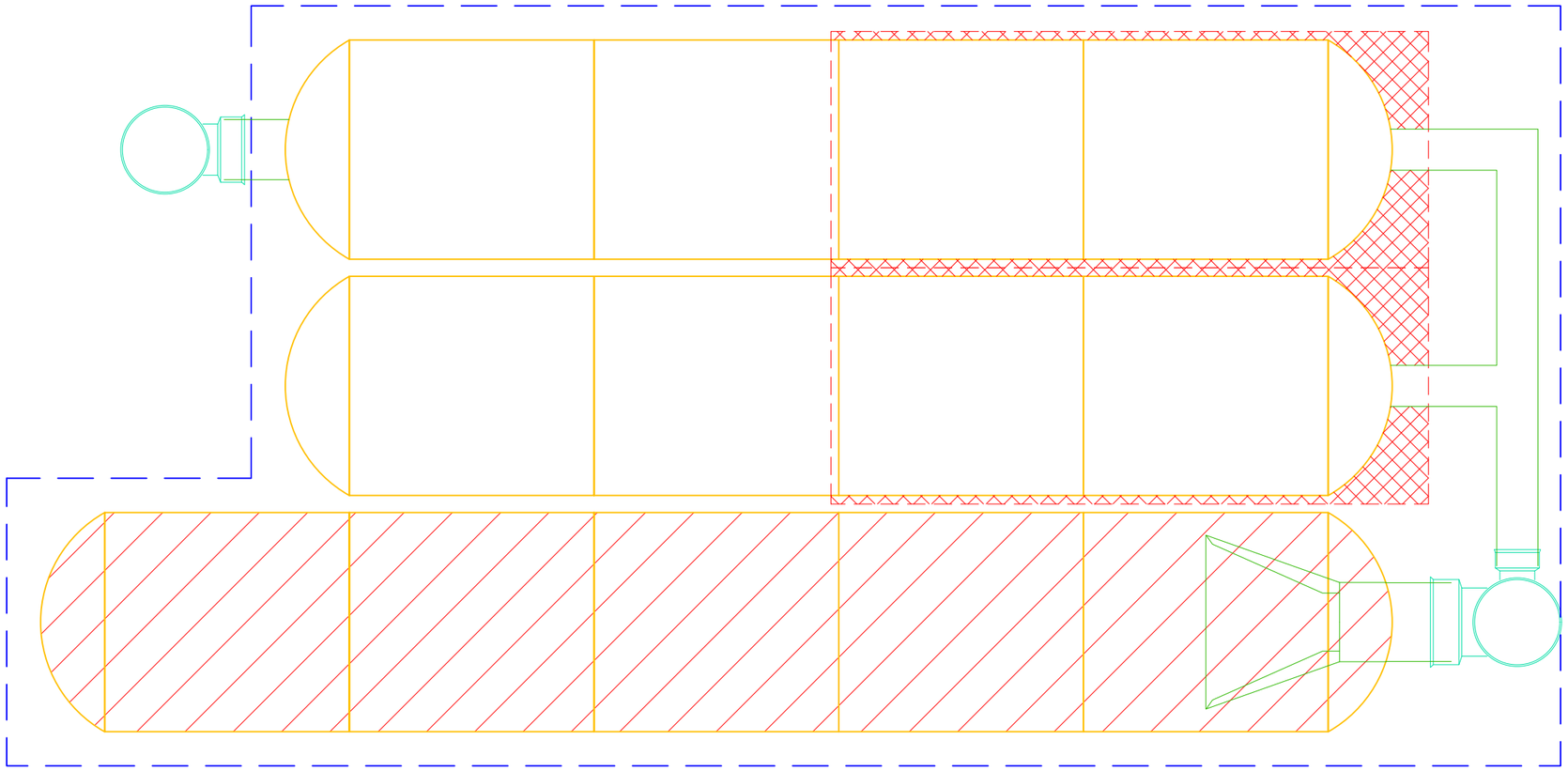
1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO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

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

ORLEANS GARDENS
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

Nyloplast®
770-932-2443 | WWW.NYLOPLAST-US.COM
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

ORLEANS GARDENS CELL 2

OTTAWA, ON, CANADA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 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.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

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

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

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

PROPOSED LAYOUT

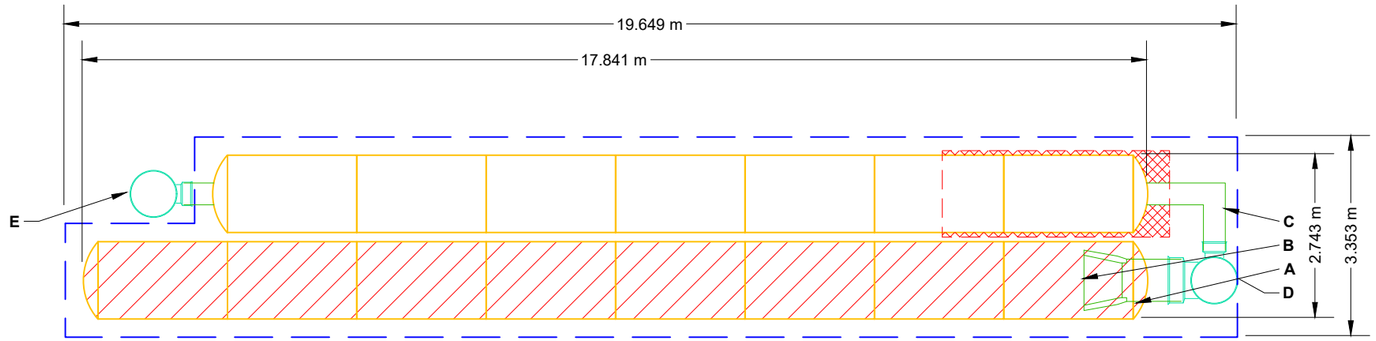
15	STORMTECH SC-740 CHAMBERS
4	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
[illegible]	STONE VOID
33.7	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
62.7	SYSTEM AREA (m²)
46.0	SYSTEM PERIMETER (m)

CONCEPTUAL ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.353
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.524
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.372
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.372
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.372
TOP OF STONE:	1.067
TOP OF SC-740 CHAMBER:	0.914
300 mm x 300 mm TOP MANIFOLD INVERT:	0.470
300 mm BOTTOM CONNECTION INVERT:	0.183
600 mm ISOLATOR ROW PLUS INVERT:	0.155
BOTTOM OF SC-740 CHAMBER:	0.152
BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	D	750 mm DIAMETER (610 mm SUMP MIN)		65 L/s IN
NYLOPLAST (OUTLET)	E	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

ORLEANS GARDENS CELL 2
OTTAWA, ON, CANADA

DATE: | DRAWN: RM | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

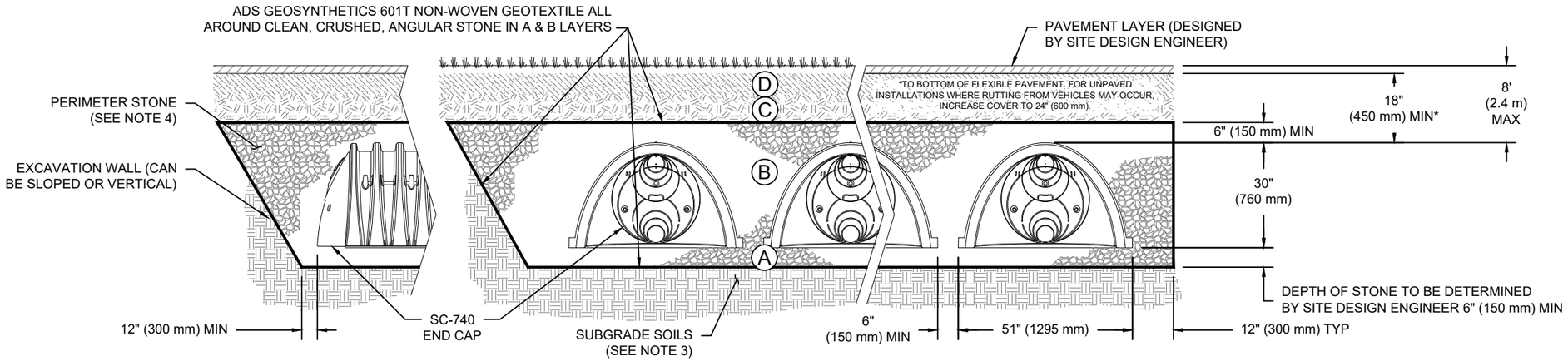
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	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	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

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



NOTES:

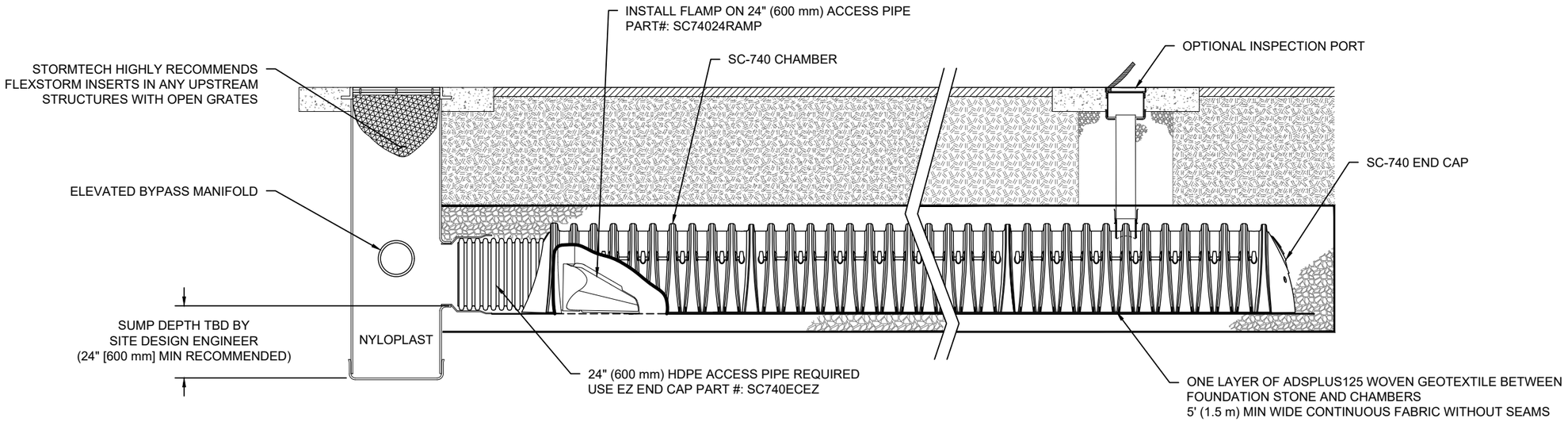
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

ORLEANS GARDENS CELL 2
OTTAWA, ON, CANADA
DATE: DRAWN: RM CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

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



SC-740 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.

ORLEANS GARDENS CELL 2
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
PROJECT #:
CHECKED: N/A

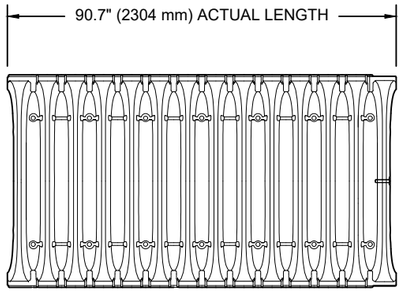
DATE	DRW	CHK	DESCRIPTION

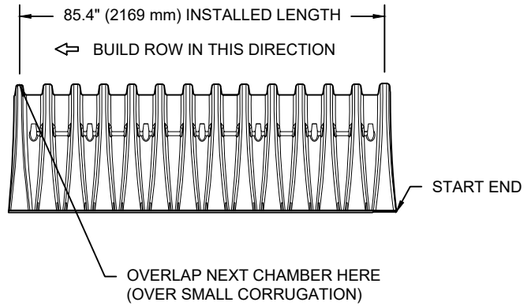
StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

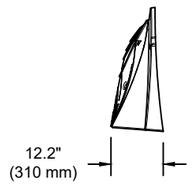
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

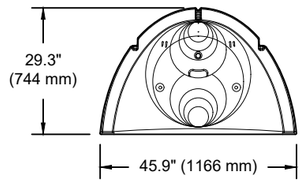
SC-740 TECHNICAL SPECIFICATION

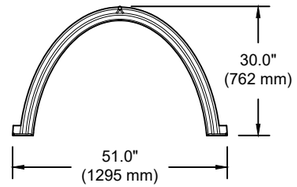
NTS







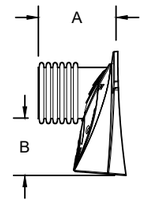


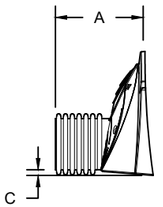


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

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





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

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

ORLEANS GARDENS CELL 2
OTTAWA, ON, CANADA
DATE:
DRAWN: RM
PROJECT #:
CHECKED: N/A

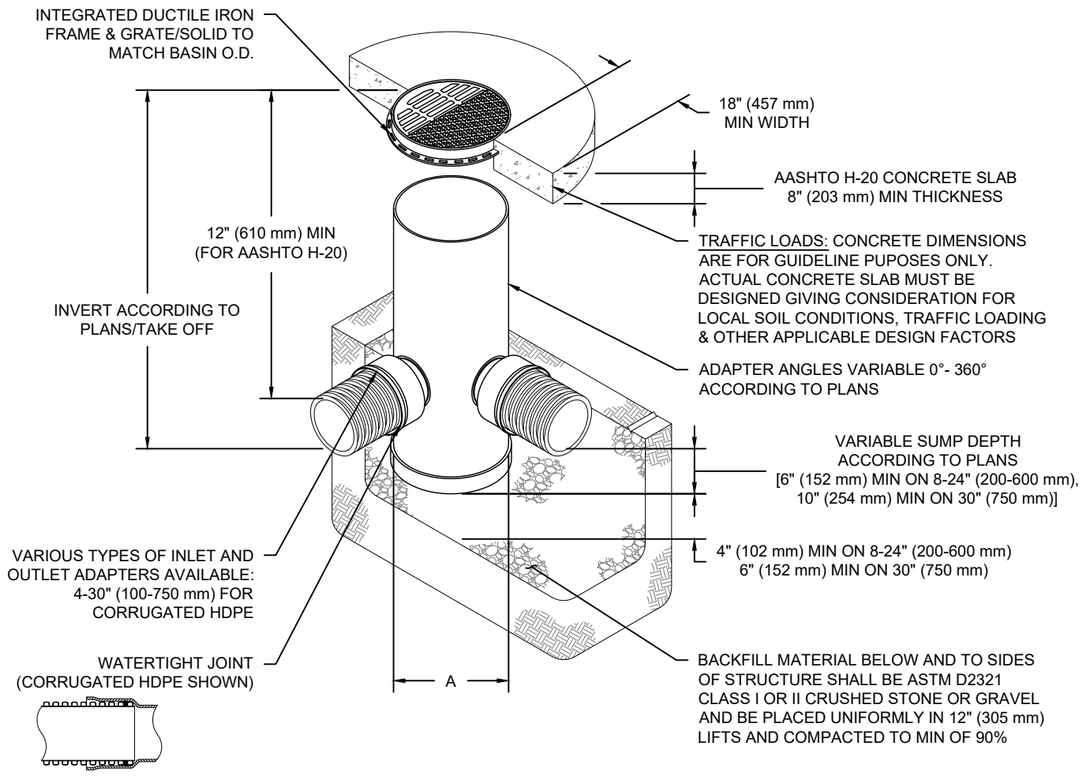
DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

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

NYLOPLAST DRAIN BASIN

NTS



NOTES

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

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

ORLEANS GARDENS CELL 2

OTTAWA, ON, CANADA

DATE: | DRAWN: RM

PROJECT #: | CHECKED: N/A

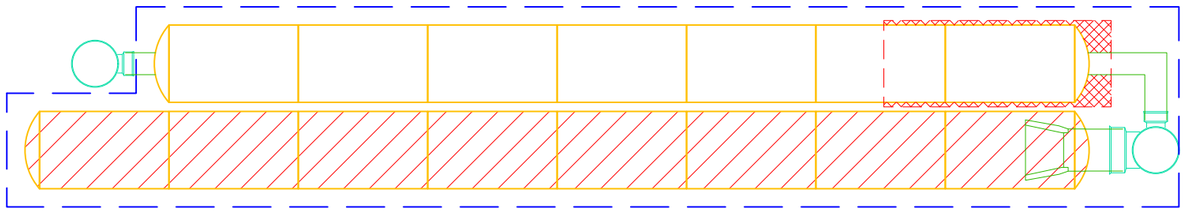
DATE	DRW	CHK	DESCRIPTION

Nyloplast®

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

ADS.

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



Orleans Gardens
North American Dev. Group

2023-01-26

Ditch MH10 — Length = 15.00 m

New Ditch Section Required 1:100 yr. +20% flow = 37.49 l/s			0.037 Cu m/sec				
From Seelye use n =	0.013	(Channels)				area=	0.07
choose: slope S =	4.00	%	Up Stream Ditch btm=	86.40		wp=	9.00
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	85.80			
Ditch slopes	300.00	:1	Difference =	0.60			
Water depth	**0.015**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.45	
Check Ditch Capacity (Q)					Free Board =	0.03	
Q =	0.040	Cu M/sec	and Velocity =	0.59 M/s			

Ditch MH11 — Length = 6.00 m

New Ditch Section Required 1:100 yr. +20% flow = 13.31 l/s			0.013 Cu m/sec				
From Seelye use n =	0.013	(Channels)				area=	0.03
choose: slope S =	2.33	%	Up Stream Ditch btm=	86.44		wp=	3.84
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	86.30			
Ditch slopes	120.00	:1	Difference =	0.14			
Water depth	**0.016**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.6	
Check Ditch Capacity (Q)					Free Board =	0.14	
Q =	0.014	Cu M/sec	and Velocity =	0.47 M/s			

Ditch CBMH05 — Length = 18.50 m

New Ditch Section Required 1:100 yr. +20% flow = 4.23 l/s			0.016 Cu m/sec				
From Seelye use n =	0.020	(Channels)				area=	0.05
choose: slope S =	1.03	%	Up Stream Ditch btm=	86.40		wp=	2.80
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	86.21			
Ditch slopes	40.00	:1	Difference =	0.19			
Water depth	**0.035**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.45	
Check Ditch Capacity (Q)	0.00				Free Board =	0.01	
Q =	0.017	Cu M/sec	and Velocity =	0.34 M/s			

Ditch CBMH09 — Length = 15.00 m

New Ditch Section Required 1:100 yr. +20% flow = 10.61 l/s			0.011 Cu m/sec				
From Seelye use n =	0.020	(Channels)				area=	0.06
choose: slope S =	0.80	%	Up Stream Ditch btm=	86.35		wp=	7.31
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	86.23			
Ditch slopes	215.00	:1	Difference =	0.12			
Water depth	**0.017**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.38	
Check Ditch Capacity (Q)					Free Board =	0.01	
Q =	0.012	Cu M/sec	and Velocity =	0.19 M/s			

Ditch MH12+11 — Length = 15.25 m

New Ditch Section Required 1:100 yr. +20% flow = 0.77 l/s			0.001 Cu m/sec				
From Seelye use n =	0.013	(Channels)				area=	0.00
choose: slope S =	2.10	%	Up Stream Ditch btm=	86.27		wp=	0.80
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	85.95			
Ditch slopes	40.00	:1	Difference =	0.32			
Water depth	**0.010**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.32	
Check Ditch Capacity (Q)					Free Board =	0.04	
Q =	0.001	Cu M/sec	and Velocity =	0.33 M/s			

Ditch EXMH49-1 — Length = 7.00 m

New Ditch Section Required 1:100 yr. +20% flow = 1.09 l/s			0.001 Cu m/sec				
From Seelye use n =	0.013	(Channels)				area=	0.00
choose: slope S =	1.86	%	Up Stream Ditch btm=	86.51		wp=	0.80
Ditch Bottom	0.00	metres	Dn Stream Ditch Btm =	86.38			
Ditch slopes	40.00	:1	Difference =	0.13			
Water depth	**0.010**	metres (depth needed to carry 0.13 Cu. M/sec)			Top Bank =	86.59	
Check Ditch Capacity (Q)					Free Board =	0.07	
Q =	0.001	Cu M/sec	and Velocity =	0.31 M/s			

Q = A*(1.0/n)*R^2/3*S^1/2 where: A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in m

IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT:	Orleans Gardens
DATE:	2023-02-07
FILE:	122764-6.2.4
REV #:	-
DESIGNED BY:	RM
CHECKED BY:	RM

ORIFICE SIZING

Orifice coefficients	
Cv =	0.60

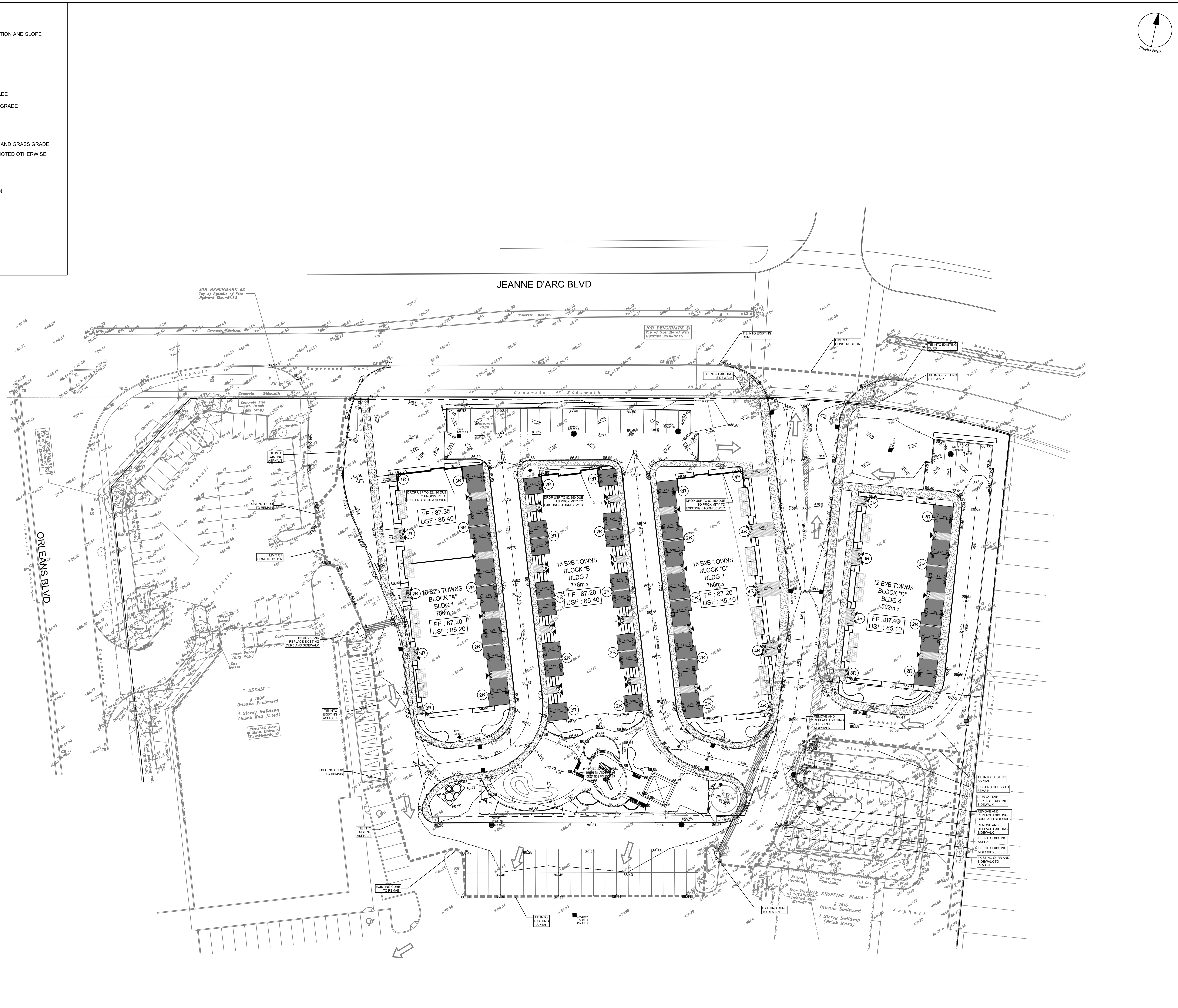
							Theoretical		Recommended		
	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Orifice	Actual Flow	Orifice	Actual Flow	
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)	
MH10	83.063	450	83.288	86.40	3.11	84.00	0.1340	84.18	0.134	84.18	
MH11	82.485	200	82.585	86.44	3.86	40.00	0.0870	39.50	0.087	39.50	
CBMH05	83.214	375	83.402	86.60	3.20	10.00	0.0460	10.06	0.046	10.06	H-VEX
CB09	83.500	375	83.688	86.43	2.74	20.00	0.0670	19.76	0.067	19.76	
MH12+11	83.610	375	83.798	86.27	2.47	15.00	0.0600	15.04	0.060	15.04	
EXMH49-1	83.450	375	83.638	86.51	2.87	20.00	0.0670	20.22	0.067	20.22	
						189.00				**188.76**	

APPENDIX E

- Grading Plan 122764-C-200
- Erosion and Sediment Control Plan 122764-C-900

GRADING LEGEND

- PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- PROPOSED SPOT GRADE
- PROPOSED SWALE GRADE
- PROPOSED SWALE HIGH POINT GRADE
- LOT CORNER GRADE C/W EXISTING GRADE
- FULL STATIC PONDING GRADE
- RETAINING WALL C/W TOP OF WALL AND GRASS GRADE
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- PRESSURE REDUCING VALVE
- FF : 87.20 — FINISHED FLOOR ELEVATION
- USF : 85.10 — UNDERSIDE OF FOOTING ELEVATION
- (2R) — NUMBER OF RISERS
- NOISE BARRIER LOCATION
- NOISE BARRIER GATE
- RIP-RAP
- TOWN HOUSE SPLITS



CLIENT

NORTH AMERICAN PROPERTIES

COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-06

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

PLEASE CONFIRM **KEYPLAN** BOX

SITE

CONSULTANTS

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:400 0 4 12 20m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

PROJECT NO: 122764	
DRAWN BY: A.B. / E.H.	CHECKED BY: R.M./D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

SHEET TITLE

GRADING PLAN

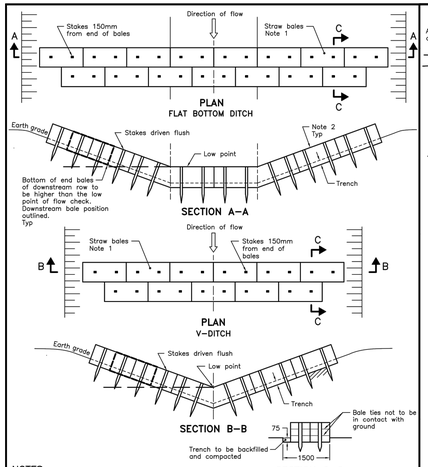
SHEET NUMBER C-200 — ISSUE 1

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-200 GRADING PLAN.dwg Last Saved: February 7, 2023, by Ehenrie Plotted: Tuesday, February 7, 2023 4:17:21 PM by Eric Henrie

SCALE CHECK 1 in 10mm

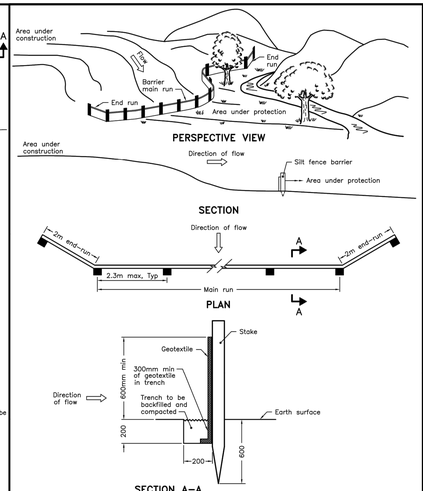
CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx



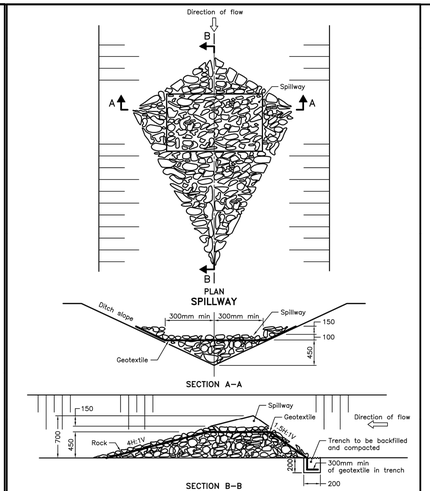
NOTES:
1 Number of bales varies to suit ditch.
2 Straw bales to be butted tightly against adjoining bales and shaped to conform to the sides of the ditch to prevent water flow through barrier.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
STRAW BALE FLOW CHECK DAM			OPSD 219.180



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

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
LIGHT–DUTY SILT FENCE BARRIER			OPSD 219.110



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

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
ROCK FLOW CHECK DAM V–DITCH			OPSD 219.210

NOTES:

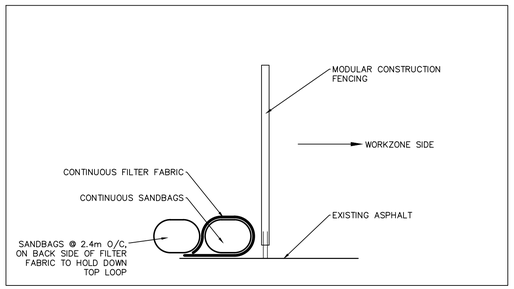
THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY,

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
6. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
7. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT

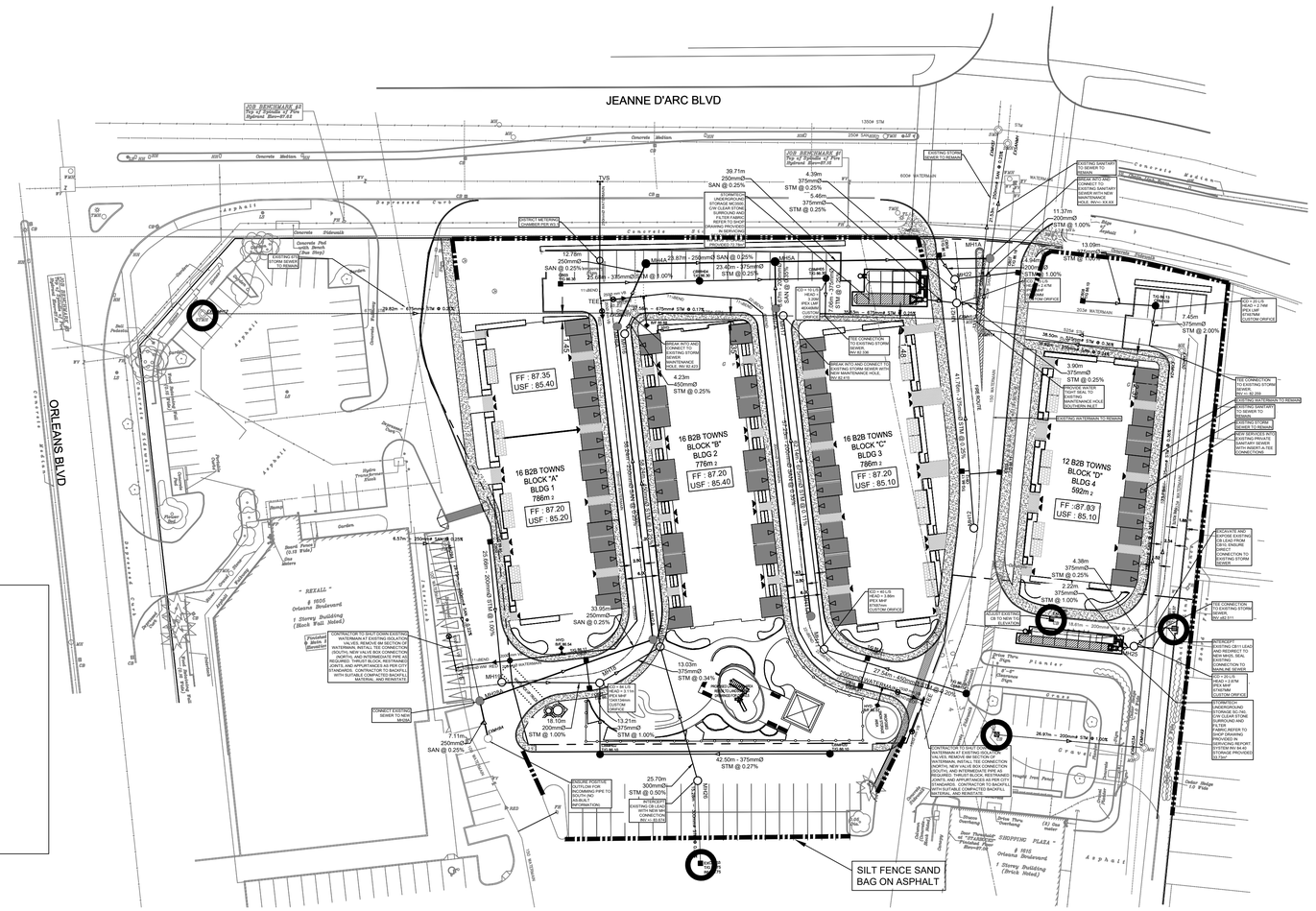
LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (7.0 × 15.0)

North



CUSTOM SILT FENCE DETAIL
FOR SITE PERIMETER
LOCATION AS REQUIRED



CLIENT
NORTH AMERICAN PROPERTIES

IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

ISSUES

No.	DESCRIPTION	DATE
~~###~~	~~ISSUED~~ FOR CITY REVIEW	2023/02/07

NOT FOR CONSTRUCTION

REFER TO 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, SHEET SECTIONS AND DETAILS

KEY PLAN

LEGEND

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levstek Consultants Inc.

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
I.D. 45 Yannoulopoulos
2023/02/07
PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
ORLEANS GARDENS

PROJECT NO: 122764

DRAWN BY:	CHECKED BY:
A.B. / E.H.	R.M./D.G.Y.
PROJECT MGR:	APPROVED BY:
R.M.	D.G.Y.

SHEET TITLE
SEDIMENT-EROSION PLAN

SHEET NUMBER	ISSUE
C-900	1

File Location: J:\122764_OrlnsGardens\7.0_Production\7.3_Design\04_Civil\Sheets\C-900 SEDIMENT-EROSION PLAN.dwg Last Saved: February 6, 2023, by Eherrele Plotted: Tuesday, February 7, 2023 4:23:00 PM by Eric Herrele

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx