OCTOBER 23, 2024
PROJECT NO. 2024-094

53 BRUCE STREET S
FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

TOWN OF THE BLUE MOUNTAINS

CAPES ENGINEERING

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Introduction

CAPES Engineering Ltd. has been retained by 2417762 Ontario Inc. to prepare a functional servicing and stormwater management report in support of a Site Plan Agreement for the 0.19 ha site located on the east side of Bruce Street South in the Town of The Blue Mountains.

The site currently has a 2 storey building on it which is the former location of the Dam Pub restaurant which has been closed for several years.

It is proposed to construct a two storey, 82.8 sq. m (footprint) 3 room commercial (motel) building and a separate one storey 222.6 sq. m 7 room motel building along the north side of the site. In addition, it is proposed to construct a pool area between the two buildings, decking and an internal 6 m wide two-way access road and 14 spot parking area.

Approvals are required from the Town of The Blue Mountains (Town) in the form of a Site Plan Agreement, but we do not believe any other approvals are required from other agencies are required for this site.

The following report is intended to discuss the servicing requirements for the site and to demonstrate the viability of the project in support of the Site Plan Application.

Existing Site Conditions

The existing 0.19 ha site, located on the east side of Bruce Street S in the Town of The Blue Mountains, is legally described as Part of Park Lot 4, Northeast Side of Alice Street, RP 103, Geographic Township of Thornbury, Town of the Blue Mountains. Please refer to the Legal Plan prepared by Van Harten Surveying Inc. for the site completed in 2021 in **Appendix A**.

The rectangular shaped site is bound by Bruce Street S to the west, by commercial zoned properties to the north and east and by a residential property to the south. The site currently has a 2 storey building which is the former location of the Dam Pub restaurant, complete with a large deck off the front, sheds, and a large gravel driveway and parking area. The east and north yards are largely pervious grassed areas which slope (relatively steeply) to the north and east.

The site grading splits with the front yard gently sloping (1.6%) to Bruce Street and the rear yard sloping east at 3.6% to a low retaining wall. East of the wall the slope increases to 33% (3:1). The north and south side yard slope towards the north and south respectively.

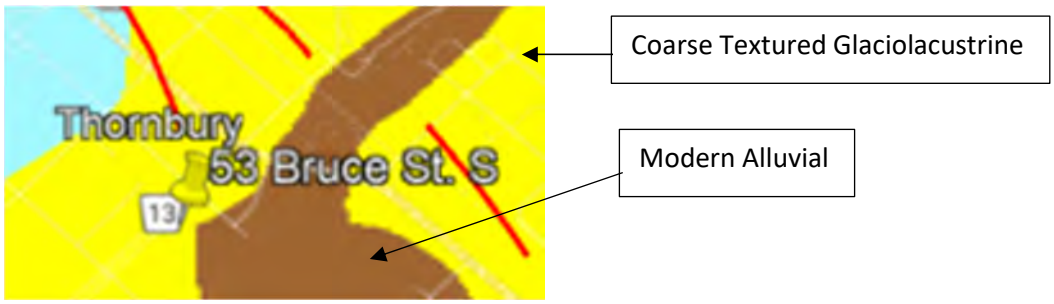
Bruce Street S along the west edge of the site is a Municipally controlled 20.12 m road allowance with two lanes and an asphalt surface, paving stone boulevard, concrete sidewalks and curb and gutter.

There is Municipal sanitary sewer watermain and storm sewer on the street and streetlights on the east side of the road and a hydro pole line on the west side of the road.

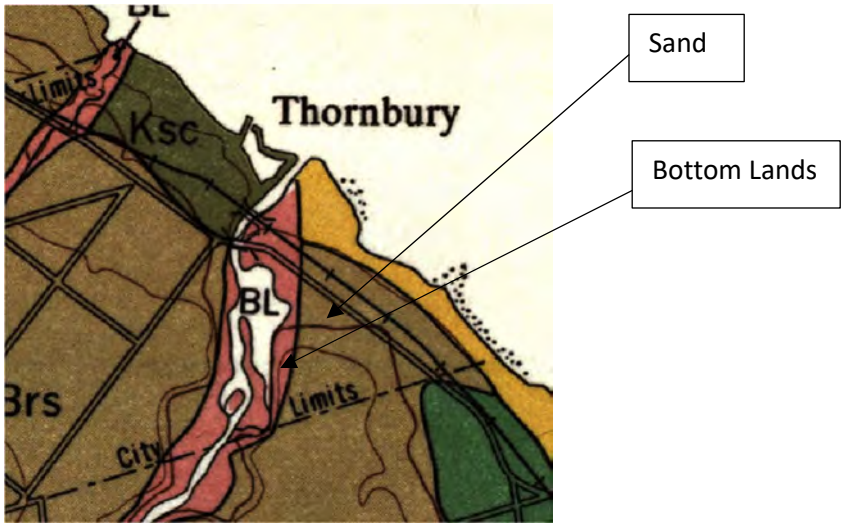
Geotechnical Information

No geotechnical study has been completed for the site, however we have reviewed the available soil mapping for the area.

According to the Ontario Geological Survey the site and surrounding area is dominated by “Coarse Textured Glaciolacustrine” deposits consisting of sand, gravel, with minor silt and clay. East of the site adjacent to the Beaver River there are “Modern Alluvial” deposits consisting of clay, silt, sand, gravel and possible organic remains.



This is consistent with the older Soils Map of Grey County N Sheet No. 17 which shows the dominant soil type on the site to be BRS (Brighton) Sand with variable “Bottom Land” to the east along the Beaver River.



We believe that sand is the most dominant soil type in this area and is assumed to be the dominant type on the site.

Existing Sanitary Sewer

According to the as-built information provided by the Town of the Blue Mountains there is an existing 150 mm dia. sanitary service line to site connected to the 300 mm dia. sanitary line (0.67% slope) on Bruce Street S (See **Drawing 101212-RC5 in Appendix B**). The sanitary sewer drains north to the Mill Street Sewage Lift Station which then pumps the sewage to the Thornbury WWTP.

We understand that the Mill Street Pump Station requires upgrades and the installation of a secondary sanitary forcemain from the pump station to the wastewater treatment plant. The proposed upgrades to the station and the new sanitary forcemain connection is currently being studied by the Town but we do not have any information on the timing of the proposed upgrades.

We have reviewed the existing sanitary sewage flows based on the most recent site usage, specifically as a restaurant.

The Town Engineering Standards recommend that for the calculation of commercial flows that be based on MECP Guidelines. Using Section 5.5.2.2 of the 2008 MOE Design Guidelines for Sewage Works the recommended design flows for a restaurant is not listed in Table 5.3. The recommended minimum allowance of 28m^3/ha/day is noted for commercial areas as an average flow.

The site at 0.19 ha would therefore generate an average flow of 5320 L/day of sewage. As a restaurant use, we assume the actual time period for the flow would occur over a 10hr average operating day. This equates to a rate of 0.15 L/s. The Town require an additional extraneous flow amount of 0.28 L/s/ha which equates to a total average flow of 0.20 L/s.

The peak flow for the site can be determined by applying a peak factor as per the recommendations of the MECP Design Guidelines for Sewage Works (2008) which indicates that peak sewage flow factors should be industry specific and similar to the water demand peaks. In this case the specific industry peaking factor is not known, but the Town recommended peaking factor for water demand is 2.0 for the max day or 4.5 for peak hourly. In absence of site-specific industry usage, we have assumed the peak factor to be 2.0 for the day and 4.5 for the peak hour.

Applying the max day peak factors equates to a max day rate of 0.40 L/s and a max hour rate of 0.90 L/s.

We also reviewed the sewage flows based on Table 8.2.1.3.B of the Ontario Building Code. Using "Restaurant (not 24 hrs service)" the sewage flows are 125 L/seat. The Dam Pub could accommodate 65 people on the main floor, 30 people on the upper floor and 40 people on the outdoor patio for a total of 135 people (https://www.scotchwhisky.net/bars/dampub.htm). This equates to a total daily flow of 16,875 L/day or 0.47 L/s.

The existing 150 mm dia. sanitary sewer connection to the site is assumed to be at a minimum of 2.0% slope (as per Town Standards) which equates to a capacity of 20 L/s. The estimated capacity of the sanitary connection is well in excess of the peak and total flow amount.

It appears that the sanitary sewer line, where it enters the existing building has been reduced to a 100 mm dia. line but it is anticipated that the 100 mm dia. portion of the line will be removed under the proposed conditions.

Existing Watermain

There is an existing water service extending to the site from the 200 mm dia. watermain on Bruce Street S. however, there is no indication on the provided plan what size the service may be. We have assumed the service connection is a 25 mm dia. copper line as has been shown and labelled for other lots on the street on the as-built plan. The water line inside the existing building is 25 mm dia. PE.

Please refer to **Appendix B** for the relevant as-constructed drawings.

The closest fire hydrant is located on the east side of Bruce Street S approximately 25 m south of the driveway to the site. The next closest hydrant is located on the SW corner of Bruce Street S and Louisa Street approximately 72 m north of the site driveway.

Existing Stormwater Infrastructure

There are currently no existing stormwater controls on the site. Runoff currently flow overland via sheet flow. The area of the front yard drains to Bruce Street S where there are a series of catchbasins connected to a 600 mm dia. storm sewer that flows north.

The north side of the site drains overland towards the commercial property at 51 Bruce Street S. The south side of the site drains overland to the residential property at 55 Bruce Street S. The rear yard is steeply sloped and pervious and drains overland to the neighbouring property.

Existing Condition Stormwater Modelling

We have utilized PCSWMM 2023 modelling software (Version 7.6.3675, SWMM version 5.0.013-5.2.4) to undertake the analysis of the existing site condition.

The contributing drainage area for the site was determined using a combination of aerial imagery from Grey County Mapping (https://geo.grey.ca), topographic survey of the site completed in 2021, and a site visit conducted in August 2024.

Based on the available information there is no external drainage area as the entire site is higher than the surrounding lands or, in the case of the extreme SW corner any external runoff onto the site is blocked by a large hedge.

Rainfall data was obtained from the updated Town Engineering Standards which refer to the “MTO Look Up Curve” and have adjusted the rainfall by 10% to account for Climate Change. We have tested the site for the 2-100 storm event for the 4-hour Chicago Storm and the 24 hr SCS Type II Storm as required by the Town standards. We have also analysed the 4 hr 25 mm Chicago storm (quality control storm) and the Regional (Timmins) storms.

The total on-site drainage area has been determined to be 0.19 ha in size and flows primarily by overland sheet flow to neighbouring properties in all four cardinal directions. For the purposes of this model, we have assumed four existing condition catchments for the site.

Please refer to **Appendix C** for the existing condition catchment plan.

Based on the available soil mapping for the area we have selected the Green Ampt Method of infiltration for the majority of the surface soils for a "sand". The estimated Ksat, Suction Head and Initial Soil Deficit have been selected as per Rawls (1983) for a sand.

K_{eff} = 117.8 mm/hr

Suction Head = 49.022 mm

Initial Deficit (fraction) = 0.375

Additional PCSWMM model input parameters for the Manning's roughness coefficient (*n*) and depression storage were determined from the US EPA TR-55 Report (1986) and from UNESCO Manual on Urban Drainage (1987).

Table 5.9: Manning Roughness Coefficients - Overland Flow

Cover	*n*
Impervious areas	0.013
Woods	
with light underbrush	0.4
with dense underbrush	0.8
Lawns	
Short grass	0.15
Dense grass	0.24
Agriculture Land	0.050-0.170

Ref: Adapted from Soil Conservation Service, Urban Hydrology for Small Watersheds, U.S. Dept. of Agriculture, Soil Conservation Service, Engineering Division, Technical Release 55, June 1986

10.2 Initial Abstraction/Depression Storage

Table 10.2: Initial abstraction/depression storage

Cover	Depth (mm)
Woods	10
Pasture/Meadow	8
Cultivated	7
Lawns	5
Wetland	12/16
Impervious areas	2

Ref: UNESCO, Manual on Drainage in Urbanized Areas, 1987.

Subcatchment A1 – 0.05 ha – This area is located on the west side of the site in the front yard between the existing building and Bruce Street S and generally drains west to Bruce Street S. The subcatchment is 30% pervious (cedar hedge, grass and flower beds) and we have assigned a pervious n value of 0.15 and a depression storage of 5 to reflect predominantly urban lawn. The flow length was set to 18 m and a slope of 2%.

Subcatchment A2 – 0.03 ha – This subcatchment is located on the south side of the site generally drains overland south towards the neighbouring property, however we believe surface runoff is prevented from leaving the site by the dense hedge along the property line. The subcatchment is 95% impervious

(half the existing building and gravel parking area) with a flow length of 8 m a slope of 1.2% and an n value of 0.4 and depression storage of 10 mm to reflect the cedar hedge.

Subcatchment A3 – 0.05 ha – This area is located on the east side of the site in the rear yard between the existing building and the east property line and generally drains east down a relatively steep slope towards the neighbouring property. The subcatchment is 73% pervious (cedar hedge, grass and trees) and we have assigned a pervious n value of 0.24 and a depression storage of 7 to reflect a mix of lawn and trees. The flow length was set to 24 m and a slope of 17%.

Subcatchment A4 – 0.05 ha – This area is located on the north side of the site in the side yard between the existing building and the north property line and generally drains north towards the neighbouring property. The subcatchment is 27% impervious (half the roof, two sheds and concrete walkway) and the pervious area consists of mostly grass with some trees and we have assigned a pervious n value of 0.15 and a depression storage of 5 to reflect predominantly urban lawn. The flow length was set to 12 m and a slope of 37% (roughly 3:1) as it includes the continuation of the slope from the rear yard.

Please refer to **Table 1** below for a summary of the existing condition peak runoff.

Table 1 – Pre-Development Modelling Results

Storm Event	Peak Flow To Bruce St. S (A1) (m^3/s)	Peak Flow South (A2) (m^3/s)	Peak Flow East (A3) (m^3/s)	Peak Flow North (A4) (m^3/s)	Total Peak Flow Offsite (m^3/s)
24 Hr SCS Type II					
2-year	0.01	0.01	0.00	0.00	0.02
5-year	0.01	0.01	0.00	0.00	0.02
10-year	0.01	0.01	0.00	0.00	0.02
25-year	0.01	0.01	0.00	0.00	0.02
50-year	0.01	0.01	0.00	0.00	0.02
100-year	0.02	0.01	0.00	0.00	0.03
4 Hr Chicago					
2-year	0.01	0.01	0.00	0.00	0.02
5-year	0.02	0.01	0.00	0.00	0.03
10-year	0.02	0.02	0.00	0.00	0.04
25-year	0.02	0.02	0.00	0.00	0.04
50-year	0.03	0.02	0.00	0.00	0.05
100-year	0.03	0.02	0.00	0.00	0.05
25 mm	0.01	0.01	0.00	0.00	0.02
Timmins	0.00	0.00	0.00	0.00	0.00

The 4 Hr Chicago Storm produces the highest peak flow and volume from the site. Please refer to **Appendix C** for a summary of the results for the 100-year SCS storm. Additional storm results or the full digital model can be provided upon request.

Proposed Site Design

It is proposed to construct a new two-way, 6.0 m wide entrance extending east from Bruce Street S at the southwest corner of the site, roughly in the same location as the existing entrance but shifted slightly. It is proposed to construct a two storey, 82.8 sq. m (footprint) 3 room commercial (motel) building and a separate one storey 222.6 sq. m 7 room motel building along the north side of the site. In addition, it is proposed to construct a pool area between the two buildings, decking and an internal 6 m wide two-way access road and 14 spot parking area.

Please refer to the Site Plan prepared by Edward Lee Architect included in **Appendix A** for the proposed site layout.

The site will use the existing 150 mm dia. sanitary connection at the property line but will require a new watermain service connection as the existing 25 mm dia. connection line is too small for the proposed use.

Stormwater will be managed on site through the use of a permeable paving system and pervious infiltration areas which will be detailed below.

Garbage and recycling will be sorted and stored in Building No.1 in a dedicated room in the basement. The sorted materials will be placed in small totes with lids, and a private contractor will manage their removal. Snow will be stored on site, primarily in the eastern part of the property at the end of the driving lane with smaller amounts stored along the south edge of the site.

It is not proposed to install parking lot lights other than the lights on the proposed buildings which will be shown on the architectural drawings.

Water Servicing

The Town of the Blue Mountains Engineering Standards do not have standard flows or demands for commercial or industrial uses and therefore they must be determined on an individual basis.

The total number of fixture units (FU) for the proposed development has been used to determine the total water demand flows for the site. Based on OBC Table 7.6.3.2 “Hydraulic Load” the number of fixture units is as follows:

Guest Rooms

- 10 sinks x 1.5 FU/sink = 15 FU
- 10 showers x 1.5 FU/shower = 15 FU
- 10 toilets x 4.0 FU/toilet = 40 FU

Reception Area

- 1 sink x 1.5 FU = 1.5 FU
- 1 Toilet x 1.5 FU = 1.5 FU

- 1 Floor Drain x 2.0 FU = 2.0 FU

Staff/Guest Amenity Room

- 2 sinks x 1.5 FU = 3.0 FU
- 1 Toilet x 4.0 FU = 4 .0 FU
- 1 Washing Machine x 1.5 FU = 1.5 FU
- 1 Dishwasher x 1.4 = 1.4 FU

Amenity Area

- 1 Outdoor Shower x 1.5 FU = 1.5 FU

The total number of Fixture Units for the proposed development is therefore 86.4.

It is anticipated that additional water using fixture units not contributing to the sewage system will also be installed. These include three hose bibbs (3 FU ea.) which brings the total FU count to 95.4.

Using a modified Hunter Curve for less than 400 FU the domestic water demand has been calculated and included in **Appendix D**. Using the total FU count of 95.4 the total peak hourly demand for the site is 2.27 L/s. The number of fixture units exceeds the maximum recommended for a 32 mm dia. line under OBC Table 7.6.3.4 (max allowable 57 FU).

We recommend that the existing 25 mm dia. water service to the property line be increased to a 50 mm dia. domestic water service connection. This will require excavating Bruce Street S to the main and decommissioning the existing line and replacing it with a new 50 mm line.

The closest fire hydrant is located on the east side of Bruce Street S approximately 25 m south of the driveway to the site. The next closest hydrant is located on the SW corner of Bruce Street S and Louisa Street approximately 72 m north of the site driveway. The furthest entrance to the eastern building is 55 m from Bruce Street (49 m from the edge of the ROW). The total distance from the closest fire hydrant to the furthest entrance would therefore be 80 m which is less than the maximum allowable of 90 m (45 m from the hydrant to the fire truck and 45 m from the truck to the entrance) under the OBC.

As the distance from the hydrant to the entrance is less than 90 m, the buildings are less than 3 storeys and less than 600 sq. m we do not believe the site requires an emergency access route to be provided, but we recognize that the distance from the truck if parked on Bruce street will exceed 45 m and therefore it is proposed that the fire truck could pull off of Bruce Street partially onto the site in the event of a fire. The proposed permeable paving system (gravel filled Ecoraster E50, or equivalent) can withstand heavy duty loading and will be placed through out the site to allow for a truck to pull onto the site. A fire route sign will be posted in the entrance for the first 10 m.

The total fire flow demand based on the Fire Underwriters Survey (FUS) method is 100 L/s (See **Appendix D**) with a total combined fire flow + domestic flow of 102.27 L/s.

The Town Water Treatment Plant (WTP) has a firm capacity of 15,140 m^3/day and receives up to 1,250 m^3/day from the Town of Collingwood. The total firm capacity is therefore 16,390 m^3/day or 16,006 units based on the 5 year rolling MDD of 1.024 m^3/day.

A total of 11,134 m^3/day (10,873 units) is currently connected or allocated leaving a total flow of 2,641 m^3/day (2,579 units) in reserve. Of the total 16,006 units of water supply available there are currently 13,452 units allocated and reserved leaving a total of 2,554 units available.

We believe that there is sufficient capacity in the WTP to accommodate the proposed development especially as a portion of the proposed demand has already been accounted for in the WTP demand through the pre-existing Restaurant usage for the site.

Sanitary Flows & Sewer Design

The proposed 3 room, two-storey motel building and the proposed 7 room, one story building will require a new sanitary sewer connection between the existing 150 mm dia. Municipal sanitary sewer line at the property line and the buildings.

The sewage flows from the proposed motel buildings and associated on site works are to be calculated using Table 8.2.1.3.A of the Ontario Building Code.

Under Part 5 “Hotels and Motels (excluding bars and restaurants) section a. “Regular, per room” the sewage flows are 250 L/day. With 10 rooms the site will generate 2,000 L/day. This is assumed to occur over a 24 hr period which equates to a flow of 0.03 L/s.

Using the flows as determined from the Water Demand (above) the peak water demand of 2.27 L/s could be used as an alternative method to determine the peak sewage flows for the site.

Using mannings equation the capacity of a 150 mm dia. line at the minimum allowable slope of 2.0% is equal to 20 L/s, well in excess of the sewage generated from the proposed buildings regardless of the methodology used. It is proposed to not replace the 150 mm dia. sanitary line from the property line to the sanitary main, but to replace the (apparent) 100 mm dia. service line between the property line and the existing building with a new 150 mm dia. line.

Utilities

Hydro is provided on Bruce Street from an overhead pole line on the west side of the road and there is already an existing hydro connection to the site.

We believe a new electrical connection will need to be coordinated with Hydro One (HONI) and extended to the new buildings. Telecommunications and natural gas connections (if required) will be coordinated at the same time as the hydro connection, and it is proposed that the coordinated design would be completed by others.

It is not proposed to provide streetlighting within the parking area. Only on-building lighting will be provided and will be shown on the architectural drawings.

Stormwater Approval Criteria

The stormwater management for the site must conform to the Town of Blue Mountains Engineering Standards (2023) as well as the GSCA Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (2010).

The following are the criteria the site must achieve:

- Post Development peak runoff must match pre-development peak runoff for the 2-100 year storm events
- Safe Conveyance of the Regulatory (Timmins/100 Year) storm
- Enhanced level of quality control as defined by the MECP (80% TSS Removal)

Stormwater Modelling - Proposed Development

It is proposed to utilize the site's sandy soils for infiltration to manage both stormwater quality and quantity. The site driving lane and parking spaces will be constructed with a permeable paving system such as Ecoraster E50 Mineral (or approved equivalent). This consists of a grid system to carry the load of vehicle traffic (including heavy duty traffic) placed at surface over a stone storage layer for stormwater. The grid is filled with gravel and allows for stormwater to drain directly through to the storage layer and below into the sand.

Additional infiltration will occur on the site pervious area in the side and rear yards, but no other formal stormwater controls are proposed or required for the site.

Using the proposed site plan (**Appendix A**) we have measured the overall imperviousness of the site and found it increases from 50% (existing) to 71% in the proposed condition although 43% of that impervious area is actual the pervious paving system.

As with the existing condition model we have assumed the dominant soils will be the Sand as per the geotechnical information available. To be conservative we have assumed that subsurface infiltration rate (Ksat) will be reduced by 2.5x from 117.9 mm/hr to 47.16 mm/hr.

We have separated the post development model into 7 internal sub-catchments

Subcatchment A1 is 0.05 ha in size and 100% impervious and consists of the entire driving and parking area which will be covered by a permeable paving system. The PCSWMM model requires that this subcatchment be shown as 100% impervious and then the LID editor is used to assign the entire subcatchment as covered by permeable pavers. The permeable paving system will have a 450 mm thick stone storage layer below the surface driving layer. We have used a berm height of 150 mm to represent the curb height around the pavers and a subsurface Ksat of 47.16 mm/hr (normal rate reduced by 2.5x factor of safety). Any runoff from the pavers is to be directed to the Bruce Street S storm sewer system as per the existing condition.

Subcatchments A2-A4 are a combined 0.05 ha in size and are 100% pervious and consists of the landscaped/pervious areas on the south, east and north sides of the site respectively. All have steep sloping (generally 3:1) and will be largely tree covered. We have used a pervious n value of 0.40 and depression storage value of 10 mm to reflect the vegetated and primarily treed nature of the subcatchments.

Subcatchment A5 is 0.05 ha in size and represents half the roof area (both buildings), pool area and front walkways of the buildings. The runoff will be directed onto the permeable pavers using roof downspouts. The subcatchment is 100% impervious.

Subcatchment A6 is 0.02 ha in size and represents half the roof area of the 3 unit building and landscaped front yard and a small portion of the permeable paver driveway which slopes towards Bruce Street S. The runoff will be directed from the roof onto the pervious yard and any runoff will be directed to Bruce Street. The subcatchment is 63% impervious and we have assigned a mannings n of 0.15 and depression storage of 5 mm to represent urban lawn.

Subcatchment A7 is 0.02 ha in size and represents half the roof area of the 7 unit building and rear yard decks. The runoff will be directed from the roof and decks onto the pervious north side yard (A4). The subcatchment is 100% impervious.

Please refer the **Drawing C4** for the post development drainage plan and to the PCSWMM model view in **Appendix E**.

Please also refer to **Table 2** for a summary of the Post Development Peak Flows and to **Appendix E** for the PCSWMM output results.

Table 2 – Post Development Modelling Results

Storm Event	Total Existing Peak Flow Offsite (m^3/s)	Peak Flow To Bruce St. S (m^3/s)	Peak Flow South (A2) (m^3/s)	Peak Flow East (A3) (m^3/s)	Peak Flow North (A4) (m^3/s)	Total Peak Flow Offsite (m^3/s)
24 Hr SCS Type II						
2-year	0.02	0.00	0.00	0.00	0.00	0.00
5-year	0.02	0.00	0.00	0.00	0.00	0.00
10-year	0.02	0.00	0.00	0.00	0.00	0.00
25-year	0.02	0.00	0.00	0.00	0.00	0.00
50-year	0.02	0.00	0.00	0.00	0.01	0.01
100-year	0.03	0.00	0.00	0.00	0.01	0.01
4 Hr Chicago						
2-year	0.02	0.00	0.00	0.00	0.00	0.00
5-year	0.03	0.00	0.00	0.00	0.00	0.00
10-year	0.04	0.00	0.00	0.00	0.00	0.00
25-year	0.04	0.00	0.00	0.00	0.00	0.00
50-year	0.05	0.00	0.00	0.00	0.00	0.00
100-year	0.05	0.01	0.00	0.00	0.01	0.01
25 mm	0.02	0.00	0.00	0.00	0.00	0.00
Timmins	0.00	0.005	0.00	0.00	0.00	0.005

All of the storms (with the exception of the Timmins event which is not required to be attenuated) are attenuated to below existing condition levels by the implementation of the permeable paving system and directing runoff to pervious areas.

Stormwater Quality Controls

The Town of the Blue Mountains, GSCA and MECP quality control criteria require the long-term removal of 80% total suspended solids (TSS). In practice the TSS removal is calculated based on a 4 hr Chicago Distribution 25 mm storm event.

There is no runoff from the site under the 25 mm storm event and therefore the site TSS removal rate is 100% and exceeds the MECP Guidelines.

Erosion and Sediment Controls

We recommend that heavy duty silt fence as per OPSD 219.130 be installed along the perimeter of the site to prevent sediment transport during construction. These controls should remain in place and be maintained until the vegetation is re-established on the site.

Some of the existing trees will need to be removed throughout the site in order to facilitate the construction of the buildings and parking areas. The removal of trees should be minimized where possible, and the proposed silt fencing should be in place prior to the removal of the trees.

Temporary ESC controls are proposed in places within the 10 m watercourse setback and as per the EIS recommendations the disturbance in these areas is to be minimised and the area restored following construction.

We believe that a mud mat is not required for the site as it is already developed with asphalt driveway within the ROW and granular surface within the site, however we have shown a mud mat on the plans should one be required to be installed. Please refer to **Drawing C1** for the proposed ESC controls.

Conclusions

The 0.19 ha site currently has a 2 storey building on it which is the former location of the Dam Pub restaurant which has been closed for several years.

It is proposed to construct a two storey, 82.8 sq. m (footprint) 3 room commercial (motel) building and a separate one storey 222.6 sq. m 7 room motel building along the north side of the site. In addition, it is proposed to construct a pool area between the two buildings, decking and an internal 6 m wide two-way access road and 14 spot parking area.

The site requires Town approval but is not within a regulated area by the GSCA and does not require a permit from their office. In addition, as a private commercial site connected to Municipal servicing none of the proposed servicing requires an approval from the MECP.

The site will be serviced with an upgraded Municipal watermain connection from a 25 mm service line to a 50 mm dia. water line for potable water.

Sewage will be discharged to the existing 150 mm dia. gravity sanitary sewer connection from Bruce Street.

Stormwater management will be implemented in the form of a permeable paving system in the driving and parking areas and by directing runoff to pervious areas at the perimeter of the site. The proposed controls reduce to stormwater runoff to zero in the majority of storm events and to less than existing in all storm events.

This report is intended to provide support for the proposed Site Plan Agreement and demonstrate that the site is feasible from an engineering point of view. We believe that this report demonstrates the site can be constructed to meet all of the relevant Town of the Blue Mountains, GSCA, and MECP guidelines and criteria.

Report Prepared By:

Clayton Capes, MSc. P.Eng.

CAPES Engineering Ltd.

Drawings

Cover Sheet
Drawing C1 –Removals and Erosion and Sediment Control Plan
Drawing C2 – Site Grading and Servicing Plan
Drawing C3 – Post Development Drainage Area Plan
Drawing C4 - Standard Details

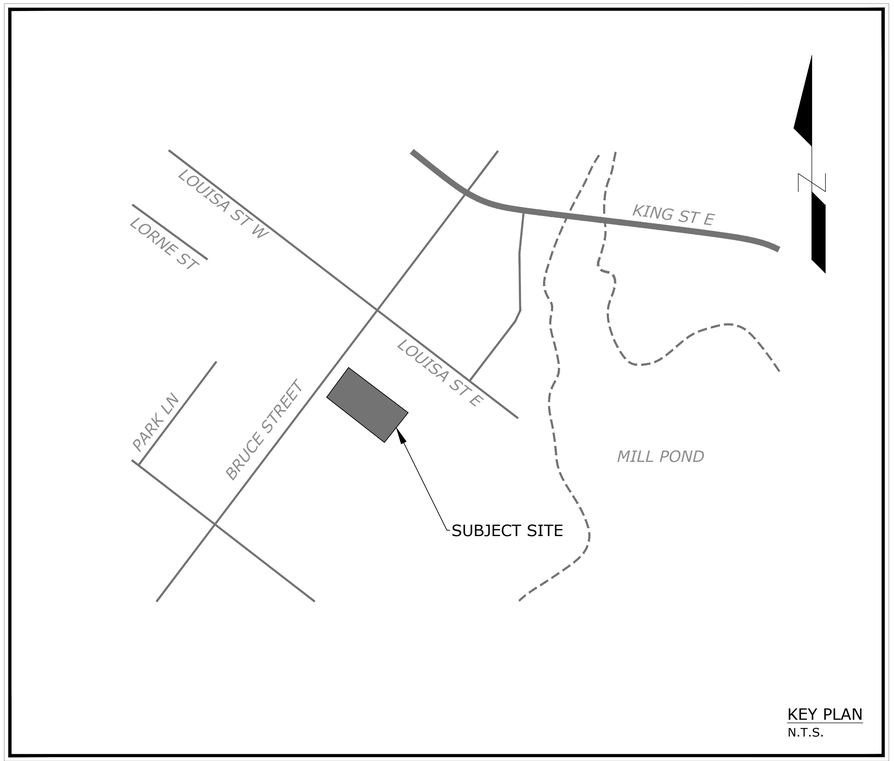
2417762 ONTARIO INC.

#53 BRUCE STREET SOUTH

TOWN OF BLUE MOUNTAINS

DRAWING INDEX

	COVER SHEET
C1	REMOVALS AND EROSION & SEDIMENT CONTROL
C2	SITE GRADING AND SERVICING PLAN
C3	POST DEVELOPMENT DRAINAGE PLAN
C4	STANDARD DETAILS



KEY PLAN
N.T.S.

2417762 Ontario Inc.

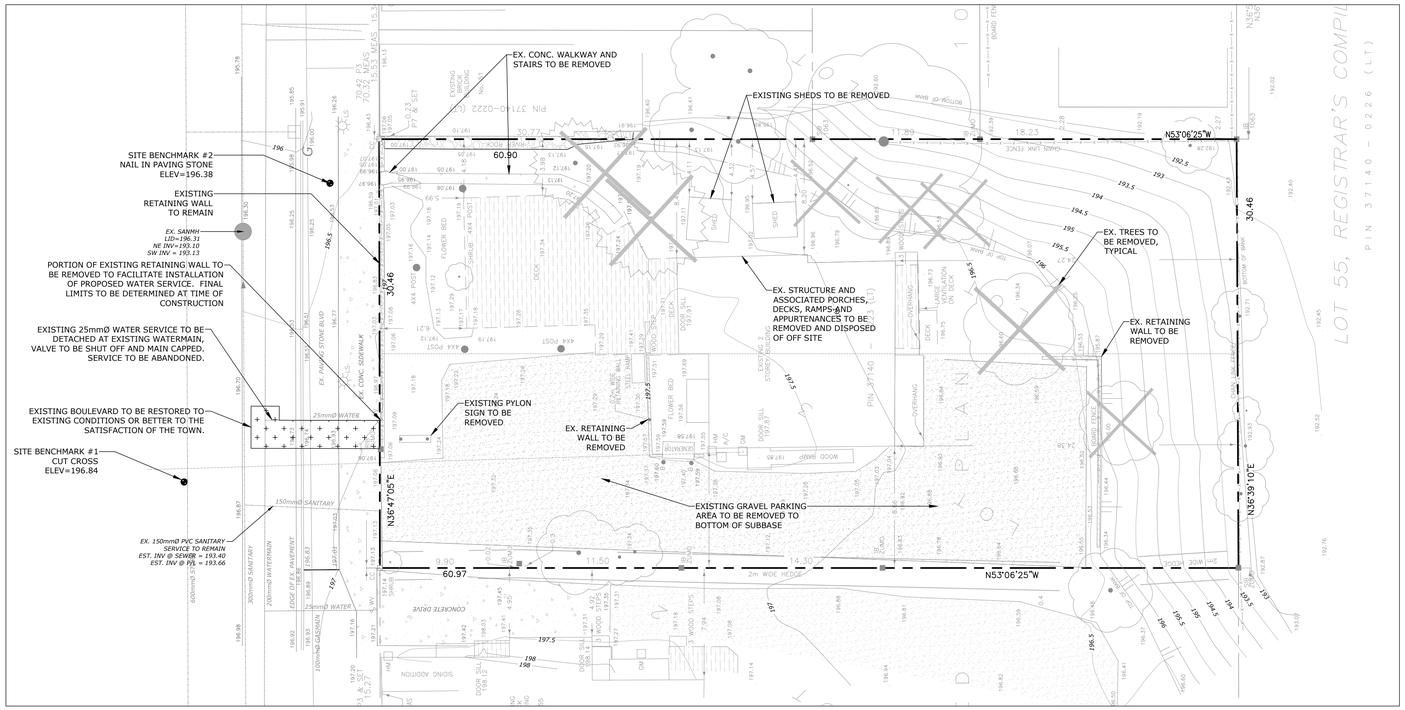
Project No. 2024-094

ISSUED FOR APPROVALS - 24/10/23

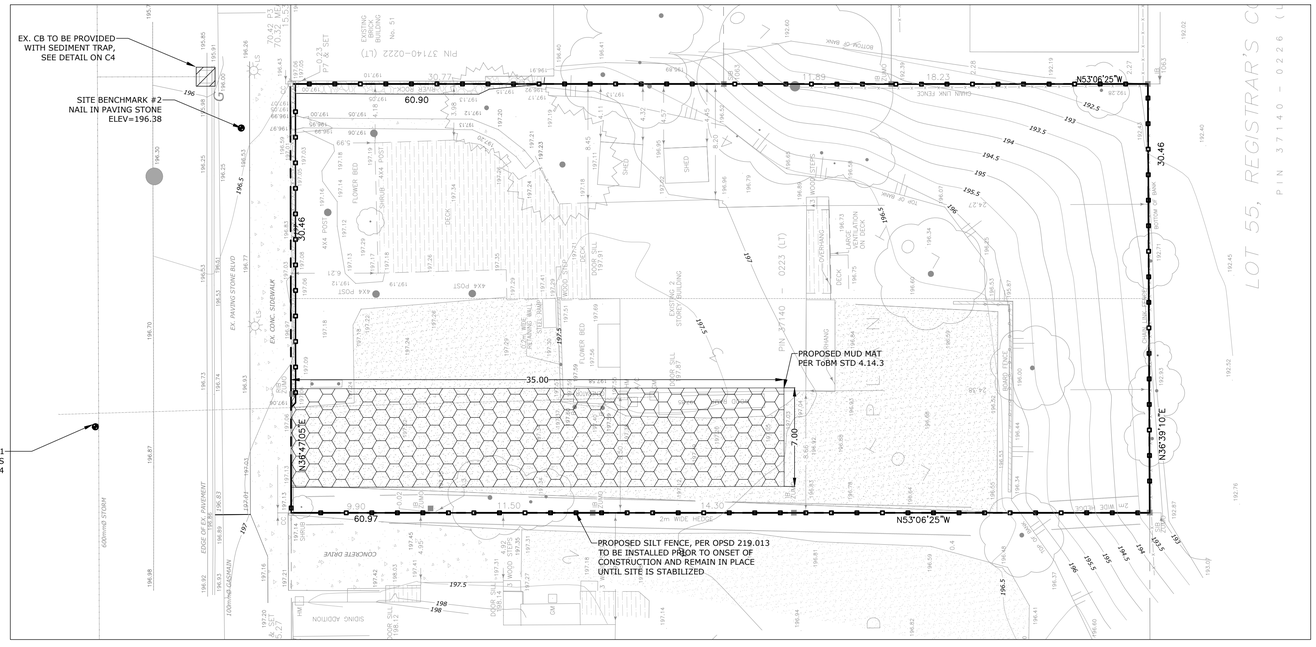
CAPES ENGINEERING

2417762 ONTARIO INC. - #53 BRUCE STREET SOUTH - PROJECT No. 2024-094

ISSUED FOR APPROVALS - 24/10/23

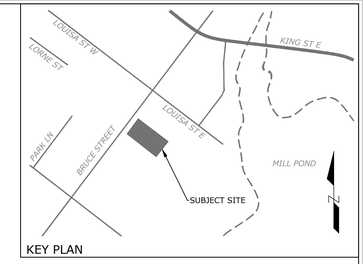


REMOVALS PLAN



EROSION AND SEDIMENT CONTROL PLAN

NOTE:
DURING CONSTRUCTION, EXISTING ENTRANCE AND BRUCE ST. ROW IT TO BE SWEPT AT THE END OF EACH WORKING DAY UNTIL CONSTRUCTION HAD BEEN COMPLETED.



KEY PLAN

LEGEND

- ENTRANCE
- PROPERTY LINE
- BUILDING SETBACK (ENVELOPE)
- EXISTING SANITARY SERVICE
- EXISTING WATER SERVICE
- SANITARY SERVICE
- STORM SERVICE
- WATER SERVICE
- SWALE AND FLOW DIRECTION
- ROOF LEADER DISCHARGE TO SPLASH PAD LOCATION
- 3:1 SLOPING (MAXIMUM)
- × 184.90 PROPOSED GRADE
- × 184.90 EXISTING GRADE
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- EXISTING CURB STOP
- EXISTING VALVE & BOX
- HP HYDRO/UTILITY POLE
- 2.00% PROPOSED OVERLAND FLOW GRADE
- EX. 2.00% EXISTING OVERLAND FLOW GRADE
- EXISTING TREES TO REMAIN
- EXISTING TREE TO BE REMOVED

NOTES

1. THE OWNER/BUILDER/APPLICANT MUST OBTAIN A ROAD OCCUPANCY PERMIT FROM PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION WORKS.
2. A COPY OF THE "ACCEPTED FOR CONSTRUCTION" LOT GRADING AND DRAINAGE PLAN IS ALWAYS TO BE ON SITE FOR REFERENCE DURING CONSTRUCTION.
3. THE OWNER IS RESPONSIBLE FOR OBTAINING UTILITY AND SERVICING LOCATES PRIOR TO ANY WORKS BEING UNDERTAKEN.
4. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE IMPLEMENTED TO PREVENT MIGRATION OF SILT AND SEDIMENT FROM THE SUBJECT LOT TO ANY ADJACENT LOT, INCLUDING MUNICIPAL RIGHT-OF-WAY. SPECIAL CARE SHALL BE TAKEN TO ENSURE THAT SILT AND SEDIMENT LADEN SURFACE WATER DOES NOT ENTER ANY WATERCOURSES OR ENVIRONMENTALLY SENSITIVE AREAS, EITHER OVERLAND OR THROUGH THE STORM DRAINAGE SYSTEM.
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6. ALL DISTURBED AREAS ARE TO BE SODDED OVER A MINIMUM OF 100MM OF TOPSOIL OR APPROVED ALTERNATIVE GROUND COVER.
7. ALL WORK WITHIN THE TOWNSHIP RIGHT-OF-WAY MUST BE RESTORED TO EQUAL OR BETTER CONDITION.
8. RETAINING WALLS ARE TO BE CONSTRUCTED OF ACCEPTABLE ARCHITECTURAL BLOCK OR APPROVED EQUIVALENT. FILTER CLOTH SHALL BE PLACED BEHIND ALL RETAINING WALLS TO PREVENT THE MIGRATION OF FINES. RETAINING WALLS ARE NOT TO ENCROACH INTO THE MUNICIPAL ROAD ALLOWANCE.
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11. HEADWALLS SHALL BE CONSTRUCTED OF RISI-STONE (PISA 2) ARCHITECTURAL BLOCK. COMPLETE WITH FILTER CLOTH TO PREVENT THE MIGRATION OF FINES.
12. ALL SWALES SHALL HAVE A MINIMUM DEPTH OF 150mm; 150mm DIAMETER SUBDRAINS SHALL BE PROVIDED UNDER ALL SWALES WITH GRADIENTS LESS THAN 1.0%. SUBDRAINS SHALL BE PERFORATED, CORRUGATED PIPE WITH GEOTEXTILE AND BE BEDDED IN A 300mmX300mm CLEAR STONE TRENCH WRAPPED WITH FILTER CLOTH.
13. EXISTING VEGETATION ON SITE TO BE REMOVED AND DISPOSED OF OFF SITE BEFORE LOT GRADING WORK AS SPECIFIED.
14. FOOTING WIDTH SHALL BE PER O.B.C. SECTION 9.15.3.4 WITH WIDTH ADJUSTMENTS IF FOOTINGS ARE LOCATED NEAR SEASONALLY HIGH GROUNDWATER AS PER O.B.C SECTION 9.15.3.4.3.
15. AS PER SECTION 4.2.2.1 OF O. REG 332/12 BUILDING CODE A SUBSURFACE INVESTIGATION INCLUDING GROUNDWATER CONDITIONS IS REQUIRED PRIOR TO PLACING THE FOUNDATION. THE UNDERSIDE OF FLOOR SLAB AND ASSOCIATED DRAINS SHALL BE ENTIRELY LOCATED A MINIMUM SEPARATION OF 0.4m ABOVE THE SEASONAL HIGH GROUNDWATER LEVEL, OR AS REQUIRED PER HYDROSTATIC PRESSURES, BASED ON THE SUBSURFACE INVESTIGATION.
16. NO SUBSURFACE INVESTIGATION INFORMATION WAS PROVIDED BY THE OWNER PRIOR TO THE COMPLETION OF THIS LOT GRADING PLAN. ADJUSTMENTS TO THE GRADING INCLUDING THE FOUNDATION LEVEL MAY BE REQUIRED FOLLOWING THE COMPLETION OF THE SUBSURFACE INVESTIGATION. IF THE SUBSURFACE INVESTIGATION DEMONSTRATES A NEED TO ALTER THE BUILDING ELEVATIONS, THE OWNER/CONTRACTOR IS TO INFORM CAPES ENGINEERING LTD.
17. IT IS THE OWNER/CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL GROUNDWATER SEPARATIONS ARE ADHERED TO PRIOR TO CONSTRUCTION.

No	Revision	Date
1	ISSUED FOR FIRST SUBMISSION	24/10/23

NOTES:

BOUNDARY SURVEY INFORMATION:
EXTRAPOLATED FROM SURVEYOR'S REAL PROPERTY REPORT WITH TOPOGRAPHICAL DATA, ALL OF LOTS 3 & 4, REGISTERED PLAN 103, GEOGRAPHIC TOWNSHIP OF THORNBURY, TOWN OF BLUE MOUNTAINS, COUNTY OF GREY, PREPARED BY VAN HARTEN SURVEYING INC., 2021

TOPOGRAPHICAL INFORMATION:
TOPOGRAPHICAL SURVEY COMPLETED BY VAN HARTEN SURVEYING INC., 2021.

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SITE BENCHMARKS:
1 - CUT CROSS ON NORTH SIDE OF BRUCE ST, NORTHWEST OF SOUTHWEST CORNER OF SUBJECT PROPERTY: ELEV = 196.84m

2 - NAIL IN PAVING STONE WEST OF NORTHWEST CORNER OF SUBJECT PROPERTY: ELEV = 196.38m

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
OCT. 25, 2024
PROVINCE OF ONTARIO

Client
2417762 Ontario Inc.

CAPES ENGINEERING
WWW.CAPESENGINEERING.COM

#53 BRUCE STREET SOUTH

REMOVALS AND EROSION & SEDIMENT CONTROL

Designed	Checked	Date	Drawing No.
B.H./K.G.	K.G.	24/10/18	C1
Project No.	CONTRACT NO.	Rev No.	
2024-094		1	
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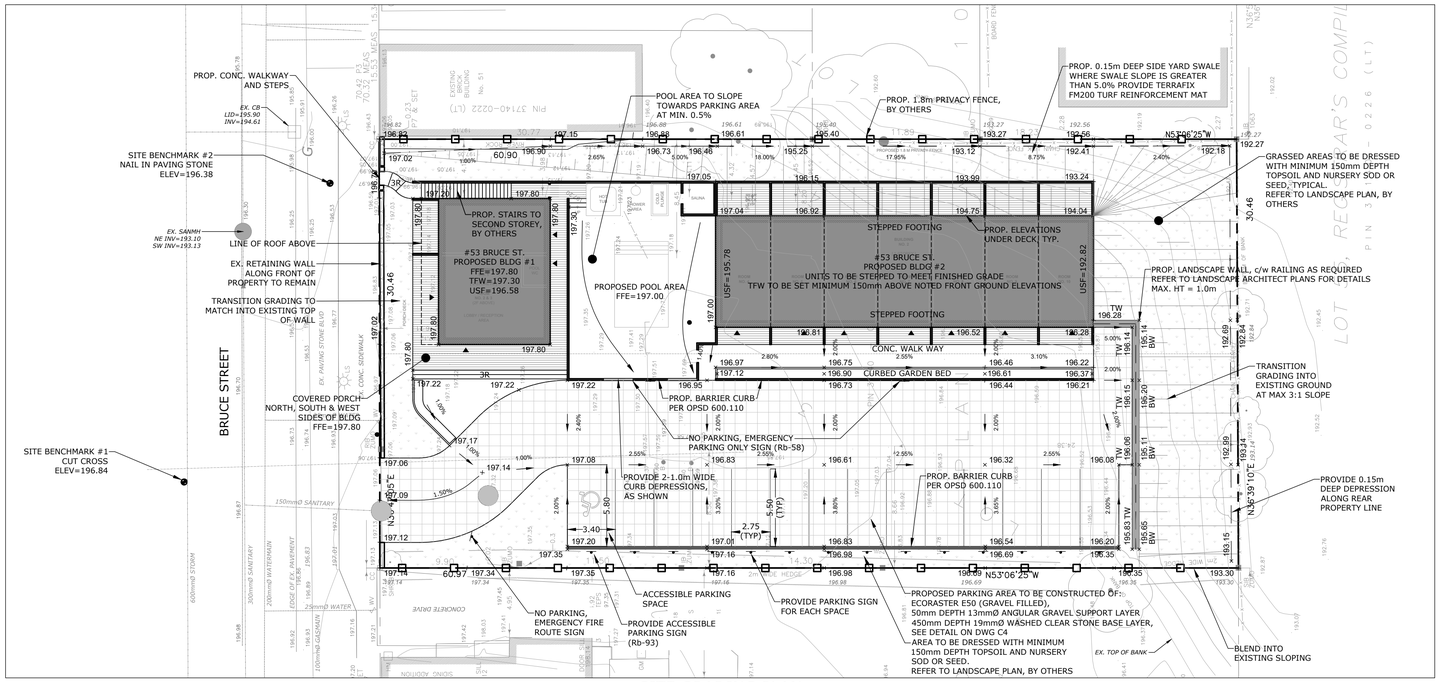
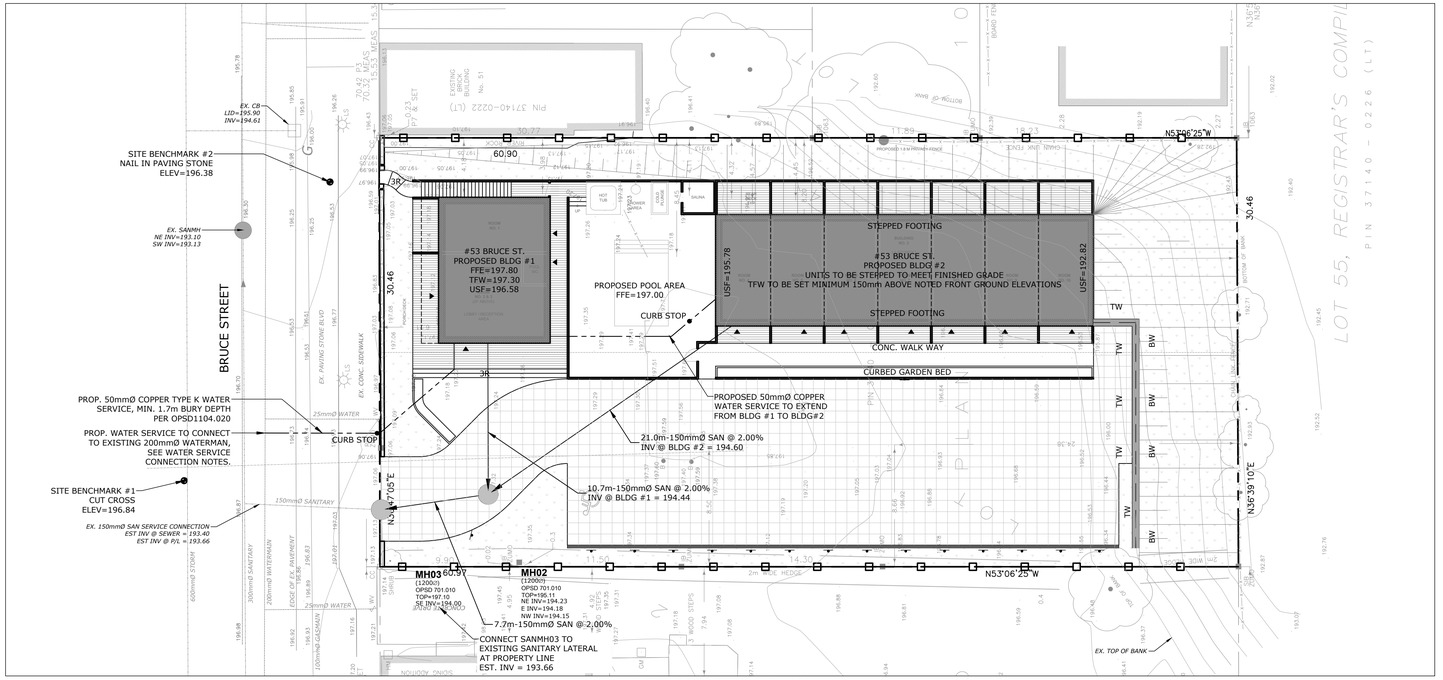
1:200			

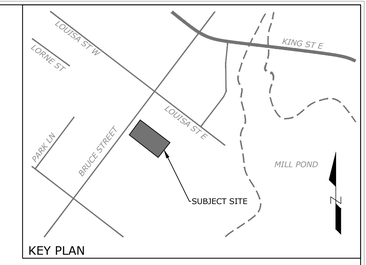
File: C:\Users\brandon\Capes Engineering Dropbox\Projects\2024\2024-094 53 Bruce St S\Drawings\03_Production\Working\2024-094 Removals and ESC.dwg Date Plotted: October 25, 2024 - 2:08 PM



SITE GRADING PLAN



SITE SERVICING PLAN



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- EXISTING TREE TO BE REMOVED

WATER SERVICE CONNECTION NOTES

1. PROPOSED WATER SERVICE TO CONNECT TO EXISTING 200mmØ WATERMAIN WITH SERVICE SADDLE AND 50mmØ CORPORATION (MAIN) STOP.
2. SERVICE SADDLE TO BE CAMBRIDGE BRASS 403 TECK SADDLE SERIES 8403, OR APPROVED EQUIVALENT.
3. CORPORATION (MAIN) STOP TO BE CAMBRIDGE BRASS 301NL-A7H7 (50mm), OR APPROVED EQUIVALENT.
4. PROPOSED CURBSTOPS TO BE CAMBRIDGE BRASS 202NL-H7H7 (50mm), OR APPROVED EQUIVALENT.
5. PROPOSED WATER SERVICE TO BE 50mmØ SEAMLESS COPPER TYPE 'K'

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Client
2417762 Ontario Inc.

#53 BRUCE STREET SOUTH

SITE GRADING AND SERVICING PLAN

CAPES ENGINEERING
WWW.CAPESENGINEERING.COM

Designed	Checked	Date	Drawing No.
B.H./C.C.	C.C.	24/10/18	C2
Project No.		Rev No.	
2024-094	CONTRACT NO.	1	
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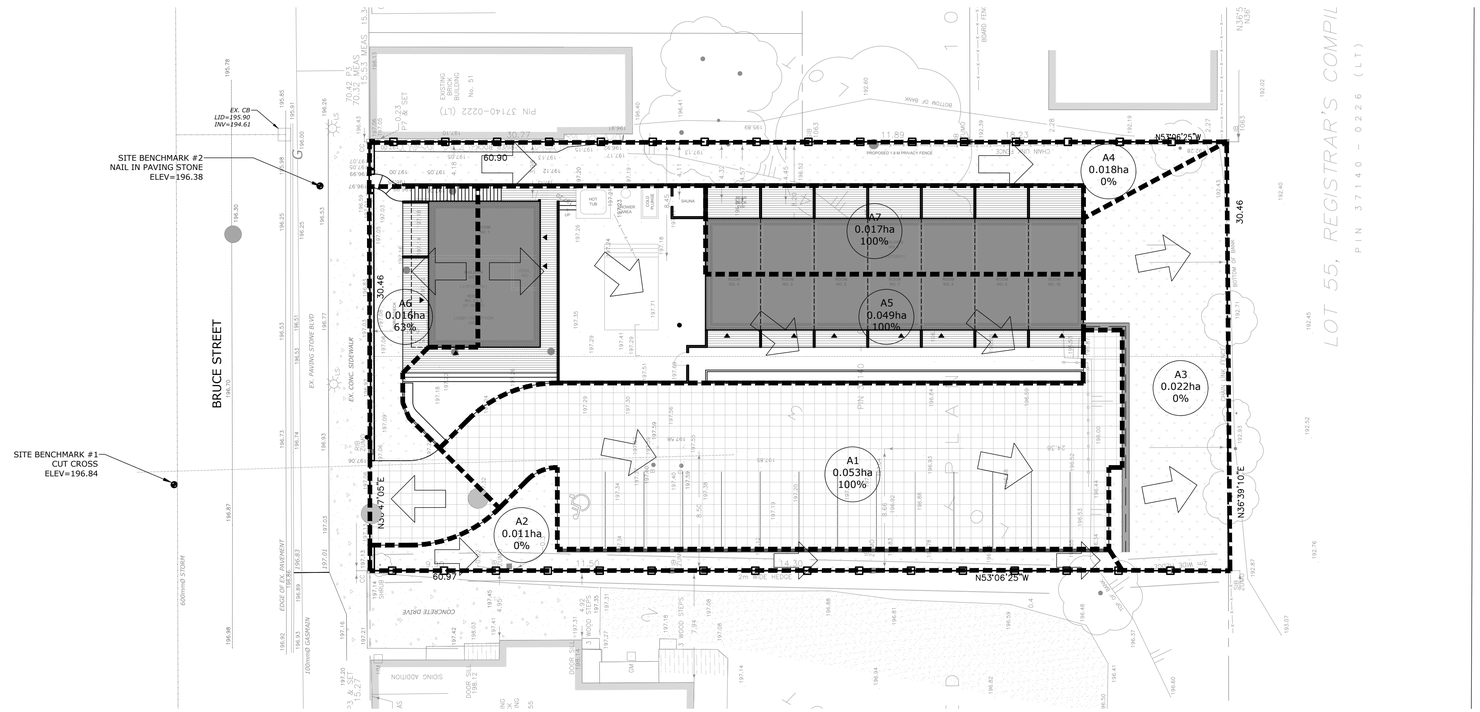

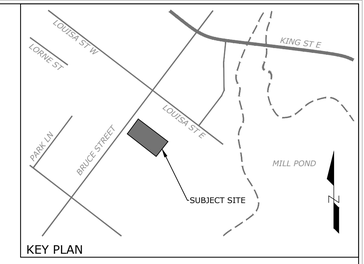

LEGEND

* 221.21	PROPOSED ELEVATION
221.21	EXISTING ELEVATION
	MAXIMUM 3:1 SLOPE UNLESS OTHERWISE NOTED
	STORM SEWER/MANHOLE
	WATERMAIN/WATER SERVICE
	HYDRANT & VALVE
	PROPOSED DRAINAGE AREA BOUNDARY
A1 / 0.82ha / 62%	DRAINAGE AREA ID / DRAINAGE AREA, HECTARES / PERCENT IMPERVIOUS AREA
	PROPOSED OVERLAND FLOW DIRECTION

Notes
1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Revision	Date
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C. CAPES
100056104
OCT. 25, 2024
PROVINCE OF ONTARIO

Client
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CAPES ENGINEERING
WWW.CAPESENGINEERING.COM

#53 BRUCE STREET SOUTH

POST DEVELOPMENT DRAINAGE PLAN

Designed	Checked	Date	Drawing No.
B.H./K.G.	K.G.	24/10/18	C3
Project No.		Rev No.	
2024-094	CONTRACT NO.	1	
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1:200			

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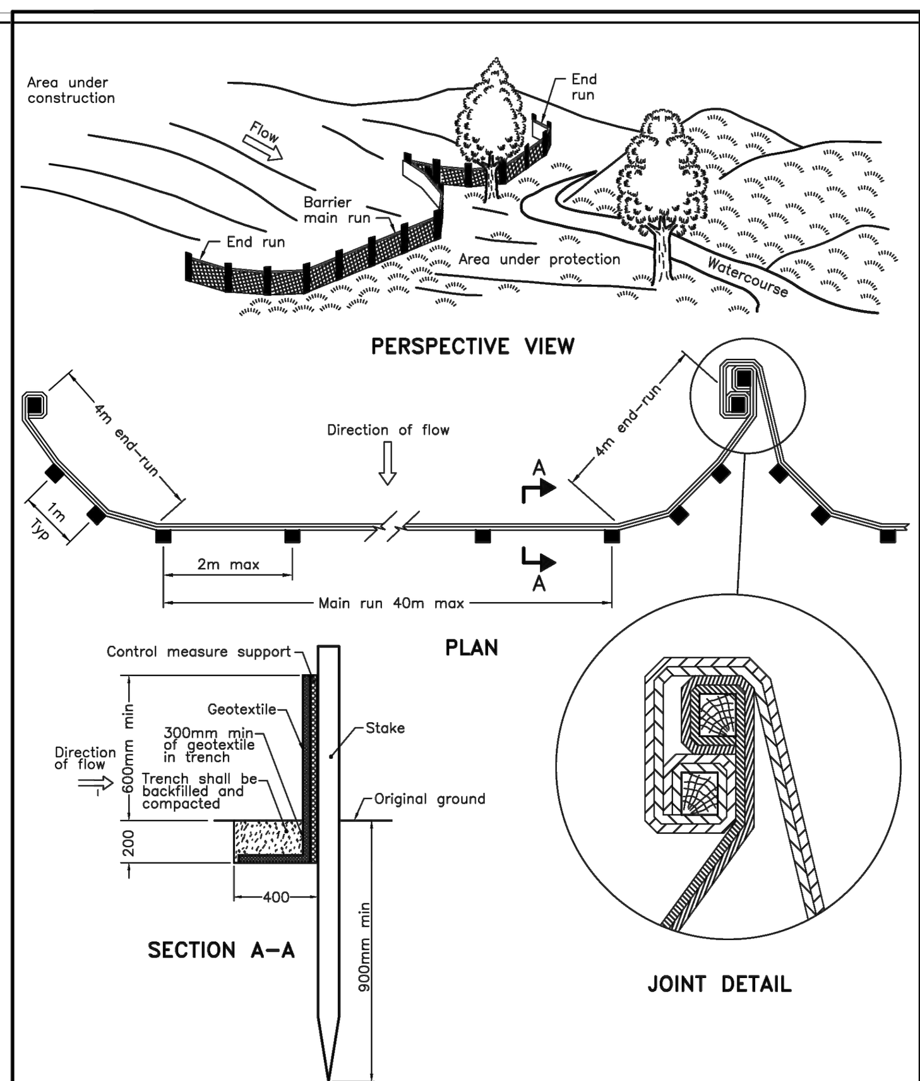
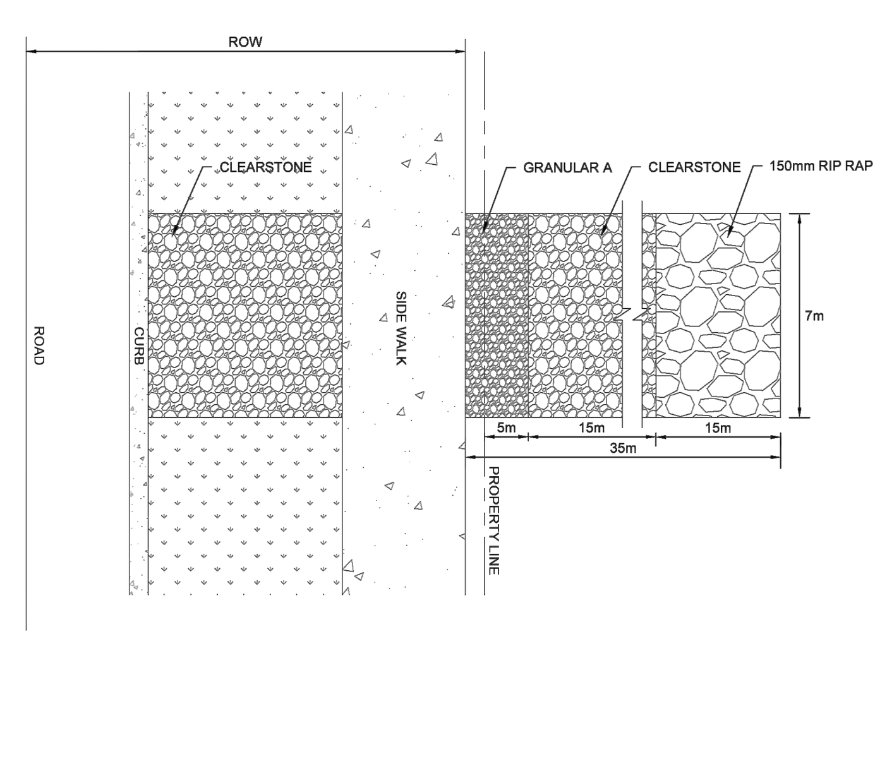


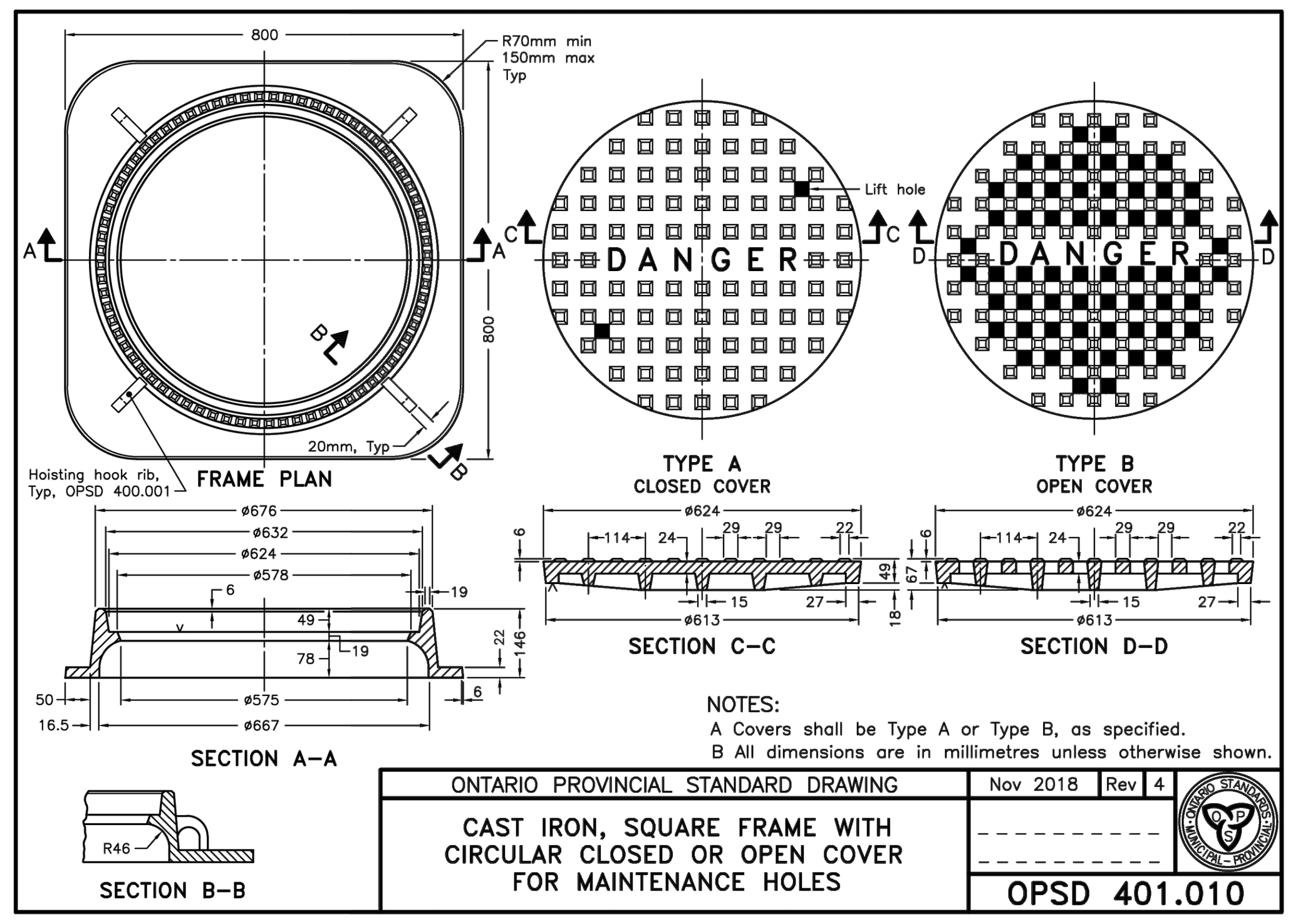
NOTE:
A All dimensions are in millimetres unless otherwise shown.

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



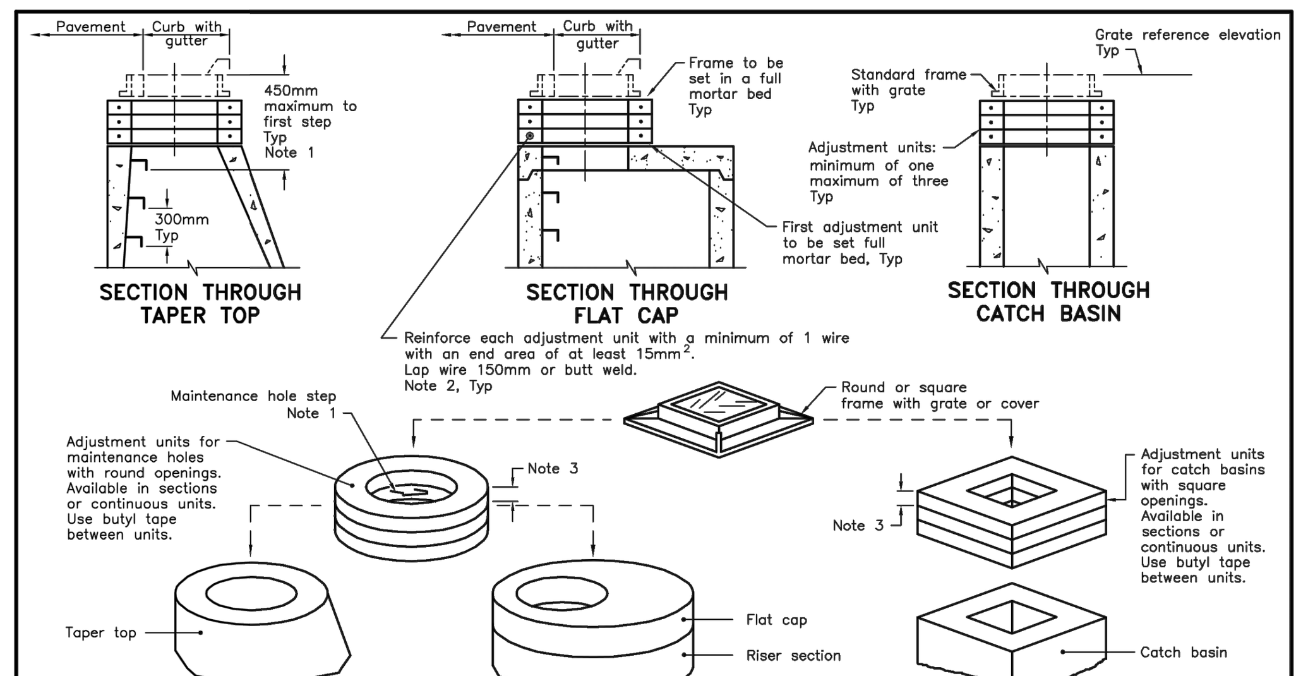
NOTES
1. MUD MATS ARE TO BE INSTALLED AND MAINTAINED AS PER SITE CONDITIONS TO ENSURE THERE IS NO MUD TRACKING ON MUNICIPAL ROADS.
2. MUD MAT BE A MINIMUM OF 35m LONG FROM THE PROPERTY LINE, A MINIMUM OF 7m WIDE, AND 0.45m IN DEPTH FILLED WITH CLEAR STONE, GRANULAR 'A' AND 150mm RIP RAP.
3. A MUD SHALL BE PROVIDED AT EVERY ENTRANCE AND START IMMEDIATELY FROM THE BACK OF CURB.
4. CONTRACTOR IS RESPONSIBLE FOR ENSURING SIDEWALK IS SAFE AND MAINTAINED IN GOOD CONDITION.
5. ANY DISTURBANCE / DAMAGE TO THE BOULEVARD IS TO BE REINSTATED TO ITS ORIGINAL CONDITION OR TO SATISFACTION OF THE TOWN.
6. CONTRACTOR SHALL REMOVE ACCUMULATED SEDIMENTS AND DEBRIS AS REQUIRED.
7. THIS DETAIL IS FOR SCHEMATIC INFORMATION ONLY. THE ACTUAL CONFIGURATION USED MUST SATISFY THE INTENT OF THIS DRAWING.

Town Of The Blue Mountains Standard Drawings		
MUD MAT DETAIL		
Date JAN 2023	Scale N.T.S.	TOTBM STD. 4.14.3



NOTES:
A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.

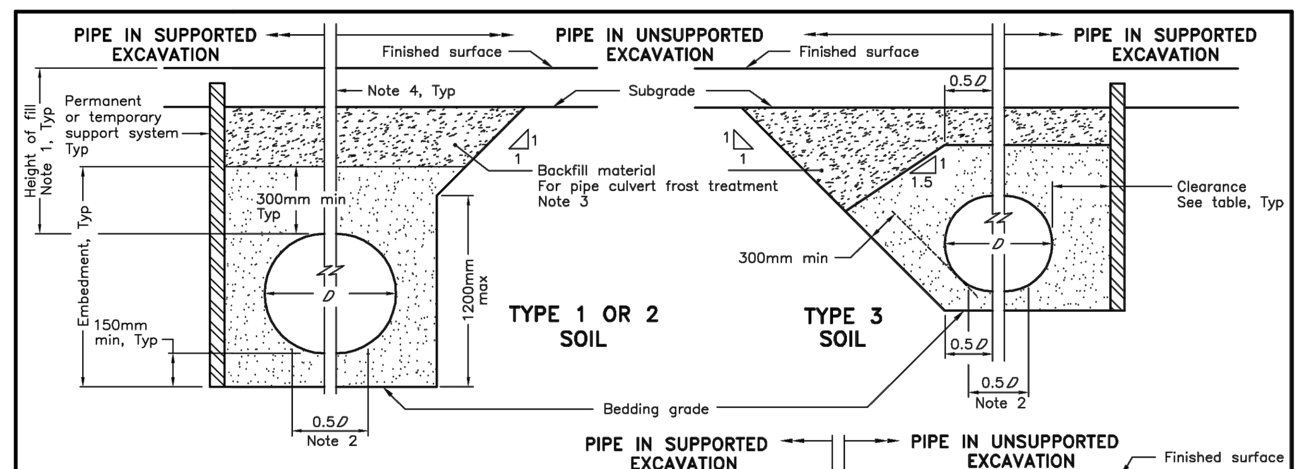
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 4
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		OPSD 401.010



NOTES:
1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		OPSD 704.010



LEGEND:
D – Inside diameter

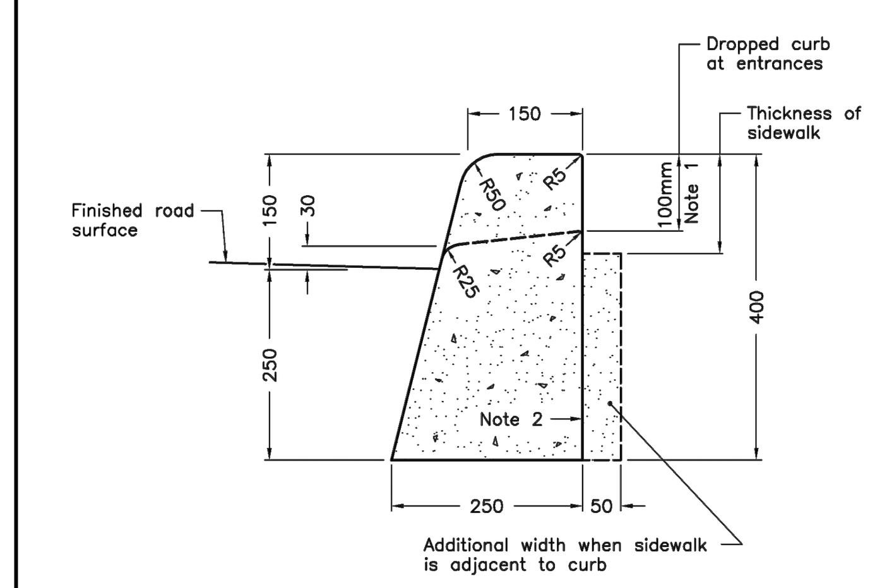
NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

CLEARANCE TABLE

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

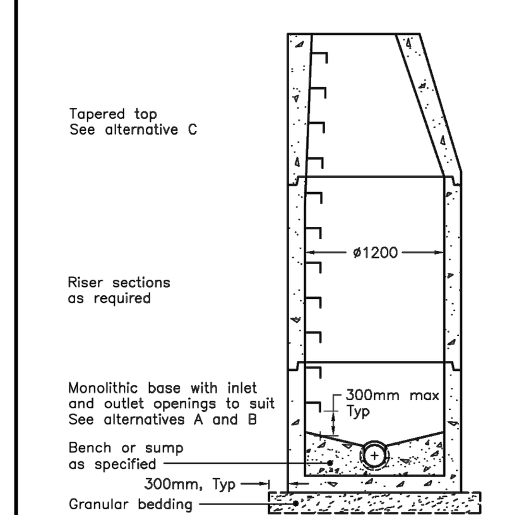
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010



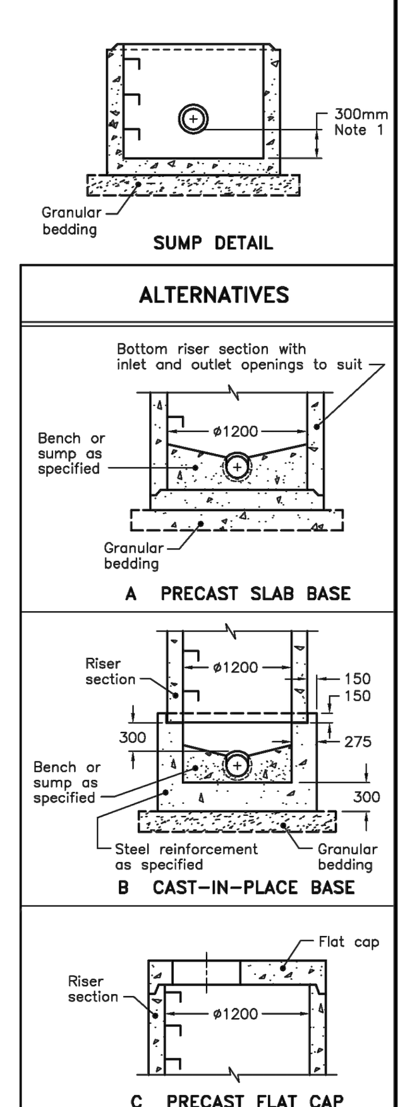
NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.

A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

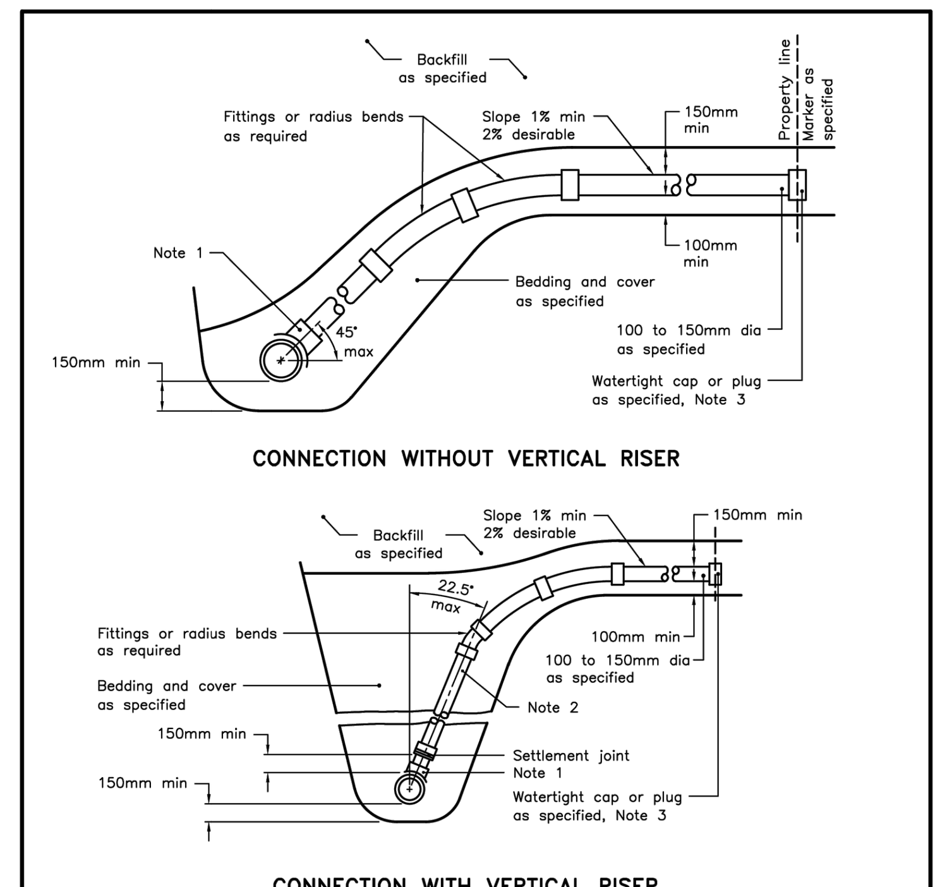
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		OPSD 600.110



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



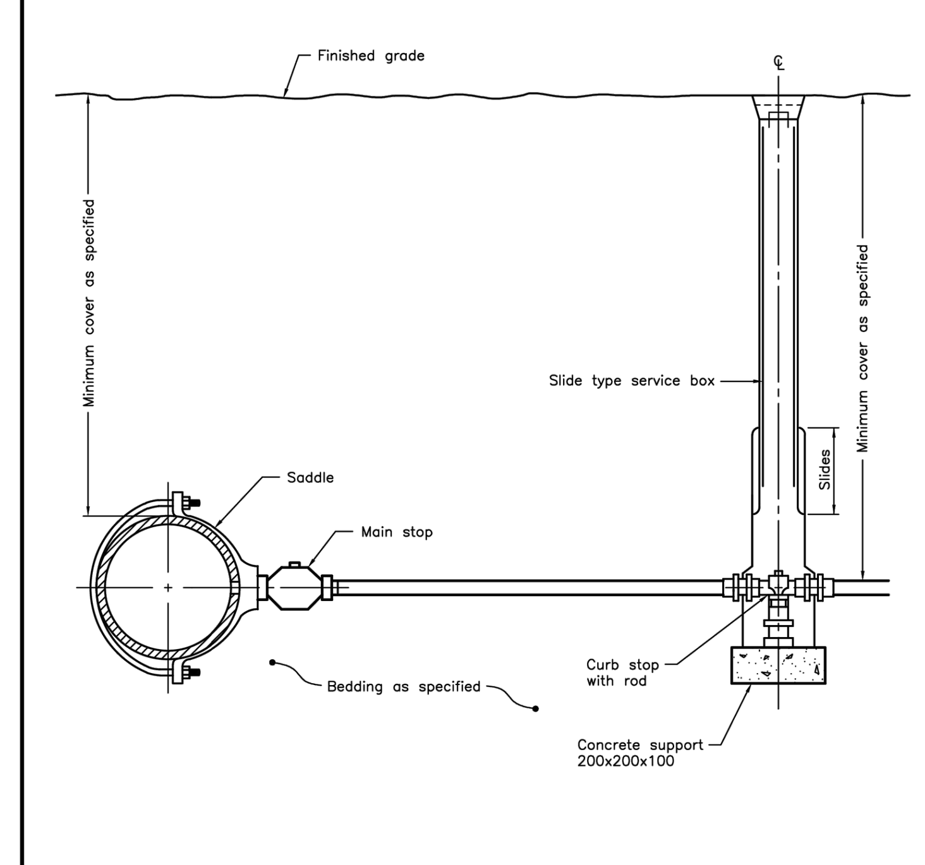
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010



NOTES:
1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap–on–saddles, or other approved saddles.
2 Vertical risers shall be as specified.
3 Cap or plug at property line shall be adequately braced.

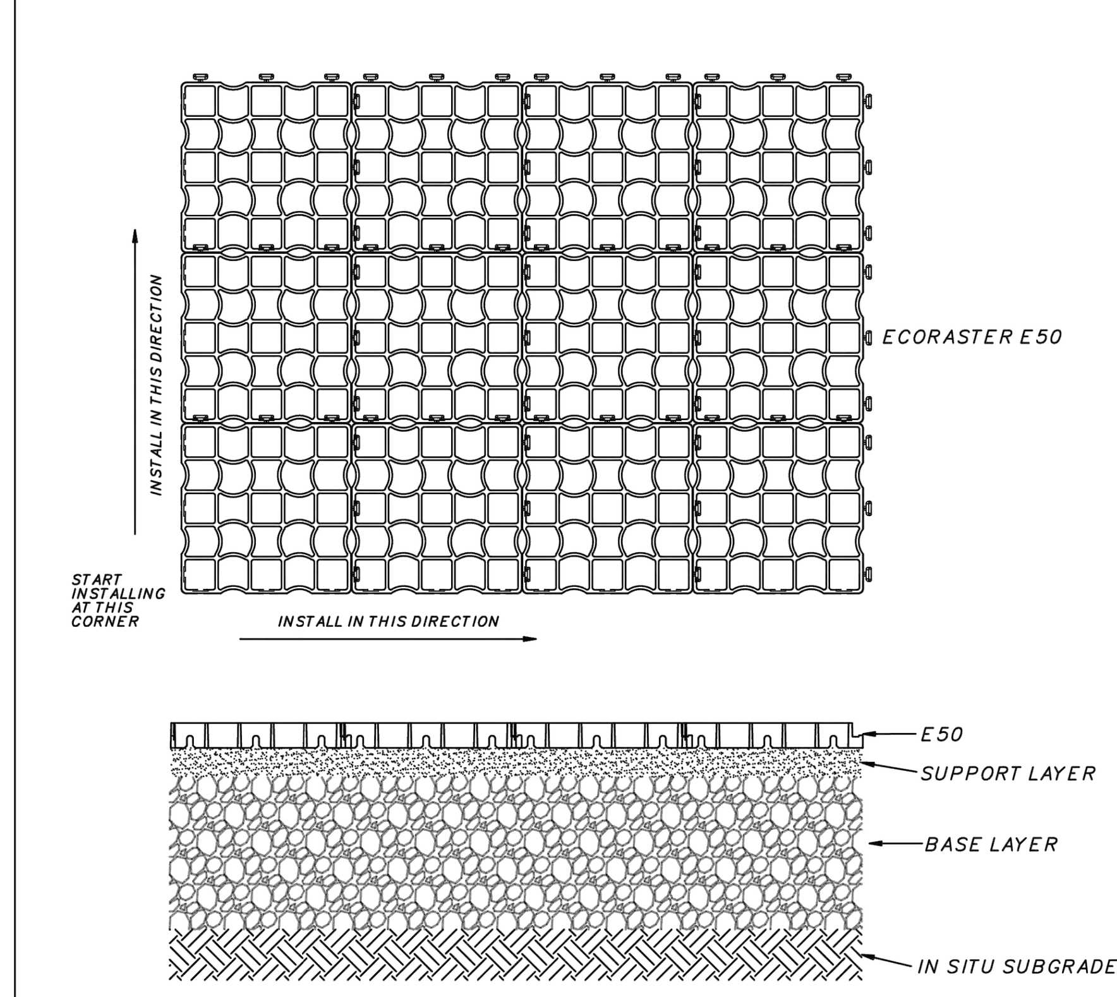
A Maintenance holes shall be used at the main sewer to connect service connections greater than 200mm.
B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
C Approved cut–in tool shall be used for field made connections.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 4
SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER		OPSD 1006.010



NOTES:
A Couplings shall not be permitted unless the service length exceeds 20m between the main stop and curb stop.
B All water services shall be installed 90° to the longitudinal axis of the watermain.
C Backfill material within 500mm of service box shall be native or imported, as specified.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
WATER SERVICE CONNECTION 32, 38, and 50mm DIAMETER SIZES		OPSD 1104.020



NOTES:

1. SUPPORT LAYER ~ 2in OF ANGULAR GRAVEL #78 OR SIMILAR. THICKNESS MAY BE REDUCED IF BASE CBR >6. BED ECORASTER INTO SUPPORT LAYER USING PLATE COMPACTOR OR SIMILAR.

2. BASE LAYER – COMPOSITION AND THICKNESS PER ENGINEER. SEE ECORASTER BEST PRACTICES MANUAL FOR TYPICAL INSTALLATIONS AND SUGGESTED PRODUCT USES AND DETAILS.

3. E50 MAY BE LEFT UNFILLED IF VEHICLE TIRE OR SURFACE LOAD PRESSURE <115psi. EDGES WHERE VEHICLES OR LOADS ENTER OR LEAVE SHOULD BE SUPPORTED BY GRAVEL FILLING OR SOLID EDGING TO MINIMIZE EDGE DEFORMATION. INSTALL ECORASTER LEVEL WITH ANY ADJACENT TRAVEL SURFACES. ANY FILLING TO BE PER ENGINEER OR PROJECT SPECIFICATIONS.

4. ALLOW FOR THERMAL EXPANSION WHEN INSTALLING IN A CONFINED AREA BY LEAVING ADEQUATE SPACE BETWEEN ECORASTER AND ADJACENT PAVEMENT OR HARD SURFACES. ECORASTER IS 100% RECYCLED LDPE WITH A WORKING TEMPERATURE RANGE OF –65 TO 150F.

5. E50 INDIVIDUAL GRIDS ARE A NOMINAL 13x 13x 2in WHEN ASSEMBLED. A 3x 4 PREASSEMBLED MULTI GRID (SHOWN) IS SHIPPED TO THE JOB SITE FOR EASE OF INSTALLATION. WEIGHT IS 1.95 lb/sf. ECORASTER IS NONTOXIC TO FISH AND WILDLIFE.

6. GRIDS SNAP TOGETHER WITH FOOT PRESSURE (NO TOOLS REQUIRED) AND CAN BE CUT ON SITE WITH SAWSALL, CIRCULAR SAW, CONCRETE SAW OR SIMILAR.

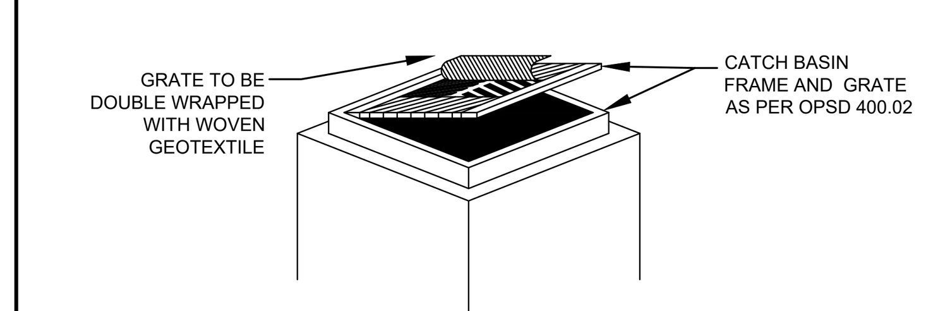
7. ECORASTER CARRIES A 20 YEAR WARRANTY WHEN INSTALLED PER THIS DRAWING. CONSULT ENGINEER FOR ANY ADDITIONAL REQUIREMENTS ON ALL PROJECTS PRIOR TO CONSTRUCTION.

8. TYPICAL GRAVEL FILLING FOR THE ECORASTER IS THE SAME MATERIAL AS THE SUPPORT LAYER. OTHER MATERIALS PER ENGINEER.

ECORASTER STRUCTURE:
- EXCORASTER GRID SURFACE TO BE FILLED WITH 19mmØ WASHED CLEAR STONE
- SUPPORT LAYER TO BE 50mm DEPTH 13mmØ ANGULAR GRAVEL
- BASE LAYER TO BE 450mm DEPTH 19mmØ WASHED CLEAR STONE

ECORASTER

ECORASTER E50 Gravel Filled		
DATE 30 JULY 2021	SCALE NTS	REV 3



NOTES:

1. TO BE USED UNDER APPROPRIATE DRAINAGE CIRCUMSTANCES, BETWEEN APRIL AND DECEMBER.
2. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING SIZE OF 0.15mm AND A MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm.
3. WOVEN GEOTEXTILE TO BE PLACED PERIODICALLY WHEN ACCUMULATED SEDIMENTS INTERFERES WITH DRAINAGE.
4. CLEAR STONE TO BE PLACE ON TOP OF WRAPPED CATCHBASIN TO PROTECT GEOTEXTILE FROM LARGE OBJECTS.

INTERNAL CATCHBASIN PROTECTION DETAIL

NTS

2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. CAPES Engineering Ltd. accepts no responsibility for interpretation of third party information, contractor to verify all third party information prior to construction.
5. This is not a plan of survey. Any and all representation of property boundaries are approximate only.

No	Revision	Date
1	ISSUED FOR FIRST SUBMISSION	24/10/23

NOTES:

BOUNDARY SURVEY INFORMATION:
EXTRAPOLATED FROM SURVEYOR'S REAL PROPERTY REPORT WITH TOPOGRAPHICAL DATA, ALL OF LOTS 3 & 4, REGISTERED PLAN 103, GEOGRAPHIC TOWNSHIP OF THORNBURY, TOWN OF BLUE MOUNTAINS, COUNTY OF GREY, PREPARED BY VAN HARTEN SURVEYING INC., 2021

TOPOGRAPHICAL INFORMATION:
TOPOGRAPHICAL SURVEY COMPLETED BY VAN HARTEN SURVEYING INC., 2021.

ELEVATIONS ARE BASE DON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE BENCHMARKS:
1 - CUT CROSS ON NORTH SIDE OF BRUCE ST, NORTHWEST OF SOUTHWEST CORNER OF SUBJECT PROPERTY: ELEV = 196.84m

2 - NAIL IN PAVING STONE WEST OF NORTHWEST CORNER OF SUBJECT PROPERTY: ELEV = 196.38m

LICENSED PROFESSIONAL ENGINEER
C. CAPES
100056104
OCT. 22, 2024
PROVINCE OF ONTARIO

Client
2417762 Ontario Inc.

CAPES ENGINEERING

WWW.CAPESENGINEERING.COM

#53 BRUCE STREET SOUTH

STANDARD DETAILS

Designed	Checked	Date	Drawing No.
B.H./K.G.	K.G.	24/10/18	C4
Project No. 2024-094	CONTRACT NO.	Rev No. 1	
Scale 1:200	0 4.0 8.0 12.0m		

File: C:\Users\Branden\Capes Engineering Dropbox\Projects\2024\2024-094 53 B

Appendices

Appendix A – Legal & Site Plan
Appendix B - As Constructed Drawings
Appendix C – Existing Condition Stormwater
Appendix D – Water Demand
Appendix E – Post-Development Stormwater

Appendix A – Legal & Site Plan

LEGEND:

- SIB DENOTES SURVEY MONUMENT SET
- IB DENOTES SURVEY MONUMENT FOUND
- SIB DENOTES .025 x .025 x 1.20 STANDARD IRON BAR
- IB DENOTES .015 x .015 x 0.60 IRON BAR
- 375 DENOTES BLACK, SHOEMAKER et. al., O.L.S.'s
- VH DENOTES VAN HARTEN SURVEYING INC., O.L.S.'s
- ZUMO DENOTES ZUBEK, EMO, PATTEN & THOMSEN LTD.
- P1 DENOTES REGISTERED PLAN 103
- P2 DENOTES DEPOSITED PLAN 16R-8467 BY (ZUMO)
- P3 DENOTES SURVEY BY (ZUMO), JOB No. 76-103-3, MAY 11, 1992
- P4 DENOTES SURVEY BY (ZUMO), JOB No. 76-103-8, SEPT. 13, 2013
- P5 DENOTES DRAFT PLAN OF SURVEY BY (ZUMO), JOB No. 76-103-4
- P6 DENOTES SURVEY BY (R. W. McKAY), SEPT. 22, 1975
- P7 DENOTES SURVEY BY (R. W. McKAY), APRIL 13, 1966

EXISTING ELEVATION × 206.55

TOP OF FOUNDATION T/F=206.33

FINISHED FLOOR ELEVATION F/F=206.33

UTILITY POLE UP

HYDRO POLE HP

HP WITH LIGHT HPL

LIGHT STANDARD LS

HYDRO METER HM

FIRE HYDRANT FH

WATER VALVE WV

CATCHBASIN CB

MANHOLE MH

DITCH/SWALE

OVERHEAD HYDRO OH

OVERHEAD BELL TEL

UNDERGROUND BELL UTEL

UNDERGROUND FIBRE FIBRE

GAS LINE GAS

WATER LINE W

SANITARY SEWER SAN

STORM SEWER STM

FENCELINE X

TOP OF BANK

DECIDUOUS TREE

CONIFEROUS TREE

BELL PEDESTAL BELL

TV PEDESTAL CATV

HANDWELL HW

GAS METER GM

GRAVEL

CONCRETE

WATER

ASPHALT

BUILDING

PAVESTONE

BEARING AND COORDINATE NOTE:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17, NAD 83 (CSRS-2010) ADJUSTMENT.
2. DISTANCES SHOWN ON THIS PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 0.99959803.
3. COORDINATES ON THIS PLAN ARE UTM, ZONE 17, NAD83 (CSRS-2010) ADJUSTMENT AND ARE BASED ON GPS OBSERVATIONS FROM A NETWORK OF PERMANENT GPS REFERENCE STATIONS.

BEARING COMPARISONS:

FOR THE PURPOSES OF BEARING COMPARISONS, PREVIOUS SURVEYS HAVE BEEN ROTATED TO UTM BEARINGS BY THE ANGLES SHOWN BELOW.

PLANS	ROTATION FOR NORTHEAST BEARINGS
P2, P3, P4, P5, P6 & P7	−0°15'25"

SURVEY INFORMATION:

BENCHMARK REFERENCE:

ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HT v2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE BENCHMARK:

1. CUT CROSS ON NORTH SIDE OF BRUCE STREET NORTHWEST OF SOUTHWEST CORNER OF SUBJECT PROPERTY HAVING AN ELEVATION OF 196.84 METRES.
2. NAIL IN PAVING STONE WEST OF NORTHWEST CORNER OF SUBJECT PROPERTY HAVING AN ELEVATION OF 196.38 METRES.

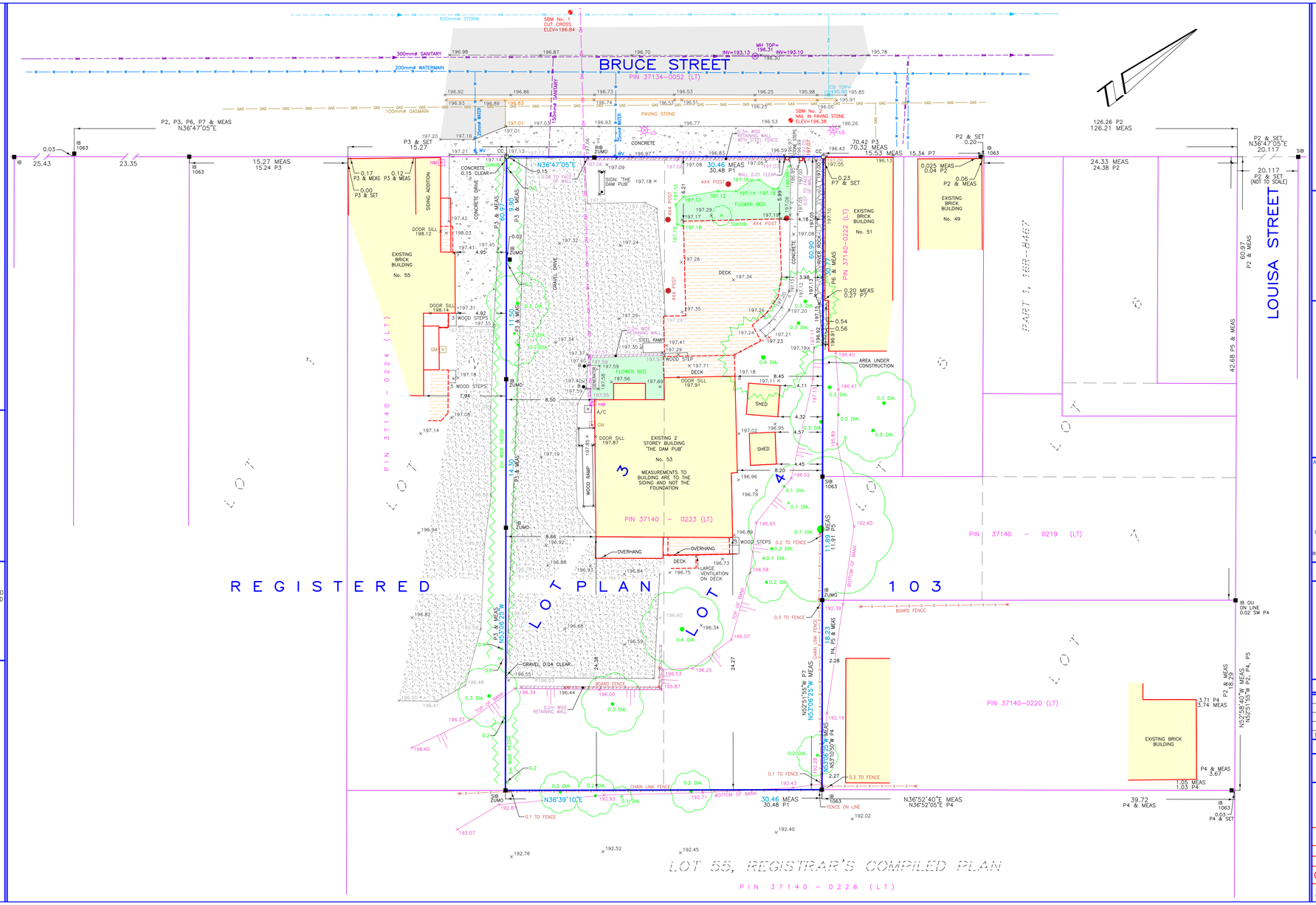
UNDERGROUND SERVICES:

STORM : BASED ON LOCATION CATCH BASINS, MANHOLES AND TOWN OF THE BLUE MOUNTAINS SERVICE DRAWING No. 101212-RC5-RD.

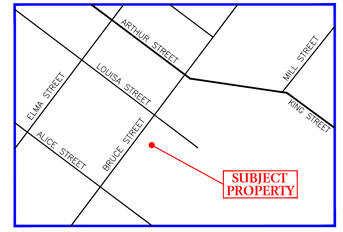
SANITARY : BASED ON LOCATION OF MANHOLES AND TOWN OF THE BLUE MOUNTAINS SERVICE DRAWING No. 101212-RC5-RD.

WATER : BASED ON LOCATION OF HYDRANTS, VALVES AND TOWN OF THE BLUE MOUNTAINS SERVICE DRAWING No. 101212-RC5-RD.

GAS : BASED ON TOWN OF THE BLUE MOUNTAINS SERVICE DRAWING No. 101212-RC5-RD.



KEYMAP:



SUMMARY REPORT:

CLIENT:
THIS PLAN WAS PREPARED FOR **JOHN-PAUL ADAMO** AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

NOTE:
THIS SURVEY PLAN IS TO BE READ IN CONJUNCTION WITH A WRITTEN SURVEY REPORT DATED OCTOBER 1, 2021.

PROPERTY DESCRIPTION:

- PIN 37140-0223 (LT)
- ALL OF LOTS 3 & 4, REGISTERED PLAN 103
- ADDRESS: 53 BRUCE STREET SOUTH
- GEOGRAPHIC TOWN OF THORNBURY, TOWN OF THE BLUE MOUNTAINS

EASEMENTS

- NONE FOUND IN REGISTRY OFFICE.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2173564

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR in accordance with Regulation 1026, Section 29(3).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THIS TOPOGRAPHIC SURVEY WAS COMPLETED ON THE 11th DAY OF AUGUST, 2021.

DATE: OCTOBER 1, 2021

JEFFREY E. BUISMAN
ONTARIO LAND SURVEYOR

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

SURVEYOR'S REAL PROPERTY REPORT WITH TOPOGRAPHIC DATA

ALL OF LOTS 3 & 4
REGISTERED PLAN 103
GEOGRAPHIC TOWN OF THORNBURY
TOWN OF THE BLUE MOUNTAINS
COUNTY OF GREY

DRAWING REVISION SCHEDULE

NO.	REVISION	DATE
2	ADDED SERVICING	OCT. 8, 2021
1	COMPLETED PLAN	OCT. 1, 2021
0	INITIAL SUBMISSION – DRAFT	SEPT. 27, 2021

PROJECT No. 30130-21

DRAWING SCALE 1 : 200

0 2.5 5 7.5 10 metres

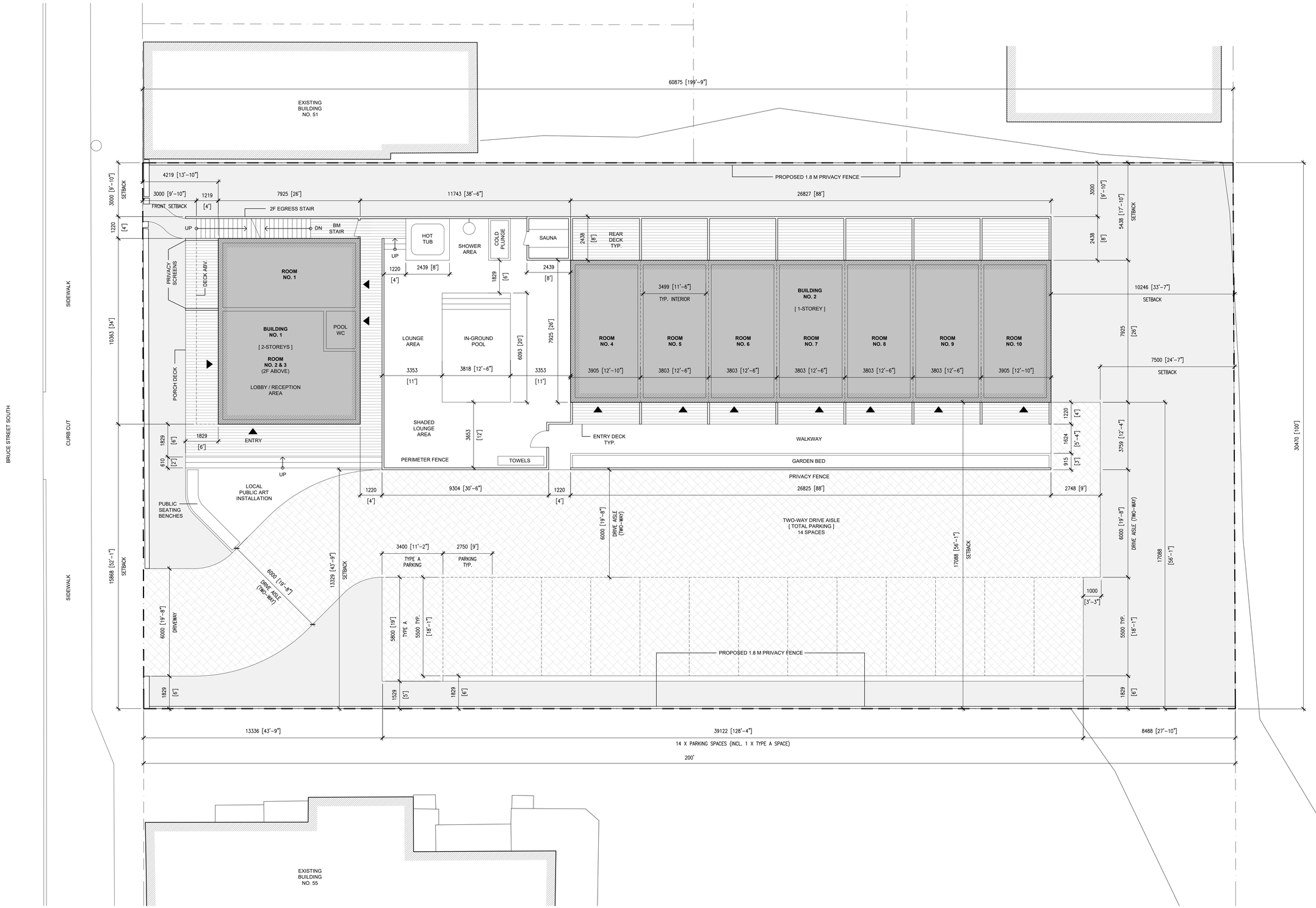
Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

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

www.vanharten.com info@vanharten.com

DRAWN BY: S.A.P. CHECKED BY: J.E.B.

Oct 08,2021-10:12am
G:\THORNBURY\103\ACAD\BPT LOT 3,4 (ADAMO) UTM-2010.dwg



PROPOSED SITE PLAN
SCALE: 1/8" = 1'-0"

EDWARD LEE ARCHITECT

6 ARGYLE STREET
TORONTO ONTARIO M6J 1N4
E: info@edwardlee.ca T: 647.894.7172

NO.	ISSUED / REVISED	DATE
1	PRELIMINARY	24.09.17
2	COORDINATION	24.10.10

53 BRUCE STREET SOUTH
THORNBURY, ONTARIO

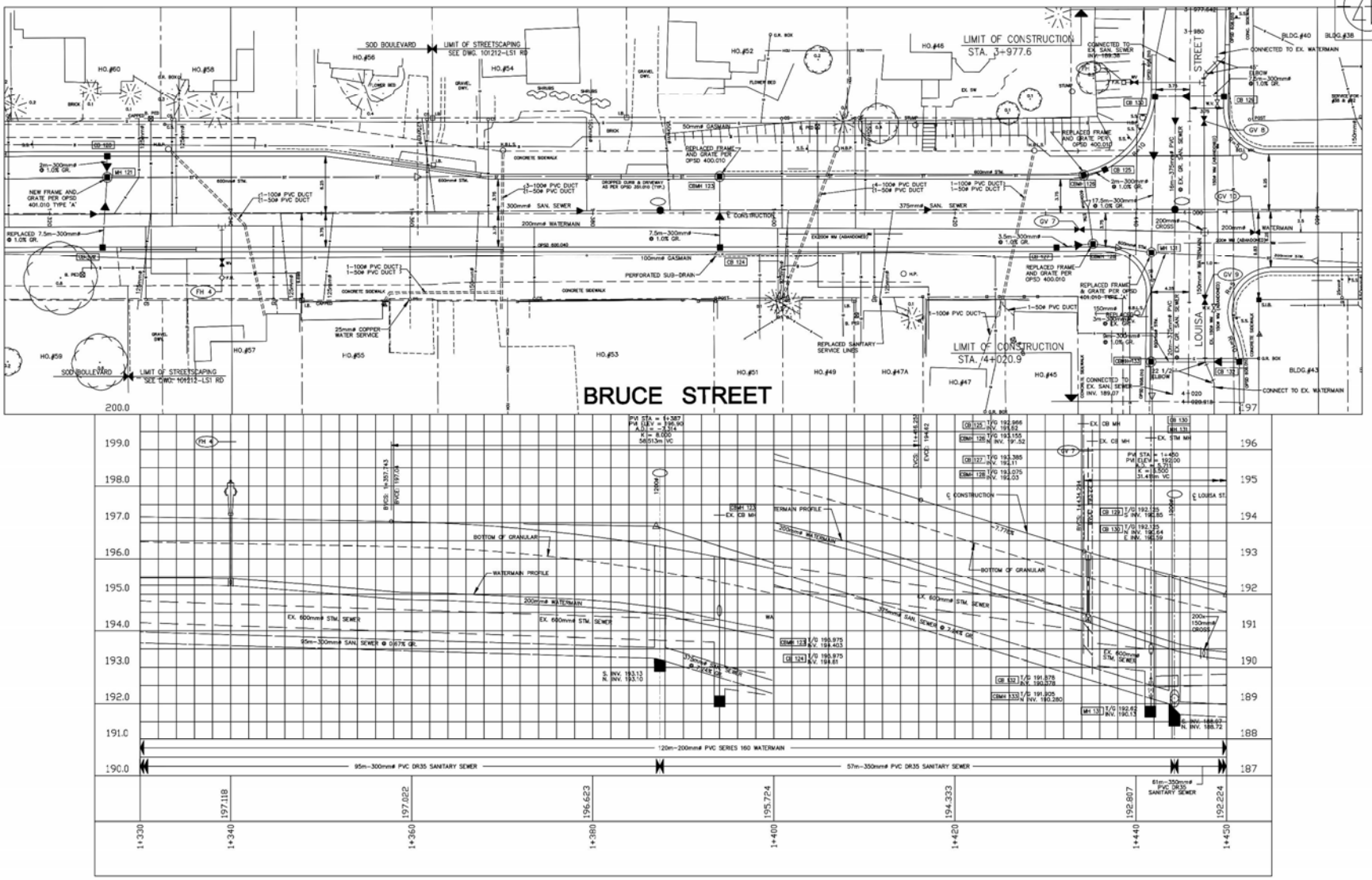
SCALE: 1/8" = 1'-0"
DRAWN BY: EL
DATE: 2024.07.04

PROPOSED SITE PLAN

** SPA COORDINATION*

A1.0

Appendix B – As Constructed Drawings



RECORD DRAWING		
COMPILED BY: N.A.M.	DATE: MAR. 2004	
CHECKED BY: N.M.	DATE: MAY 2004	
DRAWN BY: E.K.	DATE: MAY 2004	
CHECKED BY: R.E.D.	DATE: MAY 2004	

NO.	REVISIONS	DATE	INITIAL
	REVISED AS RECORD DRAWING	MAY 2004	R.E.D.

RECORD DRAWING
NOTICE TO USERS

This Record Drawing may include information provided by others. Ainley & Associates Limited believes this information to be reliable but has not verified its accuracy and/or completeness and, accordingly, shall not be responsible for any errors or omissions which may result from its incorporation herein.

SCALE:	HORZ. 1=250 VERT. 1=50
DESIGN:	N.M./T.N.
DRAWN:	E.K.
CHECKED:	R.E.D.
DATE:	MAR. 2003

TOWN OF THE BLUE MOUNTAINS
(THORNBURY)
BRUCE STREET RECONSTRUCTION

PLAN & PROFILE
STA. 1+330 TO STA. 1+450

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. | DWG. 1012'2-RC5 RD

Appendix C – Existing Condition Stormwater

Active coordinate

44° 33' 15" N, 80° 26' 15" W (44.554167,-80.437500)

Retrieved: Fri, 27 Oct 2023 13:05:24 GMT

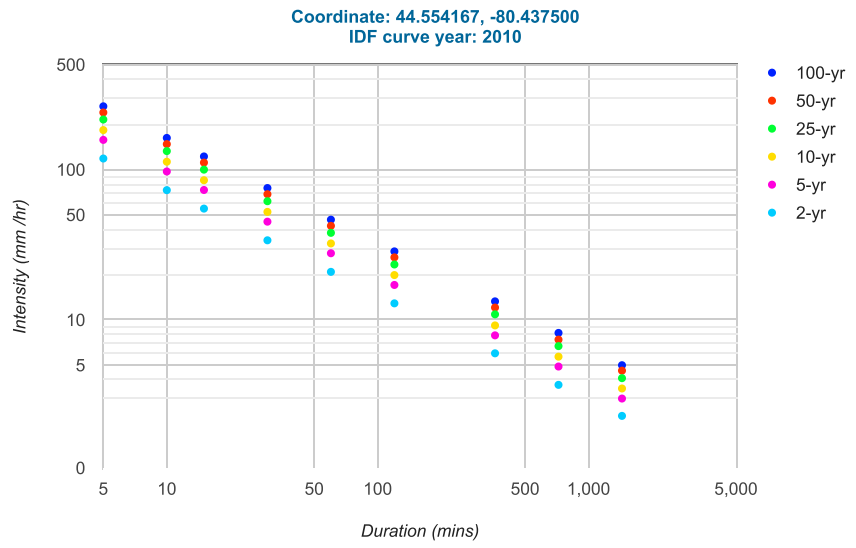
Location summary

These are the locations in the selection.

IDF Curve: 44° 33' 15" N, 80° 26' 15" W (44.554167,-80.437500)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 33' 15" N, 80° 26' 15" W (44.554167,-80.437500)

Retrieved: Fri, 27 Oct 2023 13:05:24 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	20.9	27.8	32.3	38.0	42.3	46.5
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

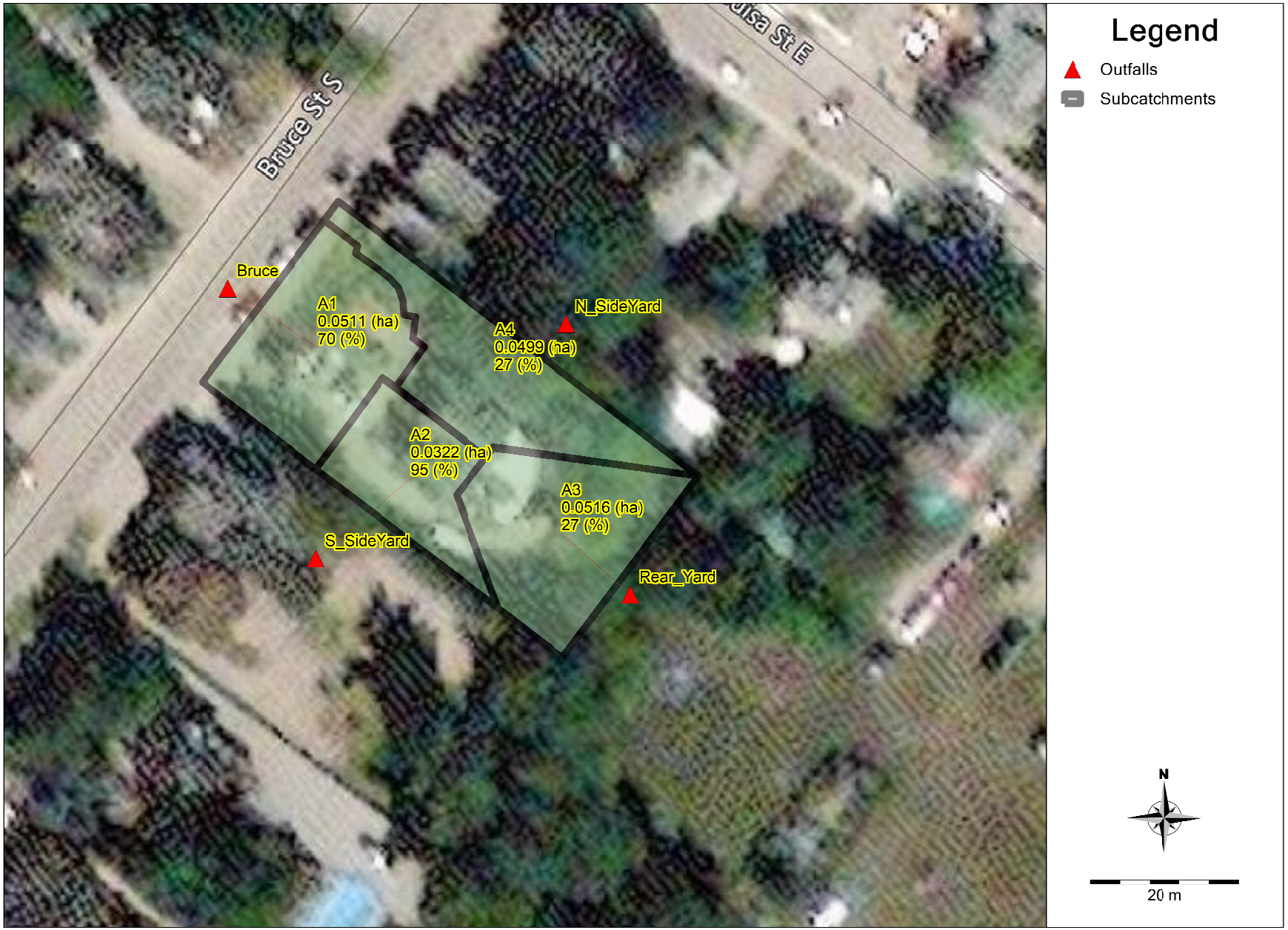
Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	118.7	73.1	55.1	33.9	20.9	12.9	6.0	3.7	2.3
5-yr	157.9	97.3	73.3	45.1	27.8	17.1	7.9	4.9	3.0
10-yr	183.5	113.0	85.1	52.4	32.3	19.9	9.2	5.7	3.5
25-yr	215.8	133.0	100.1	61.7	38.0	23.4	10.9	6.7	4.1
50-yr	240.3	148.0	111.5	68.7	42.3	26.1	12.1	7.4	4.6
100-yr	264.1	162.7	122.5	75.5	46.5	28.6	13.3	8.2	5.0

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	9.9	12.2	13.8	17.0	20.9	25.7	35.8	44.2	54.4
5-yr	13.2	16.2	18.3	22.6	27.8	34.2	47.7	58.7	72.4
10-yr	15.3	18.8	21.3	26.2	32.3	39.8	55.4	68.2	84.1
25-yr	18.0	22.2	25.0	30.8	38.0	46.8	65.2	80.3	98.9
50-yr	20.0	24.7	27.9	34.3	42.3	52.1	72.5	89.4	110.1
100-yr	22.0	27.1	30.6	37.7	46.5	57.3	79.7	98.2	121.0

Existing Condition PCSWMM Subcatchment View



Existing Condition 4hr 100yr Chicago Storm - PCSWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
-------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 4
Number of nodes ........... 4
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
25mm                 25mm                         INTENSITY    5 min.
Chicago_4h_100Yr     Chicago_4h_100Yr             INTENSITY    5 min.
Chicago_4h_10Yr      Chicago_4h_10Yr              INTENSITY    5 min.
Chicago_4h_25Yr      Chicago_4h_25Yr              INTENSITY    5 min.
Chicago_4h_2Yr       Chicago_4h_2Yr               INTENSITY    5 min.
Chicago_4h_50Yr      Chicago_4h_50Yr              INTENSITY    5 min.
Chicago_4h_5Yr       Chicago_4h_5Yr               INTENSITY    5 min.
SCS_Type_II_110.1mm_50Yr SCS_Type_II_110.1mm_50Yr       INTENSITY    6 min.
SCS_Type_II_121.0mm_100Yr SCS_Type_II_121.0mm_100Yr      INTENSITY    6 min.
SCS_Type_II_54.4mm_2Yr SCS_Type_II_54.4mm_2Yr         INTENSITY    6 min.
SCS_Type_II_72.4mm_5Yr SCS_Type_II_72.4mm_5Yr         INTENSITY    6 min.
SCS_Type_II_84.1mm_10Yr SCS_Type_II_84.1mm_10Yr        INTENSITY    6 min.
SCS_Type_II_98.9mm_25Yr SCS_Type_II_98.9mm_25Yr        INTENSITY    6 min.
Timmins_Storm_(0-25) Timmins_Storm_(0-25)           INTENSITY   60 min.


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

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.05	28.39	70.00	2.0000	Chicago_4h_100Yr	Bruce
A2	0.03	40.25	95.00	1.2000	Chicago_4h_100Yr	S_SideYard
A3	0.05	21.50	27.00	17.0000	Chicago_4h_100Yr	Rear_Yard
A4	0.05	41.58	27.00	37.0000	Chicago_4h_100Yr	N_SideYard

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
Bruce	OUTFALL	0.00	0.00	0.0	
N_SideYard	OUTFALL	0.00	0.00	0.0	
Rear_Yard	OUTFALL	0.00	0.00	0.0	
S_SideYard	OUTFALL	0.00	0.00	0.0	

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Surcharge Method ..... EXTRAN
Starting Date 09/04/2024 00:00:00
Ending Date 09/06/2024 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.015	79.241
Evaporation Loss	0.000	0.000
Infiltration Loss	0.010	54.263
Surface Runoff	0.004	24.087
Final Storage	0.000	1.015
Continuity Error (%)	-0.155	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.004	0.045
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.004	0.045
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
A1	79.24	0.00	0.00	23.77	54.18	0.00	54.18	0.03	0.03	0.684
A2	79.24	0.00	0.00	25.33	73.52	52.25	52.25	0.02	0.02	0.659
A3	79.24	0.00	0.00	78.78	20.93	0.00	0.00	0.00	0.00	0.000
A4	79.24	0.00	0.00	78.80	20.96	0.00	0.00	0.00	0.00	0.000

Analysis begun on: Wed Oct 23 15:49:02 2024
Analysis ended on: Wed Oct 23 15:49:03 2024
Total elapsed time: 00:00:01

Appendix D – Water Demand

CAPES ENGINEERING

Domestic & Fire Protection Water Supply/Storage

Project: **53 Bruce St. S**
Town of the Blue Mountains

Prepared by:	C. Capes
Checked by:	C. Capes
Project No:	2024-094
Date:	October 23, 2024

Domestic Flow Calculations

Commercial & Industrial Building

Number of Water Fixture Units = 95.4
Water Demand = 2.27 L/s From Modified Hunter Curve Type B "Motels" with less than 400 FU

Total Domestic Peak Demand = 2.27 L/s

Fire Flow Calculations

Based on Fire Underwriters Survey

1 $F = 220C\sqrt{A}$

Where F = Required fire flow in Lpm
C = Construction type coefficient

=	1.5	Type V wood frame (essentially all combustible)
=	0.8	Type IV-A Mass Timber Construction
=	0.9	Type IV-B Mass Timber Construction
=	1.0	Type IV-C Mass Timber Construction
	1.5	Type IV-D Mass Timber Construction
	1.0	ordinary construction (brick or other masonry walls, combustible floor and interior)
	0.8	non-combustible (unprotected metal structure components, masonry or metal walls)
	0.6	fire-resistive construction (fully protected frame, floors, roof)

A = Total floor area in sq.m. excluding basements, includes garage per building

Floor	Area (sq.m)	%
Bldg. A	82.8	100%
Bldg. B	222.6	100%
Total	**305**	

A = for fire resistive bldgs., consider the 2 largest adjoining floors + 50% of each of any floors immediately above them when the vertical openings are not adequately protected.

or

A = for fire resistive bldgs., consider the area of largest adjoining floor + 25% of each of the 2 floors immediately adjoining floors when the vertical openings and exterior vertical communications are protected for 1 hr rating.

Total Applicable Area = 305

F = 3,845 L/min (adjust formula accordingly) 4000 L/min (Round to nearest 1000 L/min)

2 Occupancy Reduction

-25%	reduction for non-combustible
-15%	reduction for limited combustible
0%	reduction for combustible
15%	increase for free burning
25%	increase for rapid burning

Reduction = 0 L/min (0% of F1)
F = 4000 L/min

3 Sprinkler Reduction

30% Reduction for NFPA Sprinkler System (refer to FUS manual, 2020)

Reduction = 0 L/min (0% of F2)
F = 4000 L/min

4 Separation Charge

	Building A	Building B
North Side	20%	20%
East Side	15%	0%
South Side	10%	15%
West Side	0%	15%
Total	45%	50%

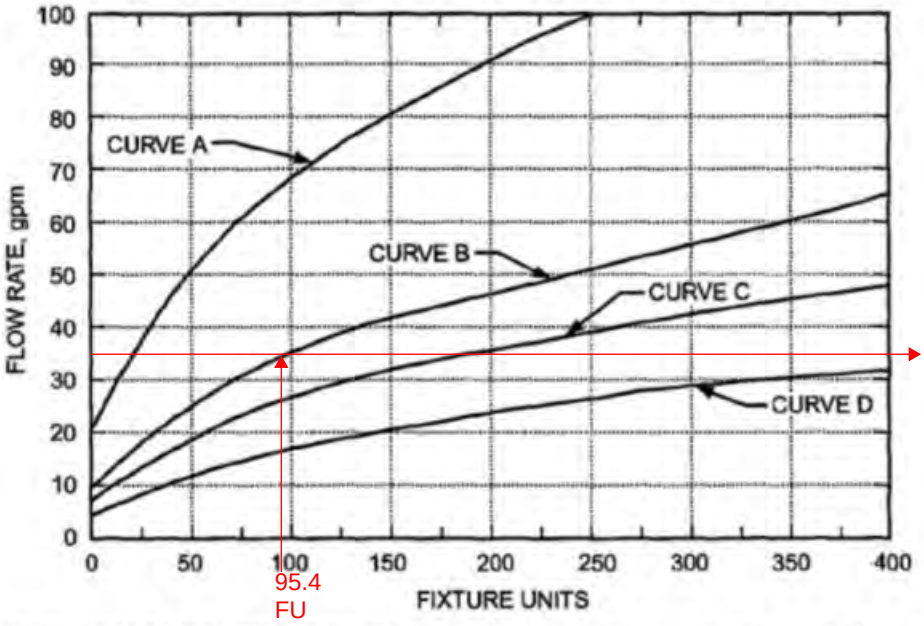
MaxSeparation Charge = 50% 2000 L/min (50% of F3)

Separation	Charge
0 to 3m	25%
3.1 to 10m	20%
10.1 to 20m	15%
20.1 to 30m	10%
>30m	0%

Fire Flow = 1 - 2 - 3 + 4
= 6000 L/min
= 100.00 L/s

Domestic Demand + Fire Flow = 102.27 L/s 6136 l/min

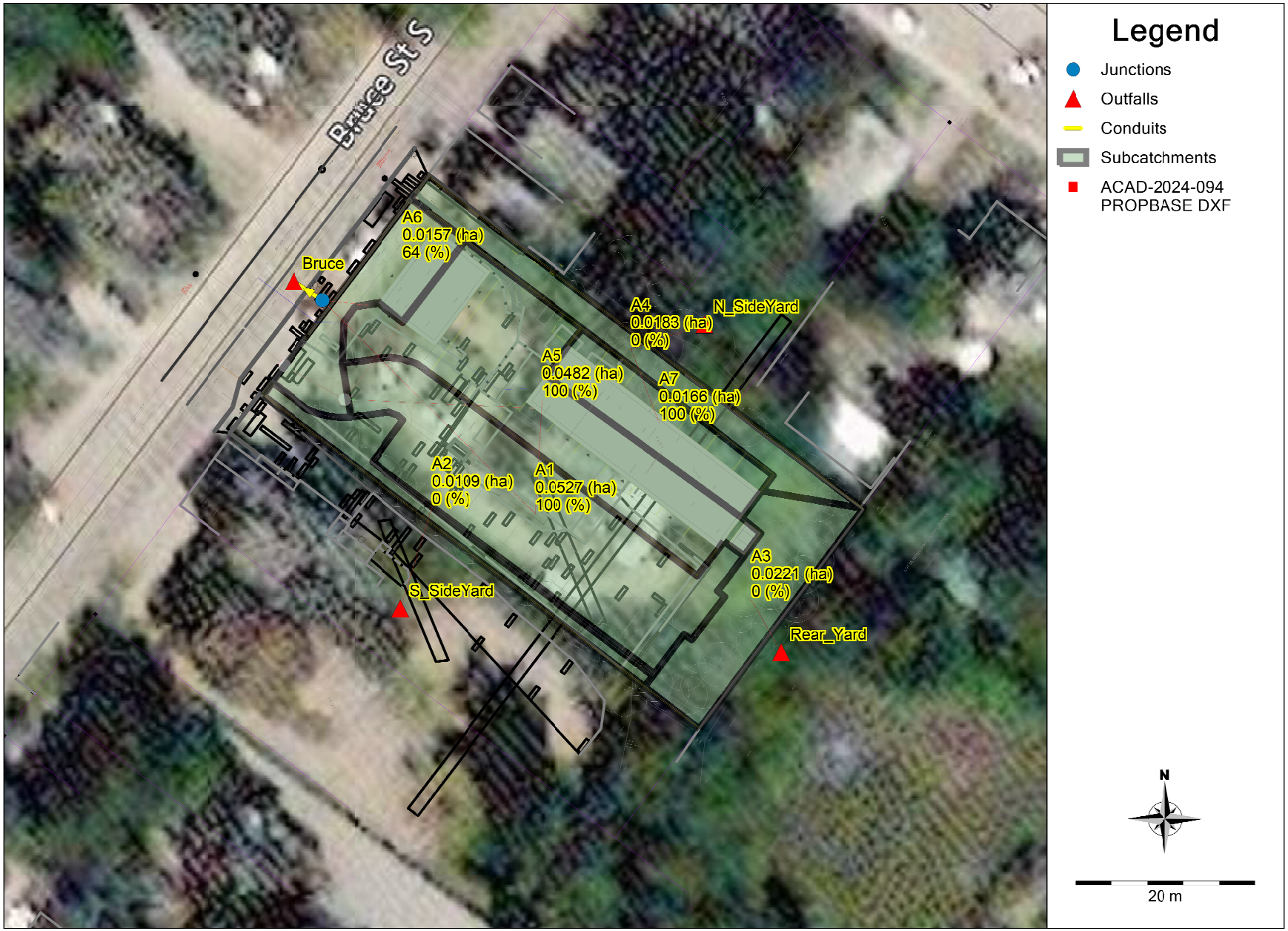
Min Value Under FUS = 2,000 L/min
Max Value Under FUS = 45,000 L/min



MODIFIED HUNTER'S CURVE METHOD Curve A – Restaurants Curve B – Hospitals, nursing homes, nurses' residences, dormitories, hotels and motels Curve C – Apartment buildings Curve D – Office buildings, elementary and high schools Conversion factor: L/s = gpm x 0.0631

Appendix E – Post Development Stormwater

Post Development PCSWMM Subcatchment View



Pose Development 25 mm Chicago Storm - Quality Control Event - PCSWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
-------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 7
Number of nodes ........... 5
Number of links ........... 1
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
25mm                 25mm                         INTENSITY    5 min.
Chicago_4h_100Yr     Chicago_4h_100Yr             INTENSITY    5 min.
Chicago_4h_10Yr      Chicago_4h_10Yr              INTENSITY    5 min.
Chicago_4h_25Yr      Chicago_4h_25Yr              INTENSITY    5 min.
Chicago_4h_2Yr       Chicago_4h_2Yr               INTENSITY    5 min.
Chicago_4h_50Yr      Chicago_4h_50Yr              INTENSITY    5 min.
Chicago_4h_5Yr       Chicago_4h_5Yr               INTENSITY    5 min.
SCS_Type_II_110.1mm_50Yr SCS_Type_II_110.1mm_50Yr       INTENSITY    6 min.
SCS_Type_II_121.0mm_100Yr SCS_Type_II_121.0mm_100Yr      INTENSITY    6 min.
SCS_Type_II_54.4mm_2Yr SCS_Type_II_54.4mm_2Yr         INTENSITY    6 min.
SCS_Type_II_72.4mm_5Yr SCS_Type_II_72.4mm_5Yr         INTENSITY    6 min.
SCS_Type_II_84.1mm_10Yr SCS_Type_II_84.1mm_10Yr        INTENSITY    6 min.
SCS_Type_II_98.9mm_25Yr SCS_Type_II_98.9mm_25Yr        INTENSITY    6 min.
Timmins_Storm_(0-25) Timmins_Storm_(0-25)           INTENSITY   60 min.


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

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.05	47.91	100.00	2.0000	25mm	J1
A2	0.01	68.12	0.00	2.0000	25mm	S_SideYard
A3	0.02	36.83	0.00	30.0000	25mm	Rear_Yard
A4	0.02	61.00	0.00	30.0000	25mm	N_SideYard
A5	0.05	40.17	100.00	2.0000	25mm	A1
A6	0.02	22.43	64.00	2.0000	25mm	J1
A7	0.02	27.67	100.00	2.0000	25mm	A4

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
A1	LID	1	527.00	0.00	100.00	100.00	0.00
A6	LID	1	42.00	6.00	26.75	26.00	0.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	196.70	0.30	0.0	
Bruce	OUTFALL	196.53	0.00	0.0	
N_SideYard	OUTFALL	0.00	0.00	0.0	
Rear_Yard	OUTFALL	0.00	0.00	0.0	
S_SideYard	OUTFALL	0.00	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	Bruce	CONDUIT	3.8	4.4419	0.0130

```
**********************
Cross Section Summary
**********************
                                    Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape             Depth     Area     Rad.    Width  Barrels     Flow
-------------------------------------------------------------------------------------
C1               DUMMY              0.00     0.00     0.00     0.00        1     0.00


****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 09/04/2024 00:00:00
Ending Date .............. 09/06/2024 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
```

Total Precipitation	0.005	24.999
Evaporation Loss	0.000	0.000
Infiltration Loss	0.004	24.246
Surface Runoff	0.000	0.000
Final Storage	0.000	0.782
Continuity Error (%)	-0.115	

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

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

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

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
A1	25.00	21.10	0.00	46.10	0.00	0.00	0.00	0.00	0.00	0.000
A2	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
A3	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
A4	25.00	20.94	0.00	45.94	0.00	0.00	0.00	0.00	0.00	0.000
A5	25.00	0.00	0.00	0.00	23.07	0.00	23.07	0.01	0.01	0.923
A6	25.00	0.00	0.00	24.08	10.80	0.00	0.00	0.00	0.00	0.000
A7	25.00	0.00	0.00	0.00	23.08	0.00	23.08	0.00	0.00	0.923

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
A1	LID	46.10	0.00	46.10	0.00	0.00	0.00	0.00	0.00
A6	LID	25.00	0.00	25.00	0.00	0.00	0.00	0.00	-0.00

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.00	0.00	196.70	0 00:00	0.00
Bruce	OUTFALL	0.00	0.00	196.53	0 00:00	0.00
N_SideYard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Rear_Yard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
S_SideYard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Bruce	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
N_SideYard	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
Rear_Yard	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
S_SideYard	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr

****
Node Surcharge Summary
****

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	48.00	0.000	0.300

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Bruce	0.00	0.000	0.000	0.000
N_SideYard	0.00	0.000	0.000	0.000
Rear_Yard	0.00	0.000	0.000	0.000
S_SideYard	0.00	0.000	0.000	0.000
System	0.00	0.000	0.000	0.000

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	DUMMY	0.000	0 00:00			

****
Flow Classification Summary
****

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

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Oct 23 15:56:41 2024
Analysis ended on: Wed Oct 23 15:56:41 2024
Total elapsed time: < 1 sec

Post Development 4hr 100yr Chicago Storm PCSWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
-------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 7
Number of nodes ........... 5
Number of links ........... 1
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
25mm                 25mm                         INTENSITY    5 min.
Chicago_4h_100Yr     Chicago_4h_100Yr             INTENSITY    5 min.
Chicago_4h_10Yr      Chicago_4h_10Yr              INTENSITY    5 min.
Chicago_4h_25Yr      Chicago_4h_25Yr              INTENSITY    5 min.
Chicago_4h_2Yr       Chicago_4h_2Yr               INTENSITY    5 min.
Chicago_4h_50Yr      Chicago_4h_50Yr              INTENSITY    5 min.
Chicago_4h_5Yr       Chicago_4h_5Yr               INTENSITY    5 min.
SCS_Type_II_110.1mm_50Yr SCS_Type_II_110.1mm_50Yr       INTENSITY    6 min.
SCS_Type_II_121.0mm_100Yr SCS_Type_II_121.0mm_100Yr      INTENSITY    6 min.
SCS_Type_II_54.4mm_2Yr SCS_Type_II_54.4mm_2Yr         INTENSITY    6 min.
SCS_Type_II_72.4mm_5Yr SCS_Type_II_72.4mm_5Yr         INTENSITY    6 min.
SCS_Type_II_84.1mm_10Yr SCS_Type_II_84.1mm_10Yr        INTENSITY    6 min.
SCS_Type_II_98.9mm_25Yr SCS_Type_II_98.9mm_25Yr        INTENSITY    6 min.
Timmins_Storm_(0-25) Timmins_Storm_(0-25)           INTENSITY   60 min.


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

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.05	47.91	100.00	2.0000	Chicago_4h_100Yr	J1
A2	0.01	68.12	0.00	2.0000	Chicago_4h_100Yr	S_SideYard
A3	0.02	36.83	0.00	30.0000	Chicago_4h_100Yr	Rear_Yard
A4	0.02	61.00	0.00	30.0000	Chicago_4h_100Yr	N_SideYard
A5	0.05	40.17	100.00	2.0000	Chicago_4h_100Yr	A1
A6	0.02	22.43	64.00	2.0000	Chicago_4h_100Yr	J1
A7	0.02	27.67	100.00	2.0000	Chicago_4h_100Yr	A4

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
A1	LID	1	527.00	0.00	100.00	100.00	0.00
A6	LID	1	42.00	6.00	26.75	26.00	0.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	196.70	0.30	0.0	
Bruce	OUTFALL	196.53	0.00	0.0	
N_SideYard	OUTFALL	0.00	0.00	0.0	
Rear_Yard	OUTFALL	0.00	0.00	0.0	
S_SideYard	OUTFALL	0.00	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	Bruce	CONDUIT	3.8	4.4419	0.0130

```
**********************
Cross Section Summary
**********************
                                    Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape             Depth     Area     Rad.    Width  Barrels     Flow
-------------------------------------------------------------------------------------
C1               DUMMY              0.00     0.00     0.00     0.00        1     0.00


****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 09/04/2024 00:00:00
Ending Date .............. 09/06/2024 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
```

Total Precipitation	0.015	79.241
Evaporation Loss	0.000	0.000
Infiltration Loss	0.014	77.173
Surface Runoff	0.000	2.160
Final Storage	0.000	0.782
Continuity Error (%)	-1.103	

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

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

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

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

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
A1	79.24	70.79	0.00	150.03	0.00	0.00	0.00	0.00	0.00	0.000
A2	79.24	0.00	0.00	79.24	0.00	0.00	0.00	0.00	0.00	0.000
A3	79.24	0.00	0.00	79.24	0.00	0.00	0.00	0.00	0.00	0.000
A4	79.24	70.23	0.00	144.59	0.00	11.96	11.96	0.00	0.01	0.080
A5	79.24	0.00	0.00	0.00	77.40	0.00	77.40	0.04	0.04	0.977
A6	79.24	0.00	0.00	68.21	36.33	11.44	11.44	0.00	0.00	0.144
A7	79.24	0.00	0.00	0.00	77.42	0.00	77.42	0.01	0.01	0.977

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
A1	LID	150.03	0.00	150.03	0.00	0.00	0.00	0.00	0.00
A6	LID	79.24	0.00	79.24	0.00	0.00	0.00	0.00	0.00

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.00	0.00	196.70	0 00:00	0.00
Bruce	OUTFALL	0.00	0.00	196.53	0 00:00	0.00
N_SideYard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Rear_Yard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
S_SideYard	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
J1	JUNCTION	0.005	0.005	0 01:30	0.0018	0.0018	0.000	
Bruce	OUTFALL	0.000	0.005	0 01:30	0	0.0018	0.000	
N_SideYard	OUTFALL	0.007	0.007	0 01:30	0.00219	0.00219	0.000	
Rear_Yard	OUTFALL	0.000	0.000	0 00:00	0	0	0.000	ltr
S_SideYard	OUTFALL	0.000	0.000	0 00:00	0	0	0.000	ltr

****
Node Surcharge Summary
****

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	48.00	0.000	0.300

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Bruce	0.67	0.002	0.005	0.002
N_SideYard	0.34	0.004	0.007	0.002
Rear_Yard	0.00	0.000	0.000	0.000
S_SideYard	0.00	0.000	0.000	0.000
System	0.25	0.005	0.012	0.004

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	DUMMY	0.005	0 01:30			

****
Flow Classification Summary
****

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

****
Conduit Surcharge Summary
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No conduits were surcharged.

Analysis begun on: Wed Oct 23 15:55:29 2024
Analysis ended on: Wed Oct 23 15:55:29 2024
Total elapsed time: < 1 sec