



**Site Servicing and
Stormwater Management Report
for Site Plan Control Application**

**Proposed New Public High School
Barrhaven Centre
4005 Strandherd Drive
Barrhaven, Ontario**

Prepared for

Conseil des écoles publiques de l'Est de l'Ontario

Attention: Mrs Carolyn Jones, MRAIC

LRL File No.: 170364

September 5, 2019
Revision 03



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1 INTRODUCTION

LRL Associates Ltd. (LRL) has been retained by the Conseil des écoles publiques de L'Est de l'Ontario (CEPEO) to prepare a site servicing and stormwater management report in support of their site plan control application for a proposed new Public High School in Barrhaven. This report presents the proposed servicing plan of the new development for water and sanitary services, as well as stormwater management.

This report has been prepared in consideration of the survey carried out by Annis O'Sullivan Vollebakk Ltd. (AOV) in August 2017 and the design brief prepared by J.L. Richards & Associates Limited and dated July 2017. Should there be any discrepancies in the existing infrastructure and/or connections to the existing services, which may relate to the site servicing considerations, LRL should be advised in order to review the report recommendations. This report should be read in conjunction with the grading and drainage, site servicing, and stormwater management plans prepared by LRL.

2 SITE DESCRIPTION

The subject property is currently vacant land and is located within the urban boundary of the City of Ottawa, Ontario. As illustrated in Figure 1, the development is located south on Strandherd Drive. The total area of the property measures approximately 4.86 ha.

Chapman Mills is to be developed and constructed by others in accordance with the design prepared by J.L. Richards & Associates Limited as part of Harmony Stage 1 Development for Minto Communities, dated July 2017.





Figure 1 - Aerial view of the location of the proposed development (Google Earth)

The proposed development is located within the proposed Minto Harmony Community area that has yet to be fully constructed by others. The land surface has a minimal grade change with elevations ranging between 92.09m and 94.57m.

The proposed development consists of a three-storey, slab-on grade, public high school with access roadway, parking areas, playground areas, a soccer field and a future portable classes area. Refer to Appendix D for the proposed site plan (Drawing C401 – Servicing Plan).

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Water services

- Calculate the expected domestic water demands at average and peak flow conditions.
- Calculate the fire flow as per the Fire Underwriters Survey (FUS) method.
- Describe the proposed water distribution network and connection to the existing watermain.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate the peak flow rates from the development.
- Describe the proposed sanitary sewer system.



- Verify the available capacity in the downstream sanitary sewer.
- Verify the capacity of the existing lateral sanitary sewer

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post development stormwater release rates.
- Demonstrate how the target quality and quantity objectives will be achieved.
- Verify the capacity of the existing lateral storm sewer

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services

The 300mm diameter watermain on Chapman Mills Drive will be constructed by others. According to J.L. Richards & Associates Limited design, the site will have a 200mm diameter water service stub provided along Chapman Mills Drive, approximately 240m southeast of Strandherd Drive. There will be four (4) fire hydrants along Chapman Mills Drive on the east side near the proposed site. Refer to C401 – Servicing Plan for the proposed municipal infrastructure design.

4.2 Water Supply Demand

As per the AWWA Standards and the City of Ottawa Design Guidelines, the average domestic water demand was calculated using 850 equivalent fixture units and for daily and hourly peaking factors of **1.5** and **1.8**, respectively. Thus, the average daily domestic water demand for the proposed building is **12.33 L/s**, the maximum daily flow rate is **18.50 L/s** and the maximum hourly flow rate is **22.20 L/s**. Refer to Appendix A for the domestic water demand calculation sheet.

The fire flow requirement was evaluated in accordance with the Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, type and combustibility of the structural frame and the separation distances with adjoining buildings. The fire flow demand was calculated to be **116.7L/s**. Refer to Appendix A – Fire Flow Calculations, for the fire flow

However, to meet the minimum requirement of a 90m radius distance between the fire hydrant and the building, as required by the City of Ottawa, a private fire hydrant on the said property is added to service the building. In addition, a second private hydrant has been proposed south corner of the school for future portable expansion planning. Refer to LRL drawing C401 Rev.01 – *Servicing Plan* for the layout of the proposed water services and connections.



4.3 Water supply servicing design

The proposed building will be serviced by a 200mm dia. water service which will connect to the 200mm diameter stub along Chapman Mills Drive. The proposed service will be located on the east side of the building. Refer to LRL drawing C401 – Servicing Plan for the layout of the proposed water service.

A fire department siamese connection is proposed on the east side near the building main student entrance. The siamese connection is located adjacent to the proposed sidewalk to facilitate the access for the fire department year-round. To meet the minimum requirement of a 45m radius distance between the fire hydrant and the building main entrance, as required by the OBC, a private fire hydrant will be installed at the north-east corner of the building. Refer to LRL drawing C401 Rev.01 – *Servicing Plan* for the layout of the proposed water service connection and the private fire hydrant.

4.4 Boundary Conditions

The existing boundary conditions provided by the City of Ottawa for the site are as follow:

| Demand Scenario | Head (m) | Pressure ¹ (psi) |
|------------------------------------|----------|-----------------------------|
| Maximum HGL | 156.5 | 89.5 |
| Peak Hour | 144.7 | 72.7 |
| Max Day Plus Fire (7,000) L/min | 127.8 | 48.7 |

As the available fire flow provided by the City of Ottawa is above the minimum fire flow requirement for the proposed development, no supplementary fire protection and storage are required for the site. Refer to Appendix A for the provided city boundary conditions dated 2018-Dec-17.



5 SANITARY DRAINAGE

5.1 Municipal Sanitary Sewer Services

Along Chapman Mills Drive, a 300mm diameter sanitary sewer flowing easterly on Clarity Street will be constructed by others. J.L. Richards & Associates Limited design indicates that a 250mm diameter sanitary service stub will be provided to service this site with a total allowable flow 62.0 L/s. Refer to drawing C401 – Servicing Plan for the layout.

5.2 Sanitary Sewer Servicing Design

The new building will be serviced with a 250mm dia. sanitary service that will be installed south of the new building. A sanitary maintenance manhole, SAN MH01 will be installed just north of the property line before connecting to the 250mm stub and discharging to the municipality sewer system. The proposed 250mm PVC DR35 sanitary service will be installed at a minimum slope of 1.00%. Refer to LRL drawing C401 – Servicing Plan for the proposed sanitary servicing.

The sanitary peak load was calculated using the Ontario Building Code (2012), Part 7 – Plumbing and estimated at **12.33 L/s**.

Also, LRL used the City of Ottawa Sanitary Design Guidelines to estimate the allocated sanitary peak flow to ensure the most conservative demand is used. Using the criteria as shown in Table 1 and the City specific design parameters, the site anticipated sanitary flow was calculated at **5.58 L/s** for the 4.86 ha area. Refer to Appendix B for the site sanitary sewer design sheet. Since this estimate is lower than the total sanitary peak flow estimated using the Ontario Building Code (2012) Part 7, the total sanitary flow for the proposed elementary school was estimated at **12.33 L/s**, as this flow rate is more accurate and conservative.

Table 1 Sanitary Sewer Design Criteria

| Design Parameter | Value |
|--|---------|
| Minimum service connection size (diameter) | 135 mm |
| Manning roughness coefficient (n) | 0.013 |
| Minimum velocity (full) | 0.6 m/s |
| Maximum velocity (full) | 3.0 m/s |

6 STORMWATER MANAGEMENT

6.1 Municipal Stormwater Infrastructure

Along Chapman Mills Drive, a 675mm diameter storm sewer flowing easterly and draining into the 1,350mm diameter storm sewer on Clarity Street will be constructed by others. J.L. Richards



& Associates Limited show that a 1,050mm diameter storm service stub will be provided to service the site. Refer to drawing C401 – Servicing Plan for the layout.

6.2 Stormwater Management Concept

Drainage from the site will be captured by a series of roof drains, catchbasins, catchbasin manholes and perforated subdrains which will convey the stormwater to the existing 1,050mm diameter storm sewer stub on Chapman Mills Drive. Refer to LRL drawing C401 for the proposed storm servicing and drawings C301 and C702 for the grading and drainage plan and stormwater management. Refer to Appendix C – Stormwater Management Design Sheets for the proposed site storm sewer design.

6.3 Design Criteria

Stormwater quantity control measures are proposed for this site to reduce the post-development stormwater runoff to allowable levels.

6.3.1 Water Quality

Enhanced (80% Total Suspended Solids removal) quality control is to be provided by others. The stormwater retaining pond has been designed as part of Minto Harmony Community project, Phase 1 which was prepared by J.L. Richards & Associates Limited.

6.3.2 Water Quantity

All storm events up to and including the 100-year event will be controlled to the 5-year pre-development level. The site major overland flow route has been designed to ensure that storm events beyond the 100-year design storm can be safely conveyed overland towards the Chapman Mills Drive right-of-way. The minor system (storm sewer) within the site is sized to convey the 5-year storm event flows from the site to the municipal storm sewer on Chapman Mills Drive.

6.4 Method of Analysis

The Rational Method was used to calculate the runoff from the development. The Intensity-Duration-Frequency (IDF) curve formulas for the MacDonald-Cartier International Airport, in the city of Ottawa, were used to calculate the peak storm flows for the site.

6.5 Allowable Release Rate

This site is subject to stormwater management control where the allowable flow for the 5 and 100-year storm events are estimated at 1,055.8 L/s as per the design prepared by J.L. Richards & Associates Limited. The total allowable release rate will be restricted with an undersized pipe



at the outlet that will throttle the total allowable release rate to **884L/s** as per J.L. Richards & Associates Limited design sheet. Refer to Appendix D - Supporting Documents.

6.6 Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished through the use of: undersized piping to throttle the flow rate, Zurn Control-Flo roof drains, roof top water storage, pipe and maintenance holes structure underground. The proposed site storm sewer and stormwater management system are shown on drawing C401 – Servicing Plan and detailed calculations including the design sheet are attached in Appendix C.

The collected stormwater from catchment area WS-15 (0.711ha), will first be regulated using thirty-five (35) one notch Zurn Control-Flo roof drains with a total maximum release rate of **14.91 L/s*m**. With the thirty-five (35) roof drains, a maximum ponding volume of **213 m³** of water will be stored on the roof during the 100-year storm event to minimize the water directed to MH02. The controlled roof water will be captured by the proposed storm manhole MH02 before outletting to Chapman Mills Drive. The two future expansions have been added to the design calculations in order to obtain the maximum value for the roof top ponding and flow generated by the hard surface. The roof drains will be connected downstream of the controlled manhole (MH03) to prevent a double control measurement as per the City of Ottawa guidelines. The total anticipated flow of the roof drains is **63.47L/s**.

WS-01, WS-02, WS-03, WS-04, WS-05, WS-06, WS-07, WS-08, WS-09, WS-10, WS-11, WS-12, WS-13 and WS-14 areas, (0.059ha, 0.105ha, 0.281ha, 0.221ha, 0.161ha, 0.095ha, 0.169ha, 0.201ha, 0.130ha, 1.033ha, 0.929ha, 0.333ha, 0.285ha and 0.147ha respectively) consist of parking and driving area, landscaped area and playground area. These catchments area will be captured through a number of catchbasins and subdrains before being directed to the proposed 825mm outlet on Chapman Mills Drive and controlled using an undersized 825mm diameter reinforced concrete pipe. The 825mm pipe will be installed at a 0.29% slope that has a full capacity of **769 L/s**.

In order to control the 100-year storm event, **224.25m³** of on-site storage will be required. This storage will be provided with the use of some pipe/structure storage and an infiltration gallery up to the expected high water level of 93.00m MASL. The stormwater storage will be provided as follows: **115.84 m³** from on-site pipes and maintenance structures and **180.31 m³** from the infiltration gallery. Refer to C401 – Servicing Plan and Appendix C for stormwater management design details. Thus, the outlet to Chapman Mills Drive is able of achieving the required stormwater quantity control of **884L/s**.



6.7 Stormwater Quality Management

A Stormwater Management Facility Pond design by J.L. Richards & Associates Limited is located southeast of the subject site at the downstream end of Minto Harmony Community and will provide enhanced protection, 80% Total Suspended Solids removal. Hence, no stormwater quality management is required on the site. Refer to Appendix D – Supporting Documents for the location of the proposed stormwater management pond.

7 EROSION AND SEDIMENT CONTROL

During the construction, erosion and sediment controls will be required primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catchbasin and/or manholes on and around the site that may be impacted by the site construction activities. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to LRL drawing C101 – Erosion and Sediment Control Plan for details.

8 CONCLUSIONS

In accordance with this report objectives, the analyses for the proposed development can be summarized as follows:

Water Service

- The anticipated maximum domestic water demand for the site is 22.20 L/s.
- The required fire flow was calculated at 116.7 L/s using the FUS method.
- A new fire hydrant will be installed on-site within the m radius from the siamese connection.
- The new development will be serviced with a 200mm dia. watermain connected to the proposed 300mm dia. watermain on Chapman Mills Drive.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 12.33 L/s.
- The proposed building will be serviced by a 250mm sanitary service connection to the existing 900mm dia. sanitary sewer on Chapman Mills Drive.
- A new monitoring manhole will be installed on the new 250mm sanitary service that is connected to the proposed 900mm dia. sanitary sewer on Chapman Mills Drive.

Stormwater Management

- The stormwater release rates from the proposed development will meet the pre-development allowable release rate of 884 L/s onto Chapman Mills Drive.



- Stormwater quantity control objectives will be achieved through on-site storage.
- Stormwater quality control objectives will be achieved off-site through the future Stormwater Management Pond designed by J.L. Richards & Associates Limited.

9 LIMITATIONS AND USE OF REPORT

The report conclusions are applicable only to this project described in this report. Any changes may require a review by LRL Associates Ltd. to insure compatibility with the recommendations contained in this report. We trust the information presented meets your current requirements. Please do not hesitate to contact us should you have any questions or concerns.

Prepared by:

LRL Associates Ltd.

Virginia Johnson

Virginia Johnson, P.Eng

Civil Engineer



APPENDIX A

Domestic Water Demand and Fire Flow Calculations & Boundary Conditions



Domestic Water Supply Calculations

LRL File No. 170364
Project: Public High School Barrhaven Centre
Location: 4005 Strandherd Drive, Barrhaven, Ottawa
Date: January 16, 2019
Designed: G. Brunet
Verified: J.C. Lalonde

Domestic Commercial Flow Demand

| | | | | |
|--|--------------|-------------------------|---|-----|
| Total Building Floor Area = | 5,956 | m ² | (includes existing and proposed building) | |
| Site Total Area = | 4.86 | ha | | |
| Total Proposed Fixture Unit = | 850 | | | |
| Average Demand Per Fixture Unit = | 0.8704 | L/min | As per AWWA Standard | |
| Average Commercial Water Demand = | 740 | L/min | 12.33 | L/s |
| Maximum Daily Peak Factor = | 1.5 | * As per City of Ottawa | | |
| Maximum Daily Commercial = | 1,110 | L/min | 18.50 | L/s |
| Maximum Hourly Peak Factor = | 1.8 | * As per City of Ottawa | | |
| Maximum Hourly Commercial = | 1,332 | L/min | 22.20 | L/s |
| Therefore, | | | | |
| Domestic Peak Hourly Flow Rate | 22.20 | L/s | | |
| Required Fire Flow rate= | 116.7 | L/s | | |



Fire Flow Calculations

LRL File No. 170364
 Project Public High School Barrhaven Centre
 Date January 16, 2019
 Method Fire Underwriters Survey (FUS)
 Designed by G. Brunet

| | | |
|-------------------------|--------------|----------------|
| Multi-level Development | 9281 | |
| | 9,281 | m ² |

| Step | Task | Term | Options | Multiplier | Choose: | Value | unit | Fire Flow | |
|--|--|---|---|------------|-----------------------------------|-------|-------|-----------|--------|
| Structural Framing Material | | | | | | | | | |
| 1 | Choose frame used for building | Coefficient C related to the type of construction | Wood Frame | 1.5 | Non-combustible construction | 0.8 | | | |
| | | | Ordinary Construction | 1.0 | | | | | |
| | | | Non-combustible construction | 0.8 | | | | | |
| | | | Fire resistive construction <2 hrs | 0.7 | | | | | |
| | | | Fire resistive construction >2 hrs | 0.6 | | | | | |
| Floor Space Area | | | | | | | | | |
| 2 | Choose type of housing | Type of housing | Single family dwelling | 0 | Building - no. of units per floor | 1 | units | | |
| | | | Townhouse - no. of units | 0 | | | | | |
| | | | Building - no. of units per floor | 1 | | | | | |
| | | Enter no. of storeys | Number of floors/storeys for the building (excluding the basement) | | | | 3 | floors | |
| 3 | Enter area | Enter floor space area | | 1 | | 9,281 | sq.m. | | |
| 4 | Obtain fire flow before reductions | Required fire flow | Fire Flow = 220 x C x Area ^{0.5} | | | | L/min | 16,955 | |
| | | | | | | | L/s | 282.6 | |
| Reductions or surcharge due to factors affecting burning | | | | | | | | | |
| 5 | Choose combustibility of contents | Occupancy hazard reduction or surcharge | Non-combustible | -0.25 | Limited combustible | -0.15 | | | |
| | | | Limited combustible | -0.15 | | | | | |
| | | | Combustible | 0 | | | | | |
| | | | Free burning | 0.15 | | | | L/min | 14,412 |
| | | | Rapid burning | 0.25 | | | | L/s | 240.2 |
| 6 | Choose reduction for sprinklers | Sprinkler reduction | Sprinklers (NFPA13) | -0.30 | True | -0.3 | | | |
| | | | Water supply is standard for both the system and fire department hose lines | -0.10 | True | -0.1 | L/min | 7,206 | |
| | | | Fully supervised system | -0.10 | True | -0.1 | L/s | 120.1 | |
| 7 | Choose separation | Exposure distance between units | North side | Over 45m | 0 | | | | |
| | | | East side | Over 45m | 0 | | | | |
| | | | South side | Over 45m | 0 | | L/min | 7,206 | |
| | | | West side | Over 45m | 0 | 0 | L/s | 120.1 | |
| Net required fire flow | | | | | | | | | |
| 8 | Obtain fire flow, duration, and volume | Minimum required fire flow rate (rounded to nearest 1000 as per City of Ottawa) | | | | | L/min | 7,000 | |
| | | Minimum required fire flow rate | | | | | L/s | 116.7 | |
| | | Required duration of fire flow | | | | | hr | 2 | |

BOUNDARY CONDITIONS



Boundary Conditions For: 4005 Strandherd Dr.

Date of Boundary Conditions: 2018-Dec-17

Provided Information:

| Scenario | Demand | |
|----------------------|--------|-------|
| | L/min | L/s |
| Average Daily Demand | 739.8 | 12.3 |
| Maximum Daily Demand | 1,110 | 18.5 |
| Peak Hour | 1332 | 22.2 |
| Fire Flow #1 Demand | 7,000 | 116.7 |

Number of Connections: 1

Location:



BOUNDARY CONDITIONS



Results:

Pre-Configuration

Connection #: 1

| Demand Scenario | Head (m) | Pressure ¹ (psi) |
|------------------------------------|----------|-----------------------------|
| Maximum HGL | 156.5 | 89.5 |
| Peak Hour | 144.7 | 72.7 |
| Max Day Plus Fire (7,000) L/min | 127.8 | 48.7 |

¹Elevation: **94.640 m**

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:


- a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
 - b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.
- 2) Both HGL and Pressures at Junction reflect the interm condition of watermain connections and not the ultimate condition of watermain connections which involves a 400 mm diameter main at Strandherd Dr. that will connect the network providing higher HGL at near by connections.

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 watermain 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 B
Sanitary Servicing Calculation Sheet


LRL Associates Ltd.
Storm Design Sheet

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| <div><div>LRL File No. 170364 Project: Public High School Barrhaven Centre Location: 4005 Strandherd Drive, Barrhaven, Ottawa Date: January 16, 2019 Designed: G. Brunet Verified: J.C. Lalonde</div></div> | | | | | | | | | | <div><div>Average Daily Flow = 350 L/p/day Commercial & Institutional Flow = 50000 L/ha/day Light Industrial Flow = 35000 L/ha/day Heavy Industrial Flow = 55000 L/ha/day Maximum Residential Peak Factor = 4.0 Commercial & Institutional Peak Factor = 1.5</div><div>Sanitary Design Parameters Industrial Peak Factor = as per Appendix 4-B = 7 Extraneous Flow = 0.28 L/s/gross ha</div></div> | | | | | | | | | | <div>Pipe Design Parameters Minimum Velocity = 0.60 m/s Manning's n = 0.013</div> | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMMERCIAL | | INDUSTRIAL | | INSTITUTIONAL | | C+I+I | INFILTRATION | | | TOTAL FLOW | PIPE | | | | | | MANHOLE | | |
|---|------------|-------|---------------------------------|------|-------------|------|------------|-----------------|------------|-----------------|-----------------|------------|---------------------------------------|-----------------|-----------------|--|-----------------|--------------------|-----------------------|------------|-----------|------------------|-----------|-------------------|-------------------|---------------|-----------------|--|
| STREET | FROM MH | TO MH | AREA (Ha) | POP. | CUMMULATIVE | | PEAK FACT. | PEAK FLOW (l/s) | AREA (Ha) | ACCU. AREA (Ha) | ACCU. AREA (Ha) | PEAK FACT. | AREA (Ha) | ACCU. AREA (Ha) | PEAK FLOW (l/s) | TOTAL AREA (Ha) | ACCU. AREA (Ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | LENGTH (m) | DIA. (mm) | SLOPE (%) | MATERA IL | CAP. (FULL) (l/s) | VEL. (FULL) (m/s) | UP INVERT (m) | DOWN INVERT (m) | |
| | | | | | AREA (Ha) | POP. | | | | | | | | | | | | | | | | | | | | | | |
| SITE | PROP. BLDG | MH01 | 0.000 | 0.0 | 0.00 | 0.0 | 0.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 4.9 | 4.9 | 4.22 | 4.86 | 4.86 | 1.36 | 5.58 | 91.3 | 250 | 1.00% | PVC | 59.47 | 1.21 | 91.43 | 90.52 | |
| SITE | MH01 | STUB | 0.000 | 0.0 | 0.0 | 0.0 | 4.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 0.0 | 4.9 | 4.22 | 0.00 | 4.86 | 1.36 | 5.58 | 26.8 | 250 | 1.00% | PVC | 59.47 | 1.21 | 90.46 | 90.19 | |
| SITE | STUB | CITY | 0.000 | 0.0 | 0.0 | 0.0 | 4.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 0.0 | 4.9 | 4.22 | 0.00 | 4.86 | 1.36 | 5.58 | 1.0 | 250 | 1.00% | PVC | 59.47 | 1.21 | 90.19 | 90.18 | |
| NOTES | | | | | | | | | | | | | Designed: G.B. | | | PROJECT: Public High School Barrhaven Centre | | | | | | | | | | | | |
| Existing inverts and slopes are estimated. They are to be confirmed on-site. Inverts provided by J.L. Richards & Associates Ltd * Use average flow rate of 12.33 L/s for design | | | | | | | | | | | | | Checked: J.C.L. | | | LOCATION: 4005 Standherd Drive, Ottawa | | | | | | | | | | | | |
| | | | | | | | | | | | | | Dwg. Reference: C401 - Servicing Plan | | | File Ref.: 170364 | | | Date: September-14-18 | | | Sheet No. 1 of 1 | | | | | | |

APPENDIX C
Stormwater Management Design Sheets

LRL Associates Ltd.
Storm Design Sheet

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| <div><div>LRL File No. 170364 Project: Public High School Barrhaven Centre Location: 4005 Strandherd Drive, Barrhaven, Ottawa Date: January 16, 2019 Designed: G. Brunet Verified: J.C. Lalonde</div></div> | | | | | | | | | | <div><div>Average Daily Flow = 350 L/p/day Commercial & Institutional Flow = 50000 L/ha/day Light Industrial Flow = 35000 L/ha/day Heavy Industrial Flow = 55000 L/ha/day Maximum Residential Peak Factor = 4.0 Commercial & Institutional Peak Factor = 1.5</div><div>Sanitary Design Parameters Industrial Peak Factor = as per Appendix 4-B = 7 Extraneous Flow = 0.28 L/s/gross ha</div></div> | | | | | | | | | | <div>Pipe Design Parameters Minimum Velocity = 0.60 m/s Manning's n = 0.013</div> | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMMERCIAL | | INDUSTRIAL | | INSTITUTIONAL | | C+I+I | INFILTRATION | | | TOTAL FLOW | PIPE | | | | | | MANHOLE | | |
|---|------------|-------|---------------------------------|------|-------------|------|------------|-----------------|------------|-----------------|-----------------|------------|---------------------------------------|-----------------|-----------------|--|-----------------|--------------------|-----------------------|------------|-----------|------------------|-----------|-------------------|-------------------|---------------|-----------------|--|
| STREET | FROM MH | TO MH | AREA (Ha) | POP. | CUMMULATIVE | | PEAK FACT. | PEAK FLOW (l/s) | AREA (Ha) | ACCU. AREA (Ha) | ACCU. AREA (Ha) | PEAK FACT. | AREA (Ha) | ACCU. AREA (Ha) | PEAK FLOW (l/s) | TOTAL AREA (Ha) | ACCU. AREA (Ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | LENGTH (m) | DIA. (mm) | SLOPE (%) | MATERA IL | CAP. (FULL) (l/s) | VEL. (FULL) (m/s) | UP INVERT (m) | DOWN INVERT (m) | |
| | | | | | AREA (Ha) | POP. | | | | | | | | | | | | | | | | | | | | | | |
| SITE | PROP. BLDG | MH01 | 0.000 | 0.0 | 0.00 | 0.0 | 0.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 4.9 | 4.9 | 4.22 | 4.86 | 4.86 | 1.36 | 5.58 | 91.3 | 250 | 1.00% | PVC | 59.47 | 1.21 | 91.43 | 90.52 | |
| SITE | MH01 | STUB | 0.000 | 0.0 | 0.0 | 0.0 | 4.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 0.0 | 4.9 | 4.22 | 0.00 | 4.86 | 1.36 | 5.58 | 26.8 | 250 | 1.00% | PVC | 59.47 | 1.21 | 90.46 | 90.19 | |
| SITE | STUB | CITY | 0.000 | 0.0 | 0.0 | 0.0 | 4.0 | 0.00 | 0.000 | 0.000 | 0.00 | 7.0 | 0.0 | 4.9 | 4.22 | 0.00 | 4.86 | 1.36 | 5.58 | 1.0 | 250 | 1.00% | PVC | 59.47 | 1.21 | 90.19 | 90.18 | |
| NOTES | | | | | | | | | | | | | Designed: G.B. | | | PROJECT: Public High School Barrhaven Centre | | | | | | | | | | | | |
| Existing inverts and slopes are estimated. They are to be confirmed on-site. Inverts provided by J.L. Richards & Associates Ltd * Use average flow rate of 12.33 L/s for design | | | | | | | | | | | | | Checked: J.C.L. | | | LOCATION: 4005 Standherd Drive, Ottawa | | | | | | | | | | | | |
| | | | | | | | | | | | | | Dwg. Reference: C401 - Servicing Plan | | | File Ref.: 170364 | | | Date: September-14-18 | | | Sheet No. 1 of 1 | | | | | | |



LRL File No. 170364
Project: Public High School Barrhaven Centre
Location: 4005 Strandherd Drive, Barrhaven, Ottawa
Date: January 16, 2019
Designed: G. Brunet
Verified: J.C. Lalonde
Drawing Reference: C701 and C702

Post-Development Catchments

| WATERSHED | C = 0.20 | C = 0.80 | C = 0.90 | Total Area (ha) | Combined C |
|---------------|----------|----------|----------|-----------------|------------|
| EWS-01 | 0.00 | 0.00 | 0.06 | 0.059 | 0.90 |
| EWS-02 | 0.10 | 0.00 | 0.00 | 0.105 | 0.23 |
| EWS-03 | 0.07 | 0.00 | 0.21 | 0.281 | 0.73 |
| EWS-04 | 0.00 | 0.00 | 0.22 | 0.221 | 0.90 |
| EWS-05 | 0.15 | 0.01 | 0.00 | 0.161 | 0.24 |
| EWS-06 | 0.10 | 0.00 | 0.00 | 0.095 | 0.20 |
| EWS-07 | 0.15 | 0.02 | 0.00 | 0.169 | 0.27 |
| EWS-08 | 0.03 | 0.00 | 0.17 | 0.201 | 0.80 |
| EWS-09 | 0.01 | 0.00 | 0.12 | 0.130 | 0.86 |
| EWS-10 | 0.94 | 0.00 | 0.10 | 1.033 | 0.27 |
| EWS-11 | 0.80 | 0.00 | 0.13 | 0.929 | 0.30 |
| EWS-12 | 0.19 | 0.00 | 0.14 | 0.333 | 0.50 |
| EWS-13 | 0.26 | 0.00 | 0.03 | 0.285 | 0.26 |
| EWS-14 | 0.03 | 0.00 | 0.12 | 0.147 | 0.76 |
| EWS-15 (ROOF) | 0.00 | 0.00 | 0.71 | 0.711 | 0.90 |
| TOTAL | 2.819 | 0.030 | 2.011 | 4.860 | 0.49 |



LRL File No. 170364
 Project: Public High School Barrhaven Centre
 Location: 4005 Strandherd Drive, Barrhaven, Ottawa
 Date: January 16, 2019
 Designed: G. Brunet
 Checked: J.C. Lalonde
 Drawing Ref.: C401

Stormwater Management
Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
 C = Runoff coefficient
 I = Rainfall intensity (mm/hr) = $A / (T_d + C)^b$
 A = Area (ha)
 T_c = Time of concentration (min)

Pre-Development Catchments within Development Area

Allowable Release Rate

5 Year Pre-Development Flow Rate

$I_s = 998.071 / (T_d + 6.053)^{0.814}$ a = 998.071 b = 0.814 C = 6.053

Allowable Release Rate = 884.00 L/s As Per J.L. Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

| | | | | $\sum R_s$ | $\sum R_{100}$ |
|----------------------------|---------------------------------|-------|----|------------|----------------|
| Total Site Area = | | | | 4.860 | 0.62 |
| Controlled | WS-01 | 0.059 | ha | R= | 0.90 |
| | WS-02 | 0.105 | ha | R= | 0.23 |
| | WS-03 | 0.281 | ha | R= | 0.73 |
| | WS-04 | 0.221 | ha | R= | 0.90 |
| | WS-05 | 0.161 | ha | R= | 0.24 |
| | WS-06 | 0.095 | ha | R= | 0.20 |
| | WS-07 | 0.169 | ha | R= | 0.27 |
| | WS-08 | 0.201 | ha | R= | 0.80 |
| | WS-09 | 0.130 | ha | R= | 0.86 |
| | WS-10 | 1.033 | ha | R= | 0.27 |
| | WS-11 | 0.929 | ha | R= | 0.30 |
| | WS-12 | 0.333 | ha | R= | 0.50 |
| | WS-13 | 0.285 | ha | R= | 0.26 |
| | WS-14 | 0.147 | ha | R= | 0.76 |
| Total Flow to Storm Stub = | | | | 4.149 | 0.42 |
| Roof Top | WS-15 (Controlled Rooftop Area) | 0.711 | ha | R= | 0.90 |
| | Total Un-Controlled = | 0.711 | ha | $\sum R=$ | 0.90 |

Post-development Stormwater Management

$I_{100} = 1735.688 / (T_d + 6.014)^{0.820}$ a = 1735.688 b = 0.82 C = 6.014

| | | Rooftop Storage | | | Overland Storage | | | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) | Height on Roof (m) |
|------------|-------------------|-------------------------|----------------------------------|-------------------------------|---------------------------|----------------------------------|-------------------------------|---------------------------|--------------------------|--------------------|
| Time (min) | Intensity (mm/hr) | Controlled Runoff (L/s) | Storage Volume (m ³) | Controlled Release Rate (L/s) | Controlled Runoff** (L/s) | Storage Volume (m ³) | Controlled Release Rate (L/s) | | | |
| 10 | 178.6 | 352.94 | 180 | 52.89 | 1143.76 | 224 | 770.0 | 0.00 | 823 | 0.101 |
| 20 | 120.0 | 237.09 | 210 | 61.88 | 794.69 | 30 | 770.0 | 0.00 | 832 | 0.118 |
| 30 | 91.9 | 181.58 | 213 | 63.47 | 624.72 | 0 | 770.0 | 0.00 | 833 | 0.120 |
| 40 | 75.1 | 148.53 | 205 | 62.94 | 522.02 | 0 | 770.0 | 0.00 | 833 | 0.116 |
| 50 | 64.0 | 126.41 | 195 | 61.35 | 452.07 | 0 | 770.0 | 0.00 | 831 | 0.110 |
| 60 | 55.9 | 110.48 | 188 | 58.18 | 399.65 | 0 | 770.0 | 0.00 | 828 | 0.106 |
| 70 | 49.8 | 98.41 | 180 | 55.53 | 359.71 | 0 | 770.0 | 0.00 | 826 | 0.101 |
| 80 | 45.0 | 88.93 | 173 | 52.89 | 327.75 | 0 | 770.0 | 0.00 | 823 | 0.097 |
| 90 | 41.1 | 81.26 | 167 | 50.24 | 301.40 | 0 | 770.0 | 0.00 | 820 | 0.094 |
| 100 | 37.9 | 74.92 | 164 | 47.60 | 279.16 | 0 | 770.0 | 0.00 | 818 | 0.092 |
| 110 | 35.2 | 69.58 | 152 | 46.54 | 261.60 | 0 | 770.0 | 0.00 | 817 | 0.086 |
| 120 | 32.9 | 65.02 | 148 | 44.43 | 245.39 | 0 | 770.0 | 0.00 | 814 | 0.083 |
| 130 | 30.9 | 61.07 | 171 | 39.14 | 227.90 | 0 | 770.0 | 0.00 | 809 | 0.096 |

Infiltration Gallery - 280m

Pipe Storage 13.74 m³
 Granular Storage 166.6 m³
Total Available Storage = 180.31 m³
 40% Void
 refer to Drawing C401 for detail

Rooftop Controls

Control-Flo Roof Drain Rate = 136 L/min
 Max HWL = 0.150 m
 Control-Flo Roof Drain Rate = 15.11 L/s-m
 # of roof drains = 35
 Max Roof Storage = 212.6 m³
 Height = 0.120 m
 Max Roof Rate = 63.47 L/s

Onsite Stormwater Retention

Total Storage Required = 224.25 m³
 Rooftop Ponding = 212.61 m³
 Pipe Storage = 104.88 m³
 CB/MH Storage = 16.55 m³
 Infiltration Gallery = 180.00 m³
Total Available Storage = 301.42 m³
 refer to Storm Sewer Design Sheet
 refer to Storm Sewer Design Sheet
 refer to Drawing C401



LRL File No. 170364
Project: Public High School Barrhaven Centre
Location: 4005 Strandherd Drive, Barrhaven, Ottawa
Date: January 16, 2019
Designed: G. Brunet
Checked: J.C. Lalonde
Drawing Ref.: C401

**Stormwater Management
Design Sheet**

STORM - 5 YEAR

Runoff Equation

$Q = 2.78CIA \text{ (L/s)}$
 $C = \text{Runoff coefficient}$
 $I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^B$
 $A = \text{Area (ha)}$
 $T_c = \text{Time of concentration (min)}$

Pre-Development Catchments within Development Area

Allowable Release Rate

5 Year Pre-Development Flow Rate

$I_s = 998.071 / (T_d + 6.053)^{0.814}$ $a = 998.071$ $b = 0.814$ $C = 6.053$

Allowable Release Rate = **884.00** L/s

As Per J.L. Richards, Harmony Stage 1 Report Dated July 2017

Post-development Stormwater Management

| | | | | ΣR_s | ΣR_{100} |
|----------------------------|---------------------------------|--------------|-----------|--------------|------------------|
| Total Site Area = | | | | 4.860 | 0.49 |
| Controlled | WS-01 | 0.059 | ha | R= | 0.90 |
| | WS-02 | 0.105 | ha | R= | 0.23 |
| | WS-03 | 0.281 | ha | R= | 0.73 |
| | WS-04 | 0.221 | ha | R= | 0.90 |
| | WS-05 | 0.161 | ha | R= | 0.24 |
| | WS-06 | 0.095 | ha | R= | 0.20 |
| | WS-07 | 0.169 | ha | R= | 0.27 |
| | WS-08 | 0.201 | ha | R= | 0.80 |
| | WS-09 | 0.130 | ha | R= | 0.86 |
| | WS-10 | 1.033 | ha | R= | 0.27 |
| | WS-11 | 0.929 | ha | R= | 0.30 |
| | WS-12 | 0.333 | ha | R= | 0.50 |
| | WS-13 | 0.285 | ha | R= | 0.26 |
| | WS-14 | 0.147 | ha | R= | 0.76 |
| Total Flow to Storm Stub = | | | | 4.149 | 0.42 |
| Roof Top | WS-15 (Controlled Rooftop Area) | 0.711 | ha | R= | 0.90 |
| | Total Un-Controlled = | 0.711 | ha | $\Sigma R =$ | 0.90 |

5 Year Stormwater Management Calculations

$I_s = 998.071 / (T_d + 6.053)^{0.814}$ $a = 998.071$ $b = 0.814$ $C = 6.053$

| Time (min) | Intensity (mm/hr) | Rooftop Storage | | | Overland Storage | | | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) | Height on Roof (m) |
|------------|-------------------|-------------------------|---------------------|-------------------------------|---------------------------|---------------------|-------------------------------|---------------------------|--------------------------|--------------------|
| | | Controlled Runoff (L/s) | Storage Volume (m³) | Controlled Release Rate (L/s) | Controlled Runoff** (L/s) | Storage Volume (m³) | Controlled Release Rate (L/s) | | | |
| 10 | 104.2 | 185.35 | 95 | 27.14 | 536.38 | 0 | 770.00 | 0.00 | 797.14 | 0.053 |
| 20 | 70.3 | 124.97 | 111 | 32.36 | 375.71 | 0 | 770.00 | 0.00 | 802.36 | 0.063 |
| 30 | 53.9 | 95.93 | 113 | 32.88 | 296.45 | 0 | 770.00 | 0.00 | 802.88 | 0.064 |
| 40 | 44.2 | 78.60 | 111 | 32.36 | 248.31 | 0 | 770.00 | 0.00 | 802.36 | 0.062 |
| 50 | 37.7 | 66.98 | 107 | 31.32 | 215.34 | 0 | 770.00 | 0.00 | 801.32 | 0.060 |
| 60 | 32.9 | 58.60 | 102 | 30.27 | 191.28 | 0 | 770.00 | 0.00 | 800.27 | 0.057 |
| 70 | 29.4 | 52.25 | 97 | 29.23 | 172.78 | 0 | 770.00 | 0.00 | 799.23 | 0.054 |
| 80 | 26.6 | 47.25 | 94 | 27.66 | 157.48 | 0 | 770.00 | 0.00 | 797.66 | 0.053 |
| 90 | 24.3 | 43.21 | 90 | 26.62 | 145.33 | 0 | 770.00 | 0.00 | 796.62 | 0.050 |
| 100 | 22.4 | 39.86 | 86 | 25.57 | 135.09 | 0 | 770.00 | 0.00 | 795.57 | 0.048 |
| 110 | 20.8 | 37.04 | 83 | 24.53 | 126.30 | 0 | 770.00 | 0.00 | 794.53 | 0.046 |
| 120 | 19.5 | 34.63 | 80 | 23.49 | 118.63 | 0 | 770.00 | 0.00 | 793.49 | 0.045 |
| 130 | 18.3 | 32.54 | 79 | 22.44 | 111.86 | 0 | 770.00 | 0.00 | 792.44 | 0.044 |
| 260 | 10.6 | 18.85 | 0 | 19.83 | 71.63 | 0 | 770.00 | 0.00 | 789.83 | 0.000 |

Onsite Stormwater Retention

Total Storage Required = 0.00 m³
 Rooftop Ponding = 113.49 m³
 Pipe Storage = 104.88 m³
 CB/MH Storage = 16.55 m³
 Infiltration Gallery = 180.00 m³
Total Available Storage = 301.42 m³

refer to Storm Sewer Design Sheet
 refer to Storm Sewer Design Sheet
 refer to Drawing C401

Rooftop Controls

Control-Flo Roof Drain Rate = 136 L/min
 Max HWL = 0.152 m
 Control-Flo Roof Drain Rate = 14.91 L/s-m
 # of roof drains = 35
 Max Roof Storage = 113.5 m³
 Height = 0.064 m
 Max Roof Rate = 32.88 L/s

APPENDIX D

Supporting Documents

STORM SEWER DESIGN SHEET

Date: July 2017

Denotes Existing Storm Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010

| STREET | Maintenance Hole Number | | DRAINAGE AREAS | | | | | | | | | | Inlet Time (min.) | In Pipe Flow Time (min.) | 2 YR PEAK FLOW | | | | 5 YR PEAK FLOW | | | | TOTAL Peak Design Flow (L/s) | PLUG FLOW Peak ICD Flow (L/s) | SEWER DATA | | | | | | | Residual Capacity Q _{cap} - Q _d (L/s) | UPSTREAM | | | | DOWNSTREAM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|------------------------------------|----------------|--------------|----------------------|------|------|------|------|----------------------|------------------------------|------------------------------|----------------------------------|------------------------------|----------------------|------------------------------|-------------------------|----------------------------------|-----------------|--------------|------------------|------------------------|------------------------------|-------------------------------|--------------------|--------------------|-------------|------------------------------|-----------------------------------|------------------------------|-----------------------------|---|----------------------------------|--------------------------------------|--------------------------------------|------------------------------|------------------------------------|--------------------------------|--------------------------------------|--------------------------------------|------------------------------|----------------------|--------------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----|
| | | | 0.30 | 0.53 | 0.72 | 0.75 | 0.76 | 0.80 | 0.90 | Total Area | | Cum. Area 2 YR (ha) | | | Cum. Area 5 YR (ha) | 2.78AR | 2.78AR Cum. | 2 Yr Intensity (mm/hr) | Peak Flow (L/s) | 2.78AR | 2.78AR Cum. | 5 Yr Intensity (mm/hr) | | | Peak Flow (L/s) | PIPE Dia (mm) | H (mm) | W (mm) | Slope (%) | Q full (L/s) | V full (m/s) | | Length (m) | Center Line | Obvert | Invert | Cover | Center Line | Drop | Obvert | Invert | Cover | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FROM | TO | 2 Yr | 5 Yr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commercial (Block 105) | Stub | MH120 | | | | | | 0.76 | | 0.76 | 0.00 | 0.76 | 10.00 10.42 | 0.42 | | | | | 1.90 | 1.90 | 104.19 | 198.1 | 198.13 | 235.0 | 600 | | | | 0.15 | 248.09 | 0.85 | 21.6 | 50.0 | 94.34 | 91.835 | 91.225 | 2.51 | 94.24 | 0.00 | 91.803 | 91.193 | 2.44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | MH120 | MH121 | | | 0.55 | | | | 0.55 | 0.00 | 1.31 | 10.42 12.58 | 2.16 | | | | | 1.10 | 3.00 | 102.01 | 306.2 | 306.28 | 135.0 | 675 | | | | 0.15 | 339.63 | 0.92 | 119.2 | 33.4 | 94.24 | 91.803 | 91.117 | 2.44 | 94.41 | -0.34 | 91.624 | 90.938 | 2.79 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future Institutional Block | Stub | MH121 | | | | 4.86 | | | | 4.86 | 0.00 | 4.86 | 10.00 10.14 | 0.14 | | | | | 10.13 | 10.13 | 104.19 | 1055.0 | 1055.80 | 884.0 | 650 | | | | 0.25 | 1424.40 | 1.59 | 13.8 | 368.6 | 94.41 | 92.001 | 90.934 | 2.41 | 94.32 | 0.00 | 91.967 | 90.900 | 2.35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | MH123 | MH124 | | | 0.34 | | | | | 0.34 | 0.00 | 0.34 | 10.00 11.69 | 1.69 | | | | | 0.68 | 0.68 | 104.19 | 70.91 | 70.91 | 30.0 | 450 | | | | 0.20 | 133.02 | 0.81 | 82.2 | 62.1 | 94.30 | 91.406 | 90.949 | 2.89 | 93.45 | 0.00 | 91.242 | 90.785 | 2.21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Density (Block 118) Chakra (Street No. 6) | Stub MH125 | MH125 MH123 | | | | | 0.32 | | | 0.32 | 0.00 0.10 | 0.32 0.32 | 10.00 10.19 11.08 | 0.19 0.88 | | | | | 0.71 0.71 | 0.71 0.71 | 104.19 103.22 | 74.15 73.46 | 74.15 88.69 | 89.0 16.0 | 375 375 | | | | 0.35 0.35 | 108.21 108.21 | 0.95 0.95 | 10.6 50.0 | 34.1 19.5 | 94.40 94.28 | 91.588 91.491 | 91.207 91.110 | 2.81 2.79 | 94.28 94.30 | 0.06 0.00 | 91.551 91.316 | 91.170 90.935 | 2.73 2.98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | MH123 | MH122 | | | 0.19 | | | | | 0.19 | 0.10 | 0.51 | 11.06 | 0.82 | | 0.20 | 72.95 | 14.60 | 0.38 | 1.09 | 98.89 | 107.98 | 122.59 | 48.0 | 600 | | | | 0.15 | 248.09 | 0.85 | 41.8 | 125.5 | 94.30 | 91.316 | 90.706 | 2.98 | 94.18 | 0.00 | 91.253 | 90.644 | 2.93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | MH122 | MH121 | | | | | | | | | 0.10 | 0.51 | 11.88 | 0.63 | | 0.20 | 70.26 | 14.06 | | 1.09 | 95.20 | 103.95 | 118.02 | 0.0 | 600 | | | | 0.15 | 248.09 | 0.85 | 32.3 | 130.1 | 94.18 | 91.253 | 90.644 | 2.93 | 94.32 | -0.76 | 91.205 | 90.595 | 3.12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) | MH121 | MH115 | | | 0.34 | | | | | 0.34 | 0.44 | 6.68 | 12.58 13.80 | 1.22 | 0.68 | 0.88 | 68.13 | 60.00 | | | | | | | | | | | 0.15 | 2156.55 | 1.46 | 106.5 | 783.7 | 94.32 | 91.967 | 90.595 | 2.35 | 94.22 | 0.00 | 91.807 | 90.435 | 2.41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Park (Block 117) | Stub | MH115 | 1.53 | | | | | | | | | | 10.00 10.27 | 0.27 | | | | | 1.28 | 1.28 | 104.19 | 132.95 | 132.95 | 84.0 | 450 | | | | 0.25 | 148.72 | 0.91 | 14.8 | 15.8 | 94.33 | 91.387 | 90.929 | 2.94 | 94.21 | -0.46 | 91.350 | 90.893 | 2.86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) | MH115 | MH115A | | 0.42 | 0.41 | | | | | 0.83 | 1.27 | 8.21 | 13.80 14.68 | 0.88 | 1.44 | 2.32 | 64.76 | 150.24 | | | | | | | | | | | 0.15 | 2156.55 | 1.46 | 77.3 | 647.4 | 94.22 | 91.807 | 90.435 | 2.41 | 94.10 | -0.08 | 91.691 | 90.319 | 2.41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Waterlilly Way Waterlilly Way | MH118 MH117 | MH117 MH116 | | 0.17 0.34 | 0.39 | | | | | 0.56 0.34 | 0.56 0.90 | 0.00 0.00 | 10.00 11.49 12.70 | 1.49 1.21 | 1.03 0.68 | 1.03 1.71 | 76.81 71.54 | 79.19 122.44 | | | | | 79.19 122.44 | 62.0 52.0 | 600 675 | | | | 0.20 0.20 | 286.47 392.18 | 0.98 1.06 | 87.5 77.3 | 207.3 269.7 | 94.50 94.40 | 92.214 92.039 | 91.604 91.353 | 2.29 2.36 | 94.30 94.30 | 0.00 0.00 | 92.039 91.884 | 91.429 91.198 | 2.26 2.42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Easement (Block 110) | MH116 | MH115A | | | | | | | | | 0.90 | 0.00 | 12.70 14.11 | 1.41 | | 1.71 | 67.79 | 116.03 | | | | | 116.03 | 0.0 | 675 | | | | 0.15 | 339.63 | 0.92 | 77.9 | 223.6 | 94.16 | 91.884 | 91.198 | 2.28 | 94.32 | 0.00 | 91.767 | 91.081 | 2.55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) | MH115A | MH113 | | 0.46 | | | | | | 0.46 | 2.63 | 8.21 | 14.68 15.11 | 0.43 | 0.68 | 4.71 | 62.53 | 294.48 | | | | | 15.50 | 84.60 | 1311.58 | 1606.07 | 0.0 | 1500 | | 0.15 | 2856.14 | 1.57 | 40.4 | 1250.1 | 94.22 | 91.767 | 90.243 | 2.45 | 94.10 | 0.00 | 91.707 | 90.183 | 2.39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Namaste (Street No. 4) | MH114 | MH113 | | 0.11 | 0.42 | | | | | 0.53 | 0.53 | 0.00 | 10.00 11.65 | 1.65 | 1.00 | 1.00 | 76.81 | 77.02 | | | | | 77.02 | 66.0 | 600 | | | | 0.20 | 286.47 | 0.98 | 96.9 | 209.5 | 94.17 | 91.603 | 90.994 | 2.57 | 94.10 | -0.30 | 91.409 | 90.800 | 2.69 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) | MH113 | MH110 | | | 0.24 | | | | | 0.24 | 3.40 | 8.21 | 15.11 15.95 | 0.84 | 0.48 | 6.19 | 61.51 | 380.89 | | | | | 15.50 | 83.20 | 1289.87 | 1670.76 | 36.0 | 1500 | | 0.15 | 2856.14 | 1.57 | 78.9 | 1185.4 | 94.10 | 91.707 | 90.183 | 2.39 | 94.02 | 0.00 | 91.588 | 90.064 | 2.43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Waterlilly Way Waterlilly Way Lilthe (Street No. 3) | MH109A EX. 21 MH109 | EX. 21 MH109 MH110 | | | 0.13 0.17 0.22 | | | 0.18 | | 0.13 0.35 0.22 | 0.13 0.48 0.70 | 0.00 0.00 0.00 | 10.00 11.65 12.60 | 1.65 0.96 1.27 | 0.26 0.72 1.42 | 0.26 0.98 1.42 | 76.81 71.01 68.07 | 19.99 69.65 96.74 | | | | | 19.99 69.65 96.74 | 18.0 -- 34.0 | 300 300 450 | | | | 0.35 0.33 0.35 | 59.68 57.95 175.96 | 0.82 0.80 1.07 | 80.8 45.9 81.7 | 39.7 -11.7 79.2 | 94.60 94.77 95.00 | 92.393 92.110 91.508 | 92.088 91.805 91.051 | 2.21 2.66 3.49 | 94.77 95.00 94.02 | 0.00 0.45 -0.37 | 92.110 91.959 91.222 | 91.805 91.654 90.765 | 2.66 3.04 2.80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lilthe (Street No. 3) Lilthe (Street No. 3) | MH112 MH111 | MH111 MH110 | | | | | | | | | 0.00 0.80 | 0.00 0.00 | 10.00 11.30 12.46 | 1.30 1.16 | | 1.46 | | 105.23 | | | | 0.00 105.23 | 0.0 84.0 | 375 600 | | | | 0.25 0.16 | 91.46 256.22 | 0.80 0.88 | 62.7 60.9 | 54.1 151.0 | 94.14 93.80 | 91.545 91.388 | 91.164 90.779 | 2.59 2.41 | 93.80 94.02 | 0.00 -0.30 | 91.388 91.291 | 91.007 90.681 | 2.41 2.73 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) Clarity (Street No. 5) | MH110 MH110A | MH110A MH106 | | | | | | | | 0.23 | 4.90 5.13 | 8.21 8.21 | 15.95 16.29 16.75 | 0.34 0.47 | | 9.07 9.53 | 59.61 58.89 | 540.82 561.37 | | | | | 15.50 15.50 | 80.61 79.62 | 1249.67 1234.34 | 1790.49 1795.71 | 0.0 34.0 | 1500 1500 | | 0.15 0.15 | 2856.14 2856.14 | 1.57 1.57 | 31.6 44.0 | 1065.6 1060.4 | 94.02 93.68 | 91.588 91.541 | 90.064 90.017 | 2.43 2.14 | 93.68 93.94 | 0.00 -0.04 | 91.541 91.475 | 90.017 89.951 | 2.14 2.46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Octave (Street No. 2) Octave (Street No. 2) | MH108 MH107 | MH107 MH106 | | 0.33 | | | | | | 0.33 | 0.33 0.89 | 0.00 0.00 | 10.00 11.30 12.64 | 1.30 1.33 | 0.49 1.12 | 0.49 1.61 | 76.81 72.14 | 37.34 115.94 | | | | | 37.34 115.94 | 0.0 90.0 | 375 525 | | | | 0.25 0.16 | 91.46 179.46 | 0.80 0.80 | 62.7 64.3 | 54.1 63.5 | 94.02 93.75 | 91.769 91.612 | 91.388 91.079 | 2.25 2.14 | 93.75 93.94 | 0.00 0.00 | 91.612 91.510 | 91.231 90.976 | 2.14 2.43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clarity (Street No. 5) | MH106 | MH102 | | 0.40 | 0.24 | | | | | 0.64 | 6.66 | 8.21 | 16.75 17.49 | 0.73 | 1.07 | 12.21 | 57.91 | 707.11 | | | | | 15.50 | 78.29 | 1213.69 | 1920.81 | 36.0 | | 1585 | 2495 | 0.15 | 5749.47 | 1.87 | 82.2 | 3828.7 | 93.94 | 91.513 | 89.913 | 2.43 | 93.86 | 0.00 | 91.390 | 89.790 | 2.47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Waterlilly Way Waterlilly Way Waterlilly Way Hamsa (Street No. 1) | MH109 EX. 20 EX. 19 EX.19 MH101 | EX. 20 EX. 19 MH101 MH102 | | | | | | | | | 0.00 0.33 0.33 0.52 | 0.00 0.00 0.00 0.00 | 10.00 10.16 11.57 13.16 | 0.16 1.40 1.59 1.42 | | 0.68 0.68 0.68 1.06 | | 51.77 51.77 48.43 66.49 | | | | | 0.00 51.77 -- 70.46 | -- -- 375 450 | | | | 0.33 0.24 0.28 0.25 | 57.95 89.05 96.96 148.72 | 0.80 0.80 0.85 0.91 | 7.7 67.4 81.2 77.2 | | 95.00 94.96 94.68 94.00 | 91.960 91.961 91.761 91.171 | 91.656 91.580 91.380 90.714 | 3.04 3.00 2.92 2.83 | 94.96 94.68 91.533 90.978 | -0.03 0.04 0.36 -0.41 | 91.935 91.801 91.533 90.978 | 91.630 91.420 91.152 90.521 | 3.03 2.88 2.41 2.88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hamsa (Steet No. 1) | MH102 | MH103 | | | 0.22 | | | | | 0.22 | 7.40 | 8.21 | 17.49 17.82 | 0.33 | 0.44 | 13.71 | 56.46 | 774.00 | | | | | 15.50 | 76.29 | 1182.80 | 1956.79 | 32.0 | | 1585 | 2495 | 0.15 | 5749.47 | 1.87 | 36.6 | 3792.7 | 93.86 | 91.390 | 89.790 | 2.47 | 93.37 | -0.38 | 91.335 | 89.735 | 2.04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hamsa (Street No. 1) | MH105 | MH103 | | 0.32 | 0.25 | | | | | 0.57 | 0.57 | 0.00 | 10.00 11.89 | 1.89 | 0.97 | 0.97 | 76.81 | 74.65 | | | | | 74.65 | 40.0 | 525 | | | | 0.16 | 179.46 | 0.80 | 91.0 | 104.8 | 93.95 | 91.107 | 90.574 | 2.84 | 93.40 | -0.75 | 90.961 | 90.428 | 2.44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Easement (Block 116) Easement (Block 116) | MH103 MH104 | MH104 Pond | | | | | | | | | 7.97 7.97 | 8.21 8.21 | 17.82 18.14 18.38 | 0.33 0.24 | | 14.68 14.68 | 55.83 55.23 | 819.72 810.82 | | | | | 15.50 15.50 | 75.44 74.61 | 1169.60 1156.77 | 1989.32 1967.59 | 0.0 0.0 | 1950 1950 | | 0.15 0.15 | 5749.47 5749.47 | 1.87 1.87 | 36.4 26.7 | 3760.1 3781.9 | 93.37 93.50 | 91.716 91.661 | 89.735 89.680 | 1.65 1.84 | 93.50 93.50 | 0.00 0.00 | 91.661 91.621 | 89.680 89.640 | 1.84 1.88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | </ |



HARMONY STAGE 1
4005 STRANDHERD DRIVE
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR NO. 24051-001

SANITARY SEWER DESIGN SHEET

Designed by: J.W.

Checked by: K.F.

Date : May 2017

| | | | | | |
|-------------------------------|-------|-----------|---------|-------|-----------|
| Single Family | 3.4 | pers/unit | q = | 350 | L/cap/day |
| Semi-Detached/Townhouse (row) | 2.7 | pers/unit | I = | 0.280 | L/s/ha |
| Manning's Coeff. N = | 0.013 | | Inst. = | 50000 | L/ha/day |

| | |
|--|---|
| | Denotes Existing Sanitary Sewer (South Nepean Collector) - In accordance with City of Ottawa Drawings Contract No. ISD14-2033 |
| | Denotes Existing Sanitary Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010 |
| | Denotes Future External Lands (Refer to South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet prepared by Novatech, dated August 2015) |

| STREET | M.H. # | | RESIDENTIAL | | | | | | INSTITUTIONAL/COMMERCIAL | | | | PEAK EXTR. FLOW l/s | PEAK DES. FLOW l/s | SEWER DATA | | | | | RESIDUAL CAP. l/s | UPSTREAM | | | | DOWNSTREAM | | | | | |
|--------------------------------------|----------|----------|-----------------|--------------|---------|------------|--------|----------------|--------------------------|---------|---------------|----------------|---------------------|--------------------|------------|---------|------------|----------|----------|-------------------|-------------|--------|--------|-------|-------------|-------------|--------|--------|--------|--|
| | | | NUMBER OF UNITS | | | CUMULATIVE | | PEAKING FACTOR | POPUL. FLOW l/s | AREA ha | CUMM. AREA ha | INST. FLOW l/s | | | DIA. mm | SLOPE % | CAPAC. l/s | VEL. m/s | LENGTH m | | Center Line | Obvert | Invert | Cover | Center Line | Obvert Drop | Obvert | Invert | Cover | |
| | SING. | MULT. | AREA ha | POPUL. peop. | AREA ha | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hamsa Street (Street No. 1) | MH1 | MH2 | 10 | 0 | 0.48 | 34 | 0.48 | 4.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.13 | 0.69 | 200 | 0.35 | 20.2 | 0.62 | 64.5 | 19.56 | 94.06 | 92.191 | 91.988 | 1.87 | 93.86 | 1.00 | 91.965 | 91.762 | 1.89 | |
| Hamsa Street (Street No. 1) | MH5 | MH3 | 15 | 0 | 0.69 | 51 | 0.69 | 4.00 | 0.83 | 0.00 | 0.00 | 0.00 | 0.19 | 1.02 | 200 | 0.35 | 20.2 | 0.62 | 88.9 | 19.22 | 93.88 | 91.462 | 91.259 | 2.42 | 93.47 | | 91.151 | 90.947 | 2.32 | |
| Hamsa Street (Street No. 1) | MH3 | MH2 | 5 | 0 | 0.26 | 68 | 0.95 | 4.00 | 1.10 | 0.00 | 0.00 | 0.00 | 0.27 | 1.37 | 200 | 0.35 | 20.2 | 0.62 | 37.0 | 18.87 | 93.47 | 91.151 | 90.947 | 2.32 | 93.86 | 0.06 | 91.021 | 90.818 | 2.84 | |
| Clarity Street (Street No. 5) | MH2 | MH6 | 4 | 0 | 0.25 | 116 | 1.68 | 4.00 | 1.87 | 0.00 | 0.00 | 0.00 | 0.47 | 2.34 | 200 | 0.35 | 20.2 | 0.62 | 76.1 | 17.90 | 93.86 | 90.961 | 90.758 | 2.90 | 93.94 | | 90.695 | 90.491 | 3.25 | |
| Octave Street (Street No. 2) | MH8 | MH7 | 12 | 0 | 0.51 | 41 | 0.51 | 4.00 | 0.66 | 0.00 | 0.00 | 0.00 | 0.14 | 0.80 | 200 | 0.35 | 20.2 | 0.62 | 62.6 | 19.44 | 94.07 | 91.194 | 90.991 | 2.88 | 93.77 | | 90.975 | 90.772 | 2.79 | |
| Octave Street (Street No. 2) | MH7 | MH6 | 10 | 0 | 0.41 | 75 | 0.92 | 4.00 | 1.21 | 0.00 | 0.00 | 0.00 | 0.26 | 1.47 | 200 | 0.35 | 20.2 | 0.62 | 63.1 | 18.77 | 93.77 | 90.975 | 90.772 | 2.79 | 93.94 | 0.06 | 90.755 | 90.551 | 3.19 | |
| Clarity Street (Street No. 5) | MH6 | MH10A | 4 | 0 | 0.24 | 204 | 2.84 | 4.00 | 3.31 | 0.00 | 0.00 | 0.00 | 0.80 | 4.10 | 200 | 0.35 | 20.2 | 0.62 | 51.0 | 16.14 | 93.94 | 90.695 | 90.491 | 3.25 | 93.76 | | 90.516 | 90.313 | 3.24 | |
| Clarity Street (Street No. 5) | MH10A | MH10 | 0 | 0 | 0.00 | 204 | 2.84 | 4.00 | 3.31 | 0.00 | 0.00 | 0.00 | 0.80 | 4.10 | 200 | 0.35 | 20.2 | 0.62 | 25.4 | 16.14 | 93.76 | 90.516 | 90.313 | 3.24 | 94.02 | | 90.427 | 90.224 | 3.59 | |
| Lilith Street (Street No. 3) | MH9 | MH10 | 0 | 14 | 0.46 | 38 | 0.46 | 4.00 | 0.61 | 0.00 | 0.00 | 0.00 | 0.13 | 0.74 | 200 | 0.35 | 20.2 | 0.62 | 65.5 | 19.50 | 95.00 | 92.343 | 92.139 | 2.66 | 94.02 | 1.69 | 92.113 | 91.910 | 1.91 | |
| Lilith Street (Street No. 3) | MH12 | MH11 | 10 | 0 | 0.46 | 34 | 0.46 | 4.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.13 | 0.68 | 200 | 0.35 | 20.2 | 0.62 | 62.8 | 19.56 | 94.15 | 90.919 | 90.716 | 3.23 | 93.84 | | 90.699 | 90.496 | 3.14 | |
| Lilith Street (Street No. 3) | MH11 | MH10 | 9 | 0 | 0.41 | 65 | 0.87 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.24 | 1.29 | 200 | 0.35 | 20.2 | 0.62 | 60.5 | 18.95 | 93.84 | 90.699 | 90.496 | 3.14 | 94.02 | 0.06 | 90.487 | 90.284 | 3.53 | |
| Clarity Street (Street No. 5) | MH10 | MH13 | 0 | 6 | 0.27 | 323 | 4.44 | 4.00 | 5.23 | 0.00 | 0.00 | 0.00 | 1.24 | 6.47 | 200 | 0.35 | 20.2 | 0.62 | 78.5 | 13.77 | 94.02 | 90.427 | 90.224 | 3.59 | 94.10 | | 90.153 | 89.949 | 3.95 | |
| Namaste (Street No. 4) | MH14 | MH13 | 14 | 0 | 0.69 | 48 | 0.69 | 4.00 | 0.77 | 0.00 | 0.00 | 0.00 | 0.19 | 0.96 | 200 | 0.35 | 20.2 | 0.62 | 97.1 | 19.28 | 94.20 | 90.552 | 90.349 | 3.65 | 94.10 | 0.06 | 90.213 | 90.009 | 3.89 | |
| Clarity Street (Street No. 5) | MH13 | MH15 | 0 | 17 | 0.59 | 416 | 5.72 | 4.00 | 6.74 | 0.00 | 0.00 | 0.00 | 1.60 | 8.34 | 200 | 0.35 | 20.2 | 0.62 | 117.4 | 11.90 | 94.10 | 90.153 | 89.949 | 3.95 | 94.22 | -0.05 | 89.742 | 89.538 | 4.48 | |
| Park (Block 117) | MH16 | MH15 | 0 | 0 | 1.67 | 0 | 1.67 | 4.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.47 | 0.47 | 150 | 0.50 | 11.2 | 0.62 | 12.9 | 10.77 | 94.32 | 90.357 | 90.205 | 3.96 | 94.22 | 0.50 | 90.293 | 90.140 | 3.93 | |
| Clarity Street (Street No. 5) | MH15 | EX. CM 4 | 0 | 12 | 0.46 | 449 | 7.85 | 4.00 | 7.26 | 0.00 | 0.00 | 0.00 | 2.20 | 9.46 | 300 | 2.00 | 142.7 | 1.96 | 106.9 | 133.21 | 94.22 | 89.793 | 89.488 | 4.43 | 94.32 | 0.01 | 87.655 | 87.350 | 6.66 | |
| Future Institutional (Block 127) | STUB | EX. CM 4 | 0 | 0 | 0.00 | 0 | 0.00 | 4.00 | 0.00 | 4.86 * | 4.86 | 4.22 | 1.36 | 5.58 | 250 | 1.00 | 62.0 | 1.22 | 15.7 | 56.46 | 94.41 | 90.431 | 90.177 | 3.98 | 94.32 | 2.63 | 90.274 | 90.020 | 4.05 | |
| Upstream Mixed Use Development | -- | EX. CM 1 | -- | -- | 105.84 | 10974 | 105.84 | 2.91 | 129.56 | 175.19 | 175.19 | 152.07 | 78.69 | 360.33 | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | EX. CM 1 | EX. CM 2 | 0 | 0 | 0.16 | 10974 | 106.00 | 2.91 | 129.56 | 0.00 | 175.19 | 152.07 | 78.73 | 360.37 | 900 | 0.10 | 597.2 | 0.91 | 60.9 | 236.85 | 95.03 | 87.833 | 86.918 | 7.20 | 94.43 | | 87.772 | 86.857 | 6.66 | |
| Future Commercial (Block 105) | STUB | EX. CM 2 | 0 | 0 | 0.00 | 0 | 0.00 | 4.00 | 0.00 | 0.76 | 0.76 | 0.66 | 0.21 | 0.87 | 250 | 1.00 | 62.0 | 1.22 | 15.0 | 61.17 | 94.53 | 90.624 | 90.370 | 3.91 | 94.43 | 2.70 | 90.474 | 90.220 | 3.96 | |
| Chapman Mills Drive | EX. CM 2 | EX. CM 3 | 0 | 0 | 0.16 | 10974 | 106.16 | 2.91 | 129.56 | 0.00 | 175.95 | 152.73 | 78.99 | 361.29 | 900 | 0.10 | 597.2 | 0.91 | 47.4 | 235.94 | 94.43 | 87.772 | 86.857 | 6.66 | 94.41 | | 87.724 | 86.810 | 6.69 | |
| Waterlilly Way | EX. 22A | 17 | 0 | 22 | 0.56 | 59 | 0.56 | 4.00 | 0.96 | 0.00 | 0.00 | 0.00 | 0.16 | 1.12 | 200 | 1.00 | 34.2 | 1.06 | 84.2 | 33.10 | 94.59 | 92.702 | 92.499 | 1.89 | 94.40 | 0.55 | 91.860 | 91.657 | 2.54 | |
| Waterlilly Way | 17 | EX. CM 3 | 5 | 17 | 0.70 | 122 | 1.26 | 4.00 | 1.98 | 0.00 | 0.00 | 0.00 | 0.35 | 2.33 | 250 | 1.00 | 62.0 | 1.22 | 105.6 | 59.70 | 94.40 | 91.310 | 91.056 | 3.09 | 94.41 | 2.53 | 90.254 | 90.000 | 4.16 | |
| Chapman Mills Drive | EX. CM 3 | EX. CM 4 | 0 | 0 | 0.21 | 11096 | 107.63 | 2.91 | 130.79 | 0.00 | 175.95 | 152.73 | 79.40 | 362.93 | 900 | 0.10 | 597.2 | 0.91 | 76.1 | 234.30 | 94.41 | 87.724 | 86.810 | 6.69 | 94.32 | | 87.648 | 86.734 | 6.67 | |
| Chapman Mills Drive | EX. CM 4 | EX. CM 5 | 0 | 0 | 0.09 | 11545 | 115.57 | 2.89 | 135.27 | 0.00 | 180.81 | 156.95 | 82.99 | 375.21 | 900 | 0.10 | 597.2 | 0.91 | 32.0 | 222.01 | 94.32 | 87.648 | 86.734 | 6.67 | 94.20 | | 87.616 | 86.702 | 6.58 | |
| Chapman Mills Drive | EX. CM 5 | EX. CM 6 | 0 | 0 | 0.11 | 11545 | 115.68 | 2.89 | 135.27 | 0.00 | 180.81 | 156.95 | 83.02 | 375.24 | 900 | 0.10 | 597.2 | 0.91 | 42.3 | 221.98 | 94.20 | 87.616 | 86.702 | 6.58 | 94.30 | | 87.574 | 86.660 | 6.73 | |
| High Density Residential (Block 118) | STUB | 18 | 0 | 24 | 0.32 | 65 | 0.32 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.09 | 1.14 | 200 | 0.35 | 20.2 | 0.62 | 9.0 | 19.10 | 94.39 | 90.090 | 89.887 | 4.30 | 94.27 | 0.00 | 90.059 | 89.855 | 4.21 | |
| Chakra Street (Street No. 6) | 18 | EX. CM 6 | 0 | 0 | 0.10 | 65 | 0.42 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.12 | 1.17 | 300 | 4.00 | 201.8 | 2.77 | 46.8 | 200.60 | 94.27 | 90.059 | 89.754 | 4.21 | 94.30 | 0.61 | 88.185 | 87.880 | 6.11 | |
| Chapman Mills Drive | EX. CM 6 | EX. CM 7 | 0 | 0 | 0.21 | 11610 | 116.31 | 2.89 | 135.92 | 0.00 | 180.81 | 156.95 | 83.19 | 376.06 | 900 | 0.10 | 597.2 | 0.91 | 74.0 | 221.16 | 94.30 | 87.574 | 86.660 | 6.73 | 93.40 | 0.01 | 87.500 | 86.586 | 5.90 | |
| Future Residential Development | STUB | EX. CM 7 | 0 | 0 | 8.83 * | 1430 ** | 8.83 | 3.69 | 21.41 | 5.35 | 5.35 | 4.64 | 3.97 | 30.02 | 250 | 0.25 | 31.0 | 0.61 | 12.0 | 1.00 | 93.61 | 87.434 | 87.180 | 6.18 | 93.40 | -0.09 | 87.404 | 87.150 | 6.00 | |
| Chapman Mills Drive | EX. CM 7 | EX. CM 8 | 0 | 0 | 0.00 | 13040 | 125.14 | 2.84 | 149.99 | 0.00 | 186.16 | 161.59 | 87.16 | 398.75 | 900 | 0.10 | 597.2 | 0.91 | 25.7 | 198.48 | 93.40 | 87.490 | 86.576 | 5.91 | 93.38 | | 87.464 | 86.550 | 5.92 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | INV = | 86.550 | |

Notes:
* Institutional, Commercial and Residential Area taken from Draft Plan of Subdivision prepared by Annis, O'Sullivan, Vollebekk Ltd. (Residential Area inclusive of Future Transit Corridor (2.279 Ha) and Servicing Easement (0.112 Ha))
** Cumulative Population based on Medium Density Residential Land Use (162 pers/ha) as per Novatech's South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet dated August 2015



HARMONY STAGE 1
4005 STRANDHERD DRIVE
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR NO. 24051-001

SANITARY SEWER DESIGN SHEET

Designed by: J.W.

Checked by: K.F.

Date : May 2017

| | | | | | |
|-------------------------------|-------|-----------|---------|-------|-----------|
| Single Family | 3.4 | pers/unit | q = | 350 | L/cap/day |
| Semi-Detached/Townhouse (row) | 2.7 | pers/unit | I = | 0.280 | L/s/ha |
| Manning's Coeff. N = | 0.013 | | Inst. = | 50000 | L/ha/day |

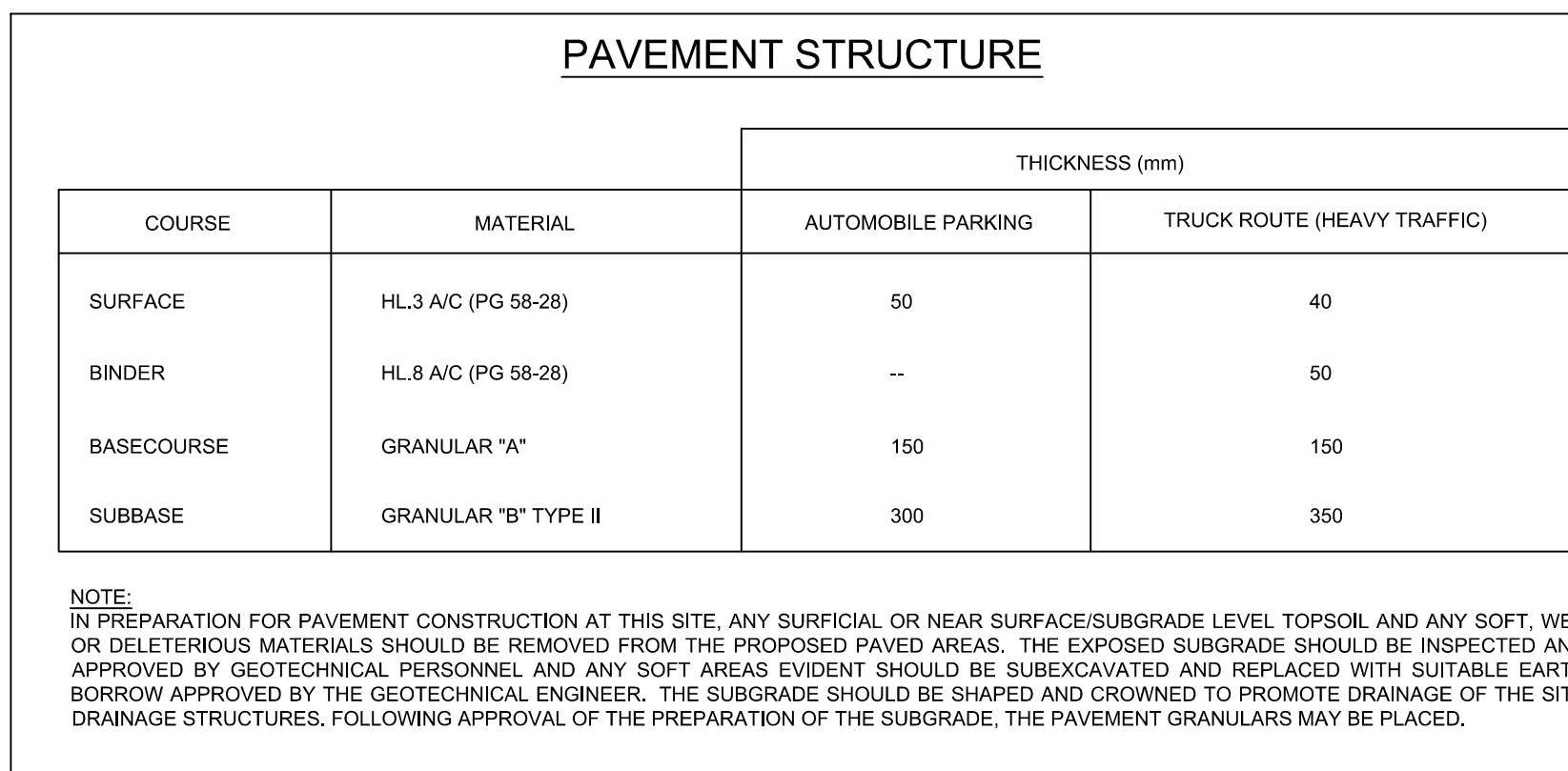
| | |
|--|---|
| | Denotes Existing Sanitary Sewer (South Nepean Collector) - In accordance with City of Ottawa Drawings Contract No. ISD14-2033 |
| | Denotes Existing Sanitary Sewer (Mattamy Barrhaven Mews) - Per IBI As-Constructed Drawings dated February 2010 |
| | Denotes Future External Lands (Refer to South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet prepared by Novatech, dated August 2015) |

| STREET | M.H. # | | RESIDENTIAL | | | | | | | INSTITUTIONAL/COMMERCIAL | | | PEAK EXTR. FLOW l/s | PEAK DES. FLOW l/s | SEWER DATA | | | | | RESIDUAL CAP. l/s | UPSTREAM | | | | DOWNSTREAM | | | | | |
|--------------------------------------|----------|----------|-----------------|--------------|---------|------------|--------|----------------|-----------------|--------------------------|---------------|----------------|---------------------|--------------------|------------|---------|------------|----------|----------|-------------------|-------------|--------|--------|-------|-------------|-------------|--------|--------|--------|--|
| | | | NUMBER OF UNITS | | | CUMULATIVE | | PEAKING FACTOR | POPUL. FLOW l/s | AREA ha | CUMM. AREA ha | INST. FLOW l/s | | | DIA. mm | SLOPE % | CAPAC. l/s | VEL. m/s | LENGTH m | | Center Line | Obvert | Invert | Cover | Center Line | Obvert Drop | Obvert | Invert | Cover | |
| | SING. | MULT. | AREA ha | POPUL. peop. | AREA ha | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hamsa Street (Street No. 1) | MH1 | MH2 | 10 | 0 | 0.48 | 34 | 0.48 | 4.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.13 | 0.69 | 200 | 0.35 | 20.2 | 0.62 | 64.5 | 19.56 | 94.06 | 92.191 | 91.988 | 1.87 | 93.86 | 1.00 | 91.965 | 91.762 | 1.89 | |
| Hamsa Street (Street No. 1) | MH5 | MH3 | 15 | 0 | 0.69 | 51 | 0.69 | 4.00 | 0.83 | 0.00 | 0.00 | 0.00 | 0.19 | 1.02 | 200 | 0.35 | 20.2 | 0.62 | 88.9 | 19.22 | 93.88 | 91.462 | 91.259 | 2.42 | 93.47 | | 91.151 | 90.947 | 2.32 | |
| Hamsa Street (Street No. 1) | MH3 | MH2 | 5 | 0 | 0.26 | 68 | 0.95 | 4.00 | 1.10 | 0.00 | 0.00 | 0.00 | 0.27 | 1.37 | 200 | 0.35 | 20.2 | 0.62 | 37.0 | 18.87 | 93.47 | 91.151 | 90.947 | 2.32 | 93.86 | 0.06 | 91.021 | 90.818 | 2.84 | |
| Clarity Street (Street No. 5) | MH2 | MH6 | 4 | 0 | 0.25 | 116 | 1.68 | 4.00 | 1.87 | 0.00 | 0.00 | 0.00 | 0.47 | 2.34 | 200 | 0.35 | 20.2 | 0.62 | 76.1 | 17.90 | 93.86 | 90.961 | 90.758 | 2.90 | 93.94 | | 90.695 | 90.491 | 3.25 | |
| Octave Street (Street No. 2) | MH8 | MH7 | 12 | 0 | 0.51 | 41 | 0.51 | 4.00 | 0.66 | 0.00 | 0.00 | 0.00 | 0.14 | 0.80 | 200 | 0.35 | 20.2 | 0.62 | 62.6 | 19.44 | 94.07 | 91.194 | 90.991 | 2.88 | 93.77 | | 90.975 | 90.772 | 2.79 | |
| Octave Street (Street No. 2) | MH7 | MH6 | 10 | 0 | 0.41 | 75 | 0.92 | 4.00 | 1.21 | 0.00 | 0.00 | 0.00 | 0.26 | 1.47 | 200 | 0.35 | 20.2 | 0.62 | 63.1 | 18.77 | 93.77 | 90.975 | 90.772 | 2.79 | 93.94 | 0.06 | 90.755 | 90.551 | 3.19 | |
| Clarity Street (Street No. 5) | MH6 | MH10A | 4 | 0 | 0.24 | 204 | 2.84 | 4.00 | 3.31 | 0.00 | 0.00 | 0.00 | 0.80 | 4.10 | 200 | 0.35 | 20.2 | 0.62 | 51.0 | 16.14 | 93.94 | 90.695 | 90.491 | 3.25 | 93.76 | | 90.516 | 90.313 | 3.24 | |
| Clarity Street (Street No. 5) | MH10A | MH10 | 0 | 0 | 0.00 | 204 | 2.84 | 4.00 | 3.31 | 0.00 | 0.00 | 0.00 | 0.80 | 4.10 | 200 | 0.35 | 20.2 | 0.62 | 25.4 | 16.14 | 93.76 | 90.516 | 90.313 | 3.24 | 94.02 | | 90.427 | 90.224 | 3.59 | |
| Lilith Street (Street No. 3) | MH9 | MH10 | 0 | 14 | 0.46 | 38 | 0.46 | 4.00 | 0.61 | 0.00 | 0.00 | 0.00 | 0.13 | 0.74 | 200 | 0.35 | 20.2 | 0.62 | 65.5 | 19.50 | 95.00 | 92.343 | 92.139 | 2.66 | 94.02 | 1.69 | 92.113 | 91.910 | 1.91 | |
| Lilith Street (Street No. 3) | MH12 | MH11 | 10 | 0 | 0.46 | 34 | 0.46 | 4.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.13 | 0.68 | 200 | 0.35 | 20.2 | 0.62 | 62.8 | 19.56 | 94.15 | 90.919 | 90.716 | 3.23 | 93.84 | | 90.699 | 90.496 | 3.14 | |
| Lilith Street (Street No. 3) | MH11 | MH10 | 9 | 0 | 0.41 | 65 | 0.87 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.24 | 1.29 | 200 | 0.35 | 20.2 | 0.62 | 60.5 | 18.95 | 93.84 | 90.699 | 90.496 | 3.14 | 94.02 | 0.06 | 90.487 | 90.284 | 3.53 | |
| Clarity Street (Street No. 5) | MH10 | MH13 | 0 | 6 | 0.27 | 323 | 4.44 | 4.00 | 5.23 | 0.00 | 0.00 | 0.00 | 1.24 | 6.47 | 200 | 0.35 | 20.2 | 0.62 | 78.5 | 13.77 | 94.02 | 90.427 | 90.224 | 3.59 | 94.10 | | 90.153 | 89.949 | 3.95 | |
| Namaste (Street No. 4) | MH14 | MH13 | 14 | 0 | 0.69 | 48 | 0.69 | 4.00 | 0.77 | 0.00 | 0.00 | 0.00 | 0.19 | 0.96 | 200 | 0.35 | 20.2 | 0.62 | 97.1 | 19.28 | 94.20 | 90.552 | 90.349 | 3.65 | 94.10 | 0.06 | 90.213 | 90.009 | 3.89 | |
| Clarity Street (Street No. 5) | MH13 | MH15 | 0 | 17 | 0.59 | 416 | 5.72 | 4.00 | 6.74 | 0.00 | 0.00 | 0.00 | 1.60 | 8.34 | 200 | 0.35 | 20.2 | 0.62 | 117.4 | 11.90 | 94.10 | 90.153 | 89.949 | 3.95 | 94.22 | -0.05 | 89.742 | 89.538 | 4.48 | |
| Park (Block 117) | MH16 | MH15 | 0 | 0 | 1.67 | 0 | 1.67 | 4.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.47 | 0.47 | 150 | 0.50 | 11.2 | 0.62 | 12.9 | 10.77 | 94.32 | 90.357 | 90.205 | 3.96 | 94.22 | 0.50 | 90.293 | 90.140 | 3.93 | |
| Clarity Street (Street No. 5) | MH15 | EX. CM 4 | 0 | 12 | 0.46 | 449 | 7.85 | 4.00 | 7.26 | 0.00 | 0.00 | 0.00 | 2.20 | 9.46 | 300 | 2.00 | 142.7 | 1.96 | 106.9 | 133.21 | 94.22 | 89.793 | 89.488 | 4.43 | 94.32 | 0.01 | 87.655 | 87.350 | 6.66 | |
| Future Institutional (Block 127) | STUB | EX. CM 4 | 0 | 0 | 0.00 | 0 | 0.00 | 4.00 | 0.00 | 4.86 * | 4.86 | 4.22 | 1.36 | 5.58 | 250 | 1.00 | 62.0 | 1.22 | 15.7 | 56.46 | 94.41 | 90.431 | 90.177 | 3.98 | 94.32 | 2.63 | 90.274 | 90.020 | 4.05 | |
| Upstream Mixed Use Development | -- | EX. CM 1 | -- | -- | 105.84 | 10974 | 105.84 | 2.91 | 129.56 | 175.19 | 175.19 | 152.07 | 78.69 | 360.33 | | | | | | | | | | | | | | | | |
| Chapman Mills Drive | EX. CM 1 | EX. CM 2 | 0 | 0 | 0.16 | 10974 | 106.00 | 2.91 | 129.56 | 0.00 | 175.19 | 152.07 | 78.73 | 360.37 | 900 | 0.10 | 597.2 | 0.91 | 60.9 | 236.85 | 95.03 | 87.833 | 86.918 | 7.20 | 94.43 | | 87.772 | 86.857 | 6.66 | |
| Future Commercial (Block 105) | STUB | EX. CM 2 | 0 | 0 | 0.00 | 0 | 0.00 | 4.00 | 0.00 | 0.76 | 0.76 | 0.66 | 0.21 | 0.87 | 250 | 1.00 | 62.0 | 1.22 | 15.0 | 61.17 | 94.53 | 90.624 | 90.370 | 3.91 | 94.43 | 2.70 | 90.474 | 90.220 | 3.96 | |
| Chapman Mills Drive | EX. CM 2 | EX. CM 3 | 0 | 0 | 0.16 | 10974 | 106.16 | 2.91 | 129.56 | 0.00 | 175.95 | 152.73 | 78.99 | 361.29 | 900 | 0.10 | 597.2 | 0.91 | 47.4 | 235.94 | 94.43 | 87.772 | 86.857 | 6.66 | 94.41 | | 87.724 | 86.810 | 6.69 | |
| Waterlilly Way | EX. 22A | 17 | 0 | 22 | 0.56 | 59 | 0.56 | 4.00 | 0.96 | 0.00 | 0.00 | 0.00 | 0.16 | 1.12 | 200 | 1.00 | 34.2 | 1.06 | 84.2 | 33.10 | 94.59 | 92.702 | 92.499 | 1.89 | 94.40 | 0.55 | 91.860 | 91.657 | 2.54 | |
| Waterlilly Way | 17 | EX. CM 3 | 5 | 17 | 0.70 | 122 | 1.26 | 4.00 | 1.98 | 0.00 | 0.00 | 0.00 | 0.35 | 2.33 | 250 | 1.00 | 62.0 | 1.22 | 105.6 | 59.70 | 94.40 | 91.310 | 91.056 | 3.09 | 94.41 | 2.53 | 90.254 | 90.000 | 4.16 | |
| Chapman Mills Drive | EX. CM 3 | EX. CM 4 | 0 | 0 | 0.21 | 11096 | 107.63 | 2.91 | 130.79 | 0.00 | 175.95 | 152.73 | 79.40 | 362.93 | 900 | 0.10 | 597.2 | 0.91 | 76.1 | 234.30 | 94.41 | 87.724 | 86.810 | 6.69 | 94.32 | | 87.648 | 86.734 | 6.67 | |
| Chapman Mills Drive | EX. CM 4 | EX. CM 5 | 0 | 0 | 0.09 | 11545 | 115.57 | 2.89 | 135.27 | 0.00 | 180.81 | 156.95 | 82.99 | 375.21 | 900 | 0.10 | 597.2 | 0.91 | 32.0 | 222.01 | 94.32 | 87.648 | 86.734 | 6.67 | 94.20 | | 87.616 | 86.702 | 6.58 | |
| Chapman Mills Drive | EX. CM 5 | EX. CM 6 | 0 | 0 | 0.11 | 11545 | 115.68 | 2.89 | 135.27 | 0.00 | 180.81 | 156.95 | 83.02 | 375.24 | 900 | 0.10 | 597.2 | 0.91 | 42.3 | 221.98 | 94.20 | 87.616 | 86.702 | 6.58 | 94.30 | | 87.574 | 86.660 | 6.73 | |
| High Density Residential (Block 118) | STUB | 18 | 0 | 24 | 0.32 | 65 | 0.32 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.09 | 1.14 | 200 | 0.35 | 20.2 | 0.62 | 9.0 | 19.10 | 94.39 | 90.090 | 89.887 | 4.30 | 94.27 | 0.00 | 90.059 | 89.855 | 4.21 | |
| Chakra Street (Street No. 6) | 18 | EX. CM 6 | 0 | 0 | 0.10 | 65 | 0.42 | 4.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.12 | 1.17 | 300 | 4.00 | 201.8 | 2.77 | 46.8 | 200.60 | 94.27 | 90.059 | 89.754 | 4.21 | 94.30 | 0.61 | 88.185 | 87.880 | 6.11 | |
| Chapman Mills Drive | EX. CM 6 | EX. CM 7 | 0 | 0 | 0.21 | 11610 | 116.31 | 2.89 | 135.92 | 0.00 | 180.81 | 156.95 | 83.19 | 376.06 | 900 | 0.10 | 597.2 | 0.91 | 74.0 | 221.16 | 94.30 | 87.574 | 86.660 | 6.73 | 93.40 | 0.01 | 87.500 | 86.586 | 5.90 | |
| Future Residential Development | STUB | EX. CM 7 | 0 | 0 | 8.83 * | 1430 ** | 8.83 | 3.69 | 21.41 | 5.35 | 5.35 | 4.64 | 3.97 | 30.02 | 250 | 0.25 | 31.0 | 0.61 | 12.0 | 1.00 | 93.61 | 87.434 | 87.180 | 6.18 | 93.40 | -0.09 | 87.404 | 87.150 | 6.00 | |
| Chapman Mills Drive | EX. CM 7 | EX. CM 8 | 0 | 0 | 0.00 | 13040 | 125.14 | 2.84 | 149.99 | 0.00 | 186.16 | 161.59 | 87.16 | 398.75 | 900 | 0.10 | 597.2 | 0.91 | 25.7 | 198.48 | 93.40 | 87.490 | 86.576 | 5.91 | 93.38 | | 87.464 | 86.550 | 5.92 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | INV = | 86.550 | |

Notes:
* Institutional, Commercial and Residential Area taken from Draft Plan of Subdivision prepared by Annis, O'Sullivan, Vollebekk Ltd. (Residential Area inclusive of Future Transit Corridor (2.279 Ha) and Servicing Easement (0.112 Ha))
** Cumulative Population based on Medium Density Residential Land Use (162 pers/ha) as per Novatech's South Nepean Collector - Phase 2 & 3 Sanitary Sewer Design Sheet dated August 2015

APPENDIX E

Engineering Drawings



PAVEMENT STRUCTURE

| | | THICKNESS (mm) | |
|------------|----------------------|--------------------|-----------------------------|
| COURSE | MATERIAL | AUTOMOBILE PARKING | TRUCK ROUTE (HEAVY TRAFFIC) |
| SURFACE | H.L.3 AC; (PG 58-28) | 50 | 40 |
| BINDER | H.L.8 AC; (PG 58-28) | -- | 50 |
| BASECOURSE | GRANULAR "A" | 150 | 150 |
| SUBBASE | GRANULAR "B" TYPE II | 300 | 350 |

NOTE:
 IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL, AND ANY SOFT AREAS EVENT SHOULD BE SUBGRAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES, FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE. THE PAVEMENT GRANULARS MAY BE PLACED.


NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WEAK OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE AREA BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES, FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE. THE PAVEMENT GRANULARS MAY BE PLACED,

| | |
|--|---|
| | EXISTING PROPOSED LINE TO REMAIN |
| | PROPOSED CURB |
| | PROPOSED DEPRESSED CURB |
| | PROPOSED TERRACING (3.1 MIN.) |
| | PROPOSED DOOR ENTRANCE/EXIT |
| | PROPOSED GRASS AS PER L-001 |
| | PROPOSED CANOE FEATURES/SLAB |
| | PROPOSED SILT FENCE AS PER P/00 219.110 |
| | PROPOSED CHAIN LINK FENCE |
| | PROPOSED HEAVY DUTY ASPHALT |
| | PROPOSED LIGHT DUTY ASPHALT |
| | PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA) |
| | PROPOSED INFILTRATION GALLERY |
| | PROPOSED ELEVATION |
| | PROPOSED HIGH POINT ELEVATION |
| | PROPOSED ELEVATION |
| | PROPOSED BOTTOM OF CURB ELEVATION |
| | PROPOSED TOP OF CURB ELEVATION |
| | PROPOSED TOP OF SIDEWALK ELEVATION |
| | PROPOSED BOTTOM OF SIDEWALK ELEVATION |
| | PROPOSED SIDEWALK ELEVATION TO BE COMPLETE BY 2022 |
| | MATCH INTO EXISTING ELEVATION |
| | EXISTING ELEVATION |
| | PROPOSED OVERLAND MAJOR FLOW ROUTE |
| | PROPOSED 100mm PERFORATED SUBDRAIN |
| | STW STW PROPOSED STORM SEWER |
| | SAN SAN PROPOSED SANITARY SEWER |
| | WTR WTR PROPOSED WATERMAIN |
| | HYD-WTR PROPOSED HYDRANT LEAD |
| | STW STW EXISTING STORM SEWER |
| | SAN SAN EXISTING SANITARY SEWER |
| | WTR WTR EXISTING WATERMAIN |
| | EXISTING MANHOLE |
| | EXISTING CATCH-BASIN |
| | PROPOSED CATCH-BASIN-MANHOLE/CATCH-BASIN |
| | PROPOSED CATCH300 |
| | PROPOSED CURB STOP |
| | PROPOSED FIRE HYDRANT |
| | PROPOSED PIPE INSULATION |
| | PROPOSED 100 YEAR HIGH WATER LEVEL |
| | STORM WATERSHED EXTENT |
| | WATERSHED NAME |
| | RUNOFF COEFFICIENT |
| | AREA IN HECTARES |

| | | | |
|-----|------------|------------------------------|------|
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| 04 | 2019/05/13 | ISSUED FOR PERMIT | G.B. |
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| 02 | 2018/10/01 | RE-ISSUED FOR SPA | G.B. |
| 01 | 2018/09/25 | ISSUE FOR SPA | G.B. |
| no. | date | revision / issue | by |

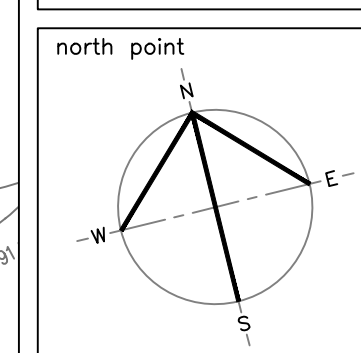
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professional stamp

project title

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SECONDAIRE
BARRHAVEN

Barrhaven

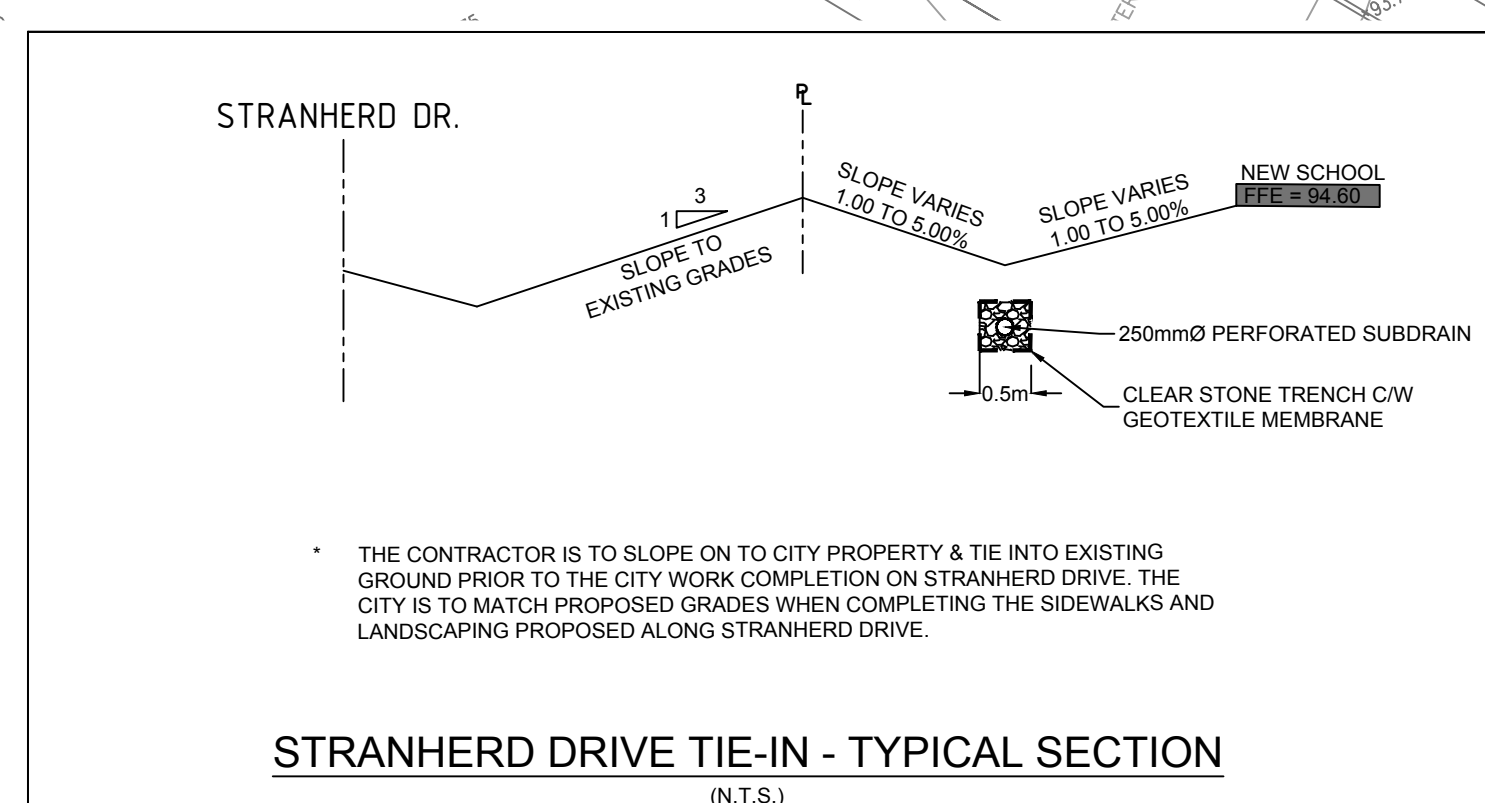
Ontario

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GRADING AND DRAINAGE PLAN

| | | | |
|-----------|------------|-------------|------|
| date | 25/01/2018 | job.no. | 1817 |
| scales | 1:400 | | |
| drawn | M.L. | drawing no. | C301 |
| approved | J.C.L. | | |
| plot date | 25/01/2018 | | |

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3 THIS DRAWING TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS: STRUCTURAL, MECHANICAL, ELECTRICAL

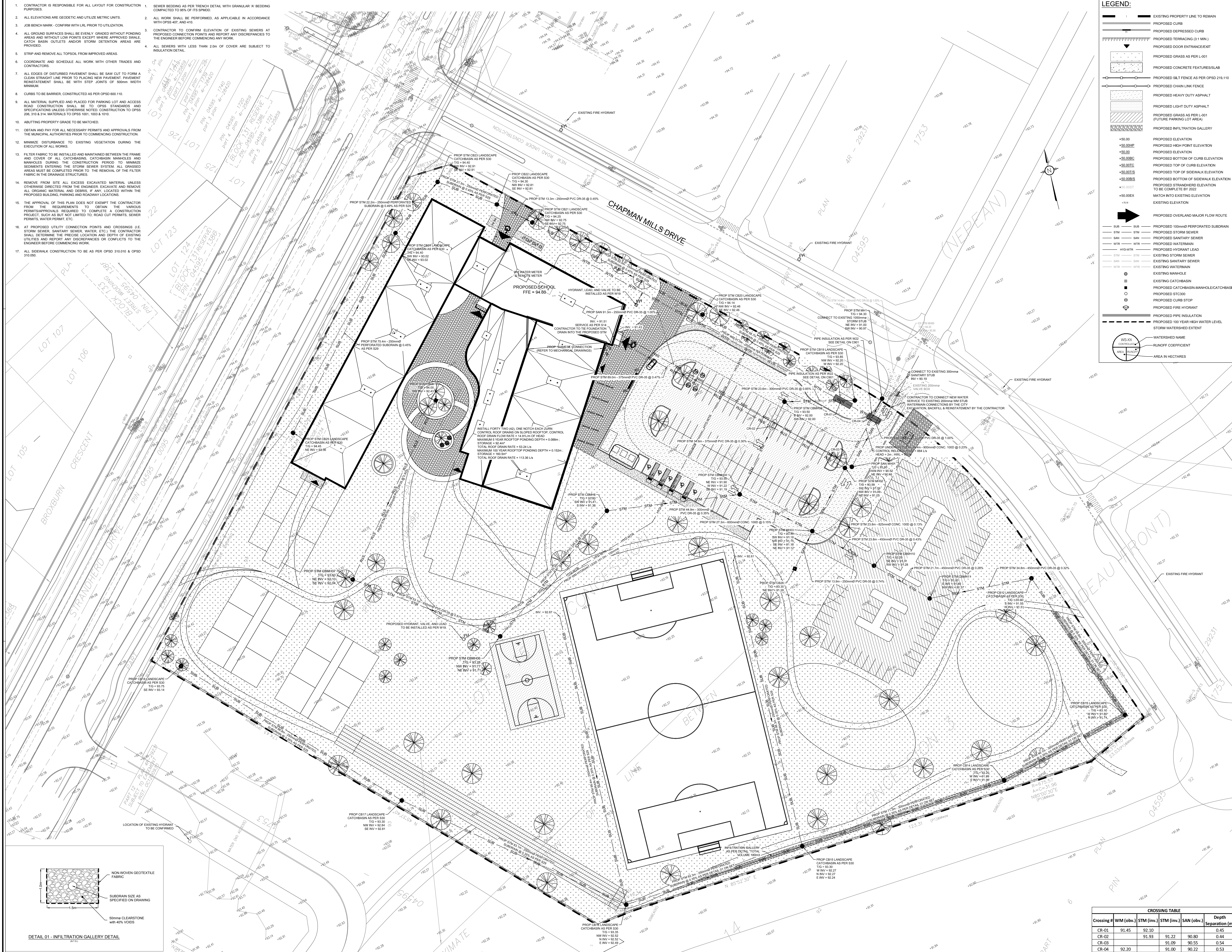


NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
2. ALL ELEVATIONS ARE GEODETIC AND UTILISE METRIC UNITS.
3. JOB BENCH MARK - CONFIRM WITH LRL PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRAZED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE, CATCH BASIN, OUTLETS AND/OR STORM DETENTION AREAS ARE PROVIDED.
5. STRIP AND REMOVE ALL TOPSOIL FROM IMPROVED AREAS.
6. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
7. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A CLEAN STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM.
8. CURBS TO BE BARRIER, CONSTRUCTED AS PER OPSD 605.110.
9. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSD STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED CONSTRUCTION TO OPSD 206.319 & 314 MATERIALS TO OPSD 1001.100 & 1010.
10. ABUTTING PROPERTY GRADE TO BE MATCHED.
11. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION.
12. MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
13. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS, CATCHBASIN MANHOLES AND MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRADED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE DRAINAGE STRUCTURES.
14. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS IF ANY LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
15. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE A CONSTRUCTION PROJECT, SUCH AS BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC.
16. AT PROPOSED UTILITY CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
17. ALL SIDEWALK CONSTRUCTION TO BE AS PER OPSD 310.010 & OPSD 310.050.

NOTES: SEWERS

1. SEWER BEDDING AS PER TRENCH DETAIL WITH GRANULAR 'A' BEDDING COMPACTED TO 95% OF ITS DRYD.
2. ALL WORK SHALL BE PERFORMED, AS APPLICABLE, IN ACCORDANCE WITH OPSD 407 AND 410.
3. CONTRACTOR TO CONFIRM ELEVATION OF EXISTING SEWERS AT PROPOSED CONNECTION POINTS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING ANY WORK.
4. ALL SEWERS WITH LESS THAN 2.0m OF COVER ARE SUBJECT TO INSULATION DETAIL.



LEGEND:

Conseil des écoles publiques de l'Est de l'Ontario

| no. | date | revision / issue | by |
|-----|------------|------------------------------|------|
| 09 | 2019/05/05 | ISSUED AS PER ADDENDUM NO.02 | M.L. |
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project title

NOUVELLE ÉCOLE SECONDAIRE BARRHAVEN

Barrhaven Ontario

drawing title

SERVICING PLAN

date

25/01/2018

scales

1:400

drawn

M.L.

approved

J.C.L.

plot date

25/01/2018

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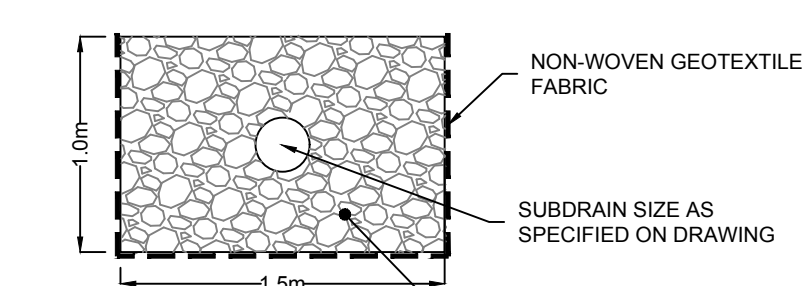
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DETAIL 01 - INFILTRATION GALLERY DETAIL






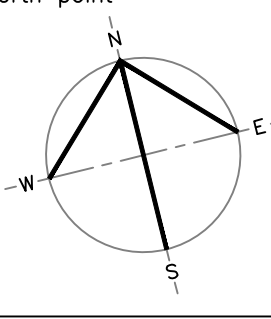
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ENGINEERING & DESIGN
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www.lrj.ca | (613) 542-3434



north point



professional stamp

project title

NOUVELLE ÉCOLE
SECONDAIRE
BARRHAVEN

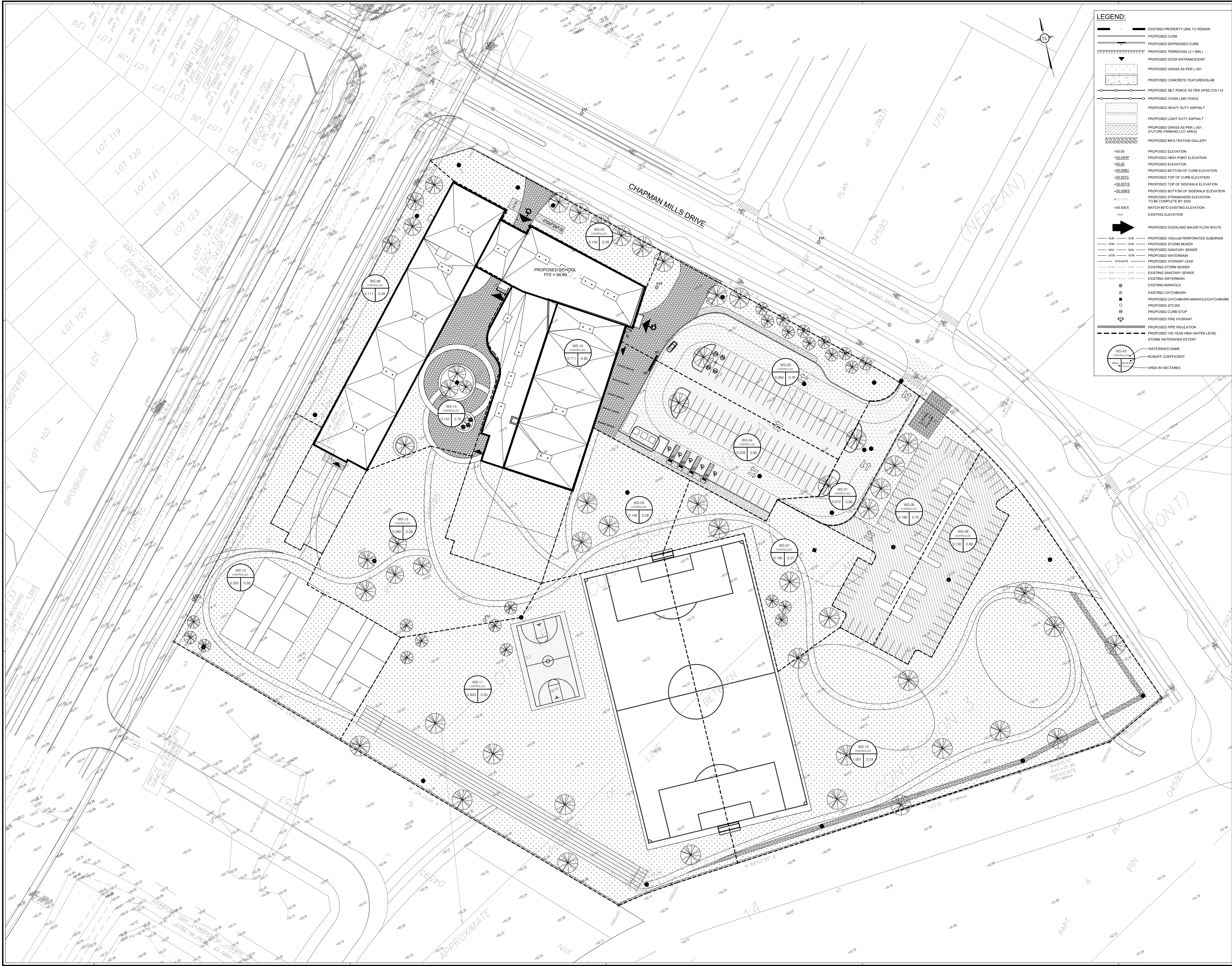
Barrhaven Ontario

drawing title

PRE-DEVELOPMENT
WATERSHED PLAN

| | | | |
|-----------|------------|-------------|------|
| date | 25/01/2018 | job.no. | 1817 |
| scales | 1:400 | drawing no. | C701 |
| drawn | M.L. | | |
| approved | J.C.L. | | |
| plot date | 25/01/2018 | | |

1 DO NOT SCALE THIS DRAWING.
2 CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BEFORE WORK COMMENCES.
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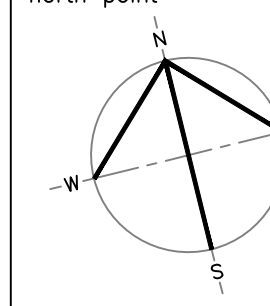

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSION CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AS PER L-001
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SILT FENCE AS PER OPSD 210.110
- PROPOSED CHAIN LINK FENCE
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRASS AS PER L-001 (FUTURE PARKING LOT AREA)
- PROPOSED INFILTRATION GALLERY
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED ELEVATION
- PROPOSED BOTTOM OF CURB ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED TOP OF SIDEWALK ELEVATION
- PROPOSED BOTTOM OF SIDEWALK ELEVATION
- PROPOSED STRAIGHTENED ELEVATION TO BE COMPLETE BY 2022
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED HYDRANT LEAD
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED CURB STOP
- PROPOSED FIRE HYDRANT
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

| | | | |
|-----|------------|------------------------------|------|
| 09 | 2018/09/05 | ISSUED AS PER ADDENDUM NO.02 | M.L. |
| 08 | 2018/06/29 | ISSUED AS PER ADDENDUM NO.01 | M.L. |
| 07 | 2018/07/24 | ISSUED TENDER | G.B. |
| 06 | 2018/07/03 | ISSUED AS PER CITY COMMENTS | G.B. |
| 05 | 2018/05/28 | ISSUED AS PER COMMENTS | G.B. |
| 04 | 2018/05/13 | ISSUED FOR PERMIT | G.B. |
| 03 | 2018/02/21 | RE-ISSUED FOR SPA | G.B. |
| 02 | 2018/10/01 | RE-ISSUED FOR SPA | G.B. |
| 01 | 2018/09/25 | RE-ISSUED FOR SPA | G.B. |
| no. | date | revision / issue | by |

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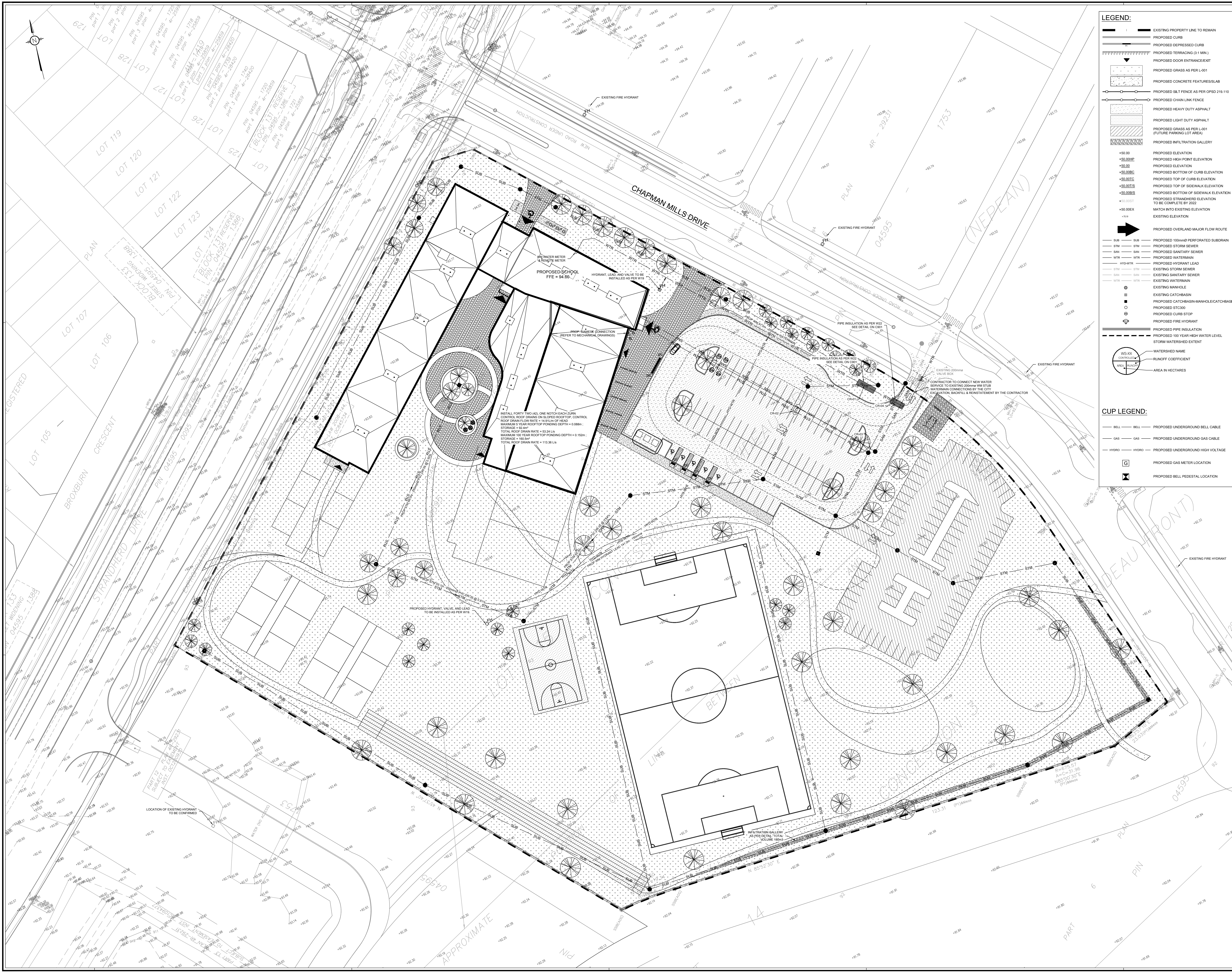
north point

professional stamp


project title
**NOUVELLE ÉCOLE
SECONDAIRE
BARRHAVEN**
Barrhaven Ontario

drawing title
**POST-DEVELOPMENT
WATERSHED PLAN**

| | | | |
|-----------|------------|-------------|------|
| date | 25/01/2018 | job.no. | 1817 |
| scales | 1:400 | | |
| drawn | M.L. | drawing no. | C702 |
| approved | J.C.L. | | |
| plot date | 25/01/2018 | | |

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LEGEND:

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- PROPOSED ELEVATION
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- PROPOSED TOP OF CURB ELEVATION
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- PROPOSED BOTTOM OF SIDEWALK ELEVATION
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- EXISTING ELEVATION
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- PROPOSED 100mm PERFORATED SUBRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED HYDRANT LEAD
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- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
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- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

CUP LEGEND:

- BELL
- BELL
- PROPOSED UNDERGROUND BELL CABLE
- GAS
- GAS
- PROPOSED UNDERGROUND GAS CABLE
- HYDRO
- HYDRO
- PROPOSED UNDERGROUND HIGH VOLTAGE
- PROPOSED GAS METER LOCATION
- PROPOSED BELL PEDESTAL LOCATION

Conseil des écoles publiques de l'Est de l'Ontario

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| 03 | 2018/12/21 | RE-ISSUED FOR SPA | G.B. |
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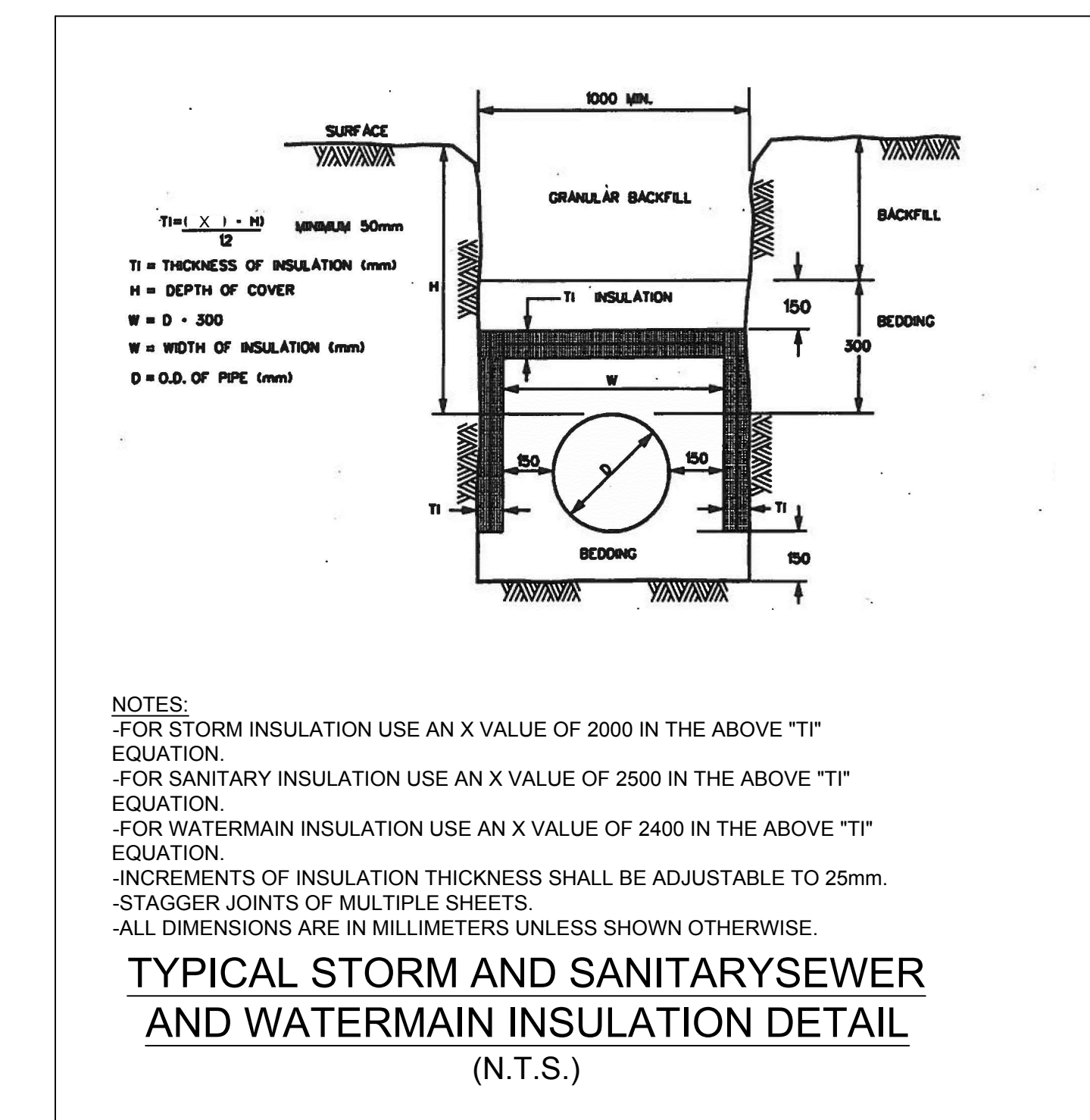
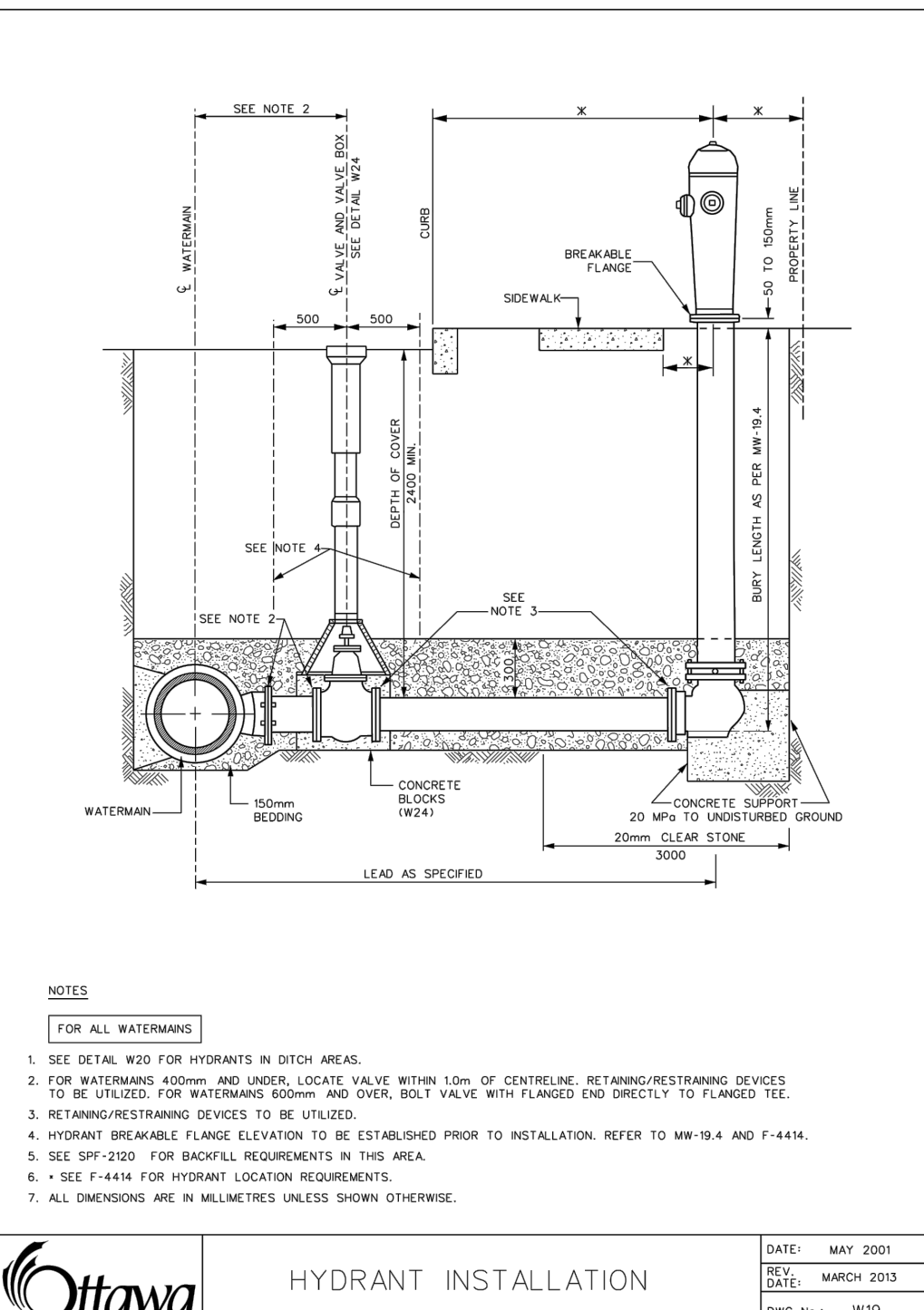
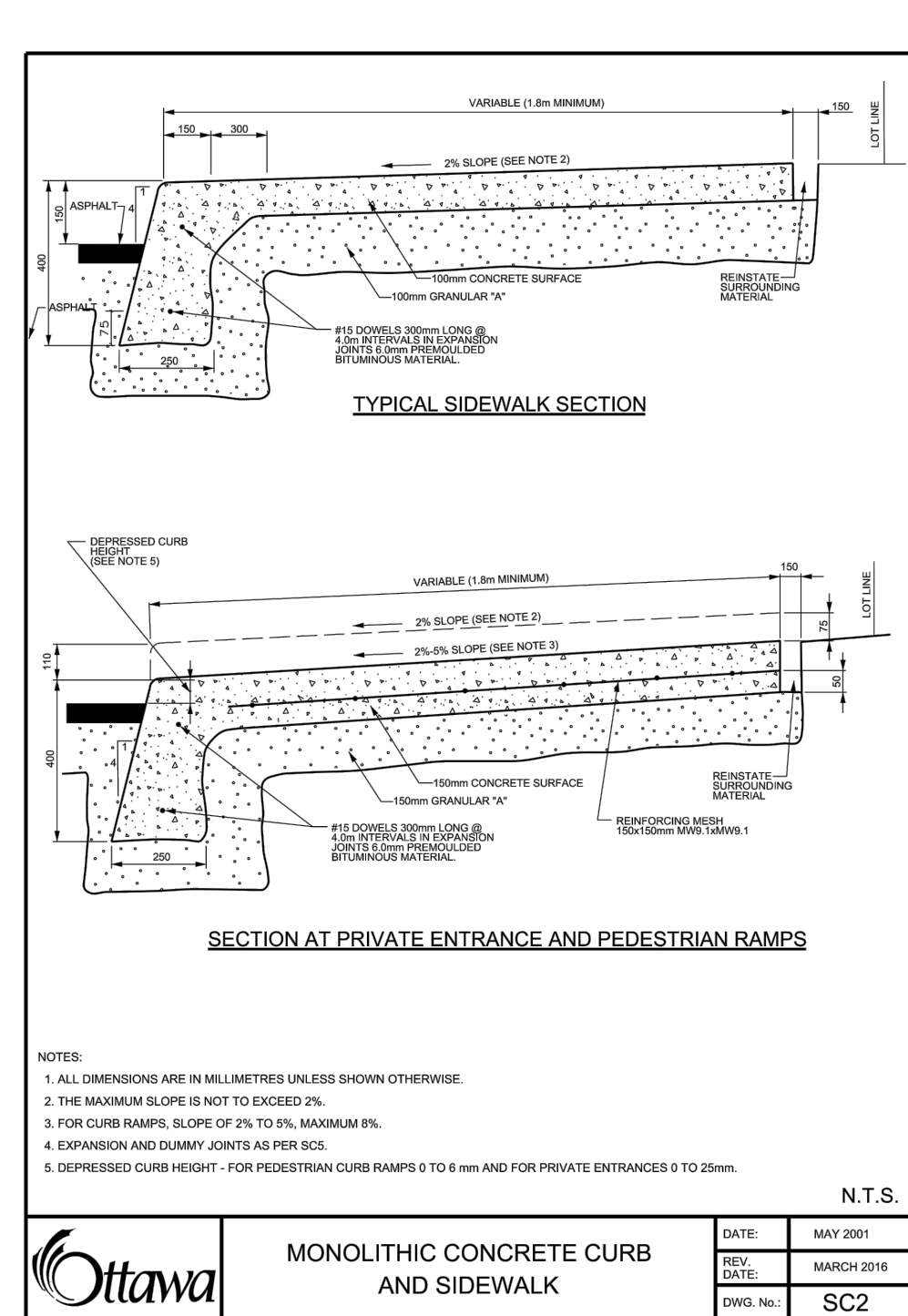
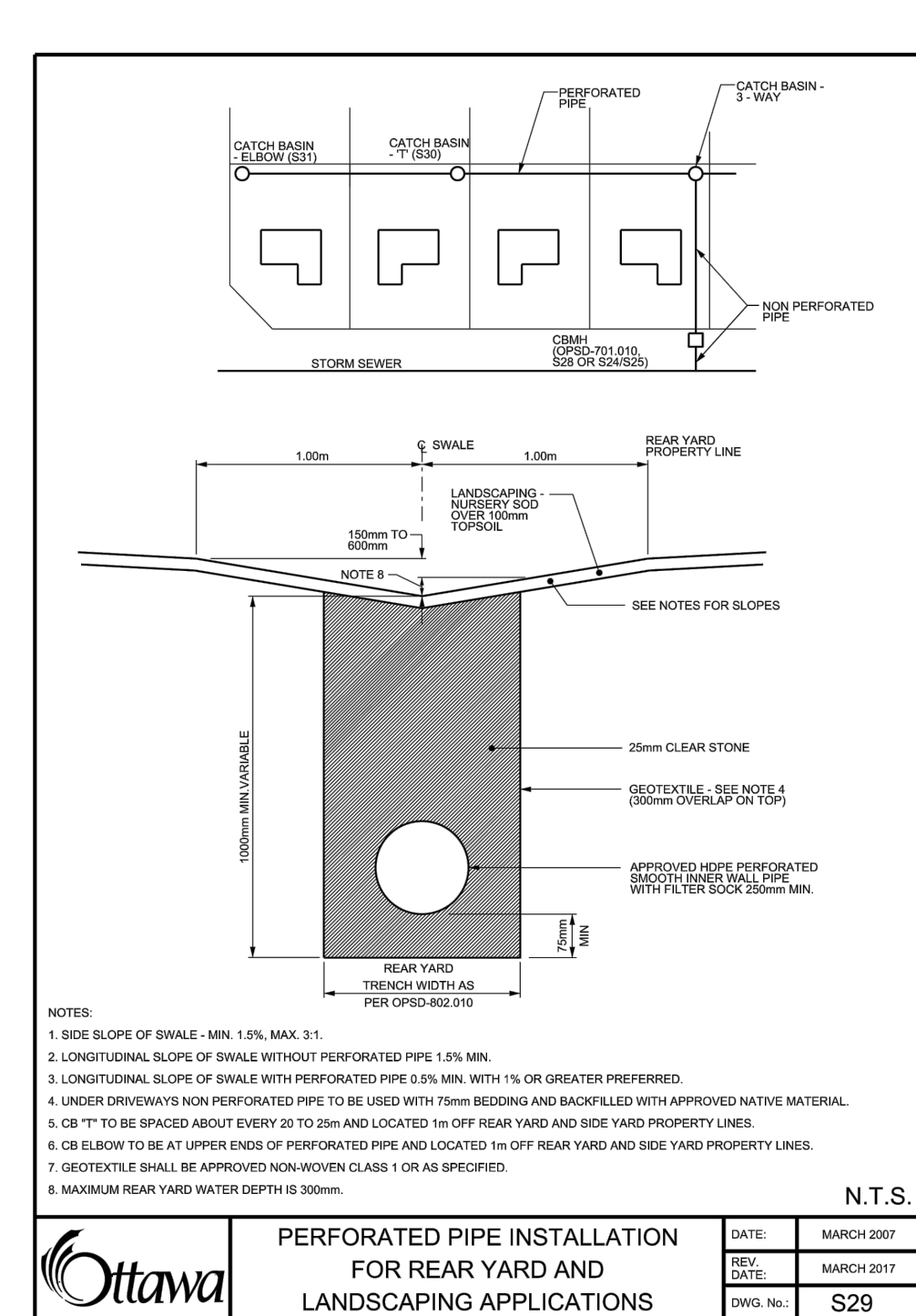
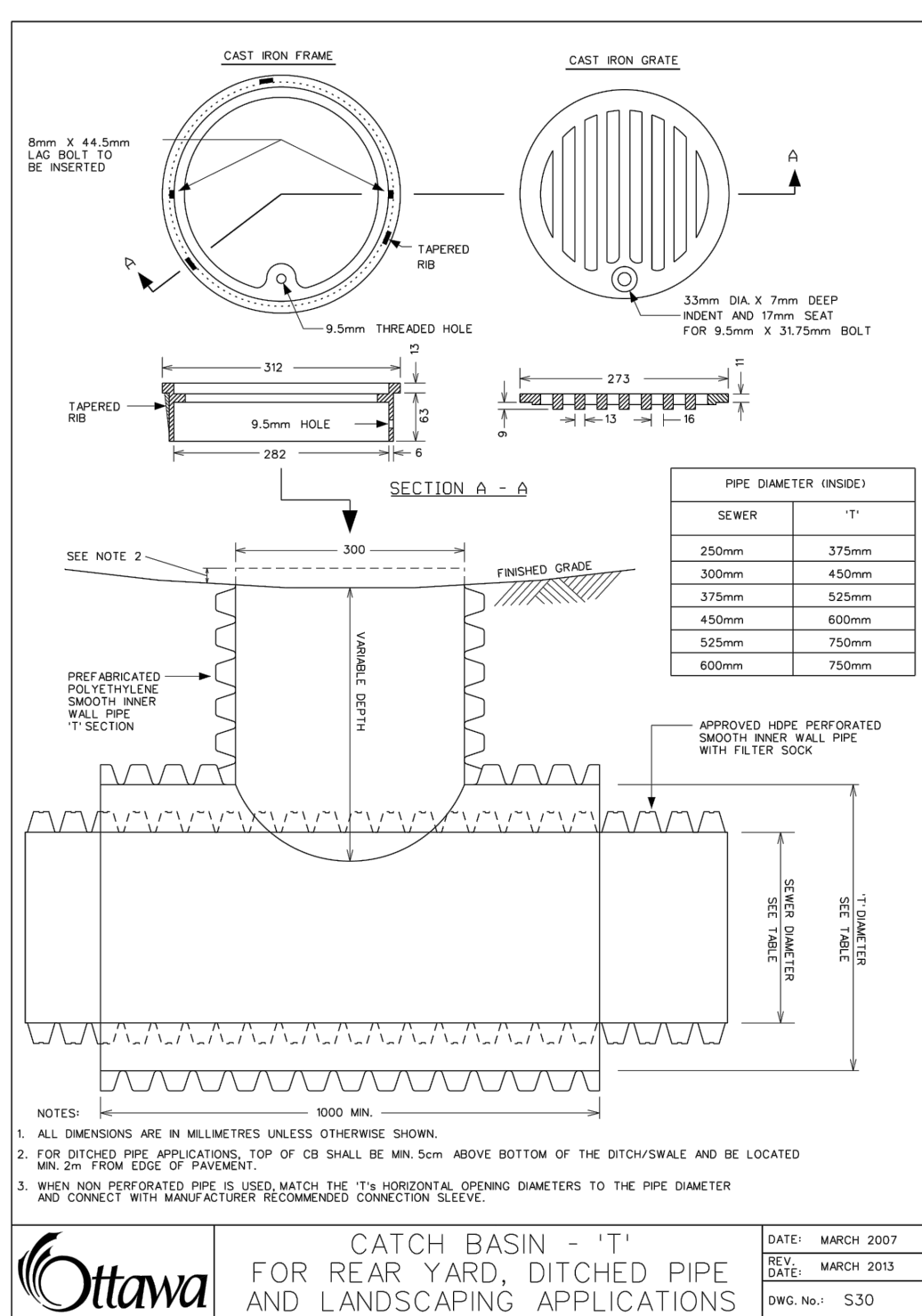
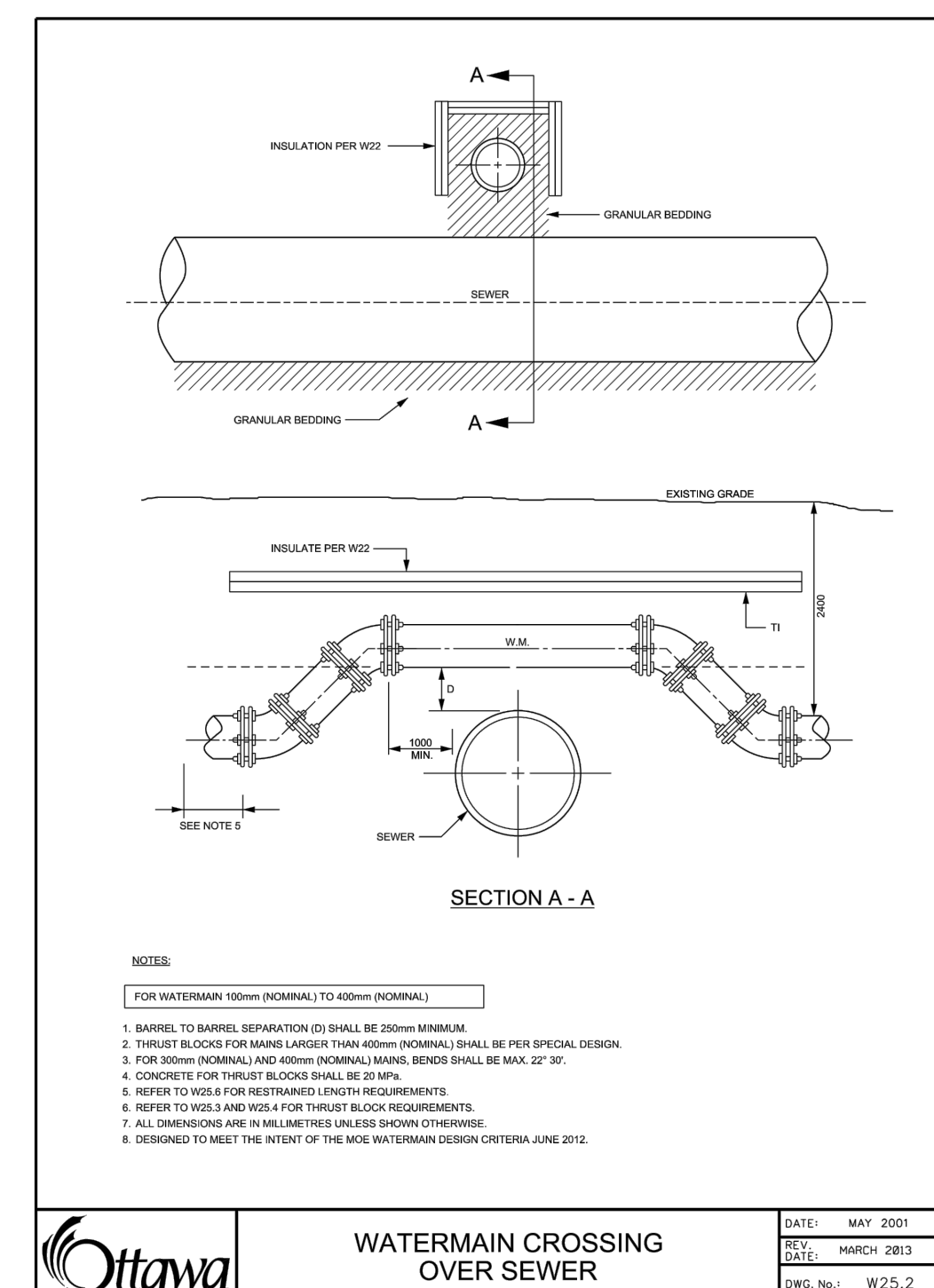
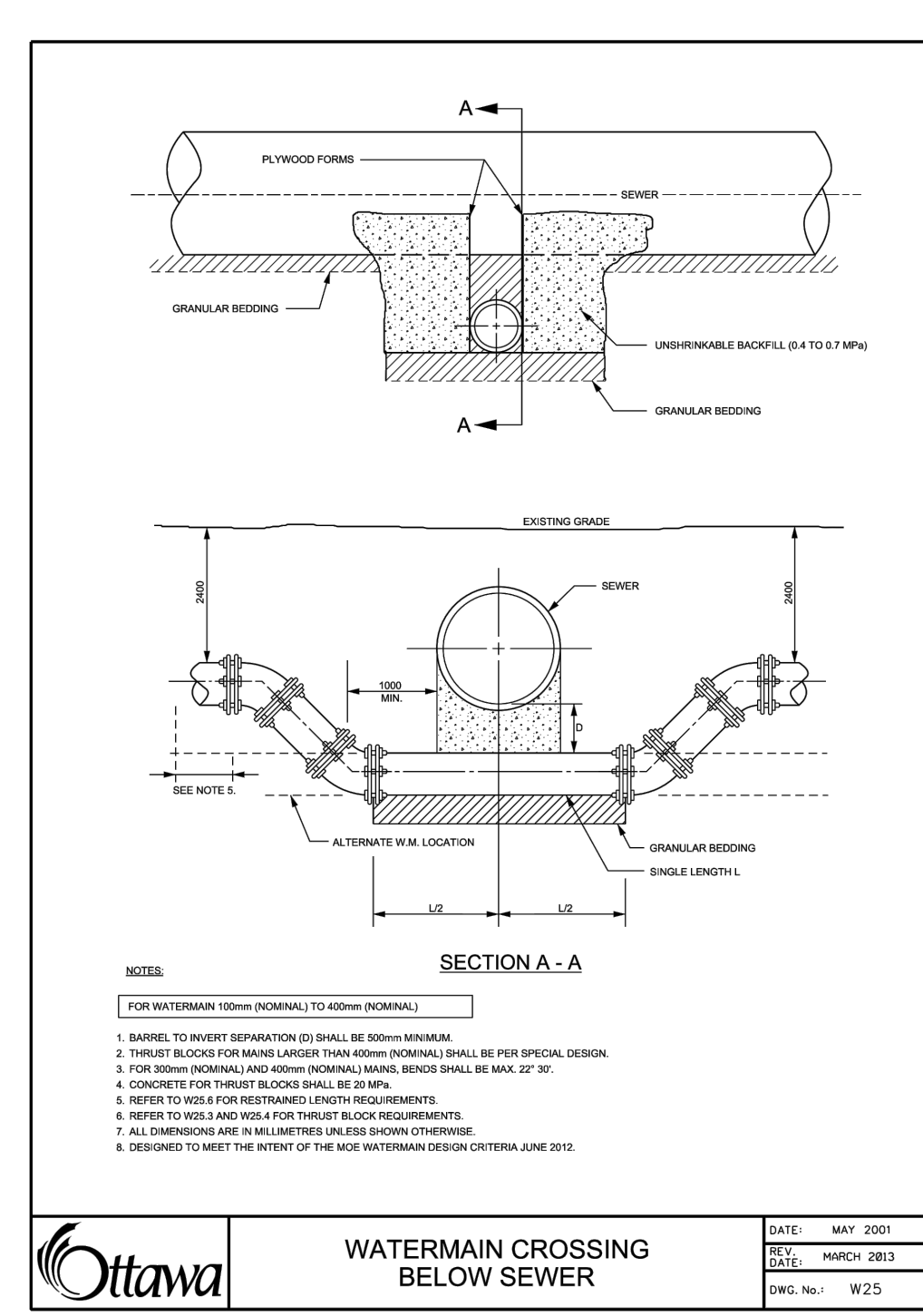
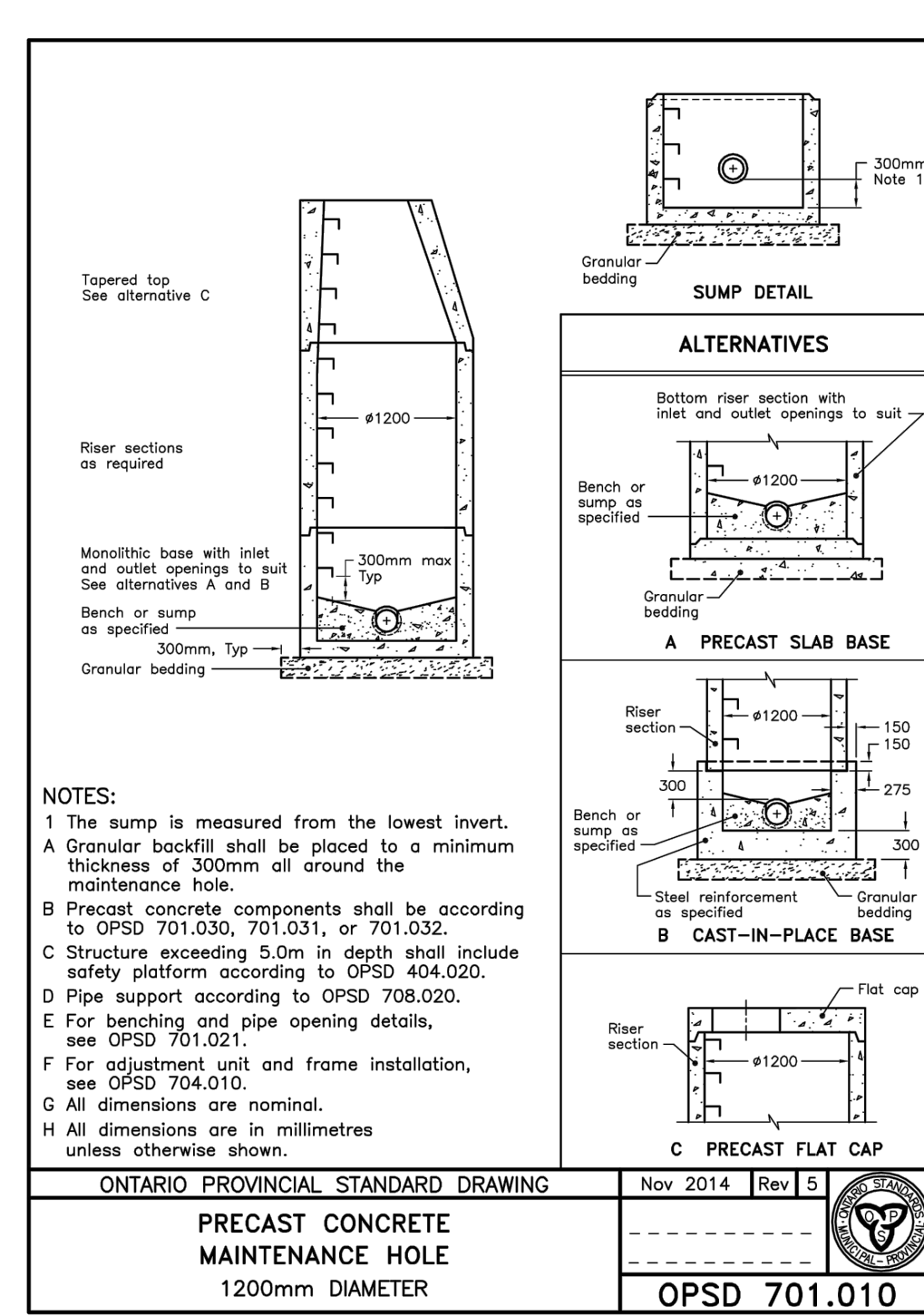
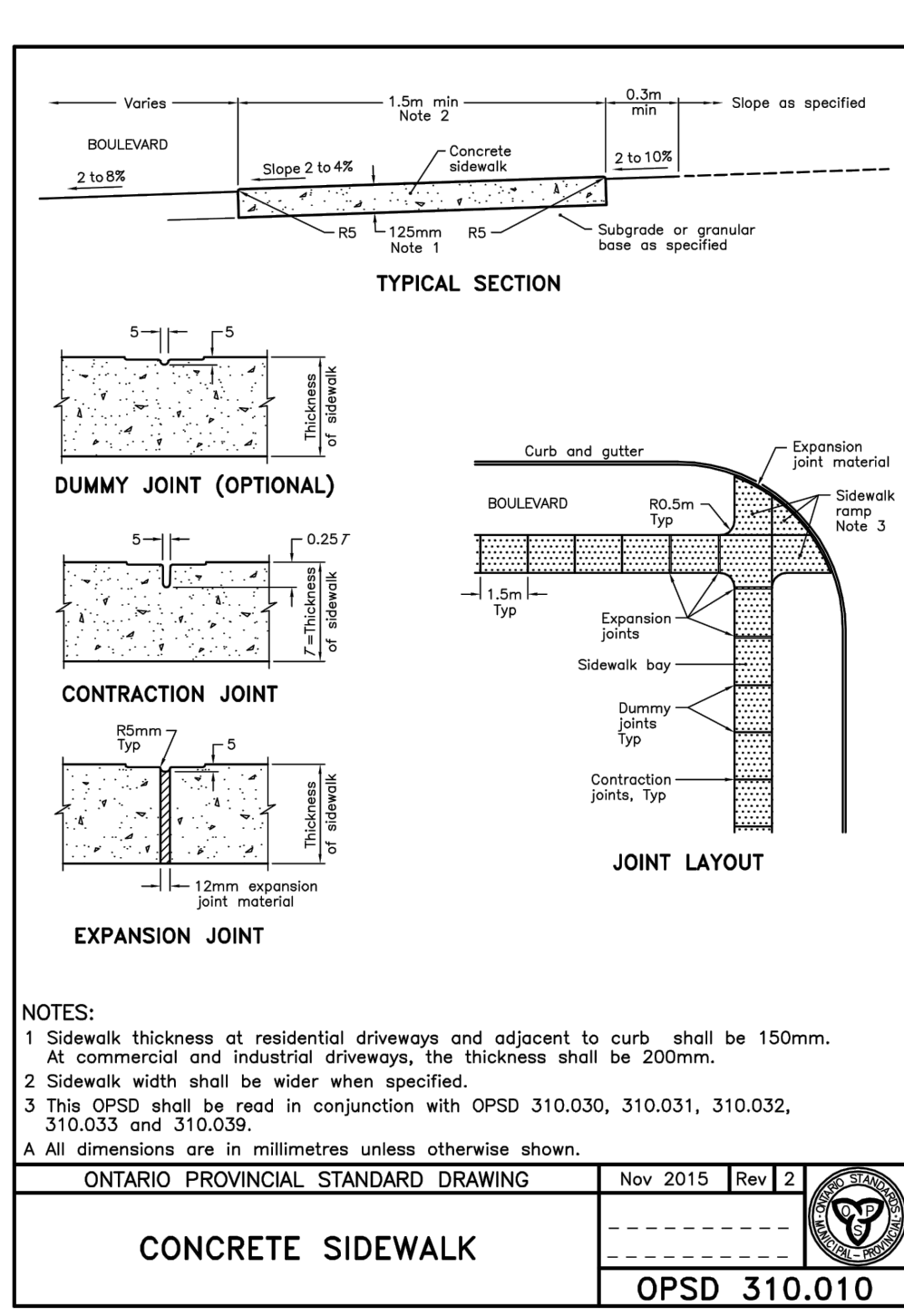
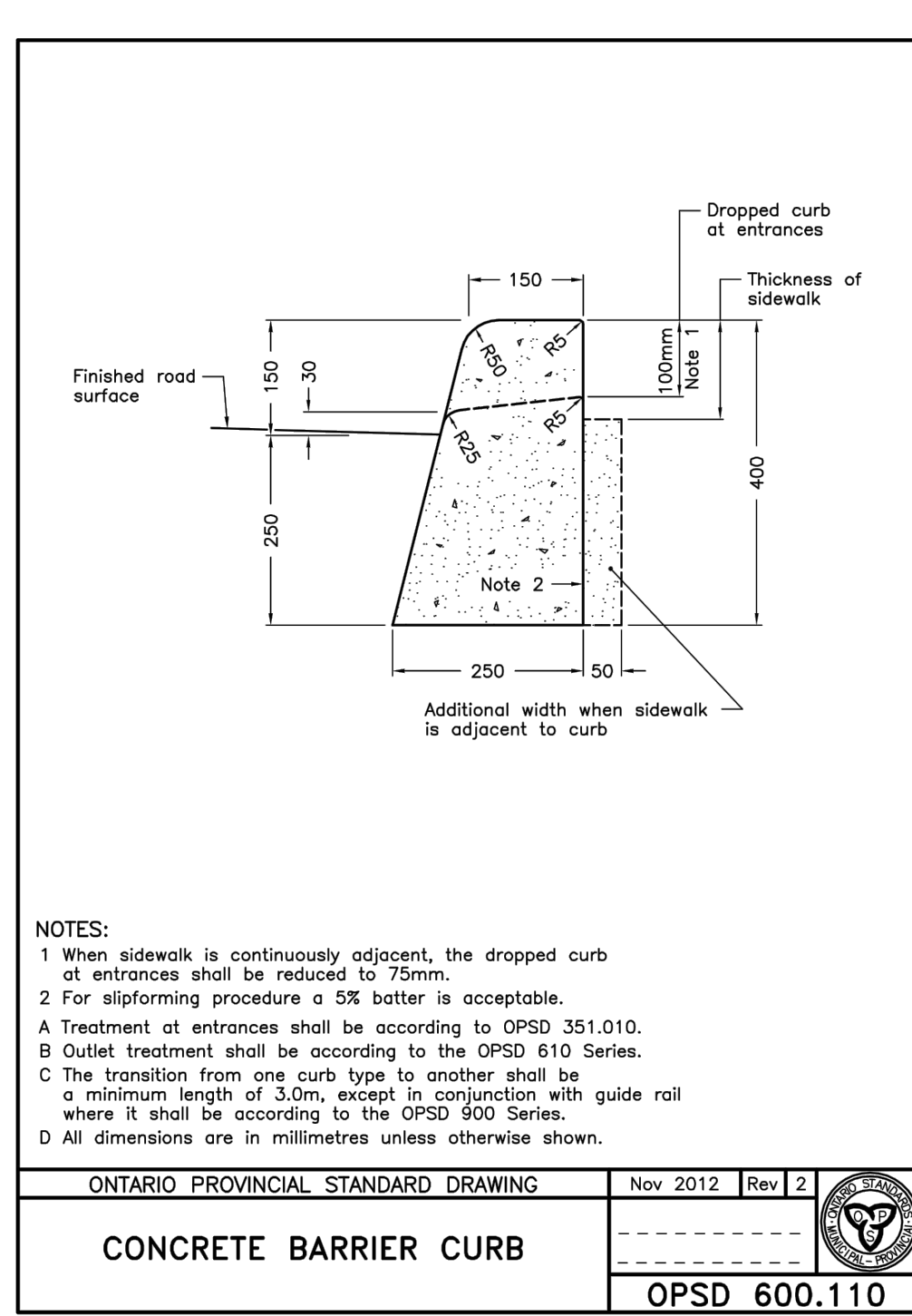
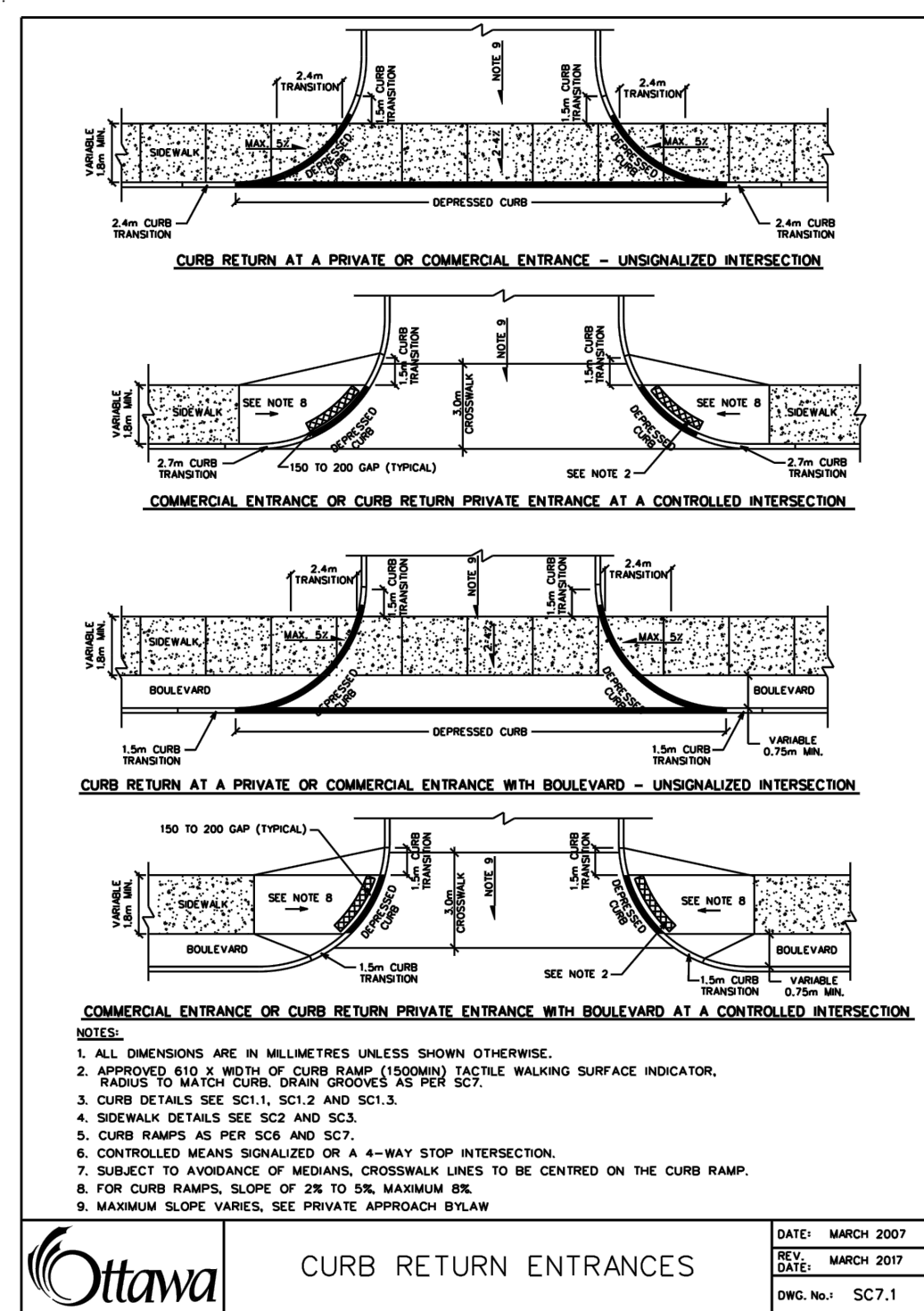
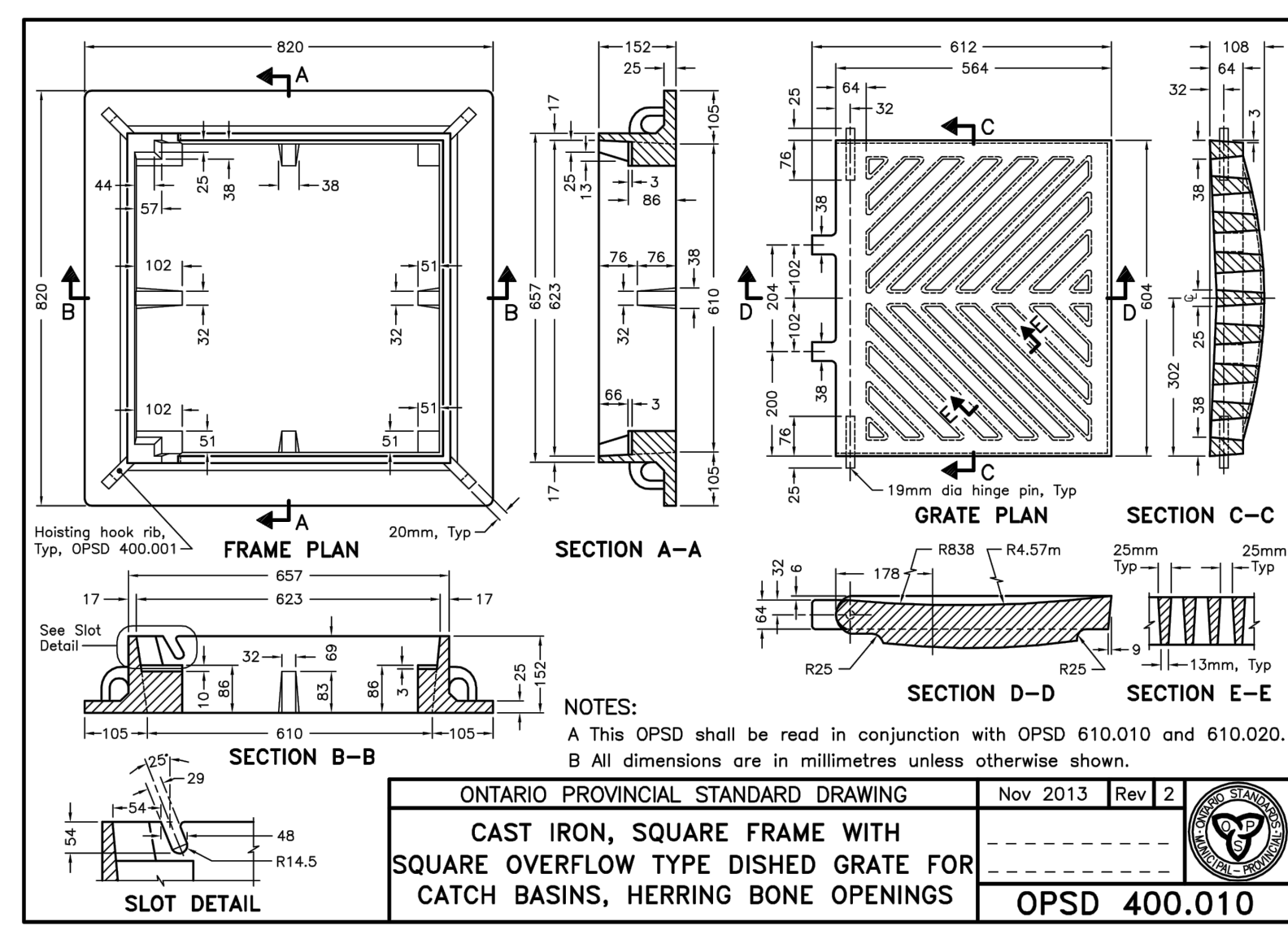
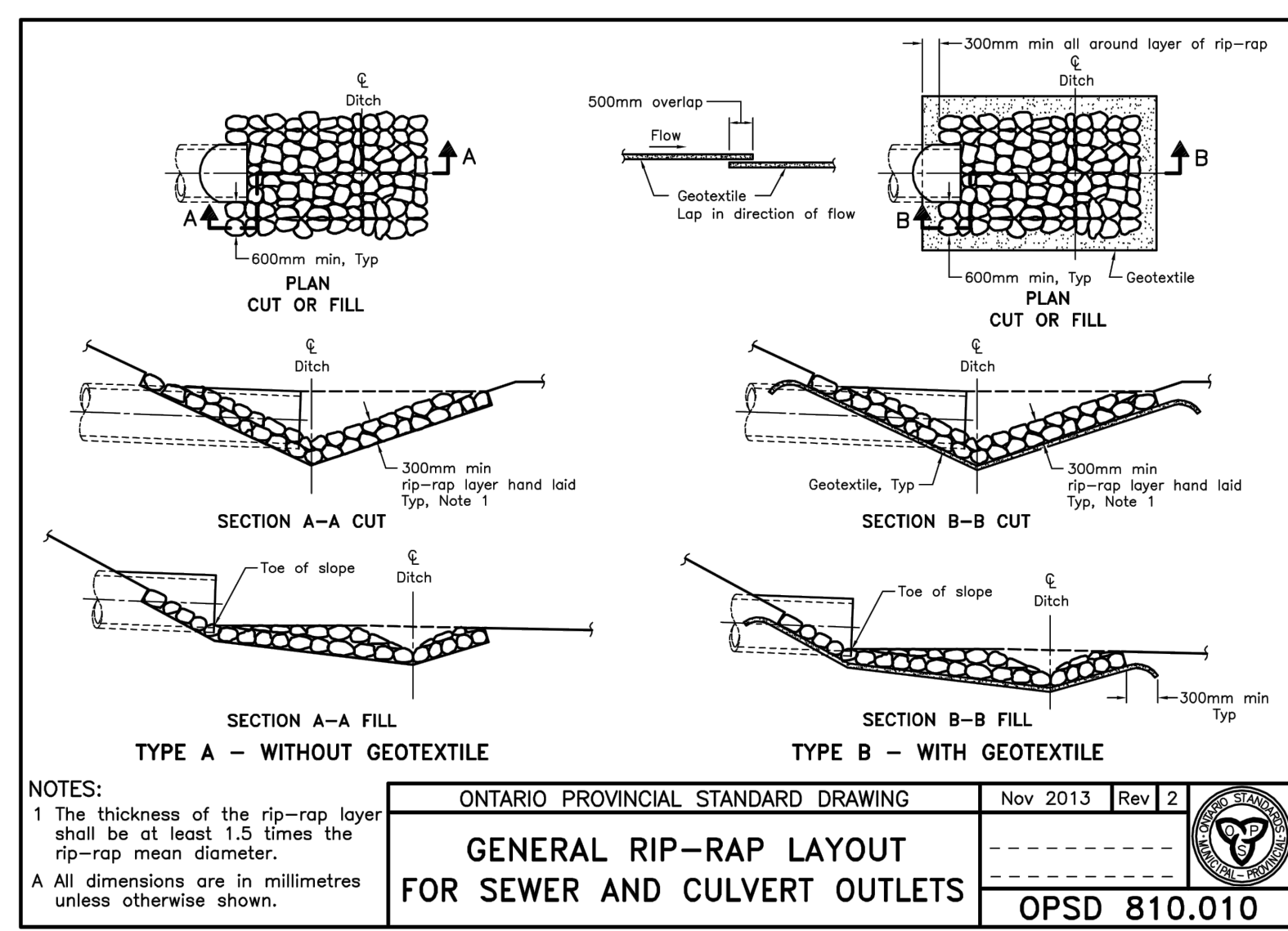
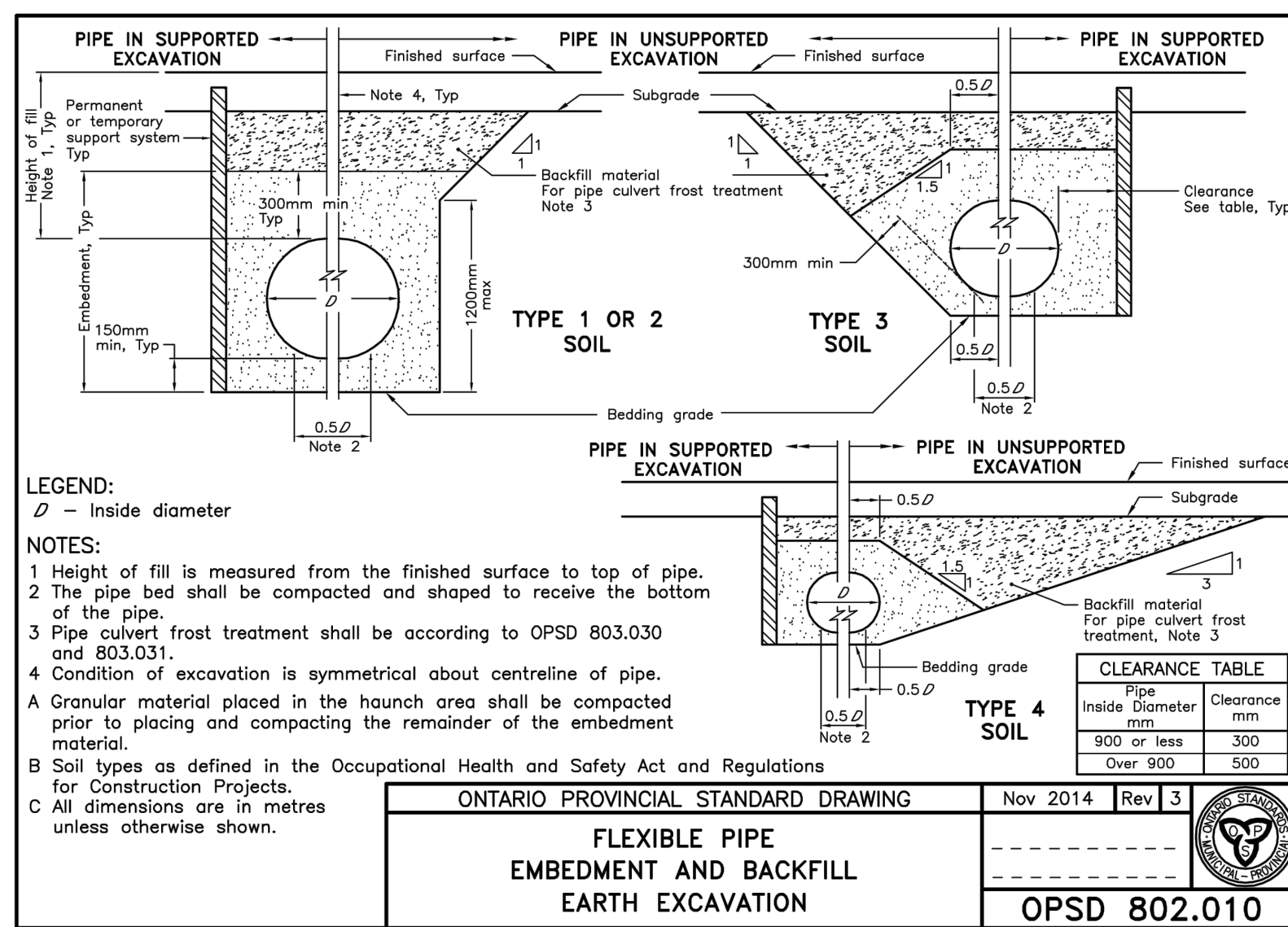
professional stamp
Professional Engineer
LRJ
2018/05/20
Province of Ontario

project title
NOUVELLE ÉCOLE
SECONDAIRE
BARRHAVEN
Barrhaven Ontario

drawing title
COMPOSITE UTILITY PLAN

| date | 25/01/2018 | job.no. | 1817 |
|-----------|------------|-------------|------|
| scales | 1:400 | drawing no. | C801 |
| drawn | M.L. | | |
| approved | J.C.L. | | |
| plot date | 25/01/2018 | | |

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