Stormwater Management & Servicing Report
KMA Mosque and Community Centre
351 Sandhill Road, Ottawa, Ontario

Client:
Kanata Muslim Association
351 Sandhill Road
Ottawa, Ontario K2K 1X7

Project Number:
OTT-00238564-A0

Site Plan Application Number:
D07-12-17-0119

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September 13, 2017
July 3, 2018
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Legal Notification

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1 Introduction

EXP Services Inc. was retained by **KMA** to prepare a Stormwater Management & Servicing Report in support of an application for Zoning By-law Amendment and Site Plan Control, to facilitate the use of the subject property as a place of worship (mosque and community centre) and for the conversion of the existing single detached dwelling for that use and the ultimate construction of an additional 2 storey, plus basement structure on the parcel of land municipally known as 351 Sandhill Road in City Ward 4-Kanata North. The legal description of the property is CON 4 PT LOT 10 RP5R7561;PART 2.

This report provides a stormwater management and servicing design brief in support of the proposed phased development. The 0.8 ha site is generally flat with a gentle slope from west to east towards Sandhill Road. There is an existing single detached dwelling and a storage shed on the property. The dwelling will be converted for use as a mosque. The first phase of development will consist of converting the existing building into a place of worship and constructing a new parking lot on the west side of the existing building and a new access to the parking lot. The second phase of development will consist of a new 2 storey building constructed adjacent to the existing building. The 2 storey building which will include a basement will serve as a place of worship and a Community Centre.

There is an existing single detached, one floor dwelling on-site. The driveway entrance is along the frontage of Sandhill road with the asphalt driveway providing an access route to the southeast side of the dwelling. Remainder of the site is vegetation. The site is currently serviced by on-site water wells and a septic system. One of the three water wells is not in service and has been abandoned. The other two wells are currently in use to meet the domestic water supply and heating/cooling requirements of the existing dwelling. Refer to FIG-2 and the Existing Conditions plan in Appendix E for the pre-development conditions of the site.

The proposed development will be connected to the municipal services on Sandhill Road. The existing septic system will be removed. The two existing water wells will be used for the heating/cooling requirements of the existing building.

This servicing design brief will address SWM requirements for the phased development of the 0.8ha site and how the proposed phased development will be serviced with sanitary, storm and water services. Servicing, Grading and drainage and SWM plans for both phases of development are included with this report.

2 References

Various documents were referred to in preparing the current report including:

- City of Ottawa Sewer Design Guidelines Revision 2, October 2012 (SDG002)
  - Technical Bulletins ISDTB-2012-4, ISDTB-2014-01, PIEDTB-2016-01, ISTB-2018-01 and ISTB-2018-04
- City of Ottawa Water Distribution Design Guidelines, July 2010 (WDG001)
  - Technical Bulletins ISDTB-2014-02 and ISTB-2018-02
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment, March 2003 (MOE SMPDM)
- Brookside Subdivision Infrastructure Study prepared by NOVATECH, November 2006
- Morgan's Creek Site Servicing Brief prepared by J.L. Richards & Associates, August 2011
- Geotechnical Investigation Report prepared by Paterson Group, November 2018

3 Regulatory Approvals

MVCA expressed no concerns regarding the development in their review comments that were included with the City comments dated November 27, 2017. The City reviewer indicated that no quality controls are required. Refer to the November 2017 City comments and City reviewer email in Appendix B1. An extension for the municipal sanitary sewer on Sandhill Road is proposed and as such approval is required from the MOECP. An ECA application will be submitted to acquire the approval.

4 Geotechnical Considerations

The following conclusions and recommendations from the geotechnical investigation report prepared by Paterson Group were taken into consideration:

- The subject site has a determined permissible grade raise restriction of 2 meters above the existing ground surface;
- Long-term ground water table is anticipated to be between 5 to 6 meters in depth;
- Development is recommended to have perimeter foundation and underslab drainage systems; however, the foundations design must be completed before drainage systems can be designed.

5 Sanitary Sewer Design

5.1 Type of Establishment

The ultimate development is to be a mosque and community center. The development will provide areas of worship and proposed amenities that include kitchens, meeting rooms and a gymnasium. Refer to the pre-consultation meeting notes in Appendix A.

The function of the proposed establishment is a place of worship and community center and thus is similar to a church or an Assembly hall as listed in Appendix 4-A of the City of Ottawa Sewer Design Guidelines (SDG02, 2012). The daily sewage flow for a church with kitchen facilities is selected.

5.2 Peak Design Flow

The site is currently serviced by an on-site septic system, which will be decommissioned during Phase 1 of development. The existing 250mm diameter sanitary sewer on Sandhill Road is proposed to be extended and the proposed development will be serviced by a new sanitary sewer connected to the proposed municipal sanitary sewer extension. The anticipated peak sanitary flow from the existing building and the proposed addition has been calculated as per the City of Ottawa Sewer Design Guidelines (SDG02, 2012) and Technical Bulletin ISTB-2018-01. Peak flows were calculated for the ultimate site plan, refer to the pre-consultation notes in Appendix A. Occupancy loads provide by the architect, refer to the email in Appendix D. The anticipated peak sanitary flow is calculated as follows:

Design Flows

Design Flow for Establishment:	30 L/sanctuary seat (person)
Site Area:	0.818 hectares
Peak Factor:	1.5
Existing Building Occupancy Load:	180 persons
Proposed Addition Occupancy Load:	1,271 persons
Extraneous Flow:	0.33 L/s/ha
Peak Design Flow:	=(30L/person/day)(1451persons)(1.5)+(0.818ha)(0.33L/s/ha)
	=**1.03 L/s**

The new 2-storey building and the existing building will be serviced by two new 200mm diameter sanitary service. The proposed on-site sanitary sewer will be installed at a minimum grade of 0.5%. At this slope, the 200mm diameter sanitary sewer will have a capacity of 23.5 L/s and a full flow velocity of 0.86 m/s, which will be sufficient to service the site under both phases of development. The City of Ottawa Sewer Design Guidelines recommend a flow velocity between 0.8m/s to 3m/s. Refer to Appendix D for detailed calculations and Appendix E for Phase 1 & Phase 2 layout details on the Site Servicing plans (dwg nos. SS-1 & SS-2).

5.3 Downstream System

The downstream existing 250mm diameter municipal sanitary sewers on Sandhill road have approximately 19.22 L/sec available capacity. Thus, the existing municipal sewers have adequate capacity to accommodate the 1.03 L/sec peak flow from the site. Refer to the JLR and IBI sanitary design sheets and the IBI sanitary drainage area plan in Appendix A.

6 Watermain Design

6.1 Phase 1 Watermain Design

The site will be serviced by a new 150mm diameter watermain which will be connected to the existing 305mm diameter municipal watermain on Sandhill Road to meet the domestic and fire flow requirements for the site. The existing building will be serviced by a new 150mm diameter water service lateral connected to the new 150mm diameter watermain. The on-site existing wells will be decommissioned in phase 2 prior to construction. These wells will only be used for providing heating/cooling to the existing building in the interim. Design of the domestic water distribution system in phase 1 will ensure that there is no cross connection between the municipal and well water systems. Before occupancy, the mechanical engineer will provide written confirmation to the City that two systems are completely independent and there is no cross connection. Phase 1 domestic and fire flow demands were not calculated as per the pre-consultation meeting notes with the City. Determination of the demands and capacity of the system are based on the ultimate site plan. Refer to the pre-consultation notes in Appendix A.

6.2 Phase 2 Watermain Design

The proposed building will be serviced by a new 150mm diameter watermain extending from the internal 150mm diameter water service of the existing dwelling. Phase 2 domestic and fire flow demands were determined as follows:

Fire Flow Demand

The fire flow demand calculations were prepared based on the Fire Underwriters Survey (FUS, 1999) criteria. The new addition will be sprinklered and will be a non-combustible steel frame construction. The existing dwelling is combustible wood construction and is not sprinklered. Based on technical bulletin ISTB-2018-02 the classification for mixed construction rule of non-combustible construction applies, where 66.7% or over of the total wall, floor and roof area constructed are defined as non-combustible. Credits for sprinkler protection applied for the percentage of the floor area protected by sprinklers. Refer to Appendix C for detailed fire flow demand calculations and the type of construction confirmation from the architect.

The domestic water demands for the proposed site were calculated as per the City of Ottawa Water Distribution Guidelines and Technical Bulletin 2018-02.

Institutional Water Demand

Average daily demand:

=28,000 L/ha/day
=0.818 ha x 28,000 L/ha/day x (1/86,400 s/day)
= 0.27 L/s

Maximum daily demand:

=1.5 x avg. day
=1.5 x 0.27 L/s
=0.41 L/s

Maximum hourly daily demand:

=1.8 x max.day
=1.8 x 0.41 L/s
=0.74 L/s

The site is located in the MG water distribution network pressure zone and the following boundary conditions were provided by the City of Ottawa (refer to Appendix C):

Peak Hour HGL = 124.2m

Maximum HGL = 131.2m

Max Day (0.41 L/s) + FireFlow (66.7L/s) = 125.1m

Based on the HGL of 124.2m for the peak hour scenario, 131.2m for the maximum HGL scenario, and 125.1m for the max day + fire flow scenario, pressure analyses were performed and residual pressures of 67.3 psi (463.9 kPa), 77.7 psi (535.5 kPa), and 57.3 psi (395.0 kPa), respectively, were estimated at the proposed 2 storey building. Refer to Appendix C for calculation details. The residual water pressures during the three scenarios are greater than the minimum requirement of 20psi (140kPa) as per the City of Ottawa Design Guidelines. The existing water supply system will therefore have adequate capacity to meet the domestic and fire demands for the proposed development.

6.3 Fire Hydrant

The fire flow demand for both buildings was calculated to be 67 L/s. An existing fire hydrant located across the proposed building on Sandhill road will provide fire protection for the proposed development. The unobstructed distance between the existing fire hydrant and the Siamese connection of the proposed building is 42m.

The existing fire hydrant has light blue colored cap that indicates it has a maximum flow of 95 L/sec at a residual pressure of 20 psi as rated by the City of Ottawa. Thus, the existing fire hydrant has adequate capacity to meet the site's fire flow demand. Table 5.3-1 below lists the minimum number of fire hydrants needed to deliver the required fire flow for the proposed building.

Table 6.3-1 – Minimum Number of Fire Hydrants for Required Fire Flow

Block	Fire Flow Demand (L/min)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m
351 Sandhill Road	4000	1	0

7 Stormwater Management

7.1 Storm Design Criteria

The storm sewer system was designed in conformance with the City of Ottawa Sewer Design Guidelines (SDG02, 2012). The stormwater servicing design criteria for the proposed development is as follows:

- The proposed on-site storm sewer network / minor system, is designed using Rational Method and Manning's Equation to convey runoff under free flow conditions for the 5-year return period.

- Maximum allowable ponding depth is 300 mm.
- No surface ponding during 2 year storm events
- Flows from storms events greater than the 100-year return period will be directed overland towards Sandhill Rd.
- Average runoff coefficients were calculated for each inlet drainage area using a runoff coefficient of 0.20 for pervious surfaces and 0.90 for impervious surfaces.
- Estimated storage volumes are based on the Modified Rational Method.
- 100-year minor system flows to the sewer on Sandhill Rd must be controlled to the allowable release rate criteria of 85L/s/ha.
- Water quality will be provided by the existing off-site Briar Ridge Stormwater Management Facility.
- The HGL in the storm sewer is to be a minimum of 0.3m below the underside of the footing during the 100-year storm event.
- Minimum freeboard of 0.3m between the 100-year overland flow elevation and finished floor.
- The time of concentration is pre-determined in the Brookside Subdivision design report, which is T_c=15mins. Refer to Appendix A.

7.2 Pre-Development Conditions

The site is generally flat with a gentle slope from west to east towards Sandhill Road. There is no existing storm sewer system on the site. The stormwater runoff currently sheet drains overland towards Sandhill Road.

7.3 Allowable Release Rate

Minor system flows from the site to the 675mm diameter storm sewer on Sandhill Rd will be restricted to 85L/s/ha for up to the 100-year event. The allowable release rate criteria of 85L/s/ha was established as part of the Briar Ridge Phase 2 Subdivision. Refer to email from the City dated April 28, 2017 and the exert page from the Brookside Subdivision Infrastructure Study in Appendix A. The ICDs have been sized to ensure that there is no surface ponding during 2-year storm events. The allowable post development release rates from the site up to the 100-year storm events will be controlled to a release rate of 48.74 L/s for phase 1 of development. The allowable release rate for phase 1 is based on a development area of 0.57ha since only 0.57ha will be developed during phase 1. The allowable post development release rate for phase 2 for up to the 100-year storm events will be controlled to 68.8 L/s based on the entire site area of f 0.81ha.

7.4 Post-Development Conditions

Stormwater will be controlled and released at a rate less than the allowable release rate for storms up to and including the 100-year storm event during both phases of development. An overland flow route is provided for storms greater than the 100-year event. Flow control devices will be installed in roof drains of the proposed 2 storey building and various catchbasins/manholes in order to control stormwater prior to its release from the site. The site under phase 1and 2 post development conditions have been divided into 4 drainage areas, refer to Stormwater Management drawing SWM-1 and SWM-2 in Appendix E.

7.4.1 Storage Requirements and Allocation

Post development runoff will be detained on-site for storms up to and including the 100-year storm. The required SWM storage volumes will be achieved using the surface storage in the parking-lots and storage on the roof of the new building for storms up to the 100-year event. Underground pipe and structure storage volumes will be utilized to meet the criteria of no surface ponding during the 2-year storm events.

Surface ponding volumes over catch basins and catch basin manholes were determined by applying the pyramid volume equation of one-third of the depth multiplied by the surface area of the pond. Ponding depths for the subject site must be equal to or less than 300 mm for the 100-year storm event. There will be no surface ponding for 2-year storm events. Major overland flows from storms greater than the 100-year event will be directed to Sandhill Rd.

The volume of storage required was calculated for the 2-year,5-year and 100-year storm events using the Rational Method. Since more storage is available than will be required in the 2-year, 5-year and 100-year events, the ponding level will be less than 300mm for the 100-year event. There will be no surface ponding during 2 year storm events.

For phase 1 of development, the 100-year on-site required and available storage volumes were estimated to be 183.1 m^3 and 218.8 m^3, respectively. The 5-year on-site required and available storage volumes were estimated to be 57.7 m^3 and 106.2 m^3, respectively. The 2-year on-site required and available storage volumes were determined to be 34.3 m^3 and 35.1m^3, respectively.

For phase 2 of development, the 100-year on-site required and available storage volumes were determined to be 246.8 m^3 and 275.8 m^3, respectively. The 5-year on-site required and available storage volumes were determined to be 152 m^3 and 163.2 m^3, respectively. The 2-year on-site required and available storage volumes were determined to be 49 m^3 and 92.1 m^3, respectively.

Detailed stormwater management calculations are shown in Appendix B, including storage requirements and storage quantities provided. Appendix B1 contains the stormwater management calculations for phase 1 of development and Appendix B2 contains the calculations for phase 2 of development. Ponding levels and drainage areas for the site are shown on the post-development storm drainage plan SWM-1 and SWM-2 for Phase 1 and Phase 2, respectively. Refer to the drawings in Appendix E.

7.4.2 Flow Control Devices

There are 2 Hydrovex-type ICDs proposed at the site. ICDs and their locations are shown on the Site Servicing plans and the Stormwater Management plans for both phase 1 and phase 2 of development, refer to drawings SS-1, SS-2, SWM-1 and SWM-2 in Appendix E. During the 100-year and 2-year storm events, CBMH203 will have design heads of 3.9m and 3.6m and allowable flowrates of 29.5L/sec and 28.0 L/sec, respectively. During the 100-year and 2-year storm events, CBMH202 will have design heads of 3.6m and 3.3m and allowable flowrates of 17.6 L/sec and 11.0 L/sec, respectively. Based on those criteria, Hydrovex ICD model 125VHV-2 is selected for CBMH203 and model 100-VHV-1 for CBMH202. Refer to the Hydrovex selection graph in Appendix B1.

There are 5 Watts Accutrol type roof drains proposed to control the release rate from the proposed phase 2 building. The proposed phase 2 development's roof allowable release rate is determined as 10 L/sec with 0.15m of ponding depth above the roof for storage. Thus, each roof drain will require to be set to a fully exposed weir opening with 0.15m of head to restrict the flow to the allowable flow rate. Roof drains and scupper locations are shown on the Site Servicing plan for phase 2 of development. Refer to Appendix B2 for roof drain specifications.

7.4.3 Summary of Proposed SWM System

A summary of the release rates for the controlled and uncontrolled drainage areas and corresponding storage details for phase 1 of development is provided in Table 6-1 below. The uncontrolled area PH1C flows are exempt from the site's release rate during the interim due to the drainage of the area flows overland and releases into the Right of Way without interacting with the on-site storm sewer system. Refer to Appendix B1 for detailed stormwater management spreadsheet calculations. The Post development 100-year controlled release rate from the site is of 47.1 L/s, which is less than the allowable limit of 48.74 L/s.

A summary of the release rates for the controlled and uncontrolled drainage areas and corresponding storage details for phase 2 of development is provided in Table 6-2 below. Refer to Appendix B2 for detailed stormwater management spreadsheet calculations and refer to Appendix D for the sewer design sheet. The Post development 100-year controlled release rate from the Site is of 67.4L/s, which is less than the allowable limit of 68.85L/s.

As per the Morgan's Creek Site Servicing Brief, the HGL of the existing 675mm diameter storm sewer on Sandhill Road has an HGL equal to the obvert of the pipe, which is 73.105. The proposed building's basement elevation is 74.20; thus, there is more than adequate clearance to satisfy the requirement of the HGL being a minimum of 0.3m below the underside of the footing. Refer to the 100-year storm sewer design sheet by J.L. Richards dated July 2011 in Appendix A.

7.4.4 Quality Control

The site is located in catchment area C-3, which is part of the overall drainage area collected by the existing Brookside Pond-C SWF. Moreover, Stormwater quality control will be provided by the existing Brookside Pond-C SWF since the facility provides level 2 water quality control as per the guidelines of the MOECP SWM planning and Design Manual. Therefore, no other water quality measures are proposed. Refer to email from the City dated April 28, 2017 in Appendix B1, exert pages and Figure-3 from the Brookside Subdivision Infrastructure Study and SWM Facilities Storm Drainage Area Plan in Appendix A.

Table 7-1: Phase 1 Summary of Proposed On-Site SWM System

Area ID	Area (ha)	Runoff Coefficient 'C'	2 Year Release (L/s)	2 Year storage required (m^3)	2 Year underground storage provided (m^3)	5 Year Release (L/s)	5 Year storage required (m^3)	5 Year surface storage provided (m^3)	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m^3)
PH1A	0.486	0.79	**28.0**	34.3	35.1	**28.8**	54.6	95.3	**29.5**	169.9	193.5
PH1B	0.088	0.73	**11.0**	0.0	0.0	**14.8**	3.1	10.9	**17.6**	13.2	25.3
PH1C	0.23	0.20	7.9	0.0	0.0	10.7	0.0	0.0	18.3	0.0	0.0
TOTAL	**0.57**										
		Totals:	**39.0**	**34.3**	**35.1**	**43.6**	**57.7**	**106.2**	**47.1**	**183.1**	**218.8**
	Total Allowable Release (L/s):		**48.74**								

Table 7-2: Phase 2 Summary of Proposed On-Site SWM System

Area ID	Area (ha)	Runoff Coefficient 'C'	2 Year Release (L/s)	2 Year storage required (m^3)	2 Year underground storage provided (m^3)	5 Year Release (L/s)	5 Year storage required (m^3)	5 Year surface storage provided (m^3)	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m^3)
PH2A	0.498	0.78	**28.0**	35.1	35.1	**28.8**	111	95.3	**29.5**	173.3	193.5
PH2B	0.118	0.77	**15.6**	0.0	0.0	**17.0**	2	10.9	**17.6**	24.9	25.3
PH2C	0.145	0.90	**7.0**	13.9	57.0	**8.5**	39	57.0	**10.0**	48.7	57.0
PH2D	0.045	0.46	3.5	0.0	0.0	4.8	0.0	0.0	10.2	0.0	0.0
TOTAL	**0.81**										
		Totals:	**54.2**	**49.0**	**92.1**	**59.1**	**152.0**	**163.2**	**67.4**	**246.8**	**275.8**
	Total Allowable Release L/s		**68.85**								

8 Erosion and Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- Extent of exposed soils shall be limited at any given time;
- Exposed areas shall be re-vegetated as soon as possible;
- Minimize the area to be cleared and disruption of adjacent areas;
- Siltsack or approved equivalent shall be installed inside all catch basins, catch basin manholes, and storm manholes as identified on the erosion and sediment control plan;
- Mud matt is required at the construction entrance to prevent mud tracking on municipal roads. Mud matt to be installed and maintained as indicated on the erosion and sediment control plan;
- Visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations;
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed;
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract;
- During construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer; and,
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

9 Conclusions

This report addresses the adequacy of the existing municipal services to service the proposed development at 351 Sandhill Rd, Ottawa, Ontario. Based on the analysis provided in this report, the conclusions are as follows:

- A 150mm diameter water service connected to the 300mm municipal water main on Sandhill Road will adequately service the proposed development.
- A 200mm diameter sanitary service connected to the 250mm diameter municipal sanitary sewer extension on Sandhill Road will adequately service the proposed development.
- SWM for the proposed phased development will be achieved by restricting all storms up to the 100-year post development flow to the allowable release rate. The allowable release rate criteria of 85L/s/ha was established as part of the Briar Ridge Phase 2 Subdivision.
- Required on-site SWM storage volumes will be achieved using the surface storage in the parking-lots and storage on the roof of the new building for storms up to the 100 year event.
- Quality control will be provided by the existing Brookside Pond-C SWF, which receives flows from the 675mm storm sewer on Sandhill Road. No other water quality measures are proposed.
- Temporary erosion and sediment control measures for the subject site have been identified.
- Overland flow routes have been provided for the subject site.
- During all construction activities, erosion and sedimentation shall be controlled.

Appendix A – Supporting Documents & Drawings

351 Sandhill Road: Pre-application Consultation Notes
July 7, 2016, Room 4103E
2:30 – 3:30pm

In attendance: Kathy Rygus (Planner, City of Ottawa), Nadege Balima (Project Manager, City of Ottawa), Mark Young (Design, City of Ottawa), John Bernier (Planner, City of Ottawa), Riley Carter (Transportation, City of Ottawa), Mark Richardson (Forester, City of Ottawa), Fredrick VanRooyen (Student Planner, City of Ottawa), Bill Holzman (Holzman Consultants Inc.), Stephanie Morris (Holzman Consultants Inc.), Virginia Robinson (LRL Associates Ltd.), Mehmood Shaikh (Kanata Muslim Association), Moinuddin Siddiqui (Kanata Muslim Association)

Proposal Summary

- Kanata Muslim Association community of worshipers in the Kanata North area are looking for a site for a new mosque. Current facility in a strip mall on March Road with other venues such as schools and gyms rented on an ongoing basis for large prayer services and Saturday school sessions
- The site at 351 Sandhill would be developed in three phases:
    - Phase 1: make the existing building structurally sound and undertake interior changes to use the space for a worship area; add required surface parking (20-30 spaces).
    - Phase 2: build an addition at rear of the existing building (2 storey multi use facility) and provide additional parking.
    - Phase 3: demolish existing building; full build out of new mosque, with worship and multiple purpose facilities.
- As the Kanata Muslim Association is a non-for-profit organization, fundraising is ongoing and it could be 5 to 10 years before mosque is built.
- Site is ideal due to surrounding institutional uses and convenient location to the Muslim community in Kanata North.
- Friday sessions and child care will still be accommodated at a larger venue.

Staff's preliminary comments on the proposal:

Servicing & Engineering (Nadege Balima)

- The site currently is privately serviced with well and septic system.
- Water, storm and sanitary pipes are located within Sandhill Road.
- The sanitary pipe was extended by Minto to serve their property immediately to the south of 351 Sandhill. The sanitary pipe does not extend to the property line. Sanitary is also available from Klondike Road. Staff were unable to find the design of Klondike Road sanitary sewer.
- If the sanitary line was not included in the design of Sandhill Road, extending the sewer would be needed and justification for capacity would be required. The as builts for the adjacent Minto site show that the sanitary is at the corner and would need to be extended. Capacity of the system should be based on the ultimate.
- If sanitary line needs to come from Klondike Road, municipal consent would be required. The City does not manage cost sharing and there would be no conditions or agreements for cost recovery from other owners to contribute.
- Ministry Of Environment Application would be required with a sanitary extension (transfer of review application).
- **Action:** Nadege Balima will search for any further infrastructure design to confirm the location of the sanitary line.
- Because the site is located within the urban area, municipal services are required to be installed at the time of the Phase 1 development, with the establishment of the parking lot.
- With a phased development, the engineering consultant will need to show how each phase will work independently as well as at the ultimate build-out.

Transportation (Riley Carter)

- Access to the site will need to be upgraded to meet the private approach by-law, requiring 6.7 metres for a two-way driveway.
- If less than 50 parking spaces are required, grade cannot exceed 2% within the private property for a distance of 6m from the highway line. If more than 50 parking spaces are required, grade cannot exceed 2% within the private property for a distance of 9m from the highway line (Private Approach By-law).
- There is no City ROW widening required on Sandhill Road.
- Sidewalks exist on the west side of Sandhill Road; current upgrades are being made to Klondike Road for cycling and sidewalks. Staff would like to see a sidewalk constructed along the frontage of the site.
- Please be aware that there are currently no parking restrictions on Sandhill Road, but such standard could change in the future if there are parking complaints about on-street parking.
- A Transportation Impact Study and Noise Study are not required.

Urban Design (Mark Young)

- With a phased development, it is important to design for the long-term scenario. The site plan can be approved showing the ultimate plan for multiple phases. In that case, further applications and revisions wouldn't necessarily be required. For example, consider providing the parking lot design/layout for both phase 1 and 2.
- It is recommended that the mosque in Phase 3 be placed close to the street and parking be provided in the back.
- It is also recommended that the parking lot for Phases 1 and 2 be located at the rear of the building, as that is the intention of the ultimate design.
- Even though the adjacent Minto site is not going to be developed as approved through the site plan process (securities have not been released yet), please be aware that the plans did show a shared aisle that was intended to be a public street in the ultimate configuration. The Minto site is zoned for residential development, so the spacing of accesses and the protection of the hedgerow and privacy fencing should be considered.
- It is recommended that the parking lot be located at the back of the building as that is the intention of the ultimate design.

Planning (Kathy Rygus)

- It is recommended that concurrent site plan control and zoning by-law amendment application be submitted. If the applications are submitted concurrently (same day), a 10% reduction in fees is applicable.
- It is not required that the applications be filed concurrently. If the applicant is concerned that there will be public opposition to the rezoning, the rezoning application could be submitted first and the site plan application submitted during the rezoning process or after approval of the zoning.
- The rezoning alone does not permit use of the building for the place of worship use. The site plan application approval is required as well, because in order to have the place of worship, the property must be connected to municipal services and a parking lot constructed that is large enough to satisfy bylaw requirements. There are no concerns with the proposed institutional land use from a planning perspective, but we would prefer to see the rezoning to be tied to the site plan.
- If the site plan is not submitted concurrently, a conceptual site plan and servicing brief to demonstrate capacity would be required at the time of the submission of the zoning bylaw amendment application. The other detailed studies could be done at the time of the site plan application submission.
- The requirement for a site plan control application is based on the need for connection to municipal services and the creation of 10+ parking spaces.
- The gravel parking area proposed in the Phase 1 concept plan would not be permitted, because asphalt parking and curbing are required in the urban area.
- There are concerns with operating the interim use without approval. There are no concerns with the institutional land use from a planning perspective, but would like to see the rezoning to be tied to the site plan.

- Please be aware of the legal nature of a site plan agreement and the requirement for securities to be held (based on a cost estimate of all site works - securities for 50% of on-site works, and 100% of off-site works). This process will require a letter of credit to be deposited and no building permit, tenant fit-up or commence work can be issued until securities are received.
- The timeline for zoning by-law amendment is approximately 6 months if no complications arise. For timing reasons, it would be effective to submit concurrently as the zoning and site plan would be reviewed at the same time.
- No cash-in-lieu of parkland is payable for an institutional use.
- **Action:** Kathy will process to apply for a discount based on non-for-profit organization.

Trees (Mark Richardson)

- Would look for tree retention details to be provided on the landscape plan, especially if the hedgerow is healthy (integrate tree conservation report into landscape plan).
- A tree permit will be required to cut down any trees on site.
- If the existing hedgerow is located on both sides of the property line, permission from the adjacent land owner would be required to cut down.
- Please be aware of special practices with respect to protection of critical root zones.

Further Information:

12 Steps of the development application review process - http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process
Zoning by-law amendment - http://ottawa.ca/en/development-application-review-process-0/zoning-law-amendment
Site Plan Control - http://ottawa.ca/en/development-application-review-process-0/site-plan-control
Guide to preparing studies and plans - http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans
Private Approach By-law - http://ottawa.ca/en/residents/laws-licenses-and-permits/laws/use-private-approaches-law-no-2003-447

ENGINEERING FOLLOW-UP

Nadege was able to reconstitute how the sanitary sewer was installed in Sandhill Road: Minto put the sanitary sewer in place before deciding not to proceed with the construction of their approved site (760 March).

Please find attached the consolidated engineering comments, along with:

1. A copy of the servicing report for the subdivision that identifies the storm water criteria for the site (this site outlets to SWM Pond C). – ***document too large: I'll send a separate e-mail***

2. The **draft report** outlining the sanitary drainage area – to get a general idea of how the drainage area was established for the sanitary sewer within Sandhill Road (**this report is not final** and a copy of the final approved version of the report (version 3 dated July 2012 according to the site plan agreement) may be obtained through our information center as outlined in the comments); ***- document too large: I'll send a separate e-mail***

3. The Brookside subdivision servicing report identifying the sanitary drainage area and design criteria for the sanitary pipe within Klondike Road.

4. The as-built cross-section of the sanitary pipe (the approved design was sent to them already).

I would also like to point out that the site is located within the Shirley's Brook Development Charges Stormwater Area (W-2) and area specific development charges would be applicable.

3.2 Storm Drainage

Storm drainage for development within the Klondike Road Lands will be designed pursuant to the major-minor system philosophy. In this manner, right-of-way drainage will be collected through a series of roadway inlet catch basins and conveyed through a storm sewer system to a water quality and quantity treatment facility located downstream.

3.2.1 Minor System

Storm sewers will be sized to permit free flow conveyance of runoff generated from 1:5 year design storm using City of Ottawa IDF data. Flow restrictors will be installed at each inlet to the minor system to control inflows to a maximum rate of 85 L/s/ha to prevent storm sewer surcharging for the protection of dwellings and to balance the distribution of rainfall runoff stored on-site versus that released into the SWM facilities.

The design criteria used to determine the size of the storm sewers are as follows:

Minimum pipe size	=	300 mm diameter
Minimum velocity	=	0.8 m/s
Maximum velocity	=	3.0 m/s

The minor systems for both the Brookside Subdivision (Area D) and the south shore (Area C) areas will outlet to one of two proposed SWM facilities located immediately upstream of March Valley Road on the north side and south side of Shirley's brook, respectively.

The minor system for the west shore (Area A), including 5.8 ha of March Road, will outlet to a proposed SWM facility located between March Road and Shirley's Brook near the confluence of the northwest and southwest branches.

Detailed design calculations and drawings for the Brookside Subdivision (Areas D-2 and D-3) are available in the *Brookside Subdivision Infrastructure Servicing Study* (NECL, November 2006).

3.2.2 Major System

Major systems will be designed to convey flows in excess of the minor system capacity via overland flow routes within the public ROW to Shirley's Brook. On-site major system storage will be provided within road sags for runoff rates that exceed the capacity of the inlet control devices. Major system storage for Areas D-1 and D-2 has been calculated at 47 m^3/ha, based on the detailed grading design of the Brookside Subdivision, and has been approximated at 50 m^3/ha in the remaining areas for hydrologic modeling purposes. Runoff volumes exceeding the available on-site major system storage will be conveyed overland along the major system flow routes to Shirley's Brook. The major overland flow route for the Brookside Subdivision is shown on Drawing 103106-STM2.

The inflow rate to the minor system will be controlled using inlet control devices, with the objective of minimizing ponding for the 1:5 year storm event. In this way, major overland flow along roadways will only occur during infrequent rainfall events (> 1:5 year). Ponding will be restricted to a maximum depth of 0.30m in the right-of-way.

SWM facility 'D' has been sized to provide Level 2 water quality control as per the guidelines provided in *MOE SWM Planning and Design Manual*, and erosion control for all storms up to the 1:5 year event based on a target erosion control rate of 8-14 L/s/ha (from Table 4 of the Kanata North EMP).

The stage-storage-discharge curve for SWM Facility 'D' used in the post-development SWMHYMO model is provided in Table 7.1-1.

Table 7.1-1 SWM Facility 'D' - Stage-Storage-Discharge Curve

Component	Elevation (m)	Volume				Release Rate (L/s)
		Forebay (m^3)	Main Cell (m^3)	Total Volume (m^3)	Active Volume (m^3)	
Pond Bottom	65.00	0	0	0	0	-
	65.55	460	1,330	1,790	0	-
Top of Forebay Berm	65.75	730	2,120	2,850	0	-
Normal Water Level	66.05	-	4,330	4,330	0	-
	66.25	-	5,420	5,420	1,090	20
Extended Detention	66.45	-	6,530	6,530	2,200	29
	66.75	-	8,270	8,270	3,940	100
	67.00	-	9,810	9,810	5,480	210
Erosion Control (1:5 year)	67.25	-	11,420	11,420	7,090	300
	67.50	-	13,130	13,130	8,800	3,000

7.2 SWM Facility 'C'

SWM Facility 'C' will service Areas C-1, C-2 and C-3 shown on Figure 3. The total drainage area to this facility will be approximately 26.2 ha with an average imperviousness of 53% (see calculations in Appendix D).

Minor system flows from the upstream drainage area will ultimately be conveyed by storm sewers along Klondike Road to SWM Facility 'C'. Until such time as Klondike Road is fully urbanized east of the OCR crossing, the Klondike Road storm sewer will outlet into a temporary open channel along Klondike Road, which will convey minor system flows from the upstream drainage area to SWM Facility 'C'.

SWM facility 'C' has been sized to provide Level 2 water quality control as per the guidelines provided in *MOE SWM Planning and Design Manual*, and erosion control for all storms up to the 1:5 year event based on a target erosion control rate of 8-14 L/s/ha (from Table 4 of the Kanata North EMP).

The stage-storage-discharge curve for SWMF 'C' used in the post-development SWMHYMO model is provided in Table 7.2-1.

4.0 STORM SEWER SYSTEM

The Brookside Subdivision has been designed pursuant to the major-minor system concept of stormwater management. The minor system for the entire subdivision outlets into a wet pond (SWM facility 'D') located just west of March Valley Road and north of Shirley's Brook.

4.1 Storm Sewer Design – Minor System

The minor system for the Brookside Subdivision was designed using the Rational Method with an initial time of concentration of 15 minutes as recommended in the Ottawa Sewer Design Guidelines for split drainage residential developments. Storm design sheets and drainage area plans for the proposed development are included in Appendix C.

The sewers were sized to permit free flow conveyance of the runoff generated from a 5-year design storm using the Rational Method. The design criteria used to determine the size of the storm sewers required to service the proposed development are as follows:

Minimum pipe size	=	300 mm diameter
Minimum velocity	=	0.8 m/s
Maximum velocity	=	3.0 m/s

4.2 Storm Sewer Design – Major System

The major system flows will be conveyed overland within the public ROW and outlet into Shirley's Brook upstream of the railway culvert. IPEX Type A, B, C & D inlet control devices (ICD) are proposed within the roadway catch basins to ensure flow into the storm sewer system does not exceed the 5-year runoff rates. The release rates used in our analysis are: Type A = 21.0 L/s, Type B = 32.0 L/s, Type C = 40.0 L/s, and Type D = 61.0 L/s

Each pair of road catchbasins will be interconnected and will operate as a single inlet. Generally, the Type C & D ICD that has an increased inlet capacity is used in road sag areas along the collectors, and where local streets meet a collector. In this way major overland flow along collector roadways can be reduced to more infrequent rainfall events. Ponding will be restricted to a maximum depth of 0.30m in the right-of-way.

The major overland flow routes have been designed using open channel principles to ensure that the product of the velocity (m/s) x depth (m) within the right-of-ways does not exceed 0.6.

Hydrovex ICDs will be installed in rearyard catchbasins to control inflows to the storm sewer system from rearyard areas to 50 L/s/ha. While rearyard grading will provide some major system storage (to a maximum depth of 0.40m), this storage is not accounted for in the major system analysis.

The ICD models to be installed at each road and rearyard inlet are indicated on the General Plan of Services (103106-GP) provided in Appendix C. Flow control charts for the proposed IPEX and Hydrovex ICDs are provided in Appendix C.

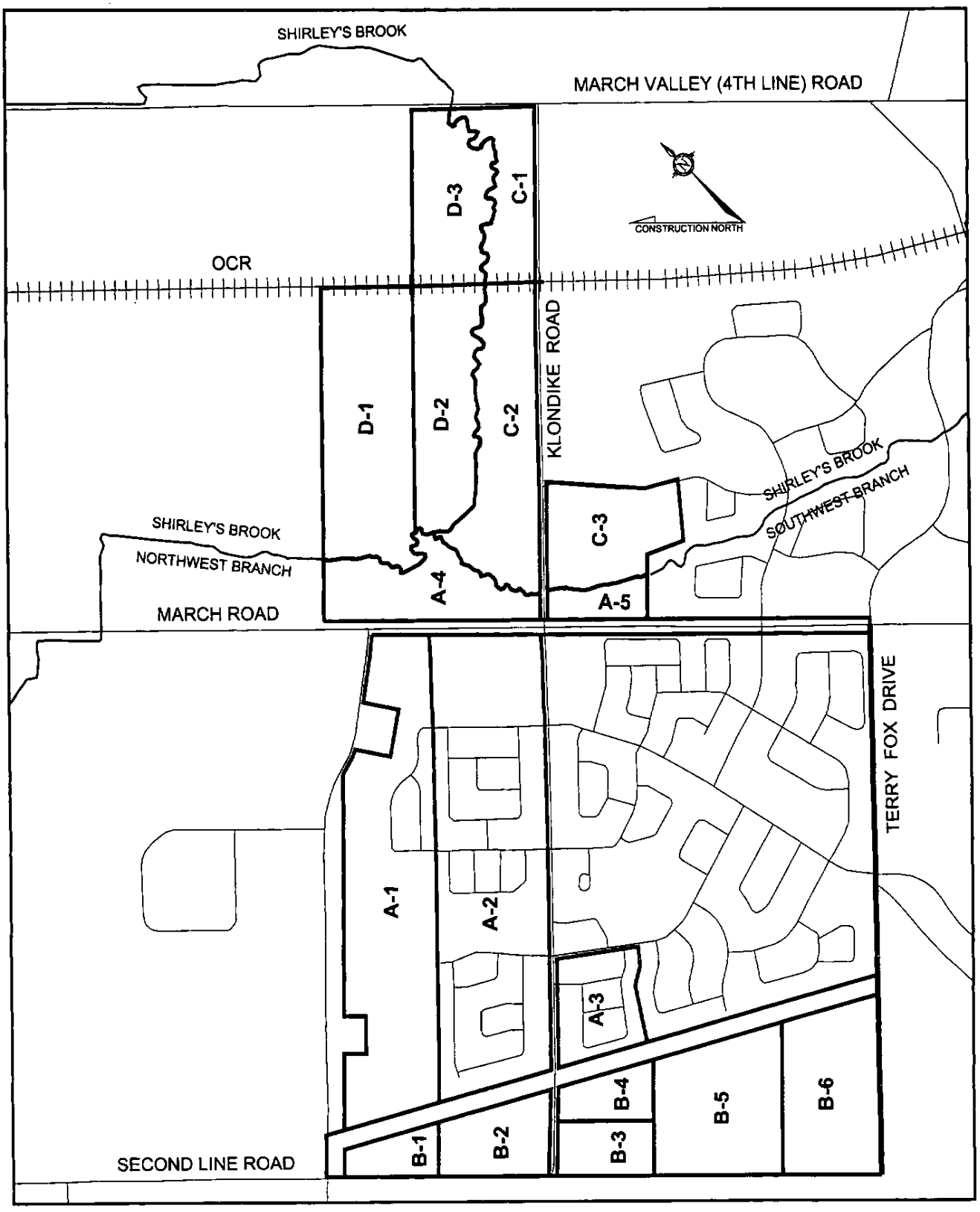

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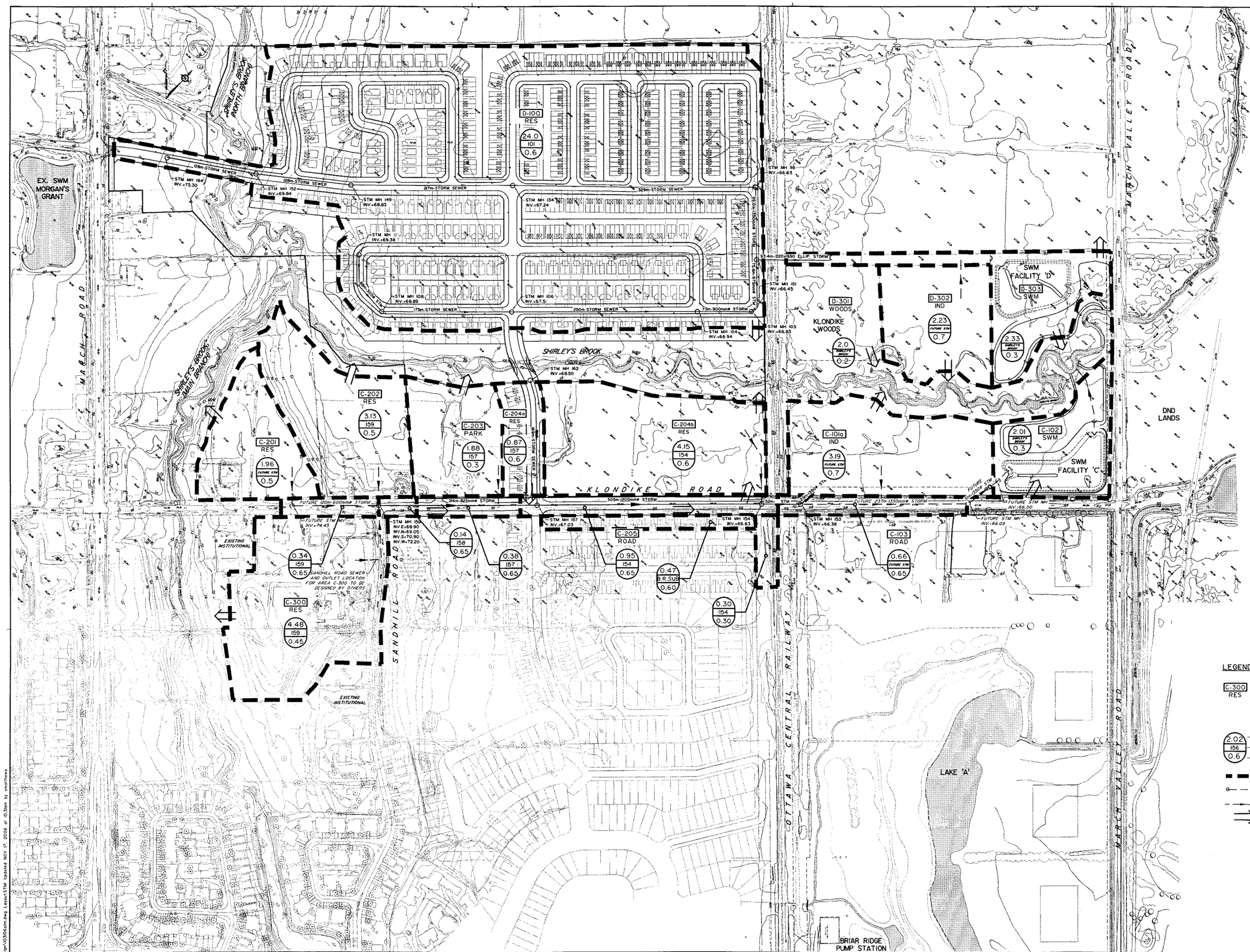
FIGURE 3
KLONDIKE ROAD LANDS
DRAINAGE AREA DELINEATION

103106 MAY 2006 N.T.S.

SHT8XII.DWG - 216mmX278mm



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

No.	REVISION	DATE	BY
9.	BRIAR RIDGE DRAINAGE AREA ADDED	NOV 17/06	MAB
8.	ISSUED FOR MOE APPROVAL	NOV 09/06	MAB
7.	ISSUED TO CLIENT	OCT 10/06	MAB
6.	ISSUED FOR CONSTRUCTION	AUG 17/06	MAB
5.	ISSUED WITH MOE APPLICATION	AUG 08/06	MAB
4.	ISSUED FOR TENDER	MAY 26/06	MAB
3.	ISSUED FOR MOE APPROVAL	MAY 01/06	MAB
2.	REVISED PER CITY COMMENTS	APR 24/06	MAB
1.	ISSUED TO CITY FOR REVIEW	MAR 20/06	MAB

LICENSED PROFESSIONAL ENGINEER M.A. BISSETT PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL PROVINCE OF ONTARIO

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DESIGN	MAB
CHECKED	SAY
DRAWN	SM
CHECKED	MAB
APPROVED	JGR

SCALE 1:2000

CITY OF OTTAWA
BROOKSIDE SUBDIVISION
SWM FACILITIES
STORM DRAINAGE AREA PLAN

PROJECT No. 103106-0
DATE AUGUST 2006
DRAWING No. 103106-STMI

Drawing:M:\2005\103106\CAD\design\103065stm.dwg Layout:STMI Updated NOV 17, 2006 at 10:31am by snatthews

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

MORGAN'S CREEK

CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR PROJECT NO.: 24566

STORM SEWER DESIGN SHEET AND
HYDRAULIC GRADE LINE ANALYSIS
IDF CURVE 1: 100

Designed by: K.F.
Checked by: L.D.

LEGEND
DENOTES EXISTING SEWERS

100 YEAR IDF CURVE
Manning's Coefficient (n) = 0.013

Date: July 2011

FLOW TO 675mmΦ STORM - SANDHILL ROAD

STREET	MANHOLE NUMBER From	To	DRAINAGE AREAS 0.20	0.40	0.50	0.80	0.85	0.90	total area (ha)	cumm area (ha)	1:100 YR PEAK FLOW GENERATION 2.78AR	2.78AR CUMM	Time min	Intens. mm/hr	Peak Flow L/s
Private Road	507	506							0.00	0.00	0.00	0.00	10.00	178.56	0.00
Private Road	506	505						0.29	0.29	0.29	0.73	0.73	10.36	175.29	127.19
Private Road	505	504				0.25		0.06	0.31	0.60	0.71	1.43	11.03	169.70	242.96
Private Road	504	503							0.00	0.60	0.00	1.43	11.87	163.07	233.46
Private Road	503	502					0.26		0.26	0.86	0.61	2.05	12.19	160.71	328.83
Private Road	502	501					0.19		0.19	1.05	0.45	2.50	12.69	157.22	392.26
													13.48		
Private Road	513	501		0.10					0.10	0.10	0.11	0.11	10.00	178.56	19.86
													10.26		
Private Road/ Sandhill Road	501	EX. 302							0.00	1.15	0.00	2.61	13.48	151.96	396.05
			TOTAL AREA (ha)					1.15							

(Above the Inlet Control Devices columns: "20" over ICD @ 20 and "20" over CUMM ICD FLOW.)

STREET	From	To	Inlet Control Devices ICD @ 10.0 L/S	ICD @ 13.0 L/S	ICD @ 15.0 L/S	ICD @ 20 L/S	ICD @ 28.4 L/S	ICD Flow (L/s) L/S	CUMM ICD FLOW L/S	1:100 YR PEAK FLOW (L/s)	Q_d/Q_{cap}
Private Road	507	506						0.00	0.00	0.00	0.00
Private Road	506	505					1.00	28.40	28.40	28.40	0.25
Private Road	505	504	1.00		1.00			25.00	53.40	53.40	0.28
Private Road	504	503						0.00	53.40	53.40	0.28
Private Road	503	502		1.00				13.00	66.40	66.40	0.23
Private Road	502	501			1.00			15.00	81.40	81.40	0.29
Private Road	513	501	1.00					10.00	10.00	10.00	0.06
Private Road/ Sandhill Road	501	EX. 302						0.00	91.40	91.40	0.32

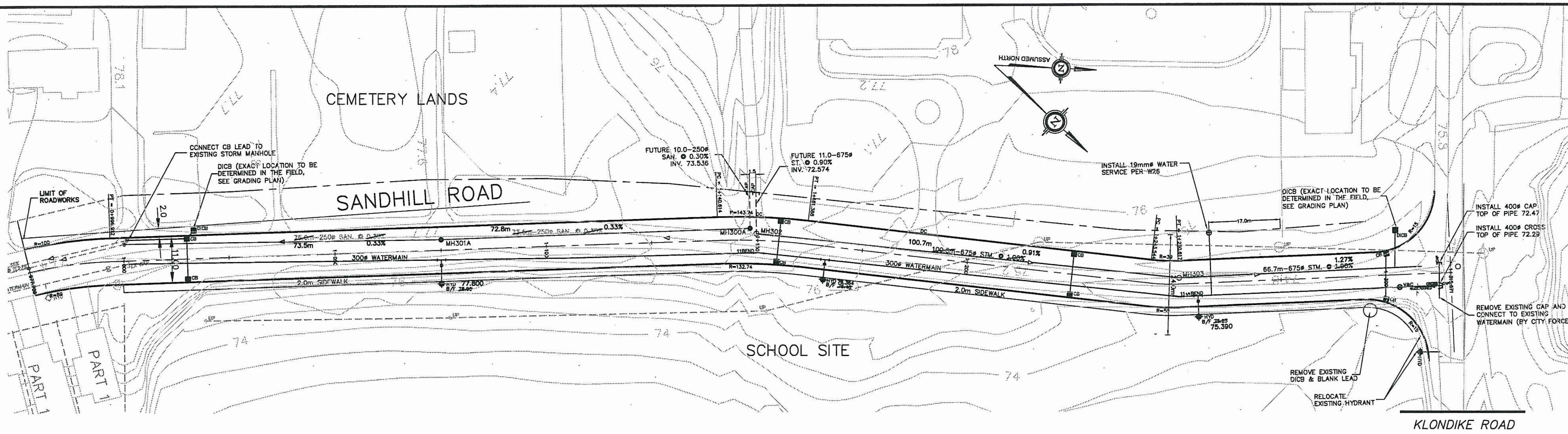
STREET	From	To	SEWER DATA Dia (mm)	Slope %	Q full (l/s)	V full (m/s)	V partial (m/s)	Depth of flow (m)	V surch (m/s)	Length (m)	Flow Time (min)
Private Road	507	506	300	0.35	59.68	0.82				17.90	0.36
Private Road	506	505	375	0.40	115.68	1.01	0.87	0.126	0.25	40.20	0.66
Private Road	505	504	450	0.40	188.11	1.15	1.00	0.165	0.33	58.40	0.85
Private Road	504	503	450	0.40	188.11	1.15	1.00	0.165	0.33	22.00	0.32
Private Road	503	502	525	0.40	283.76	1.27	1.08	0.171	0.30	37.70	0.49
Private Road	502	501	525	0.40	283.76	1.27	1.12	0.192	0.36	60.30	0.79
Private Road	513	501	300	2.80	168.81	2.31				36.10	0.26
Private Road/ Sandhill Road	501	EX. 302	525	0.40	283.76	1.27	1.13	0.208	0.41	35.20	0.46

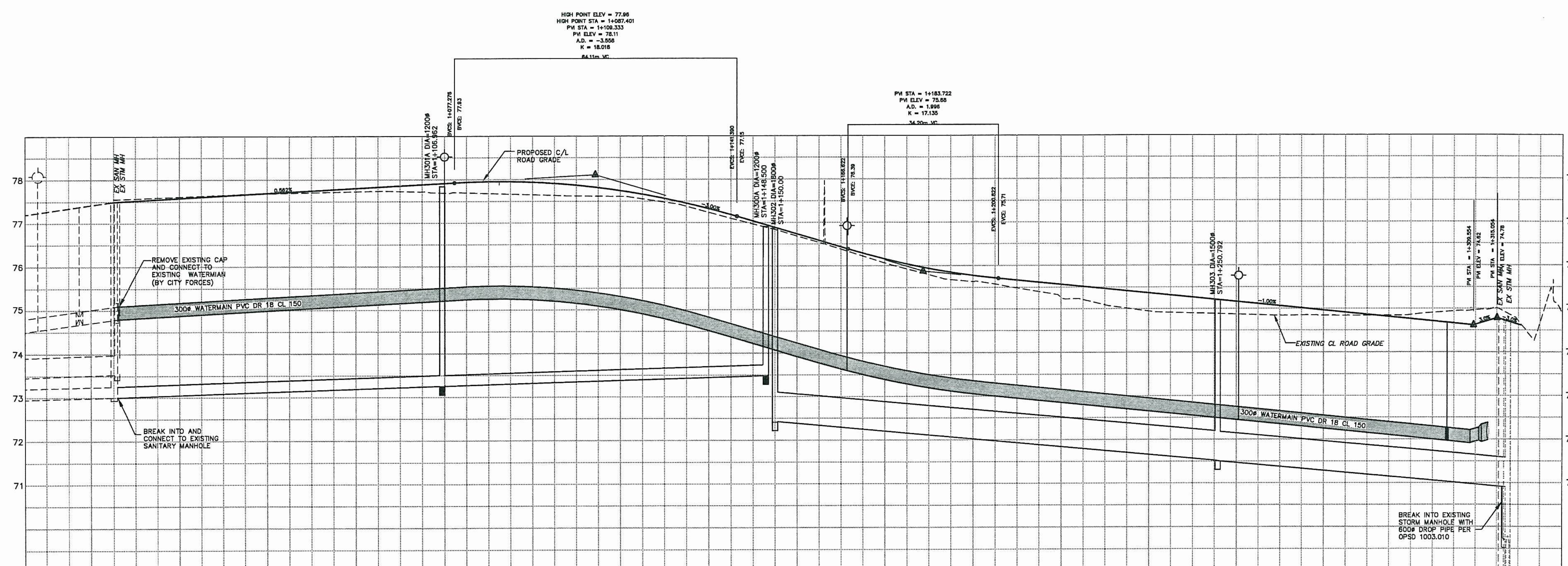
STREET	From	To	UPSTREAM Pr. Center Line	Obvert Drop	Obvert	Invert	Cover	DOWNSTREAM Pr. Center Line	Obvert	Invert	Cover
Private Road	507	506	76.70		74.18	73.88	2.52	76.60	74.12	73.82	2.48
Private Road	506	505	76.60		74.12	73.75	2.48	76.90	73.96	73.58	2.94
Private Road	505	504	76.90		73.96	73.51	2.94	76.80	73.73	73.28	3.07
Private Road	504	503	76.80		73.73	73.28	3.07	76.50	73.64	73.19	2.86
Private Road	503	502	76.50		73.64	73.11	2.86	76.90	73.49	72.96	3.41
Private Road	502	501	76.90		73.49	72.96	3.41	76.70	73.25	72.72	3.45
Private Road	513	501	77.25		74.26	73.96	2.99	76.70	73.25	72.95	3.45
Private Road/ Sandhill Road	501	EX. 302	76.70		73.25	72.72	3.45	76.80	73.11	72.58	3.69

STREET	From	To	HEAD LOSS CALCULATION f	L / D	K FRICT	V^2 / 2g (m)	Straight	Expansion	Bend	Major Loss (m)	Minor Loss (m)	Total Losses (m)	Applied Losses (m)	1:100 YR HGL Upstr.	Downs.	USF	COVER Top Foot.- HGL Upstr.	Downs.
Private Road	507	506	0.031	58.727	1.837	0.000				0.000	0.000	0.000	0.000	74.18	74.12	75.55	1.37	1.43
Private Road	506	505	0.029	105.512	3.063	0.038		0.038	0.032	0.117	0.070	0.188	0.000	74.12	73.96	75.65	1.53	1.69
Private Road	505	504	0.027	127.734	3.490	0.051			0.032	0.178	0.032	0.210	0.000	73.96	73.73	75.65	1.69	1.92
Private Road	504	503	0.027	48.119	1.315	0.051		0.051	0.008	0.067	0.059	0.126	0.000	73.73	73.64	75.50	1.77	1.86
Private Road	503	502	0.026	70.679	1.834	0.060			0.079	0.109	0.079	0.188	0.000	73.64	73.49	75.70	2.06	2.21
Private Road	502	501	0.026	113.048	2.934	0.064	0.010			0.188	0.010	0.198	0.000	73.49	73.25	75.65	2.16	2.40
Private Road	513	501	0.031	118.438	3.704	0.000				0.000	0.000	0.000	0.000	74.26	73.25	75.54	1.28	2.29
Private Road/ Sandhill Road	501	EX. 302	0.026	65.992	1.713	0.065		0.065	0.078	0.111	0.143	0.254	0.000	73.25	73.11	75.54	2.29	2.44

SANDHILL- AS BUILT INFORMATION
Ex. OBV @ ST MH 302 (SE)= 73.105
Ex. INV@ ST MH 302 (SE)= 72.430
Information taken from IBI Group As-Built Plans - Briar Ridge Phase 2
DWG No. 109-1 , Rev 5 (As-built) - Sandhill Road (Sta. 1+000 to Klondike)

SANDHILL- AS BUILT INFORMATION
HGL @ STORM MH# 302 - SANDHILL = 73.105





ROAD GRADE	77.461 / 77.493; 77.605; 77.717; 77.830; 77.940; 77.911; 77.660; 77.188; 76.589; 76.042; 75.715; 75.515; 75.315; 75.115; 74.915; 74.715
TOP OF WATERMAIN	75.08 / 75.093; 75.355 / ~~75.205~~; 75.420 / ~~75.317~~; 75.420 / ~~75.430~~; 75.445 / ~~75.540~~; 75.355 / ~~75.511~~; 74.843 / ~~75.260~~; 74.350 / ~~74.788~~; 73.991 / ~~74.189~~; 73.885; 73.695 / ~~73.642~~; 73.445 / ~~73.315~~; 73.180 / ~~73.115~~; 72.920 / ~~72.915~~; 72.850; 72.690 / ~~72.745~~; 72.629 / ~~72.515~~; 72.295 / ~~72.315~~; 72.290; 72.300 / ~~72.290~~
STM SEWER INVERT	EX. 450ø CONC ST. CL 100–D @ 0.35%; 73.453 EX.; W72.475 ~~N72.415~~ N72.430; 100.7m ~~100.5m~~–675ø CONC. STM. CL 65–D @ 0.91% ~~0.90%~~; S71.515 ~~N71.510~~ ~~S71.600~~ N71.470; 66.7m–675ø CONC. STM. CL 65–D @ 1.27% ~~0.90%~~; S70.620 ~~S70.900~~ 68.90
SAN SEWER INVERT	EX. 250ø PVC SAN. SDR–35 @ 0.27%; 72.930 EX. ~~N73.000~~ N72.965; 73.7m ~~75.0m~~–250ø PVC SAN. SDR–35 @ 0.33% ~~0.30%~~; S73.185 ~~N73.225~~ ~~S73.225~~ N73.211; 72.8m ~~73.5m~~–250ø PVC SAN. SDR–35 @ 0.33% ~~0.30%~~; S73.425 ~~S73.446~~ W73.506; 67.85
STATION	1+000 (1+001.13 EX CAP); 1+025; 1+050; 1+075 (1+075.01 HYDRANT); 1+100; 1+125; 1+150; 1+166.41 HYDRANT; 1+175; 1+200; 1+225; 1+250; 1+255.57 HYDRANT; 1+275; 1+300; 1+303.36 VC; 1+311.43 300x400 REDUCER; 1+312.93 400ø CROSS

NOTES :

1. ALL CONSTRUCTION TO BE CONSTRUCTED IN ACCORDANCE WITH CURRENT CITY OF OTTAWA SPECIFICATIONS AND DRAWINGS.
2. INSULATION TO BE PROVIDED AT OPEN STRUCTURES PER CITY STANDARD DRAWING W23.
3. CATHODIC PROTECTION TO BE PROVIDED TO CITY STANDARDS AND SPECIFICATIONS.
4. ALL BENDS, TEES, AND CAPS ARE TO BE RESTRAINED PER CITY STANDARDS. NO WATERMAIN TO BE LAID ON FILL UNTIL THE DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE CITY, FILL TO BE PLACED TO 0.60m MINIMUM ABOVE THE TOP OF THE WATERMAIN GRADES AND COMPACTED TO 100% STANDARD PROCTOR IN 0.30m LIFTS. TESTS SHALL BE TAKEN ALONG THE CENTRE OF THE LIFT. ALL TEES, HORIZONTAL BENDS, AND BRANCH VALVES IN FILL AREAS TO BE TIED WITH THRUST RESTRAINING JOINTS AND THRUST BLOCKS AS APPROPRIATE (IF APPLICABLE).
5. ALL SANITARY & STORM SERVICE LATERALS TO HAVE A MINIMUM 1.0% SLOPE.
6. SERVICE LATERALS WHICH ARE CLOSER TO MANHOLE STRUCTURES THAN 1.0m MUST BE INSULATED WITH 25mm RIGID STYROFOAM INSULATION.
7. ALL CONNECTIONS TO EXISTING WATERMAIN BY CITY FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT & REINSTATE.
8. ALL RYCB LEAD PIPES TO BE INSTALLED AT 1.0% SLOPE UNLESS NOTED OTHERWISE (IF APPLICABLE).
9. THE USE OF ELBOWS ON ALL SERVICE LATERALS SHOULD BE MINIMIZED AND LARGE RADIUS ELBOWS MUST BE USED.
10. THE ALLOWABLE BEARING PRESSURE FOR UNDISTURBED SOIL IS 100 KPA. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT # PG0347–1 PREPARED BY PATERSON GROUP INC. DURING CONSTRUCTION OF THE PROPOSED INFRASTRUCTURE.

LEGEND:

- SINGLE SERVICE LOCATION
- DOUBLE SERVICE LOCATION
- DRIVEWAY LOCATION
- CB — STREET CATCHBASIN C/W INLET CONTROL DEVICE SIZED 19.8 l/s IPEX TYPE "A" OR EQUIVALENT AND 6.0m SUBDRAIN
- RYCB — REARYARD CATCHBASIN c/w INLET CONTROL DEVICE SIZED AT 13.4 l/s
- CLAY DYKE
- CLAY DYKE
- 66.06 — TEST PIT PRACTICAL REFUSAL ELEV PER PATERSON GROUP INC. REPORT # PG0347–1
- TP#13 — TEST PIT LOCATION & NUMBER

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	AS–BUILT		10:02:16
4	ISSUED FOR MUNICIPAL CONSENT		09:07:23
3	ISSUED FOR MOE APPROVAL	LE	09:05:11
2	REVISED FOR CIRCULATION	LE	08:03:04
1	ISSUED FOR DISCUSSION	LE	08:11:20

TENTH LINE DEVELOPMENT INC.

IBI GROUP
1770 Woodward Drive
Suite 100
Ottawa, Ontario
Canada K2C 0P8
Tel (613)225–1311
FAX (613)225–9868

Project Title
BRIAR RIDGE
PHASE 2

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
PROVINCE OF ONTARIO

Drawing Title
SANDHILL ROAD
STA. 1+000 TO KLONDIKE

Scale 1:500 1:50	
Design L.M.E.	Date APRIL '07
Drawn M.M.	Checked R.W.W.
Project No. 10518	Drawing No. 109–1

J:\IBI Engineering\CCL\0–CAD\cad\Land\10518 Briar Ridge Phase 2\5.0\5.9\5.9.1 CW\As–built\10518_109_Sandhill Rd..dwg Layout Name: 109–1–REVISED SANDHILL ROAD Plot Style: AA STANDARD–FULL.CTB Plot Scale: 0.039:1 Plotted At: 10/5/2010 2:06 PM Printed By: MARIAN

IBI Group

333 Preston Street - Suite 400
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: Briar Ridge Phase 2 - Sandhill Road
LOCATION: City of Ottawa
CLIENT: Tenth Line Development Inc.

LOCATION			RESIDENTIAL									INSTITUTIONAL COMMERCIAL INDUSTRIAL							INFILTRATION ALLOWANCE			TOTAL FLOW	PROPOSED SEWER DESIGN						
			UNIT TYPES					POPULATION		CUMULATIVE FLOW		AREA (ha)																
Street	From MH	To MH	Singles	Semis	Towns	Stacked	Area (Ha.)	INDIV.	CUM.	Peaking Factor	Peak Flow (l/s)	INSTITUTIONAL Indiv	INSTITUTIONAL Cumm.	COMMERCIAL Indiv	COMMERCIAL Cumm.	INDUSTRIAL Indiv	INDUSTRIAL Cumm.	Pk. Flow (l/s)	Incr. Area (Ha.)	Cum. Area (Ha.)	Flow (l/s)	(l/s)	Capacity (l/s)	Pipe Size (mm)	Length (m)	Slope (%)	Velocity m/sec	Avail. Cap. L/s	Avail. Cap. (%)
External Area	Stub	300A					7.49	770.0	770.0	3.87	12.07							0.00	7.49	7.49	2.10	14.17	33.98	250	10.0	0.30	0.67	19.81	58.31%
Sandhill Road	300A	301A						0.0	770.0	3.87	12.07							0.00	0.00	7.49	2.10	14.17	33.98	250	73.5	0.30	0.67	19.81	58.31%
Sandhill Road	301A	*Ex. 10A*						0.0	770.0	3.87	12.07							0.00	0.00	7.49	2.10	14.17	33.98	250	75.0	0.30	0.67	19.81	58.31%
Sandhill Road	*Ex 10A*	*Ex. 9A*					0.43	32.0	802.0	3.86	12.54							0.00	0.43	7.92	2.22	14.76	33.98	*250*	*99.0*	*0.30*	0.67	19.22	56.57%

Designed:	LME		
Checked:			
		REVISION	**DATE**
Dwg Reference:	**File Ref:**	**Date:**	**Sheet No.**
10518-501-1	10518.5.7	2009-03-09	1 of 1

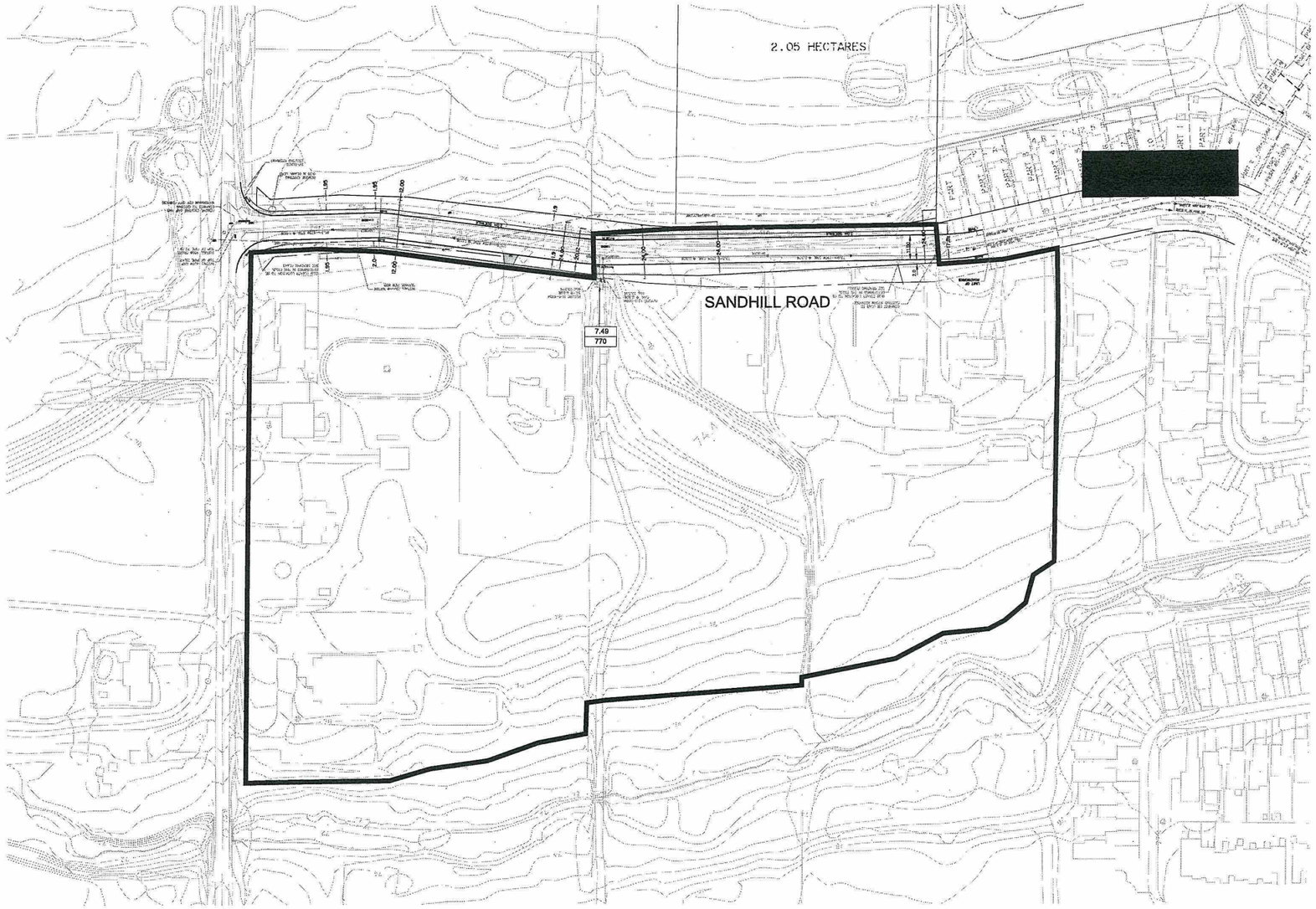
Population Per Unit: 3.4 For Singles
2.8 Townhouses/Semis

Avg. Per Capita Flow Rate: 350 l/day
Residential Peaking Factor: Harmon Formula = 1+(14/(4+P^0.5)) where P = pop'n in thousands

ICI Rates		Peak Factor
Institution	30000 l/ha/day	1.5
Commercial	50000 l/ha/day	1.5
Industrial	35000 l/ha/day	Moe Guidelines

Infiltration Allowance: 0.13 l/sec/Ha

Assumed pipe loss coefficient = 0.013



LEGEND:

7.49 ..... AREA IN HECTARES
770 ..... POPULATION

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	ISSUED FOR APPROVAL		08.03.04

TENTH LINE DEVELOPMENT INC.

IBI GROUP
1770 Woodward Drive
Suite 100
Ottawa, Ontario
Canada K2C 0P8
Tel (613)225-1311
FAX (613)225-9868

Project Title
BRIAR RIDGE
PHASE 2

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
PROVINCE OF ONTARIO

N

Drawing Title:
SANITARY DRAINAGE AREA PLAN
SANDHILL ROAD

Scale
1:1000

Design	Date
L.M.E.	MARCH '09
Drawn	Checked
M.M.	R.W.W.
Project No.	Drawing No.
10518	501-1

J:\IBI Engineering\ECJV-OSP\ref\cvs\10518 Briar Ridge Phase 2\5.0\5.5\5.5.1 Civil\Sandhill Road dwg\SANDHILLSHZ.dwg Layout Name: SANDHILL-501 Plot Style: AIA STANDARD-HALF.CTB Plot Scale: 0.0351 Plotted At: 10/6/2009 12:07 PM Plotted By: MARIAN MUNE Last Saved

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

MORGAN'S CREEK
CITY OF OTTAWA
MINTO COMMUNITIES INC.
JLR PROJECT NO.: 24566

Commercial/Institutional Flow =	50,000	L/s/ha
q =	350	L/cap/d
i =	0.28	L/s/ha
TOWNS HOUSING	2.7	pers/unit
STACKS HOUSING	2.7	pers/unit
SINGLES HOUSING	3.4	pers/unit
Manning's Coefficient (n) =	0.013	

SANITARY SEWER DESIGN SHEET
Designed: K.F.
Checked By: L.D.
Date: August 2011

STREET	SAN MH #		RESIDENTIAL									COM/INST			RES+ COM + INFILTR.		SEWER DATA					UPSTREAM					DOWNSTREAM				
			NUMBER OF UNITS					CUMULATIVE		PEAKING	POP.																			
			SINGLES	STACKS	TOWNS	POP.	AREA	POP.	AREA	FACTOR	FLOW	AREA	CUM. AREA	COM/INST FLOW	PEAK EXTR. FLOW	PEAK DES. FLOW	DIA.	SLOPE	CAPAC.	VEL. (full)	LENGTH	Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line		Obvert	Invert	Cover
	FROM	TO	units	units	units	pers	ha	pers	ha		L/s	ha	L/s	L/s	L/s	L/s	mm	%	L/s	m/s	m									
FLOW TO 250mmΦ SANITARY - SANDHILL ROAD																														
Private Road	7	6		12		32	0.20	32	0.20	4.00	0.53				0.05	0.58	200	0.33	19.66	0.61	21.80	76.70	0.02	74.65	74.45	2.05	76.60		74.58	74.38	2.02
Private Road	6	5		24		65	0.25	97	0.45	4.00	1.58				0.12	1.70	200	0.33	19.66	0.61	36.10	76.60	0.02	74.56	74.36	2.04	76.90		74.44	74.24	2.46
Private Road	5	4		24		65	0.43	162	0.88	4.00	2.63				0.25	2.87	200	0.33	19.66	0.61	55.40	76.90	0.02	74.42	74.22	2.48	76.80		74.24	74.04	2.56
Private Road	4	3		12		32	0.11	194	0.99	4.00	3.15				0.28	3.43	200	0.33	19.66	0.61	22.00	76.80		74.22	74.02	2.58	76.50		74.15	73.95	2.35
Private Road	3	2		12		32	0.16	227	1.15	4.00	3.68				0.32	4.00	200	0.33	19.66	0.61	34.70	76.50	0.04	74.15	73.95	2.35	76.90		74.03	73.83	2.87
Private Road	2	1		16		43	0.28	270	1.43	4.00	4.38				0.40	4.78	200	0.33	19.66	0.61	59.70	76.90		73.99	73.79	2.91	76.70		73.79	73.59	2.91
Private Road	8	1			4	11	0.11	11	0.11	4.00	0.18				0.03	0.21	200	2.50	54.10	1.67	32.00	77.25	0.06	74.65	74.45	2.60	76.70		73.85	73.65	2.85
Private Road/ Sandhill Road	1	EX. 300A					0.02	281	1.56	4.00	4.55				0.44	4.99	200	0.33	19.66	0.61	36.00	76.70		73.79	73.59	2.91	76.80		73.68	73.48	3.13
				100	4	281	1.56																							

SANDHILL ROAD- AS BUILT INFORMATION
Ex. Inv @ SANMH 300A (SE) 73.425
Ex. Obv @ SANMH 300A(SE) 73.675
Information taken from IBI Group As-Built Plans - Briar Ridge Phase 2
DWG No. 109-1 , Rev 5 (As-built) - Sandhill Road (Sta. 1+000 to Klondike)

FLOW TO SANITARY - MARCH ROAD/ MERSEY DRIVE																															
Private Road	11	10		56		151	0.71	151	0.71	4.00	2.45				0.20	2.65	200	0.50	24.19	0.75	74.90	78.60	0.06	76.57	76.37	2.03	78.50		76.20	76.00	2.30
Private Road	10	9					0.05	151	0.76	4.00	2.45				0.21	2.66	200	0.50	24.19	0.75	34.50	78.50	0.06	76.14	75.94	2.36	78.40		75.97	75.77	2.43
Commercial Site - 788 March RD	*Future Site*	*9*										0.83	0.83	0.72	0.23	0.95	*Detailed Design of Commercial Site located at 788 March Road to be completed in future*														
Private Rd /March Rd/ Mersey Dr	9	12						151	0.76	4.00	2.45		0.83	0.72	0.45	3.62	200	0.67	28.04	0.86	47.08	78.40	0.03	75.91	75.71	2.49	78.70		75.59	75.39	3.11
Mersey Drive	12	13						151	0.76	4.00	2.45		0.83	0.72	0.45	3.62	200	0.35	20.24	0.62	38.80	78.70		75.56	75.36	3.14	79.02		75.42	75.22	3.59
Mersey Drive	*124*	*13*				*4*	*0.14*	*4*	*0.14*	*4.00*	*0.06*				*0.04*	*0.10*	*200*	*0.55*	*25.38*	*0.78*	*33.00*	*79.27*		*75.60*	*75.40*	*3.66*	*79.02*		*75.42*	*75.22*	*3.60*
Mersey Drive	*13*	*123*				*24*	*0.30*	*179*	*1.20*	*4.00*	*2.90*		*0.83*	*0.72*	*0.57*	*4.19*	*200*	*0.55*	*25.38*	*0.78*	*63.30*	*79.02*		*75.42*	*75.22*	*3.60*	*79.46*		*75.07*	*74.87*	*4.39*
Mersey Drive	*123*	*108*				*32*	*0.42*	*211*	*1.62*	*4.00*	*3.42*				*0.45*	*3.88*	*200*	*0.59*	*26.28*	*0.81*	*109.20*	*79.46*		*75.07*	*74.87*	*4.40*	*80.00*		*74.42*	*74.22*	*5.58*
Mersey Drive	*122*	*121*				*24*	*0.38*	*24*	*0.38*	*4.00*	*0.39*				*0.11*	*0.50*	*200*	*3.78*	*66.52*	*2.05*	*63.50*	*84.45*		*80.40*	*80.20*	*4.05*	*81.82*		*78.00*	*77.80*	*3.82*
Mersey Drive	*121*	*120*				*24*	*0.28*	*48*	*0.66*	*4.00*	*0.78*				*0.18*	*0.96*	*200*	*2.53*	*54.43*	*1.68*	*68.00*	*81.82*		*77.90*	*77.70*	*3.92*	*80.27*		*76.18*	*75.98*	*4.09*
Residential Private Road	*3*	*2*		*12*		*32*	*0.26*	*32*	*0.26*	*4.00*	*0.53*				*0.07*	*0.60*	*200*	*0.90*	*32.46*	*1.00*	*52.70*	*84.25*	*0.06*	*81.66*	*81.46*	*2.59*	*84.20*		*81.19*	*80.99*	*3.01*
Residential Private Road	*2*	*1A*			*16*	*43*	*0.33*	*76*	*0.59*	*4.00*	*1.23*				*0.17*	*1.39*	*200*	*0.90*	*32.46*	*1.00*	*89.20*	*84.20*	*0.60*	*81.13*	*80.93*	*3.07*	*82.45*		*80.33*	*80.13*	*2.12*
Residential Private Road	*3*	*4*		*28*		*76*	*0.41*	*76*	*0.41*	*4.00*	*1.23*				*0.11*	*1.34*	*200*	*0.90*	*32.46*	*1.00*	*69.30*	*84.25*	*0.06*	*80.71*	*80.51*	*3.54*	*82.80*		*80.09*	*79.89*	*2.71*
Residential Private Road	*4*	*1A*		*20*		*54*	*0.28*	*130*	*0.69*	*4.00*	*2.10*				*0.19*	*2.29*	*200*	*0.40*	*21.64*	*0.67*	*74.90*	*82.80*		*80.03*	*79.83*	*2.77*	*82.45*		*79.73*	*79.53*	*2.72*
Residential Private Road	*1A*	*1*					*0.02*	*205*	*1.30*	*4.00*	*3.33*				*0.36*	*3.69*	*200*	*0.90*	*32.46*	*1.00*	*18.50*	*82.45*	*0.50*	*79.73*	*79.53*	*2.72*	*82.45*		*79.56*	*79.36*	*2.89*
Commercial Plaza	*1*	*120A*						*205*	*1.30*	*4.00*	*3.33*				*0.36*	*3.69*	*250*	*0.98*	*61.42*	*1.21*	*44.80*	*82.45*	*3.05*	*79.11*	*78.86*	*3.34*	*80.39*		*78.67*	*78.42*	*1.72*
Klondike Rd/ MG Phase 13/ Commercial Plza	*Upstream*	*120A*						*2432*	*38.86*	*3.52*	*34.66*	*1.69*	*4.62*	*4.01*	*12.18*	*50.85*	*300*	*0.30*	*55.26*								*80.39*		*75.61*	*75.31*	*4.78*
Klondike Commercial Plaza	*120A*	*120*						*2637*	*40.16*	*3.49*	*37.28*		*4.62*	*4.01*	*12.54*	*53.83*	*300*	*0.97*	*99.36*	*1.36*	*15.80*	*80.39*		*75.62*	*75.31*	*4.77*	*80.25*		*75.47*	*75.17*	*4.78*
Westmoreland Avenue	*120*	*117*				*20*	*0.33*	*2705*	*41.15*	*3.48*	*38.14*		*4.62*	*4.01*	*12.82*	*54.96*	*300*	*0.42*	*65.32*	*0.90*	*70.60*	*80.27*	*0.01*	*75.47*	*75.17*	*4.80*	*80.40*		*75.17*	*74.87*	*5.23*
Whithorn Avenue	*116*	*119*				*8*	*0.14*	*8*	*0.14*	*4.00*	*0.13*				*0.04*	*0.17*	*200*	*2.00*	*48.39*	*1.49*	*8.10*	*83.34*	*0.10*	*79.26*	*79.06*	*4.08*	*83.30*		*79.10*	*78.90*	*4.20*
Whithorn Avenue	*119*	*118*				*24*	*0.22*	*32*	*0.36*	*4.00*	*0.52*				*0.10*	*0.62*	*200*	*2.69*	*56.11*	*1.73*	*37.20*	*83.30*	*0.30*	*79.00*	*78.80*	*4.30*	*82.32*		*78.00*	*77.80*	*4.32*
Whithorn Avenue	*118*	*117*				*44*	*0.50*	*76*	*0.86*	*4.00*	*1.23*				*0.24*	*1.47*	*200*	*2.21*	*50.87*	*1.57*	*81.10*	*82.32*	*0.75*	*77.70*	*77.50*	*4.62*	*80.40*		*75.91*	*75.71*	*4.49*
Westmoreland Avenue	*117*	*110*				*24*	*0.31*	*2805*	*42.32*	*3.47*	*39.40*		*4.62*	*4.01*	*13.14*	*56.55*	*300*	*0.42*	*65.50*	*0.90*	*68.80*	*80.40*	*0.03*	*75.16*	*74.86*	*5.24*	*80.80*		*74.87*	*74.57*	*5.93*
Spalding Avenue	*111*	*110*				*12*	*0.33*	*12*	*0.33*	*4.00*	*0.19*				*0.09*	*0.29*	*200*	*1.91*	*47.29*	*1.46*	*46.00*	*81.25*	*0.78*	*76.50*	*76.30*	*4.75*	*80.80*		*75.62*	*75.42*	*5.18*
Westmoreland Avenue	*110*	*109*				*16*	*0.30*	*2833*	*42.95*	*3.46*	*39.75*		*4.62*	*4.01*	*13.32*	*57.08*	*300*	*0.36*	*60.32*	*0.83*	*66.30*	*80.80*	*0.02*	*74.84*	*74.54*	*5.96*	*80.80*		*74.60*	*74.30*	*6.20*
Mersey Drive	*Upstream*	*109*				*120*	*2.01*	*120*	*2.01*	*4.00*	*1.94*				*0.56*	*2.51*	*200*	*1.00*	*34.22*								*81.85*		*77.20*	*77.00*	*4.65*

Appendix B1 – SWM Phase 1 Design Sheets

Marc Alain Lafleur

From: Balima, Nadege <Nadege.Balima@ottawa.ca>
Sent: Friday, April 28, 2017 10:35 AM
To: Marc Alain Lafleur
Cc: Alam Ansari
Subject: RE: KMA 351 Sandhill Road - SWM design criteria

Hi Marc,
Yes, this is correct as there is currently an end of pipe stormwater management facilities and this rate appear to meet existing criteria for the area.
Regards,

Nadège Balima, P.Eng., M.P.M., LEED Green Assoc.
Project Manager, Infrastructure Approvals
Development Review Services (West)
613.580.2424 ext. 13477

From: Marc Alain Lafleur [mailto:MarcAlain.Lafleur@exp.com]
Sent: Friday, April 28, 2017 10:03 AM
To: Balima, Nadege
Cc: Alam Ansari
Subject: RE: KMA 351 Sandhill Road - SWM design criteria

Good morning Nadège,

Can you kindly confirm the SWM criteria to be use for the site at 351 Sandhill Rd.?:
-Restricted release rate to the minor system of 85L/s/ha up to the 100-year event.
-No quality control required.

Thank you,

Marc Alain Lafleur, M.Eng. | exp
EIT-Design Engineer, Infrastructure
exp Services Inc.
t: +1.613.688.1899 x3298 | e: marcalain.lafleur@exp.com
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
Canada
exp.com | *legal disclaimer*
keep it green, read from the screen

From: Marc Alain Lafleur
Sent: Wednesday, April 26, 2017 3:23 PM
To: 'Balima, Nadege' <Nadege.Balima@ottawa.ca>
Cc: Alam Ansari <alam.ansari@exp.com>
Subject: RE: KMA 351 Sandhill Road - SWM design criteria

Hi Nadège,

Please find attached site servicing brief for the Minto Communities Site adjacent to 351 Sandhill Road. The appendices is not included because the complete file is too large to send by email. I can send you sections of the appendices if needed. The report makes reference to the Briar Ridge project (Phase 2).
The storm sewer is directed to the SWM facility "C".

Thanks,

Marc Alain Lafleur, M.Eng. | exp
EIT-Design Engineer, Infrastructure
exp Services Inc.
t: +1.613.688.1899 x3298 | e: marcalain.lafleur@exp.com
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
Canada
exp.com | legal disclaimer
keep it green, read from the screen

From: Balima, Nadege [mailto:Nadege.Balima@ottawa.ca]
Sent: Wednesday, April 26, 2017 2:47 PM
To: Marc Alain Lafleur <MarcAlain.Lafleur@exp.com>
Cc: Alam Ansari <alam.ansari@exp.com>
Subject: RE: KMA 351 Sandhill Road - SWM design criteria

Good afternoon Marc,
Could you please provide a reference to the "previous sources"?
Otherwise what you have indicated appears to be correct and I believe that storm water from the said storm sewer is directed to the Shirley's Brook East treatment facility know as SWM facility "C".
Thanks,

Nadège Balima, P.Eng., M.P.M., LEED Green Assoc.
Project Manager, Infrastructure Approvals
Development Review Services (West)
613.580.2424 ext. 13477

From: Marc Alain Lafleur [mailto:MarcAlain.Lafleur@exp.com]
Sent: Wednesday, April 26, 2017 12:29 PM
To: Balima, Nadege
Cc: Alam Ansari
Subject: RE: KMA 351 Sandhill Road - SWM design criteria

Hello Nadège,

Based on previous studies, the minor system flow discharged to the 675mm diameter storm sewer on Sandhill Rd must be controlled to 85L/s/ha. Furthermore, quality control measures are not required.

Can you please confirm that this design criteria should be used for the proposed development at 351 Sandhill Rd?

Thank you,

Marc Alain Lafleur, M.Eng. | exp
EIT-Design Engineer, Infrastructure
exp Services Inc.

7. In regard to Phase 2, consider reducing the radii of the curb returns to the drop off area to 5m. Depending on the intent of the drop off area, please consider Section 3.2 of the City of Ottawa's Accessibility Design Standards.
8. Please indicate the length of the parallel parking along the south and north property lines; minimum length for parallel parking as per Section 106 (1)(b) of Part 4 – Parking, Queuing and Loading Provisions of the Zoning By-law is 6.7.
9. Please contact Rosanna Baggs at 613-580-2424 ext. 26388 or Rosanna.Baggs@ottawa.ca for any clarification on these comments or anything transportation related.

Building Code Services

1. In regard to Phase 2, private hydrants are to be no closer than 12.2m to a building, as per NFPA 24, via Sentence 7.2.11.1(1) of the O.B.C.
2. Access routes required by O.B.C. Article 3.2.5.4 shall be located so that the principal entrance and every access opening required by Articles 3.2.5.1 and 3.2.5.2 are located not less than 3m and not more than 15m from the closest portion of the access route required for fire department use, measured horizontally from the face of the building. As shown on the Phase 2 site plan, the fire access route along the south side, the fire access route is less than 3m from the building. As this is the location of the Fire Department connection, it is regarded as a required fire access route.
3. Please contact Josh Good at 613-580-2424 extension 41359 or by email at Josh.Good@ottawa.ca for any clarification on this.

External Agencies

Mississippi Valley Conservation Authority

1. MVCA's mapping information indicates that the subject lands are located approximately 100m east of Shirley's Brooke and approximately 35m east of MVCA's regulation limit for this feature. No other natural heritage or natural hazard features were identified in proximity to the subject lands. Given the setback distance and the method of proposed stormwater management, impacts to the watercourse are not anticipated.
2. The following report was reviewed by MVCA engineering staff: "Stormwater Management & Servicing Report, KMA Mosque and Community Centre, 351 Sandhill Road (EXP, September 13, 2017). MVCA notes that stormwater quantity storage will be provided in pipes and manhole structures in order to restrict flow to the allowable release rate of 85L/s/ha, which was provided by City staff. The report indicates that quality control will be provided by the existing Briar Ridge Stormwater Management Facility. No concerns are noted with this approach.
3. In conclusion, MVCA has no objection to the proposed development as there is no impact on natural heritage, natural hazards or quantity or quality of water.

Table D1
CALCULATION OF AVERAGE RUNOFF COEFFICIENTS (POST-DEVELOPMENT)

Area No.	Area	Asphalt & Concrete Areas		Roof Areas		Gravel Areas		Grassed Areas		Runoff Type	Sum AC	Total Area (m^2)	C_{AVG}	100-YR C_{AVG}
		Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C					
		C=0.90		C=0.90		C=0.90		C=0.20						
PH1A	Parking Lot	3872.0	3484.8	245.0	220.5			738.0	147.6	Controlled	3852.9	4855	0.79	1.00
PH1B	Access Rd	533.0	479.7	127.0	114.3			219.0	43.8	Controlled	637.8	879	0.73	1.00
										Average Runoff Coeff =	C_{AVG} =	C_{AVG} =	$\frac{4,531}{5,795}$	= 0.78

Table D2
SUMMARY OF POST DEVELOPMENT RUNOFF (UNCONTROLLED AND CONTROLLED)

Area No	Outlet Location	Area (ha)	Time of Conc. T_c (min)	Storm = 2-year				Storm = 5-year				Storm = 100-year			
				C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)
PH1A	Parking Lot	0.486	15	0.79	61.77	66.2	**28.0**	0.79	83.56	89.5	**28.8**	0.99	142.89	191.3	**29.5**
PH1B	Access Rd	0.088	15	0.73	61.77	11.0	**11.0**	0.73	83.56	14.8	**14.8**	0.91	142.89	31.7	**17.6**
Total Pre-Flows		0.573				77.1	**39.0**			104.3	**43.6**			223.0	**47.1**

Notes
1) Intensity, $I_2 = 732.951/(Tc+6.199)^{0.810}$ (2-year, City of Ottawa)
2) Intensity, $I_5 = 998.071/(Tc+6.035)^{0.814}$ (5-year, City of Ottawa)
3) Intensity, $I_{100} = 1735.688/(Tc+6.014)^{0.820}$ (100-year, City of Ottawa)
4) Time of Concentration: T_c=10min (5.4.5.2, City of Ottawa)
4) Flows under column Q_{CAP} which are **bold**, denotes flows that are controlled.

Table D3
Estimate of Storage Required for 2-yr, 5-yr & 100-yr Storms (Modified Rational Method)

Area No: PH1A Parking Lot
C_{AVG} = 0.79 (2-yr, 5-yr)
C_{AVG} = 0.99 (100-yr +25%)
Time Interval = 15 (mins)
Drainage Area = 0.4855 (hectares)

Duration, T_D (min)	Release Rate = 28.0 (L/sec) Return Period = 2 (years) IDF Parameters, A = 732.951, B = 0.810 ($I = A/(T_D+C)^B$, C = 6.199					Release Rate = 28.8 (L/sec) Return Period = 5 (years) IDF Parameters, A = 998.071, B = 0.814 ($I = A/(T_D+C)^B$, C = 6.053					Release Rate = 29.5 (L/sec) Return Period = 100 (years) IDF Parameters, A = 1735.688, B = 0.820 ($I = A/(T_D+C)^B$, C = 6.014				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0						230.5	246.9	28.8	218.1	0.0	398.6	533.7	29.527	504.2	0.0
5						141.2	151.2	28.8	122.4	36.7	242.7	325.0	29.527	295.4	88.6
10						104.2	111.6	28.8	82.8	49.7	178.6	239.1	29.527	209.5	125.7
15	61.8	66.2	28.04	38.1	**34**	83.6	89.5	28.8	60.7	**54.6**	142.9	191.3	29.527	161.8	145.6
30	40.0	42.9	28.04	14.9	27	53.9	57.8	28.8	29.0	52.1	91.9	123.0	29.527	93.5	168.3
45	30.2	32.4	28.04	4.4	12	40.6	43.5	28.8	14.7	39.8	69.1	92.5	29.527	62.9	**169.9**
60	24.6	26.3	28.04	-1.7	-6	32.9	35.3	28.8	6.5	23.4	55.9	74.8	29.527	45.3	163.1
75	20.8	22.3	28.04	-5.7	-26	27.9	29.9	28.8	1.1	4.9	47.3	63.3	29.527	33.7	151.8
90	18.1	19.4	28.04	-8.6	-46	24.3	26.0	28.8	-2.8	-15.0	41.1	55.0	29.527	25.5	137.8
105	16.1	17.3	28.04	-10.8	-68	21.6	23.1	28.8	-5.7	-35.8	36.5	48.9	29.527	19.3	121.8
120	14.6	15.6	28.04	-12.4	-90	19.5	20.9	28.8	-7.9	-57.2	32.9	44.0	29.527	14.5	104.5
135	13.3	14.2	28.04	-13.8	-112	17.8	19.0	28.8	-9.8	-79.1	30.0	40.2	29.527	10.6	86.1
150	12.3	13.1	28.04	-14.9	-134	16.4	17.5	28.8	-11.3	-101.4	27.6	37.0	29.527	7.4	67.0
165	11.4	12.2	28.04	-15.9	-157	15.2	16.3	28.8	-12.5	-124.0	25.6	34.3	29.527	4.8	47.1
180	10.6	11.4	28.04	-16.7	-180	14.2	15.2	28.8	-13.6	-146.9	23.9	32.0	29.527	2.5	26.7
195	10.0	10.7	28.04	-17.3	-203	13.3	14.3	28.8	-14.5	-170.0	22.4	30.0	29.527	0.5	5.9
210	9.4	10.1	28.04	-18.0	-226	12.6	13.4	28.8	-15.3	-193.3	21.1	28.3	29.527	-1.2	-15.3
225	8.9	9.6	28.04	-18.5	-250	11.9	12.7	28.8	-16.1	-216.8	20.0	26.8	29.527	-2.7	-36.9
240	8.5	9.1	28.04	-19.0	-273	11.3	12.1	28.8	-16.7	-240.4	19.0	25.4	29.527	-4.1	-58.8
255	8.1	8.7	28.04	-19.4	-297	10.8	11.5	28.8	-17.3	-264.1	18.1	24.2	29.527	-5.3	-80.9
270	7.7	8.3	28.04	-19.8	-320	10.3	11.0	28.8	-17.8	-288.0	17.3	23.2	29.527	-6.4	-103.2
285	7.4	7.9	28.04	-20.1	-344	9.9	10.6	28.8	-18.2	-311.9	16.6	22.2	29.527	-7.4	-125.8
300	7.1	7.6	28.04	-20.4	-368	9.5	10.1	28.8	-18.7	-335.9	15.9	21.3	29.527	-8.3	-148.5
315	6.8	7.3	28.04	-20.7	-392	9.1	9.7	28.8	-19.1	-360.1	15.3	20.5	29.527	-9.1	-171.4
Maximum Storage Requried =					**34.3**					**54.6**					**169.9**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(T_D+C)^B$, where T_D = storm duration (mins)
3) Release Rate = Desired Capture (Release) Rate
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) A,B,C are IDF Parameters for City of Ottawa. From Ottawa Sewer Design Guidelines, Section 5.4.2.

Table D4
Estimate of Storage Required for 2-yr, 5-yr & 100-yr Storms (Modified Rational Method)

Area No: PH1B Access Road
C_{AVG} = 0.73 (2-yr, 5-yr)
C_{AVG} = 0.91 (100-yr +25%)
Time Interval = 15 (mins)
Drainage Area = 0.0879 (hectares)

Duration, T_D (min)	Release Rate = 11.0 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 ($I = A/(T_D+C)^B$)					Release Rate = 14.8 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 ($I = A/(T_D+C)^B$)					Release Rate = 17.6 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.688, B = 0.820, C = 6.014 ($I = A/(T_D+C)^B$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0						230.5	40.9	14.8	26.1	0.0	398.6	88.3	17.612	70.7	0.0
5						141.2	25.0	14.8	10.2	**3.1**	242.7	53.8	17.612	36.2	10.9
10						104.2	18.5	14.8	3.7	2.2	178.6	39.6	17.612	22.0	**13.2**
15	61.8	11.0	10.95	0.0	**0**	83.6	14.8	14.8	0.0	0.0	142.9	31.7	17.612	14.1	12.7
30	40.0	7.1	10.95	-3.9	-7	53.9	9.6	14.8	-5.3	-9.5	91.9	20.4	17.612	2.7	4.9
45	30.2	5.4	10.95	-5.6	-15	40.6	7.2	14.8	-7.6	-20.6	69.1	15.3	17.612	-2.3	-6.2
60	24.6	4.4	10.95	-6.6	-24	32.9	5.8	14.8	-9.0	-32.3	55.9	12.4	17.612	-5.2	-18.8
75	20.8	3.7	10.95	-7.3	-33	27.9	4.9	14.8	-9.9	-44.4	47.3	10.5	17.612	-7.1	-32.1
90	18.1	3.2	10.95	-7.7	-42	24.3	4.3	14.8	-10.5	-56.7	41.1	9.1	17.612	-8.5	-45.9
105	16.1	2.9	10.95	-8.1	-51	21.6	3.8	14.8	-11.0	-69.2	36.5	8.1	17.612	-9.5	-60.0
120	14.6	2.6	10.95	-8.4	-60	19.5	3.5	14.8	-11.4	-81.8	32.9	7.3	17.612	-10.3	-74.3
135	13.3	2.4	10.95	-8.6	-70	17.8	3.1	14.8	-11.7	-94.5	30.0	6.6	17.612	-11.0	-88.8
150	12.3	2.2	10.95	-8.8	-79	16.4	2.9	14.8	-11.9	-107.2	27.6	6.1	17.612	-11.5	-103.4
165	11.4	2.0	10.95	-8.9	-88	15.2	2.7	14.8	-12.1	-120.0	25.6	5.7	17.612	-11.9	-118.2
180	10.6	1.9	10.95	-9.1	-98	14.2	2.5	14.8	-12.3	-132.9	23.9	5.3	17.612	-12.3	-133.0
195	10.0	1.8	10.95	-9.2	-107	13.3	2.4	14.8	-12.5	-145.7	22.4	5.0	17.612	-12.6	-147.9
210	9.4	1.7	10.95	-9.3	-117	12.6	2.2	14.8	-12.6	-158.6	21.1	4.7	17.612	-12.9	-162.9
225	8.9	1.6	10.95	-9.4	-127	11.9	2.1	14.8	-12.7	-171.6	20.0	4.4	17.612	-13.2	-177.9
240	8.5	1.5	10.95	-9.4	-136	11.3	2.0	14.8	-12.8	-184.5	19.0	4.2	17.612	-13.4	-193.0
255	8.1	1.4	10.95	-9.5	-146	10.8	1.9	14.8	-12.9	-197.5	18.1	4.0	17.612	-13.6	-208.1
270	7.7	1.4	10.95	-9.6	-155	10.3	1.8	14.8	-13.0	-210.5	17.3	3.8	17.612	-13.8	-223.2
285	7.4	1.3	10.95	-9.6	-165	9.9	1.7	14.8	-13.1	-223.5	16.6	3.7	17.612	-13.9	-238.4
300	7.1	1.3	10.95	-9.7	-174	9.5	1.7	14.8	-13.1	-236.5	15.9	3.5	17.612	-14.1	-253.6
315	6.8	1.2	10.95	-9.7	-184	9.1	1.6	14.8	-13.2	-249.5	15.3	3.4	17.612	-14.2	-268.9
Maximum Storage Requried =					**0.0**					**3.1**					**13.2**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(T_D+C)^B$, where T_D = storm duration (mins)
3) Release Rate = Desired Capture (Release) Rate
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) A,B,C are IDF Parameters for City of Ottawa. From Ottawa Sewer Design Guidelines, Section 5.4.2.

Table D5
Estimate of Provided Storage for 2-yr and 100-yr Storms

Total 2 Year Storage = ***35.1*** **m^3**
Total 5 Year Storage = ***106.2*** **m^3**
Total 100 Year Storage= ***218.8*** **m^3**

2 Year Catch Basin Storage

CB ID	Area (m2)	Depth (m)	Volume (m3)
CB 102	0.36	2.1	0.77
CB 103	0.36	2.1	0.77
CB 104	0.36	2.1	0.77
CB 105	0.36	2.1	0.77
CB 106	0.36	2.1	0.77
CB 107	0.36	2.1	0.77
CB 108	0.36	2.1	0.77
		Total Volume	***5.4***

5 Year Surface Ponding Volumes PH1A

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CB102	132	0.15	6.6
CB103	368.00	0.15	18.4
CB104	342.00	0.15	17.1
CB105	86.0	0.15	4.3
CB106	82.0	0.15	4.1
CB107	309.0	0.15	15.5
CB108	401.0	0.15	20.1
CBMH203	184	0.15	9.2
		Total Volume	***95.3***

2 Year Catch Basin Manhole Storage

MH ID	Diameter (mm)	Area (m2)	Depth (m)	Volume (m3)
CBMH 203	1200	1.13	3.00	3.39
CBMH 204	1200	1.13	3.20	3.62
CBMH 205	1200	1.13	3.00	3.39
			Total Volume	***7.0***

2 Year Underground Pipe Storage

Diameter (mm)	Area (m2)	Length (m)	Volume (m3)
200	0.031	119.6	3.8
600	0.283	67.0	18.9
		Total Volume	***22.7***

100 Year Surface Ponding Volumes PH1A

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CB102	132	0.30	13.2
CB103	368.00	0.30	36.8
CB104	342.00	0.30	34.2
CB105	86.0	0.30	8.6
CB106	82.0	0.30	8.2
CB107	309.0	0.30	30.9
CB108	401.0	0.30	40.1
CBMH203	184	0.35	21.5
		Total Volume	***193.5***

5 Year Surface Ponding Volumes PH1B

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CBMH202	217	0.15	10.9
		Total Volume	***10.9***

100 Year Surface Ponding Volumes PH1B

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CBMH202	217	0.35	25.3
		Total Volume	***25.3***

Table D6
Orifice Sizing

CBMH203

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
2 Year	28.0	2.75	0.006	80	90
5 Year	28.8	2.90	0.006	80	90
100 Year	29.5	3.05	0.006	80	90

Orifice Control Sizing

$Q = 0.6 \times A \times (2gh)1/2$

Where:

Q is the release rate in m^3/s

A is the orifice area in m^2

g is the acceleration due to gravity, $9.81 m/s^2$

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

Orifice Invert =	73.17 m
Ponding Elevation =	77.35 m
Top of CB Elevation =	77.05 m

Note: Orifice is located on the downstream invert of CBMH203

Table D7
Orifice Sizing

CBMH202

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
2 Year	0.0	0.00	0.004	66	75
5 Year	17.0	2.10	0.004	66	75
100 Year	17.6	2.25	0.004	66	75

Orifice Control Sizing

$Q = 0.6 \times A \times (2gh)1/2$

Where:

Q is the release rate in m^3/s

A is the orifice area in m^2

g is the acceleration due to gravity, $9.81 m/s^2$

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

Orifice Invert =	72.99	m
Ponding Elevation =	76.70	m
Top of CB Elevation =	76.40	m

Note: Orifice is located on the downstream invert of CB101

CBMH202
100-Year Allowable Flow= 17.6 L/sec
Head= 3.6m
Hydrovex Model 100 VHV-1

CBMH202
2-Year Allowable Flow= 11.0 L/sec
Head= 3.3m
Hydrovex Model 100 VHV-1

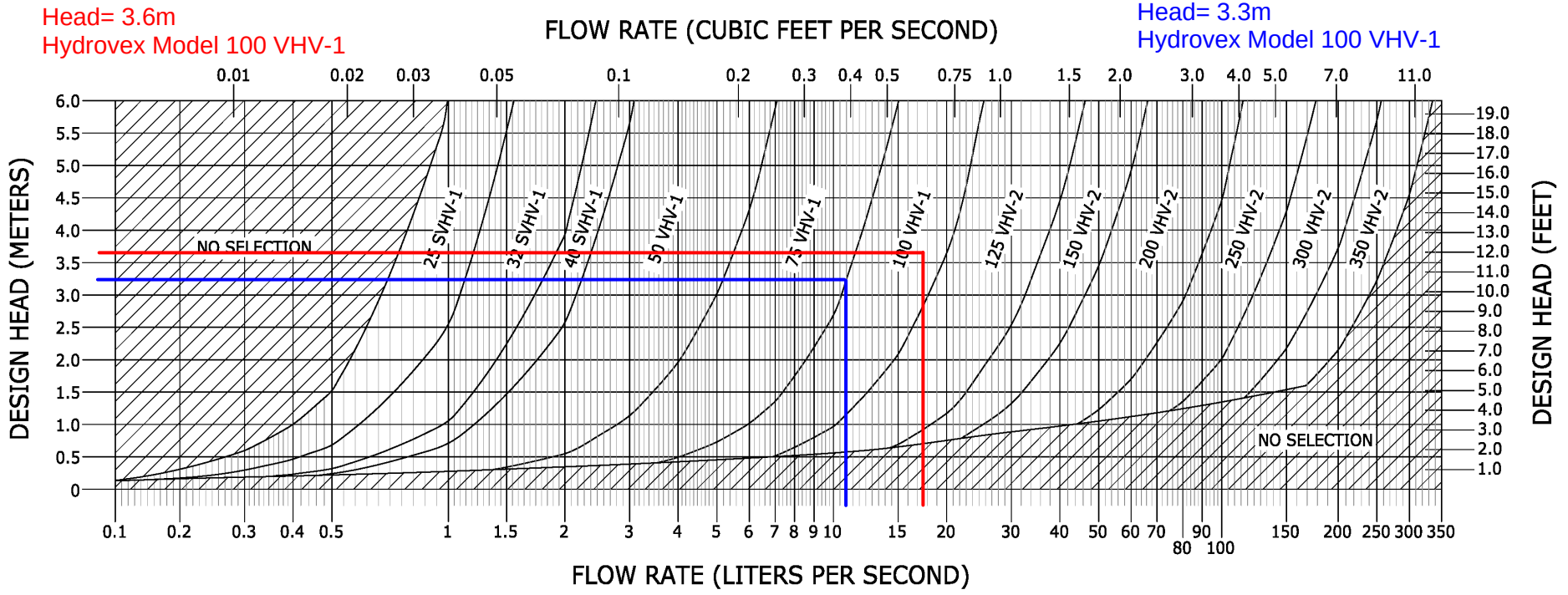


Figure 3 : HYDROVEX® VHV/SVHV Selection Chart

CBMH203
100-Year Allowable flow= 29.5 L/sec
Head= 3.9m
Hydrovex Model 125 VHV-2

CBMH203
2-Year Allowable flow= 28.0 L/sec
Head= 3.6m
Hydrovex Model 125 VHV-2

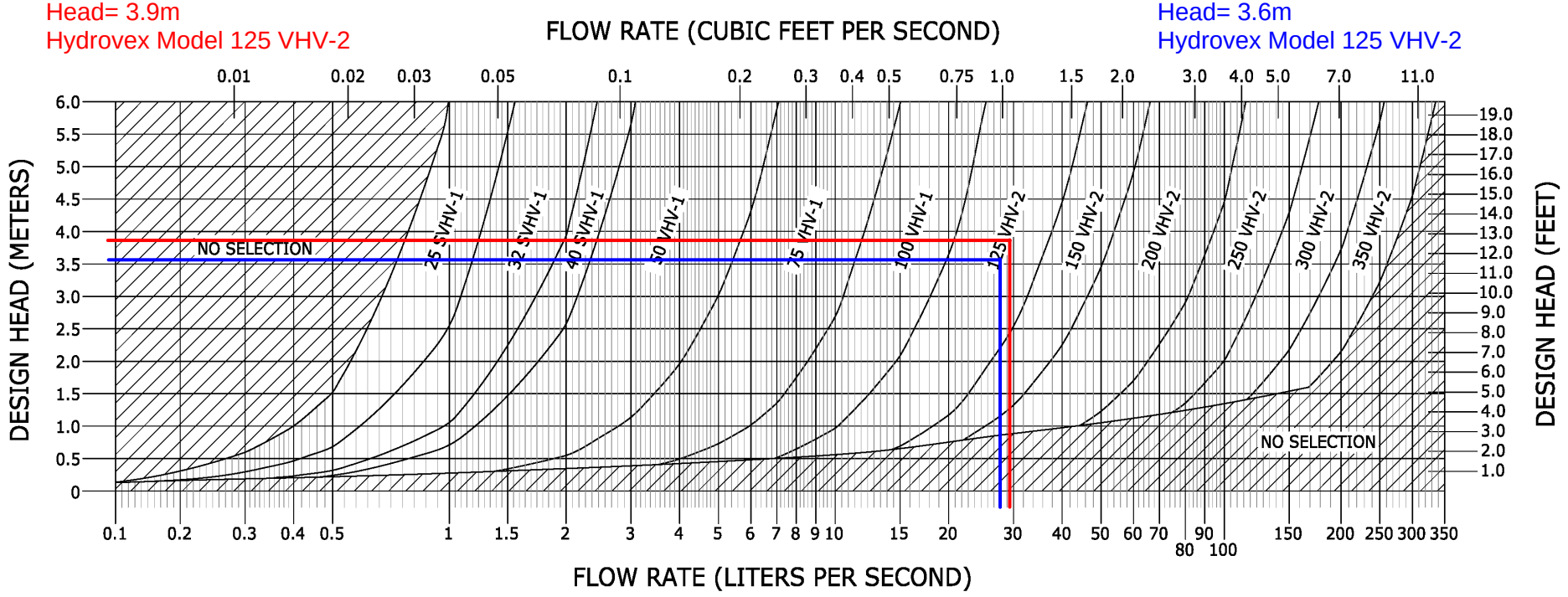


Figure 3 : HYDROVEX® VHV/SVHV Selection Chart

Appendix B2 – SWM Phase 2 Design Sheets

Table D8
CALCULATION OF AVERAGE RUNOFF COEFFICIENTS (POST-DEVELOPMENT)

Area No.	Area	Asphalt & Concrete Areas		Roof Areas		Gravel Areas		Grassed Areas		Runoff Type	Sum AC	Total Area (m^2)	C_{AVG}	100-YR C_{AVG}
		Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C					
		C=0.90		C=0.90		C=0.90		C=0.20						
PH2A	Parking Lot	3910.0	3519.0	245.0	220.5			826.4	165.3	Controlled	3904.8	4981	0.78	0.98
PH2B	Access Rd	837.0	753.3	127.0	114.3			219.0	43.8	Controlled	911.4	1183	0.77	0.96
PH2C	New Bldg			1450.0	1305.0					Controlled	1305.0	1450	0.90	1.00
PH2D	Free Flow	165.7	149.1					284.3	56.9	Uncontrolled	206.0	450	0.46	0.57
Average Runoff Coeff =										C_{AVG} =	6,368 / 8,125	= 0.78		

Table D9
SUMMARY OF POST DEVELOPMENT RUNOFF (UNCONTROLLED AND CONTROLLED)

Area No	Outlet Location	Area (ha)	Time of Conc. T_c (min)	Storm = 2-year				Storm = 5-year				Storm = 100-year			
				C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)
PH2A	Parking Lot	0.498	15	0.78	61.77	67.1	**28.0**	0.78	83.56	90.7	**28.8**	0.98	142.89	193.9	**29.5**
PH2B	Access Rd	0.118	15	0.77	61.77	15.6	**15.6**	0.77	83.56	21.2	**17.0**	0.96	142.89	45.3	**17.6**
PH2C	New Bld	0.145	15	0.90	61.77	22.4	**7.0**	0.90	83.56	30.3	**8.5**	1.00	142.89	57.6	**10.0**
PH2D	Free Flow	0.045	15	0.46	61.77	3.5	**3.5**	0.46	83.56	4.8	**4.8**	0.57	142.89	10.2	**10.2**
Total		0.616				82.7	**54.2**			111.9	**59.1**			239.2	**67.4**

Notes
1) Intensity, $I_2 = 732.951/(Tc+6.199)^{0.810}$ (2-year, City of Ottawa)
2) Intensity, $I_5 = 998.071/(Tc+6.035)^{0.814}$ (5-year, City of Ottawa)
3) Intensity, $I_{100} = 1735.688/(Tc+6.014)^{0.820}$ (100-year, City of Ottawa)
4) Time of Concentration: T_c=10min (5.4.5.2, City of Ottawa)
4) Flows under column Q_{CAP} which are **bold**, denotes flows that are controlled.

Table D10
Estimate of Storage Required for 2-yr, 5-yr & 100-yr Storms (Modified Rational Method)

Area No: PH2A Parking Lot
C_{AVG} = 0.78 (2-yr, 5-yr)
C_{AVG} = 0.98 (100-yr +25%)
Time Interval = 15 (mins)
Drainage Area = 0.4981 (hectares)

Duration, T_D (min)	Release Rate = 28.0 (L/sec) Return Period = 2 (years) IDF Parameters, A = 732.951, B = 0.810 ($I = A/(T_D+C)^B$, C = 6.199					Release Rate = 28.8 (L/sec) Return Period = 5 (years) IDF Parameters, A = 998.071, B = 0.814 ($I = A/(T_D+C)^B$, C = 6.053					Release Rate = 29.5 (L/sec) Return Period = 100 (years) IDF Parameters, A = 1735.688, B = 0.820 ($I = A/(T_D+C)^B$, C = 6.014				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0						230.5	250.2	28.79	221.4	0	398.6	540.9	29.527	511.4	0.0
5						141.2	153.3	28.79	124.5	66	242.7	329.3	29.527	299.8	89.9
10						104.2	113.1	28.79	84.3	75	178.6	242.3	29.527	212.8	127.7
15	61.8	67.1	28.04	39.0	**35**	83.6	90.7	28.79	61.9	76	142.9	193.9	29.527	164.4	147.9
30	40.0	43.5	28.04	15.4	28	53.9	58.5	28.79	29.7	**111**	91.9	124.7	29.527	95.1	171.2
45	30.2	32.8	28.04	4.8	13	40.6	44.1	28.79	15.3	80	69.1	93.7	29.527	64.2	**173.3**
60	24.6	26.7	28.04	-1.4	-5	32.9	35.8	28.79	7.0	55	55.9	75.8	29.527	46.3	166.7
75	20.8	22.6	28.04	-5.4	-24	27.9	30.3	28.79	1.5	31	47.3	64.1	29.527	34.6	155.7
90	18.1	19.7	28.04	-8.3	-45	24.3	26.4	28.79	-2.4	8	41.1	55.8	29.527	26.3	141.8
105	16.1	17.5	28.04	-10.5	-66	21.6	23.4	28.79	-5.4	-15	36.5	49.5	29.527	20.0	126.0
120	14.6	15.8	28.04	-12.2	-88	19.5	21.1	28.79	-7.7	-39	32.9	44.6	29.527	15.1	108.8
135	13.3	14.4	28.04	-13.6	-110	17.8	19.3	28.79	-9.5	-62	30.0	40.7	29.527	11.2	90.5
150	12.3	13.3	28.04	-14.7	-133	16.4	17.8	28.79	-11.0	-86	27.6	37.5	29.527	7.9	71.4
165	11.4	12.3	28.04	-15.7	-155	15.2	16.5	28.79	-12.3	-109	25.6	34.7	29.527	5.2	51.7
180	10.6	11.5	28.04	-16.5	-178	14.2	15.4	28.79	-13.4	-133	23.9	32.4	29.527	2.9	31.4
195	10.0	10.8	28.04	-17.2	-201	13.3	14.5	28.79	-14.3	-157	22.4	30.4	29.527	0.9	10.6
210	9.4	10.2	28.04	-17.8	-224	12.6	13.6	28.79	-15.2	-181	21.1	28.7	29.527	-0.8	-10.5
225	8.9	9.7	28.04	-18.4	-248	11.9	12.9	28.79	-15.9	-205	20.0	27.2	29.527	-2.4	-32.0
240	8.5	9.2	28.04	-18.8	-271	11.3	12.3	28.79	-16.5	-229	19.0	25.8	29.527	-3.7	-53.8
255	8.1	8.8	28.04	-19.3	-295	10.8	11.7	28.79	-17.1	-253	18.1	24.6	29.527	-5.0	-75.9
270	7.7	8.4	28.04	-19.7	-318	10.3	11.2	28.79	-17.6	-277	17.3	23.5	29.527	-6.1	-98.2
285	7.4	8.0	28.04	-20.0	-342	9.9	10.7	28.79	-18.1	-301	16.6	22.5	29.527	-7.1	-120.7
300	7.1	7.7	28.04	-20.3	-366	9.5	10.3	28.79	-18.5	-326	15.9	21.6	29.527	-8.0	-143.4
315	6.8	7.4	28.04	-20.6	-390	9.1	9.9	28.79	-18.9	-350	15.3	20.7	29.527	-8.8	-166.2
Maximum Storage Requried =					**35.1**					**111.4**					**173.3**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(T_D+C)^B$, where T_D = storm duration (mins)
3) Release Rate = Desired Capture (Release) Rate
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) A,B,C are IDF Parameters for City of Ottawa. From Ottawa Sewer Design Guidelines, Section 5.4.2.

Table D11
Estimate of Storage Required for 2-yr, 5-yr & 100-yr Storms (Modified Rational Method)

Area No: PH2B Access Road
C_{AVG} = 0.77 (2-yr, 5-yr)
C_{AVG} = 0.96 (100-yr +25%)
Time Interval = 15 (mins)
Drainage Area = 0.1183 (hectares)

Duration, T_D (min)	Release Rate = 15.6 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 ($I = A/(T_D+C)^B$)					Release Rate = 28.8 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 ($I = A/(T_D+C)^B$)					Release Rate = 17.6 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.688, B = 0.820, C = 6.014 ($I = A/(T_D+C)^B$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0						230.48	58.4	28.8	29.6	0	398.6	126.2	17.61	108.6	0.0
5						141.18	35.8	28.8	7.0	**2**	242.7	76.9	17.61	59.3	17.8
10						104.19	26.4	28.8	-2.4	-1	178.6	56.6	17.61	38.9	23.4
15	61.8	15.6	15.65	0.0	**0**	83.56	21.2	28.8	-7.6	-7	142.9	45.3	17.61	27.6	**24.9**
30	40.0	10.1	15.65	-5.5	-10	53.93	13.7	28.8	-15.1	-27	91.9	29.1	17.61	11.5	20.7
45	30.2	7.7	15.65	-8.0	-22	40.63	10.3	28.8	-18.5	-50	69.1	21.9	17.61	4.3	11.5
60	24.6	6.2	15.65	-9.4	-34	32.94	8.3	28.8	-20.4	-74	55.9	17.7	17.61	0.1	0.3
75	20.8	5.3	15.65	-10.4	-47	27.89	7.1	28.8	-21.7	-98	47.3	15.0	17.61	-2.6	-11.9
90	18.1	4.6	15.65	-11.1	-60	24.29	6.2	28.8	-22.6	-122	41.1	13.0	17.61	-4.6	-24.8
105	16.1	4.1	15.65	-11.6	-73	21.58	5.5	28.8	-23.3	-147	36.5	11.6	17.61	-6.1	-38.1
120	14.6	3.7	15.65	-12.0	-86	19.47	4.9	28.8	-23.9	-172	32.9	10.4	17.61	-7.2	-51.8
135	13.3	3.4	15.65	-12.3	-99	17.76	4.5	28.8	-24.3	-197	30.0	9.5	17.61	-8.1	-65.7
150	12.3	3.1	15.65	-12.5	-113	16.36	4.1	28.8	-24.6	-222	27.6	8.7	17.61	-8.9	-79.8
165	11.4	2.9	15.65	-12.8	-126	15.18	3.8	28.8	-24.9	-247	25.6	8.1	17.61	-9.5	-94.1
180	10.6	2.7	15.65	-13.0	-140	14.18	3.6	28.8	-25.2	-272	23.9	7.6	17.61	-10.0	-108.4
195	10.0	2.5	15.65	-13.1	-154	13.31	3.4	28.8	-25.4	-297	22.4	7.1	17.61	-10.5	-122.9
210	9.4	2.4	15.65	-13.3	-167	12.56	3.2	28.8	-25.6	-323	21.1	6.7	17.61	-10.9	-137.5
225	8.9	2.3	15.65	-13.4	-181	11.89	3.0	28.8	-25.8	-348	20.0	6.3	17.61	-11.3	-152.2
240	8.5	2.1	15.65	-13.5	-194	11.29	2.9	28.8	-25.9	-373	19.0	6.0	17.61	-11.6	-166.9
255	8.1	2.0	15.65	-13.6	-208	10.76	2.7	28.8	-26.1	-399	18.1	5.7	17.61	-11.9	-181.7
270	7.7	2.0	15.65	-13.7	-222	10.28	2.6	28.8	-26.2	-424	17.3	5.5	17.61	-12.1	-196.6
285	7.4	1.9	15.65	-13.8	-236	9.85	2.5	28.8	-26.3	-450	16.6	5.2	17.61	-12.4	-211.5
300	7.1	1.8	15.65	-13.9	-249	9.46	2.4	28.8	-26.4	-475	15.9	5.0	17.61	-12.6	-226.4
315	6.8	1.7	15.65	-13.9	-263	9.10	2.3	28.8	-26.5	-501	15.3	4.8	17.61	-12.8	-241.4
Maximum Storage Requried =					**0.0**					**2.1**					**24.9**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(T_D+C)^B$, where T_D = storm duration (mins)
3) Release Rate = Desired Capture (Release) Rate
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) A,B,C are IDF Parameters for City of Ottawa. From Ottawa Sewer Design Guidelines, Section 5.4.2.

Table D12
Estimate of Storage Required for 2-yr, 5-yr & 100-yr Storms (Modified Rational Method)

Area No: PH2C Roof
C_{AVG} = 0.90 (2-yr, 5-yr)
C_{AVG} = 1.00 (100-yr +25%)
Time Interval = 15 (mins)
Drainage Area = 0.1450 (hectares)

Duration, T_D (min)	Release Rate = 7.0 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 ($I = A/(T_D+C)^B$)					Release Rate = 8.5 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 ($I = A/(T_D+C)^B$)					Release Rate = 10.0 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.688, B = 0.820, C = 6.014 ($I = A/(T_D+C)^B$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0						230.5	83.6	8.5	75.1	0	398.6	160.7	10.00	150.7	0.0
5						141.2	51.2	8.5	42.7	23	242.7	97.8	10.00	87.8	26.4
10						104.2	37.8	8.5	29.3	26	178.6	72.0	10.00	62.0	37.2
15	61.8	22.4	7.00	15.4	**14**	83.6	30.3	8.5	21.8	26	142.9	57.6	10.00	47.6	42.8
30	40.0	14.5	7.00	7.5	14	53.9	19.6	8.5	11.1	**39**	91.9	37.0	10.00	27.0	**48.7**
45	30.2	11.0	7.00	4.0	11	40.6	14.7	8.5	6.2	30	69.1	27.8	10.00	17.8	48.2
60	24.6	8.9	7.00	1.9	7	32.9	12.0	8.5	3.5	22	55.9	22.5	10.00	12.5	45.1
75	20.8	7.6	7.00	0.6	2	27.9	10.1	8.5	1.6	16	47.3	19.0	10.00	9.0	40.7
90	18.1	6.6	7.00	-0.4	-2	24.3	8.8	8.5	0.3	9	41.1	16.6	10.00	6.6	35.5
105	16.1	5.9	7.00	-1.1	-7	21.6	7.8	8.5	-0.7	2	36.5	14.7	10.00	4.7	29.7
120	14.6	5.3	7.00	-1.7	-12	19.5	7.1	8.5	-1.4	-5	32.9	13.3	10.00	3.3	23.5
135	13.3	4.8	7.00	-2.2	-18	17.8	6.4	8.5	-2.1	-12	30.0	12.1	10.00	2.1	16.9
150	12.3	4.4	7.00	-2.6	-23	16.4	5.9	8.5	-2.6	-18	27.6	11.1	10.00	1.1	10.2
165	11.4	4.1	7.00	-2.9	-28	15.2	5.5	8.5	-3.0	-25	25.6	10.3	10.00	0.3	3.2
180	10.6	3.9	7.00	-3.1	-34	14.2	5.1	8.5	-3.4	-32	23.9	9.6	10.00	-0.4	-3.9
195	10.0	3.6	7.00	-3.4	-40	13.3	4.8	8.5	-3.7	-39	22.4	9.0	10.00	-1.0	-11.2
210	9.4	3.4	7.00	-3.6	-45	12.6	4.6	8.5	-3.9	-46	21.1	8.5	10.00	-1.5	-18.6
225	8.9	3.2	7.00	-3.8	-51	11.9	4.3	8.5	-4.2	-53	20.0	8.1	10.00	-1.9	-26.1
240	8.5	3.1	7.00	-3.9	-57	11.3	4.1	8.5	-4.4	-60	19.0	7.7	10.00	-2.3	-33.7
255	8.1	2.9	7.00	-4.1	-62	10.8	3.9	8.5	-4.6	-67	18.1	7.3	10.00	-2.7	-41.3
270	7.7	2.8	7.00	-4.2	-68	10.3	3.7	8.5	-4.8	-74	17.3	7.0	10.00	-3.0	-49.1
285	7.4	2.7	7.00	-4.3	-74	9.9	3.6	8.5	-4.9	-82	16.6	6.7	10.00	-3.3	-56.9
300	7.1	2.6	7.00	-4.4	-80	9.5	3.4	8.5	-5.1	-89	15.9	6.4	10.00	-3.6	-64.7
315	6.8	2.5	7.00	-4.5	-85	9.1	3.3	8.5	-5.2	-96	15.3	6.2	10.00	-3.8	-72.6
Maximum Storage Requried =					**13.9**					**39.3**					**48.7**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(T_D+C)^B$, where T_D = storm duration (mins)
3) Release Rate = Desired Capture (Release) Rate
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) A,B,C are IDF Parameters for City of Ottawa. From Ottawa Sewer Design Guidelines, Section 5.4.2.

Table D13
Estimate of Provided Storage for 2-yr, 5-yr & 100-yr Storms

Total 2 Year Storage = ***35.1*** **m³**
Total 5 Year Storage = ***163.2*** **m³**
Total 100 Year Storage= ***275.8*** **m³**

2 Year Catch Basin Storage

CB ID	Area ID	Area (m2)	Depth (m)	Volume (m3)
CB 102	PH2A	0.36	2.1	0.77
CB 103	PH2A	0.36	2.1	0.77
CB 104	PH2A	0.36	2.1	0.77
CB 105	PH2A	0.36	2.1	0.77
CB 106	PH2A	0.36	2.1	0.77
CB 107	PH2A	0.36	2.1	0.77
CB 108	PH2A	0.36	2.1	0.77
			Total Volume	***5.4***

2 Year Catch Basin Manhole Storage

MH ID	Area ID	Diameter (mm)	Area (m2)	Depth (m)	Volume (m3)
CBMH 203	PH2A	1200	1.13	3.0	3.39
CBMH 204	PH2A	1200	1.13	3.2	3.62
CBMH 205	PH2A	1200	1.13	3.0	3.39
				Total Volume	***7.0***

2 Year Underground Pipe Storage

Diameter (mm)	Area ID	Area (m2)	Length (m)	Volume (m3)
200	PH2A	0.031	119.6	3.8
600	PH2B	0.283	67.0	18.9
			Total Volume	***22.7***

5 Year Surface Ponding Volumes PH2C

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
Roof	1140	0.15	57
		Total Volume	***57.0***

100 Year Surface Ponding Volumes PH2C

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
Roof	1140	0.15	57
		Total Volume	***57.0***

5 Year Surface Ponding Volumes PH2A

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
CB102	132	0.15	6.6
CB103	368.00	0.15	18.4
CB104	342.00	0.15	17.1
CB105	86.0	0.15	4.3
CB106	82.0	0.15	4.1
CB107	309.0	0.15	15.5
CB108	401.0	0.15	20.1
CBMH203	184	0.15	9.2
		Total Volume	***95.3***

5 Year Surface Ponding Volumes PH2B

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
CBMH202	217	0.15	10.9
		Total Volume	***10.9***

100 Year Surface Ponding Volumes PH2A

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
CB102	132	0.30	13.2
CB103	368.00	0.30	36.8
CB104	342.00	0.30	34.2
CB105	86.0	0.30	8.6
CB106	82.0	0.30	8.2
CB107	309.0	0.30	30.9
CB108	401.0	0.30	40.1
CBMH203	184	0.35	21.5
		Total Volume	***193.5***

100 Year Surface Ponding Volumes PH2B

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
CBMH202	217	0.35	25.3
		Total Volume	***25.3***

Table D14
Orifice Sizing

CBMH203

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
2 Year	28.0	2.75	0.006	80	90
5 Year	28.8	2.90	0.006	80	90
100 Year	29.5	3.05	0.006	80	90

Orifice Control Sizing

$Q = 0.6 \times A \times (2gh)1/2$

Where:

Q is the release rate in m^3/s

A is the orifice area in m^2

g is the acceleration due to gravity, $9.81 m/s^2$

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

Orifice Invert =	73.17 m
Ponding Elevation =	77.35 m
Top of CB Elevation =	77.05 m

Note: Orifice is located on the downstream invert of CBMH203

Table D15
Orifice Sizing

CB101

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
2 Year	0.0	0.00	0.004	66	75
5 Year	17.0	2.10	0.004	66	75
100 Year	17.6	2.25	0.004	66	75

Orifice Control Sizing

$Q = 0.6 \times A \times (2gh)1/2$

Where:

Q is the release rate in m^3/s

A is the orifice area in m^2

g is the acceleration due to gravity, $9.81 m/s^2$

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

Orifice Invert =	72.99	m
Ponding Elevation =	76.70	m
Top of CB Elevation =	76.40	m

Note: Orifice is located on the downstream invert of CBMH101

Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

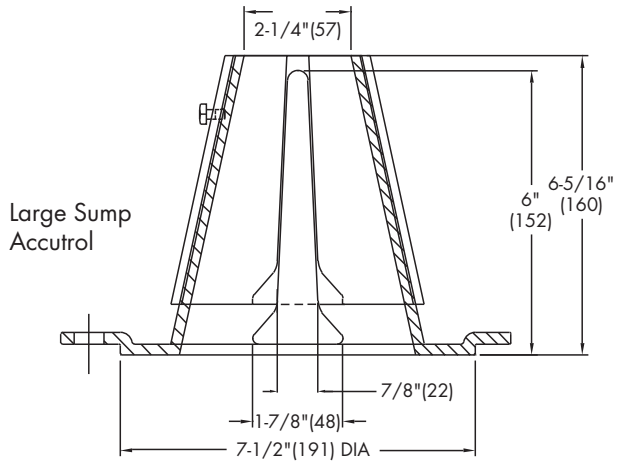
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

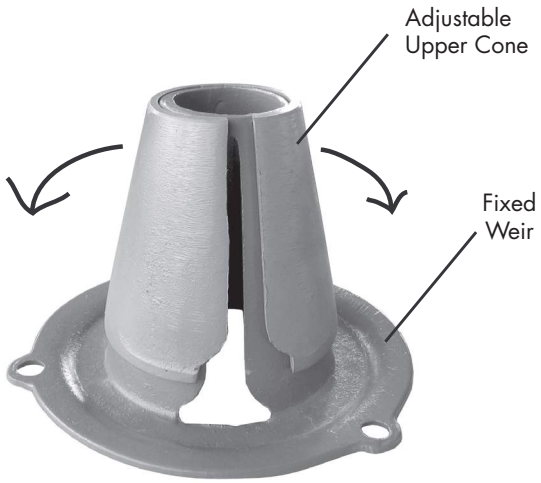
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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A Watts Water Technologies Company

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Appendix C – Water

From: Ahmed Aref <aaref@aplus-arch.com>

Sent: Monday, November 12, 2018 1:46 PM

To: Aly Elgayar

Cc: Alam Ansari; Marc Alain Lafleur

Subject: Re: KMA Mosque – Type of Construction Confirmation

Attachments: image001.png

Steel frame on concrete shallow foundations. Exterior cladding of combustible and non combustible construction.

Ahmed Aref, Architect, OAA, MRAIC, LEED Green Assoc.
Principal

A+ Architecture Inc.

555 Legget Drive, Tower A, Suite 304, Kanata, ON K2K 2X3

T. (613) 699-6860 | F. (613) 800-2204 | C. (613) 854-5008

aaref@aplus-arch.com | www.aplus-arch.com

On Mon, Nov 12, 2018, 10:58 AM Aly Elgayar <Aly.ElGayar@exp.com wrote:

> Good Morning Ahmed,
>
> Can you please confirm the proposed building's type of construction?
>
> I require documentation for the SWM report as per the City comments.
>
> Regards,

TABLE 1: FIRE FLOW REQURIEMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 1999
Project No.: OTT-00238504-A0
Project Name: KMA Mosque & Community Center

An estimate of the Fire Flow required for a given fire area may be estimated by:

F = 220 * C * SQRT(A)

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input	Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Non-combustible Construction	0.8	
	Ordinary Construction	1			
	Non-combustible Construction	0.8			
	Fire Resistive Construction	0.6			
Input Building Floor Areas (A)	Floor 3		586.4	2282.4 m²	
	Floor 2		1696		
	Floor 1		0		
	Basement (At least 50% below grade, not included)				
Fire Flow (F)	F = 220 * C * SQRT(A)				8,408
Fire Flow (F)	Rounded to nearest 1,000				8,000

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Limited Combustible	-15%	-1,200	6,800
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-23%	-1,591	5,209
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-8%	-530	4,678
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Fully Supervised Sprinkler System	-8%	-530	4,148
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposing Wall type	Exposed Wall Length: Length (m)	No of Storeys	Lenth-height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Side 1	80.5	6	> 45.1	Type A	29	1	29	6	0%	0%	0	4,148
	Side 2	100	6	> 45.1	Type A	0	0	0	6	0%			
	Front	62.5	6	> 45.1	Type A	16.4	2	32.8	6	0%			
	Back	100	6	> 45.1	Type A	0	0	0	6	0%			
Obtain Required Fire Flow	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =												4,000
	Total Required Fire Flow, L/s =												67

Exposure Charges for Exposing Walls of Wood Frame Construciton (from Table G5)

Type A	Wood-Frame or non-conbustible
Type B	Ordinary or fire-resisitve with unprotected openings
Type C	Ordinary or fire-resisitve with semi-protected openings
Type D	Ordinary or fire-resisitve with nlank wall

Conditons for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
30.1m to 45m	5
> 45.1m	6

BOUNDARY CONDITIONS

Boundary Conditions For: 351 Sandhill Rd

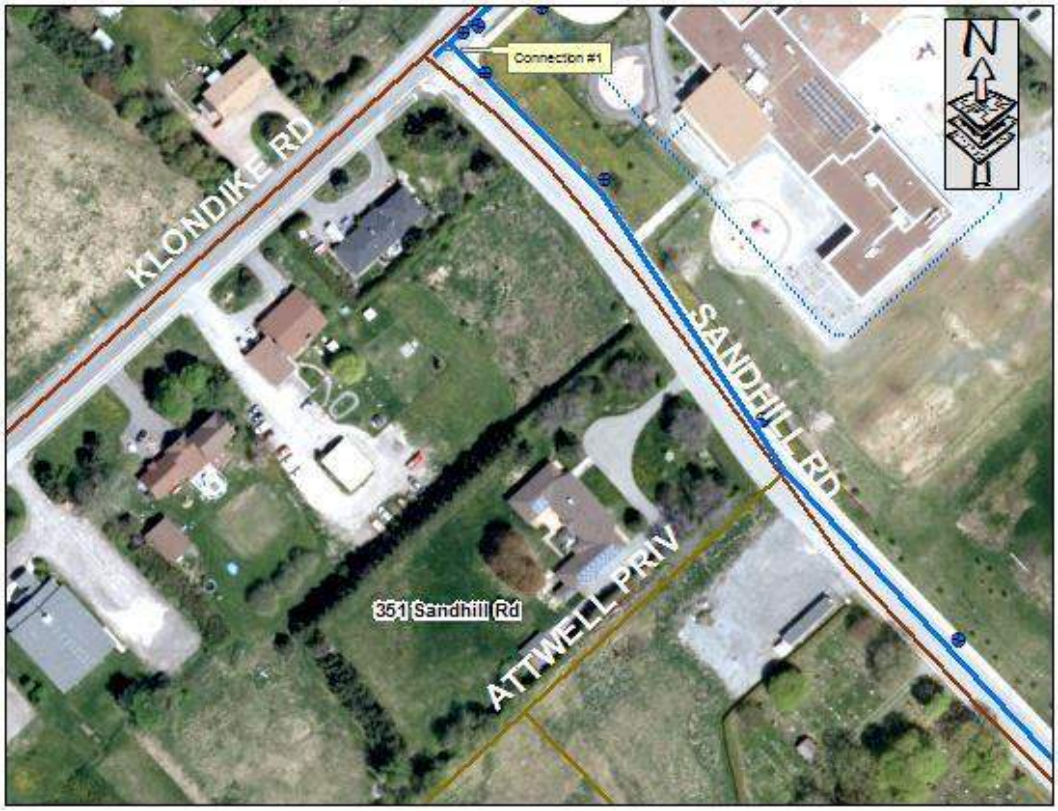
Date of Boundary Conditions: 2018-Jul-09

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	16.2	0.3
Maximum Daily Demand	24.6	0.4
Peak Hour	44.4	0.7
Fire Flow #1 Demand	4,000	66.7

Number Of Connections: 1

Location:



BOUNDARY CONDITIONS

Results:

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.5	80.7
Peak Hour	124.2	70.3
Max Day Plus Fire (4,000) L/min	125.1	71.6

[1]Elevation: **74.73 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) Connection Location is always selected to be at watermain major intersections to provide best and most accurate results.

Disclaimer

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

KMA MOSQUE AND COMMUNITY CENTRE
Client:KANATA MUSLIM ASSOCIATION
Project: OTT-00238504-A0

Prepared By: A. Elgayar
Date: February 2019

Max day(0.41L/s) + FireFlow(67L/s) HGL= 125.1 m
Max HGL= 131.5 m
Peak Hour= 124.2 m

Table C1 Pressure Analysis

Description	From	To	Flow (L/sec)	Pipe Dia (mm)	Dia (m)	Q (m^3/sec)	Area (m2)	C	Velocity V (m/s)	Slope of HGL (m/m)	Pipe Length (m)	Frictional Head Loss h_f (m)	Equivalent Pipe Length of Fittings (m)	Minor Loss of Fittings h_b (m)	Total Losses (m) $h_b + h_f$	Start Ground Elev(m)	End Ground Elev (m)	Static Head (m)	Pressure From kPa	Pressure From (psi)	Pressure To kPa	Pressure To (psi)	Pressure Drop (psi)
Max Day + Fire Flow	Main	Building	67	150	0.150	0.067	0.017671444	110	3.7914	0.1218	55.13	6.715676403	9.9	1.20597	7.92165	74.73	76.90	-2.17	494.0	(71.6)	395.0	(57.3)	14.4
Max HGL	Main	Building	0.3	150	0.150	0.0003	0.017671444	110	0.017	0.0000	55.13	0.000299797	9.9	0.00005	0.00035	74.73	76.90	-2.17	556.7	(80.7)	535.5	(77.7)	3.1
Peak Hour	Main	Building	0.7	150	0.150	0.0007	0.017671444	110	0.0396	0.0000	55.13	0.001439862	9.9	0.00026	0.00170	74.73	76.90	-2.17	485.2	(70.4)	463.9	(67.3)	3.1

V=Q/A

Slope of HGL= $(\frac{3.59}{C})^{1.852} \frac{Q}{D^{4.87}}^{1.852}$

hf = Slope of HGL * Pipe Length

Resistance of Fittings and Valves for 200mm WM

Fittings	Loss in Equiv. Length in Pipe Diameters	Equiv. Length (metres)	Quantity (each)	Total Equiv. Length (m)
Standard 90^0 Elbow	32	4.80	0	0
11.25 Degree Elbow	8	1.20	1	1.2
45 Degree Elbow	16	2.40	2	4.8
Gate Valve Full -Open	13	1.95	2	3.9
		Total:	**5**	**9.9**

Appendix D – Sewer Design Sheets

From: Ahmed Aref <aaref@aplus-arch.com>

Sent: Thursday, November 15, 2018 1:26 PM

To: Aly Elgayar

Cc: Mehmood Shaikh; Alam Ansari

Subject: KMA Mosque & Community Centre: Occupant Load Calculations

Hi Aly,

As requested, here is a breakdown of the proposed occupant load for the buildings:

- Existing Building: 180 persons

- New Building: 1,271 persons (assuming the gymnasium hall will be used as an assembly space).

Let me know if you have any questions.

Thanks,

Ahmed Aref, Architect, OAA, MRAIC, LEED Green Assoc.

Principal

A+ Architecture Inc.

555 Legget Drive, Tower A, Suite 304, Kanata, ON K2K 2X3

SANITARY SEWER CALCULATION SHEET

LOCATION				RESEDENTIAL AREAS AND POPULAITONS												COMMERCIAL			INDUSTRIAL			INSTITUTIONAL		INFILTRATION			TOTAL FLOW (L/s)	SEWER DATA						
					NUMBER OF UNITS							POPULATION				AREA (ha)			AREA (ha)					AREA (ha)										
Street	U/S MH	D/S MH	Desc	Area (ha)	Singles	Semis	Towns	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	4-Bed Apt.	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	Peak Flow (L/sec)	INDIV	ACCU	Peak Factor (per MOE)	AREA (Ha)	ACCU AREA (Ha)	INDIV	ACCU	INFILT FLOW (L/s)		Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
Private		303		0.8180																		0.82	0.82	0.818	0.818	0.27	0.67	200	201.16	0.60	7.300	25.8004	0.02587	0.93970312
	303	302																										200	201.16	2.00	41.200	47.10488		1.715655321
	302	301																										200	201.16	0.50	9.600	23.55244		0.85782766
	301	Ex.MH																										200	201.16	0.60	13.500	25.8004		0.93970312
				0.818																				0.818									

Residential Avg. Daily Flow, q (L/p/day) =	280	Commercial Peak Factor =	1.5	(when area >20%)	Peak Population Flow, (L/sec) =	P*q*M/86.4	Unti Type	Persons/Unit	
Commercial Avg. Daily Flow (L/gross ha/day) =	28,000		1.0	(when area <20%)	Peak Extraneous Flow, (L/sec) =	I*Ac	Singles	3.4	
or L/gross ha/sec =	0.324				Residential Peaking Factor, M =	1 + (14/(4+P^0.5)) * K	Semi-Detached	5.7	
Institutianal Avg. Daily Flow (L/s/ha) =	28,000	Institutional Peak Factor =	1.5	(when area >20%)	A_c = Cumulative Area (hectares)		Townhomes	2.7	
or L/gross ha/sec =	0.324		1.0	(when area <20%)	P = Population (thousands)		Single Apt. Unit	1.4	
Light Industrial Flow (L/gross ha/day) =	35,000						2-bed Apt. Unit	2.1	
or L/gross ha/sec =	0.40509	Residential Correction Factor, K =	0.80		Sewer Capacity, Qcap (L/sec) =	$1/N \; S^{1/2} \; R^{2/3} \; A_c$	3-bed Apt. Unit	3.1	
Light Industrial Flow (L/gross ha/day) =	55,000	Manning N =	0.013		(Manning's Equation)		4-bed Apt. Unit	3.8	
or L/gross ha/sec =	0.637	Peak extraneous flow, I (L/s/ha) =	0.33	(Total I/I)					

Designed:	Project:
A. Elgayar, M.A.Sc.	KMA Mosque and Community Center
Checked:	Location:
A. Ansari, P.Eng.	Ottawa, Ontario
File Reference:	Page No:
238504 - SAN Design.xlsx	**1 of 1**

TABLE C-1: 5-YEAR STORM SEWER CALCULATION SHEET

Return Period Storm = **5** (5-year)
Default Inlet Time= 10 (minutes)
Manning Coefficient = 0.013 (dimensionless)

LOCATION			AREA (hectares)			FLOW (UNRESTRICTED)						SEWER DATA										
Location	From Node	To Node	Area No.	Area (ha)	Average R	Indiv. 2.78*A*R	Accum. 2.78*A*R	Tc (mins)	I (mm/h)	Return Period	Q (L/sec)	Dia (mm) Actual	Dia (mm) Nominal	Type	Slope (%)	Length (m)	Capacity (L/sec)	Velocity (m/s)		Time in Pipe, Tt (min)	Hydraulic Ratios	
																		Vf	Va		Qa/Qf	Va/Vf
351 Sandhill Road	CB105	CBMH205	PH2A	0.0300	0.78	0.07	0.07	10.00	104.19	5.00	6.8	201.16	200	PVC	1.00	17.40	33.3	1.04	0.69	0.42	0.20	0.66
	CB106	CBMH205	PH2A	0.0450	0.78	0.10	0.10	10.00	104.19	5.00	10.2	201.16	200	PVC	1.00	19.60	33.3	1.04	0.73	0.45	0.31	0.70
	CB104	CBMH205	PH2A	0.060	0.78	0.13	0.13	10.00	104.19	5.00	13.6	201.16	200	PVC	1.00	15.30	33.3	1.04	0.74	0.35	0.41	0.71
	CB107	CBMH205	PH2A	0.080	0.78	0.17	0.17	10.00	104.19	5.00	18.1	201.16	200	PVC	1.00	14.60	33.3	1.04	0.74	0.33	0.54	0.71
	CB103	CBMH205	PH2A	0.090	0.78	0.20	0.20	10.00	104.19	5.00	20.3	201.16	200	PVC	1.00	15.30	33.3	1.04	0.95	0.27	0.61	0.91
	CB108	CBMH205	PH2A	0.100	0.78	0.22	0.22	10.00	104.19	5.00	22.6	201.16	200	PVC	1.00	18.40	33.3	1.04	0.88	0.35	0.68	0.84
	CBMH205	CBMH204					0.88	10.42	102.02	5.00	89.6	610	600	CONC	0.50	44.60	453.7	1.54	1.03	0.72	0.20	0.67
	CB102	CBMH204	PH2A	0.047	0.78	0.10	0.10	10.00	104.19	5.00	10.6	201.16	200	PVC	1.00	15.50	33.3	1.04	0.73	0.35	0.32	0.70
	CBMH204	CBMH203					0.98	11.14	98.52	5.00	96.6	610	600	CONC	0.50	23.20	453.7	1.54	1.01	0.38	0.21	0.66
	CBMH202	CBMH203	PH2B	0.120	0.77	0.26	0.26	10.00	104.19	5.00	26.8	201.16	200	PVC	1.00	2.70	33.3	1.04	1.02	0.04	0.80	0.98
	ROOF	CBMH203	PH2C	0.150	0.90	0.38	0.38	10.00	104.19	5.00	39.1	251.46	250	PVC	0.50	15.00	42.7	0.86	0.86	0.29	0.92	1.00
	CBMH203	STMMH202					1.61	11.52	96.77	5.00	156.0	610	600	CONC	0.50	67.00	453.7	1.54	1.07	1.04	0.34	0.70
	STMMH202	STMMH201					1.61	12.56	92.35	5.00	148.9	610	600	CONC	0.50	15.00	453.7	1.54	1.07	0.23	0.33	0.70
TOTALS =																**283.60**						

Definitions:
Q = 2.78*AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Watershed Area (hectares)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficients (dimensionless)

Notes:

	5yr
Ottawa Rainfall Intensity Values:	
From Sewer Desing Guidelines, 2004	
a =	998.071
b=	0.814
c =	6.053

Designed: **A. Elgayar**	Project: **351 Sand Hill Road**	
Checked: **A. Ansari, PEng.**	Location: **Ottawa, Ontario**	
Dwg Reference: **SS-2**	File Ref: **238504 - STM Design**	Sheet No: **1 of 1**

Appendix E – Drawings

exp Services Inc. 100-2650 Queensview Drive Ottawa, ON K2B 8H6 www.exp.com	
DESIGN AE	KMA MOSQUE AND COMMUNITY CENTRE 351 SANDHILL ROAD, OTTAWA, ON
DRAWN AE	
DATE NOV 2018	PRE-DEVELOPMENT AERIAL IMAGE
FILE NO OTT-00238504-A0	
SCALE N.T.S	
SKETCH NO FIG-1	

Filename: P:\Projects\Civil Engineering Services\238000\OTT-00238504-A0 - KMA Mosque and Community Centre\60-EXECUTION\64-DWG\Sketches & Figures\FIG-1 - Pre-develop Areial.dwg
Last Saved: Nov 11, 2018 1:09 PM Last Plotted:Nov 11, 2018 1:10 PM Plotted by:ElgoyarA

PHASE 1 CONSTRUCTION

PHASE 2 CONSTRUCTION

JOB BENCHMARK #2
Magnetic Nail in Utility Pole Elevation=76.075

JOB BENCHMARK
Top of Spindle of Fire Hydrant
Elevation=77.23

PROPOSED 2-STOREY MOSQUE AND COMMUNITY CENTRE
FFL=76.90

351
1 Storey Building (Brick & Siding)
FFL=78.57
TOP OF BASEMENT SLAB=75.59

PHASE 2 CONSTRUCTION

PHASE 1 CONSTRUCTION

EXISTING 675mmø STORM MAIN@0.9%

EXISTING 300mmø WATERMAIN

EXISTING 250mmø SANITARY MAIN

EX STMMH
T/G=76.84
NW INV=72
SW INV=72

EX SANMH
T/G=76.90
SW INV=73.51
SE INV=73.42

INV.=±72.57

0.05Ø Dia. Gasmain

Concrete Sidewalk

Centreline of Road

Cedar Hedge 2.0± Wide

Chain Link Fence

Garage (Unit)

Septic Tank

Wood Deck

Concrete Walk

Handrail

Wood Porch

Door Sill Elev=78.56

Door Sill Elev=78.57

FIN. ELEV. 78.59 (EXIST.)

FIN. ELEV. 78.58 (EXIST.)

FIN. ELEV. 78.57 (EXIST.)

FIN. ELEV. 78.21 (EXIST.)

FIN. ELEV. 77.50

FIN. ELEV. 77.30

FIN. ELEV. 77.36

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
www.exp.com

DESIGN	AE
DRAWN	AE
DATE	SEPT 2018
FILE NO	OTT-00238504-A0

KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

PHASING PLAN

SCALE 1:400

SKETCH NO FIG-2

Filename: P:\Projects\Civil Engineering Services\238000\OTT-00238504-A0 - KMA Mosque and Community Centre\60-EXECUTION\64-DWG\Sketches & Figures\FIG-2 - Phasing Plan.dwg
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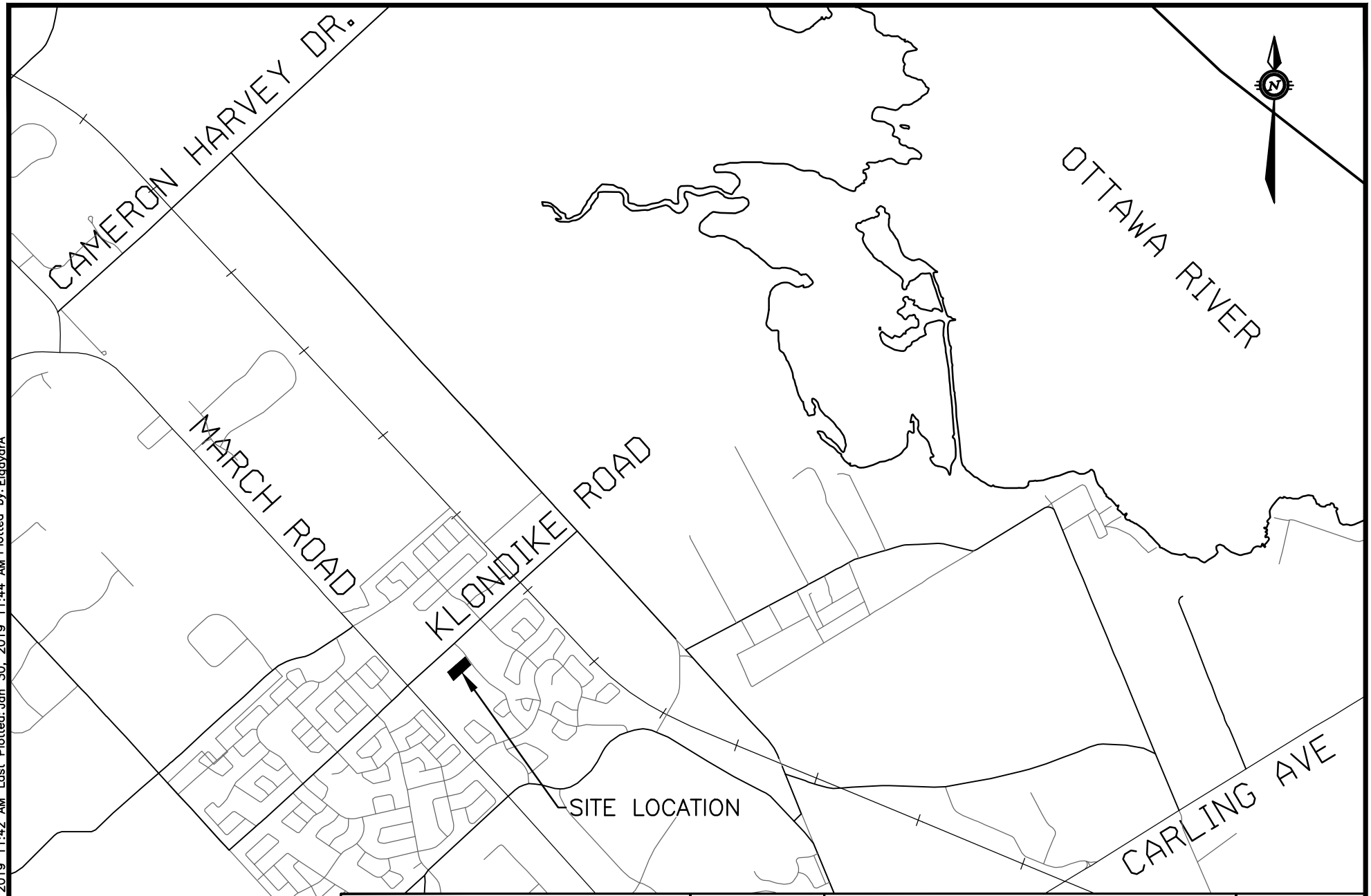

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
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DESIGN	---
DRAWN	AE
DATE	JAN 2019
FILE NO	OTT-00238504-A0

KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

SITE LOCATION

SCALE N.T.S

SKETCH NO FIG-3

Filename: P:\Projects\Civil Engineering Services\238000\OTT-00238504-A0 - KMA Mosque and Community Centre\60-EXECUTION\64-DWG\Sketches & Figures\FIG-3 - K
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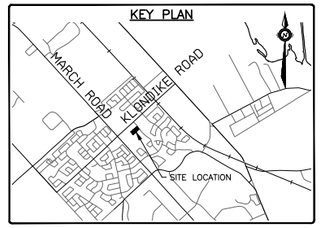
KEY PLAN



LEGEND

- SIB – STANDARD IRON BAR
- IB – IRON BAR
- CB – CATCH BASIN
- MH – MANHOLE
- MWH – WATER MANHOLE
- LS – LAMP STANDARD
- UP – UTILITY POLE
- WV – WATER VALVE
- FH – FIRE HYDRANT
- W – WELL
- – GUY WIRE AND ANCHOR
- —W— – WATERMAIN
- ---------- – OVERHEAD UTILITY WIRES
- —UH— – UNDERGROUND HYDRO
- —UB— – UNDERGROUND BELL
- —G— – GAS MAIN
- —C— – CABLE (ROGERS)
- —SL— – STREET LIGHT
- —ST— – STORM SEWER
- —S— – SANITARY SEWER
- – CURB
- – PROPERTY LINE
- +76.18 – EXISTING ELEVATION
- – EXISTING OVERLAND FLOW DIRECTION

SIB (857)
IB (857)
SIB (857)
SIB (857)
EXISTING SEPTIC TANK TO BE DECOMMISSIONED DURING PHASE 1 OF DEVELOPMENT
Septic Tank
BH
ABANDONED WELL
#351
1 Storey Building (Brick & Siding)
FFL=78.57
TOP OF BASEMENT SLAB=75.59
GFA=402m²
Wood Deck
Door Sill Elev=78.56
Door Sill Elev=78.57
Wood Porch
Concrete Walk
Handrail
OLS
Concrete Verandah
Interlocking Brick
Garage (Vinyl)
Cedar Hedge 2.0± Wide
Post & Wire Fence
Asphalt
JOB BENCHMARK #2
Magnetic Nail in Utility Pole Elevation=76.075
SSIB
BP
UP
MH
EX. STMMH
T/G=75.14
NW INV=71.52
SE INV=71.47
CB
LS
Centreline of Concrete Sidewalk
EXISTING 675mmø STORM MAIN
EXISTING 300mmø WATERMAIN
Cedar Hedge 2.0± Wide
WV
FH
JOB BENCHMARK #1
Top of Spindle of Fire Hydrant
Elevation=77.23
IB (WIT) (1144)
INV.=±72.57
PROP. 675mmø STORM MAIN@0.9%
EX. STMMH
T/G=76.84
NW INV=72.43
SW INV=72.48
0.09% Dia. Gasmain
EXISTING 250mmø SANITARY MAIN
EX. SANMH
T/G=76.90
SW INV=73.51
SE INV=73.42

CAUTION

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

PRELIMINARY
NOT FOR CONSTRUCTION

NO.	REVISION DESCRIPTION	DATE	BY	APPD
2	REVISED AS PER CITY COMMENTS	19/02/19	AE	AA
1	ISSUED FOR SITE APPLICATION	02/11/18	AE	AA

SCALE: 0 2m 4m 10m — HORIZONTAL 1:250
NORTH
DESIGNED BY
REVIEWED BY

CLIENT: KANATA MUSLIM ASSOCIATION
832 MARCH ROAD, OTTAWA, ON.
K2W 0C9
613.973.5000

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BASEPLAN	AE
DESIGN	–
CHECKED	AA
CAD	AE
PROJECT MANAGER	AA
APPROVED	AA

PROJECT: KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

PROJECT No.: OTT-00238504-A0
SURVEY: F M & W
DATE: 2018-08-20

TITLE: EXISTING CONDITIONS

DRAWING No.: EX

D07-12-17-0119

#17532

Filename: J:\Projects\civil engineering services\238000s\00238504\0 - kma mosque and community centre\40-execution\civil\ex-dwg\ex - existing conditions.dwg
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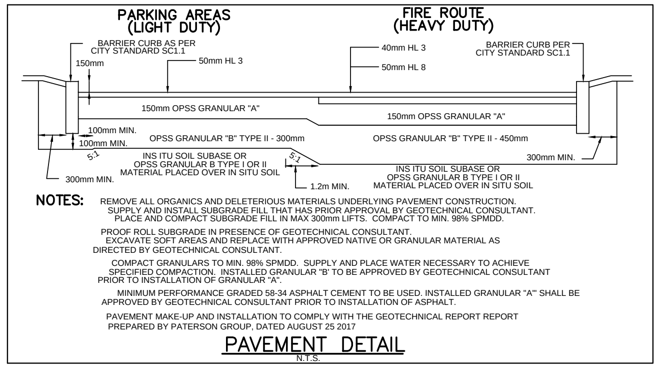
GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH exp SERVICES INC. PRIOR TO UTILIZATION.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE CONSULTANT IN WRITING.
5. CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWING SUPPLEMENTS WHERE APPLICABLE AND ONTARIO PROVINCIAL STANDARDS SHALL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.
6. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS.
7. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. REFER TO THE LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
9. FOR GEOTECHNICAL INFORMATION REFER TO THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.
10. ALL DISTURBED AREAS TO BE REINSTATED TO EQUAL OR BETTER CONDITION. ALL NEW WORK SHALL TIE INTO EXISTING.
11. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
12. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAWCUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
13. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS.
14. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO CITY OF OTTAWA AND OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
15. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
16. THE CONTRACTOR SHALL PROTECT ANY SUCH EXISTING SERVICES & FACILITIES. SUCH REQUIRED MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ENSURE ALL CONCERNED UTILITIES HAVE LOCATED THEIR PLANT PRIOR TO ANY EXCAVATING, LOCATE AND FLAG/PAINT THE LOCATIONS OF OTHER U/G PLANT WHICH MIGHT BE DAMAGED BY EXCAVATION AND CONSTRUCTION TRAFFIC, HAND DIG IN PROXIMITY TO EXISTING BURIED SERVICES TO LOCATE THEM WITHOUT ANY RESULTING DAMAGE, BRACE AND SUPPORT WHERE REQUIRED.
17. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES FOR THE PROTECTION OF THE AREA'S DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
18. DESIGN ELEVATIONS GIVEN ON THESE PLANS ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY exp SERVICES INC. SURFACE PONDING STORAGE VOLUMES AND INLET CONTROL DEVICE DIMENSIONS MUST COMPLY WITH THE DESIGN REPORT PREPARED BY exp SERVICES INC FOR THIS PROJECT.
19. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUND WATER IN A CONTROLLED AND APPROVED MANNER. THE CONTRACTOR SHALL APPLY FOR A PERMIT TO TAKE WATER FROM THE MINISTRY OF ENVIRONMENT IF MORE THAN 50,000 LITRES PER/DAY OF GROUNDWATER IS PUMPED FOR CONSTRUCTION ACTIVITIES.
20. FOR TOPOGRAPHICAL INFORMATION REFER TO PLAN PREPARED BY FAIRHALL MOFFATT & WOODLAND LTD. FOR LEGAL PROPERTY LINE DESCRIPTIONS.
21. CITY INSPECTOR IS TO NOTIFIED OF ANY WORKS IN THE ROW WITH SUFFICIENT NOTICE.
22. CLAY SEAL TO BE AS PER OPSD 802.095.
23. SHOULD ANY CONDITIONS AT THE SITE BE ENCOUNTERED WHICH DIFFER FROM THE TEST LOCATIONS IDENTIFIED IN THE GEOTECHNICAL REPORT, PATERSON'S GEOTECHNICAL ENGINEER IS TO BE NOTIFIED IMMEDIATELY IN ORDER TO PERMIT REASSESSMENT OF THE GEOTECHNICAL RECOMMENDATIONS.
24. REFER TO THE REDI-ROCK SEGMENTAL RETAINING WALL DESIGN FOR RETAINING WALL DETAILS PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.

ROADWAYS & CURBS

1. ASPHALT REINSTATEMENT AS PER CITY OF OTTAWA STANDARD DRAWING R10.
2. CURBS TO BE CONCRETE BARRIER CURBS AS PER CITY OF OTTAWA STANDARD DRAWING SC1.1.
3. THE CONTRACTOR SHALL COMPLETE ALL RESTORATION WITHIN CITY ROW's TO A CONDITION EQUAL TO ORIGINAL OR BETTER AND TO THE SATISFACTION OF THE MUNICIPAL AUTHORITIES.



NOTES: REMOVE ALL ORGANICS AND DELETERIOUS MATERIALS UNDERLYING PAVEMENT CONSTRUCTION. SUPPLY AND INSTALL SUBGRADE FILL THAT HAS PRIOR APPROVAL BY GEOTECHNICAL CONSULTANT. PLACE AND COMPACT SUBGRADE FILL IN MAX 300mm LIFTS. COMPACT TO MIN. 98% SPMDD.

PROOF ROLL SUBGRADE IN PRESENCE OF GEOTECHNICAL CONSULTANT. EXCAVATE SOFT AREAS AND REPLACE WITH APPROVED NATIVE OR GRANULAR MATERIAL AS DIRECTED BY GEOTECHNICAL CONSULTANT.

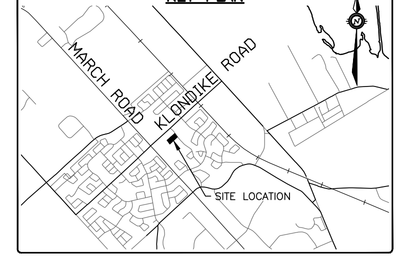
COMPACT GRANULARS TO MIN. 98% SPMDD. SUPPLY AND PLACE WATER NECESSARY TO ACHIEVE SPECIFIED COMPACTION. INSTALLED GRANULAR "B' TO BE APPROVED BY GEOTECHNICAL CONSULTANT PRIOR TO INSTALLATION OF GRANULAR "A".

MINIMUM PERFORMANCE GRADED 58-34 ASPHALT CEMENT TO BE USED. INSTALLED GRANULAR "A"' SHALL BE APPROVED BY GEOTECHNICAL CONSULTANT PRIOR TO INSTALLATION OF ASPHALT.

PAVEMENT MAKE-UP AND INSTALLATION TO COMPLY WITH THE GEOTECHNICAL REPORT REPORT PREPARED BY PATERSON GROUP, DATED AUGUST 25 2017

PAVEMENT DETAIL
N.T.S.

KEY PLAN



LEGEND

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- IB – IRON BAR
- CB – CATCH BASIN
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- WMH – WATER MANHOLE
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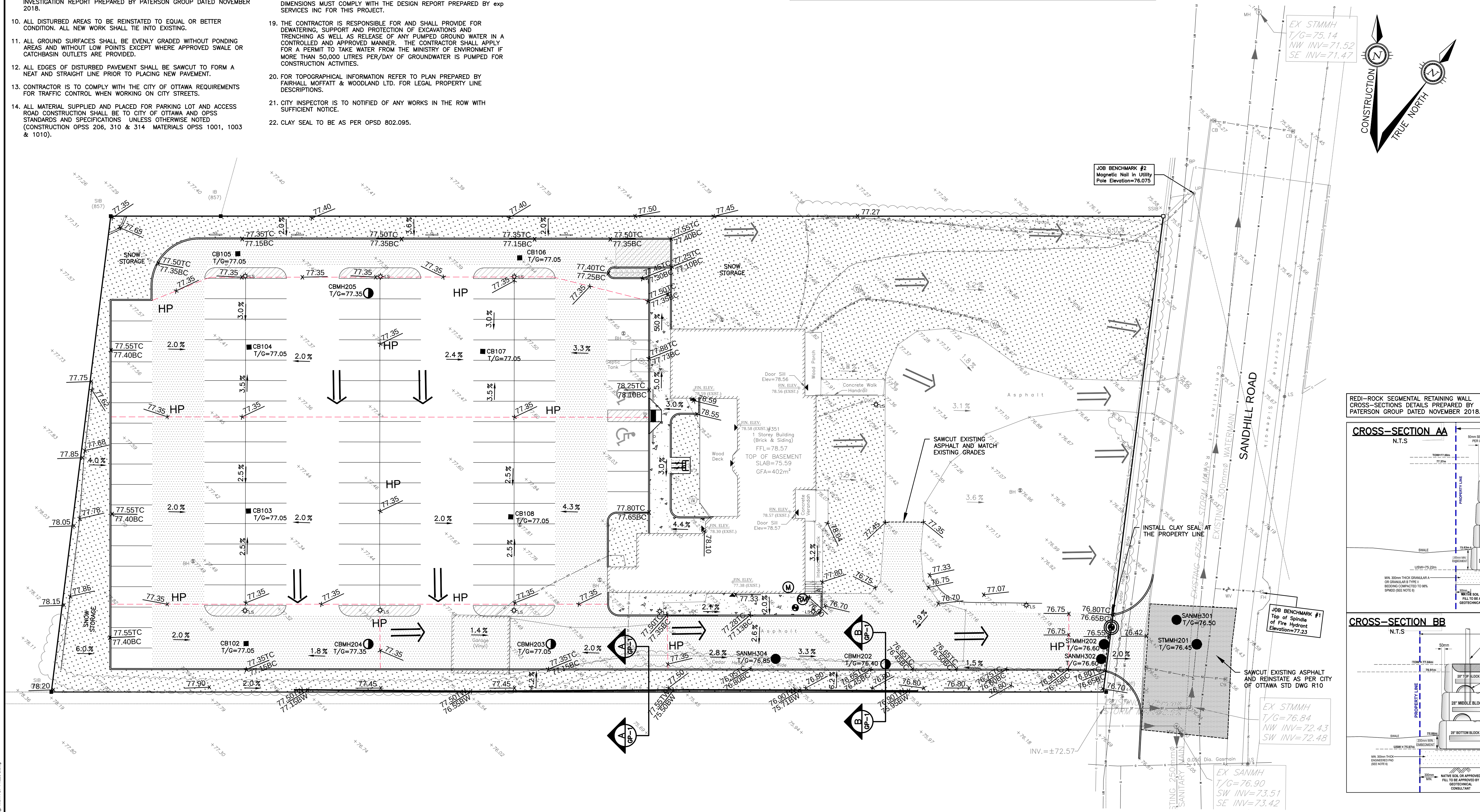
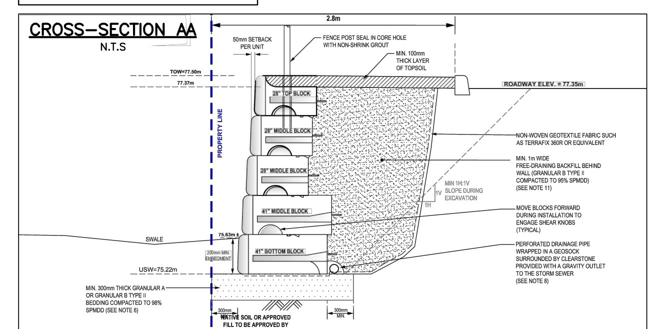
- WV – WATER VALVE
- FH – FIRE HYDRANT
- WELL
- GUY WIRE AND ANCHOR
- —W— – WATERMAIN
- OVERHEAD UTILITY WIRES
- —UH— – UNDERGROUND HYDRO
- —UB— – UNDERGROUND BELL
- —G— – GAS MAIN
- —C— – CABLE (ROGERS)
- —SL— – STREET LIGHT
- —ST— – STORM SEWER
- —S— – SANITARY SEWER
- CURB
- PROPOSED CURB
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED CLAY SEAL AT 60m INTERVALS
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN
- PROPOSED FIRE HYDRANT
- V&VB – PROPOSED VALVE & VALVE BOX
- PROPOSED SIAMESE CONNECTION
- V&VC – PROPOSED VALVE & VALVE CHAMBER
- M – PROPOSED WATER METER
- RM – PROPOSED REMOTE WATER METER
- LS – PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- 76.18 – EXISTING ELEVATION
- PROPOSED HEAVY DUTY PAVEMENT
- PROPOSED LIGHT DUTY PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- HP – HIGH POINT
- OVERLAND FLOW DIRECTION

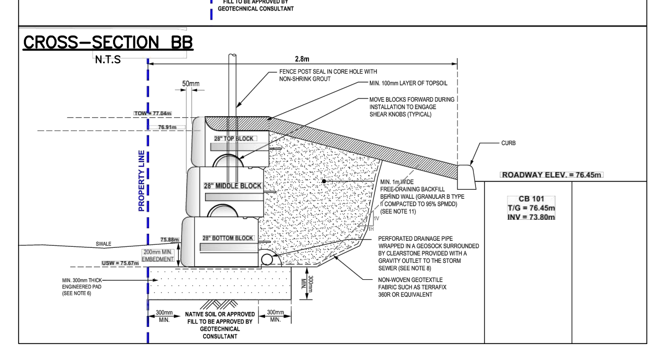


REDI-ROCK SEGMENTAL RETAINING WALL CROSS-SECTIONS DETAILS PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.

CROSS-SECTION AA
N.T.S



CROSS-SECTION BB
N.T.S



CAUTION
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PRELIMINARY
NOT FOR CONSTRUCTION

NO.	REVISION DESCRIPTION	DATE	BY	APPD
4	REVISED AS PER CITY COMMENTS	19/02/19	AE	AA
3	REVISED AS PER CITY COMMENTS	02/11/18	AE	AA
2	ISSUED FOR SITE PLAN APPROVAL	29/06/18	AE	AA
1	ISSUED FOR SITE PLAN APPROVAL	13/09/17	ML	AA

SCALE: 0 2m 4m 10m HORIZONTAL 1:250
NORTH
DESIGNED BY
REVIEWED BY

CLIENT
KANATA MUSLIM ASSOCIATION
832 MARCH ROAD, OTTAWA, ON.
K2W 0C9
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BASEPLAN ML | DESIGN ML | CHECKED AA | CAD ML | PROJECT MANAGER AA | APPROVED AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE
GRADING PLAN
PHASE 1

PROJECT No. OTT-00238504-A0
SURVEY F M & W
DATE 2016-12-09
DRAWING No. GP-1

D07-12-17-0119

#17532

Filename: p:\projects\civil engineering services\238000\ott-00238504-a0 - kma mosque and community centre\60-execution\64-dwg\ssgp-phase 1.dwg
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Pen Table: exp-64.ctb
References: xref-TOPO-AOV-PH1.dwg; xref-Keyplan.dwg; xref-A-SP-Phase 1.dwg

WATERMAIN

1. ALL WATERMAIN AND WATER SERVICE MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS.
2. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m. THERMAL INSULATION SHALL BE INSTALLED WHERE ADEQUATE SEPARATION CANNOT BE ACHIEVED AS PER CITY STANDARD W21, W22 AND W23.
3. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF OTTAWA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
4. WATERMAIN IS TO BE PVC DR18 WITH TRACER WIRE AS PER CITY OF OTTAWA STANDARD W36 UNLESS OTHERWISE NOTED.
5. VALVE BOXES AS PER CITY OF OTTAWA DETAIL W24.
6. ALL FIRE HYDRANTS TO BE INSTALLED AS PER CITY STANDARD W19 AND LOCATED AS PER CITY STANDARD W18 AND/OR CITY STANDARD CROSS SECTIONS.
7. WATERMAIN BEDDING IS TO BE AS PER CITY OF OTTAWA DETAIL W17.
8. THRUST BLOCKS AND RESTRAINT AS PER CITY OF OTTAWA DWGS: W25.3, W25.4, W25.5 AND W25.6.
9. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DWGS: W39, W40, W41.
10. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
11. DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
12. WATER SERVICES TO BE INSTALLED AS PER CITY OF OTTAWA STANDARD W26 AND W35.
13. WITHIN THE FROST ZONE, THE BACKFILL IN THE SERVICE TRENCHES SHOULD MATCH THE SOIL ON SIDES TO MINIMIZE DIFFERENTIAL FROST HEAVING IN THE SUBGRADE.
14. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
15. GATE VALVE TO BE INSTALLED INSIDE THE WATER ROOM OF THE EXISTING BUILDING FOR THE PHASE 2 WATER SUPPLY AND SHALL REMAIN CLOSED UNTIL PHASE 2 IS COMMISSIONED TO ENSURE NO STAGNANT WATER RESIDES WITHIN THE SERVICE STUB.

STORM AND SANITARY SEWERS

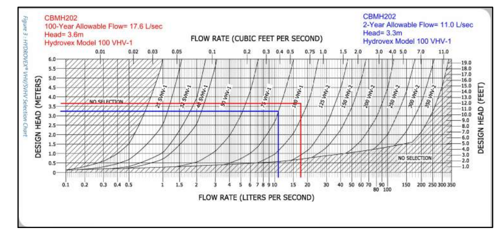
1. SANITARY AND STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS AND OPSS 407 AND 410.
2. SEWER BEDDING AS PER CITY STANDARD S6 & S7.
3. ALL SANITARY SEWERS ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35.
4. ALL STORM SEWERS ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35 OR REINFORCED CONCRETE IN ACCORDANCE WITH CSA STANDARDS A257.2 AND A257.3 (JOINTS).
5. ALL MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORIZONTAL THICKNESS GRANULAR 'A'.
6. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS AND PROVIDE TEMPORARY CAPS.
7. THE CONTRACTOR SHALL CONDUCT INFILTRATION/EXFILTRATION (AS PER CURRENT OPSS) TESTING ON ALL NEWLY INSTALLED SANITARY SEWERS. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWER INSTALLATION AND SUPERVISED BY THE ENGINEER.
8. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM AND SANITARY SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED AND SUPERVISED BY THE ENGINEER.
9. ALL SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER CITY STANDARD S11 & S11.1.
10. ALL SANITARY BUILDING DRAINS TO BE EQUIPPED WITH SANITARY BACKWATER VALVES INSTALLED PER CITY OF OTTAWA STANDARD DRAWING S14.1.
11. MINIMUM SOIL COVER TO BE 2.0M TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE COVER CANNOT BE ACHIEVED, THERMAL INSULATION TO BE INSTALLED AS PER OPSD 514.010.
12. SUBDRAINS LOCATED IN THE AREA OF PAVEMENT SHALL HAVE INVERTS APPROXIMATELY 300mm BELOW THE SUBGRADE LEVEL AS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.

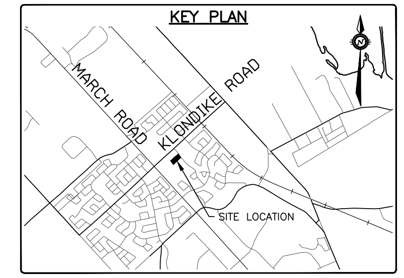
STRUCTURE TABLE

STRUCTURE LABEL	SIZE	STRUCTURE OPSD No. OR CITY STD DWG	FRAME OPSD No. OR CITY STD DWG
SANMH 301	1200mmØ	701.010	401.010-A
SANMH 302	1200mmØ	701.010	401.010-A
SANMH 303	1200mmØ	701.010	401.010-A
CBs	600mm x 600mm 1800mmØ	705.010 701.010	400.020 401.010-B
STMMH 201	1200mmØ	701.010	401.010-B
STMMH 202	1200mmØ	701.010	401.010-B
CBMH 202	1200mmØ	701.010	401.010-B
CBMH 203	1200mmØ	701.010	401.010-B
CBMH 204	1200mmØ	701.010	401.010-B
CBMH 205	1200mmØ	701.010	401.010-B

WATERMAIN TABLE

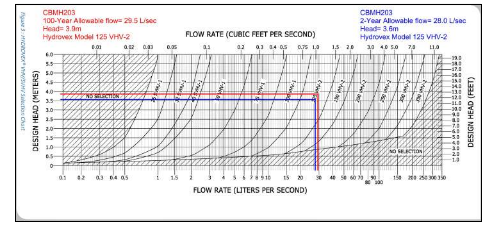
STATION	FIN/GRADE	T/W GRADE	COMMENT
0+000	76.45	74.05	TIE INTO EXISTING WATERMAIN ON SANDHILL RD
0+001.6	76.45	74.05	STM CROSSING
0+004.2	76.45	74.23	SAN CROSSING
0+012.5	76.51	73.50	VALVE AND VALVE BOX
0+016.9	76.60	73.30	THRUST BLOCK
0+022.6	76.60	73.14	SAN CROSSING
0+024.2	76.54	73.53	STM CROSSING
0+025.2	76.53	73.49	STM CROSSING
0+035	76.60	73.60	TOP OF WATERMAIN
0+045	76.60	73.80	TOP OF WATERMAIN
0+051.7	76.70	74.00	THRUST BLOCK AND 45° BEND
0+053.2	76.75	74.00	THRUST BLOCK AND 45° BEND
0+055.1	76.90	74.00	WM CAPPED





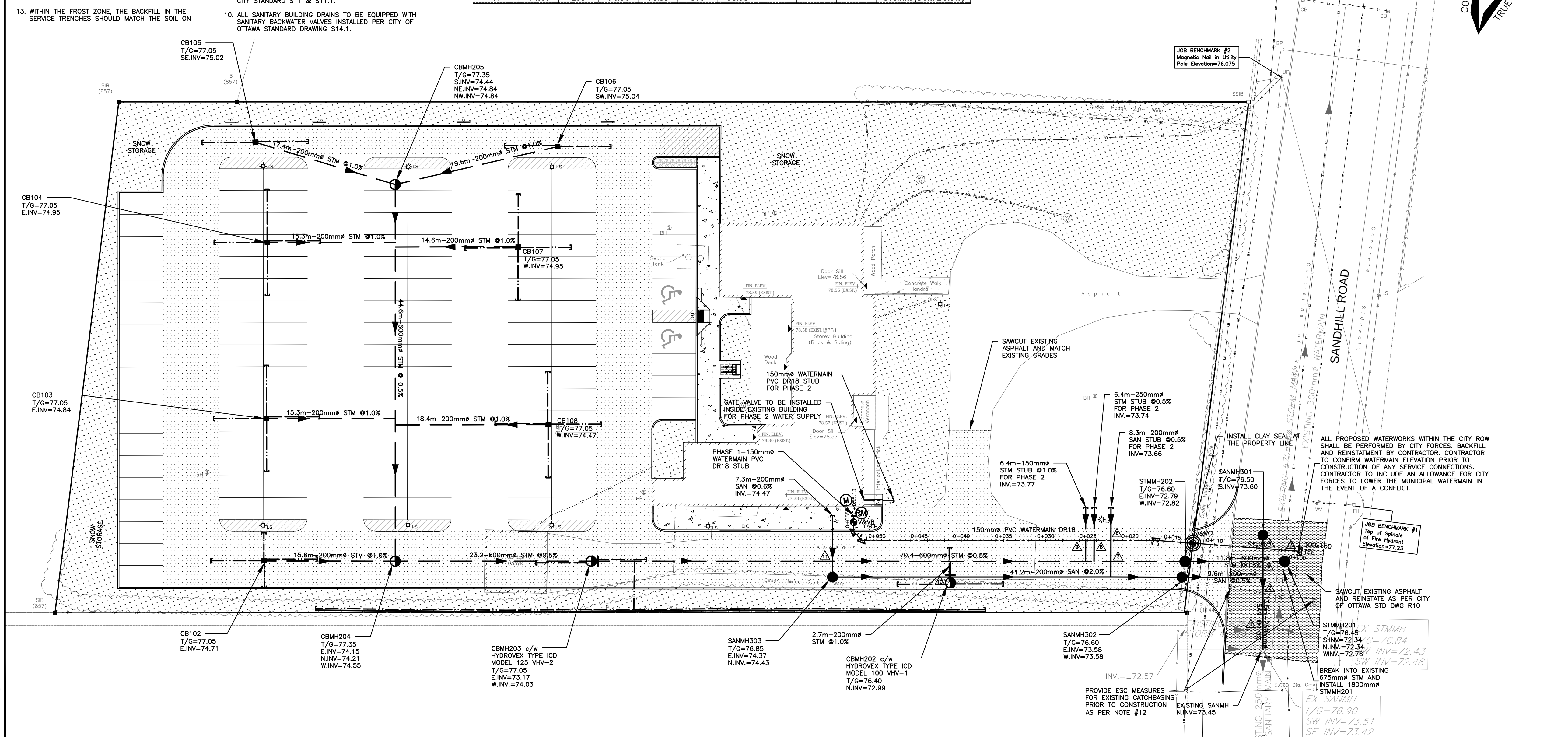
WATERMAIN / SEWER CROSSING TABLE

LOCATION	SANITARY SEWER Invert Elev	SANITARY SEWER Dia. (mm)	SANITARY SEWER Obvert Elev	STORM SEWER Invert Elev	STORM SEWER Dia. (mm)	STORM SEWER Obvert Elev	WATERMAIN Invert Elev	WATERMAIN Dia. (mm)	WATERMAIN Obvert Elev	CLEARANCES (mm)
1	73.46	250	73.71	72.65	675	73.33				130mm (STM Below)
2	73.49	250	73.74	72.39	250	72.64				850mm (STM Below)
3				72.33	675	73.01	73.90	150	74.05	890mm (STM Below)
4	73.58	250	73.83				74.08	150	74.23	250mm (SAN Below)
5	73.55	250	73.80	72.77	600	73.37				180mm(STM Below)
6	73.64	200	73.84				72.99	150	73.14	500mm (WM Below)
7	73.63	200	73.83	72.86	600	73.46				170mm (STM Below)
8				72.88	250	73.13	73.38	150	73.53	250mm (STM Below)
9				72.89	200	73.09	73.34	150	73.49	250mm (STM Below)
10	73.83	200	74.03	73.00	200	73.20				630mm (STM Below)
11	74.44	200	74.64	73.03	600	73.63				810mm (STM Below)



LEGEND

- SIB – STANDARD IRON BAR
- IB – IRON BAR
- CB – CATCH BASIN
- MH – MANHOLE
- WMH – WATER MANHOLE
- LS – LAMP STANDARD
- UP – UTILITY POLE
- WV – WATER VALVE
- FH – FIRE HYDRANT
- WELL
- GUY WIRE AND ANCHOR
- —W— – WATERMAIN
- OVERHEAD UTILITY WIRES
- —UH— – UNDERGROUND HYDRO
- —UB— – UNDERGROUND BELL
- —G— – GAS MAIN
- —C— – CABLE (ROGERS)
- —SL— – STREET LIGHT
- —ST— – STORM SEWER
- —S— – SANITARY SEWER
- CURB
- PROPOSED CURB
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED CLAY SEAL AT 60m INTERVALS
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN
- PROPOSED FIRE HYDRANT
- V&VB – PROPOSED VALVE & VALVE BOX
- PROPOSED SIAMESE CONNECTION
- V&VC – PROPOSED VALVE & VALVE CHAMBER
- M – PROPOSED WATER METER
- RM – PROPOSED REMOTE WATER METER
- LS – PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- 76.18 – EXISTING ELEVATION
- PROPOSED HEAVY DUTY PAVEMENT
- PROPOSED LIGHT DUTY PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- PROPOSED SUBDRAIN



CAUTION
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PRELIMINARY
NOT FOR CONSTRUCTION

NO.	REVISION DESCRIPTION	DATE	BY	APPD
5	REVISED AS PER CITY COMMENTS	19/02/19	AE	AA
4	REVISED AS PER CITY COMMENTS	02/11/18	AE	AA
3	ISSUED FOR COORDINATION	03/10/18	AE	AA
2	ISSUED FOR SITE PLAN APPROVAL	29/06/18	AE	AA
1	ISSUED FOR SITE PLAN APPROVAL	13/09/17	ML	AA

SCALE: 0 2m 4m 10m HORIZONTAL 1:250
NORTH
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REVIEWED BY

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BASEPLAN: ML
DESIGN: ML
CHECKED: AA
CAD: ML
PROJECT MANAGER: AA
APPROVED: AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE
SITE SERVICING
PHASE 1

PROJECT No.: OTT–00238504–A0
SURVEY: F M & W
DATE: 2016–12–09
DRAWING No.: SS–1

D07-12-17-0119

#17532

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PHASE 1 STORMWATER MANAGEMENT SUMMARY

Area ID	Area (ha)	Runoff Coefficient 'C'	2 Year Release (L/s)	2 Year storage required (m^3)	2 Year underground storage provided (m^3)	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m^3)
PH1A	0.486	0.79	28.0	34.3	35.1	29.5	168.3	193.5
PH1B	0.088	0.73	11.0	0.0	0.0	17.6	12.7	25.3
TOTAL	0.57							
		Totals:	39.0	34.3	35.1	47.1	180.9	218.8

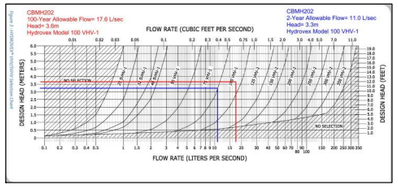
Total Allowable Release (L/s): 48.74

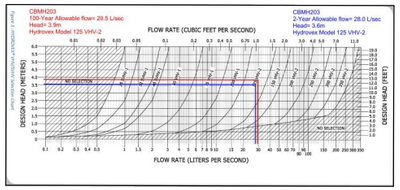
PH1A – 100 YEAR SURFACE STORAGE VOLUMES

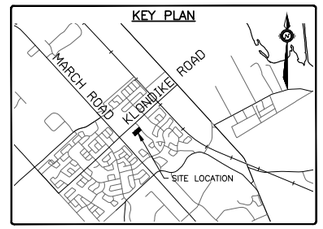
Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CB102	132	0.30	13.2
CB103	368.00	0.30	36.8
CB104	342.00	0.30	34.2
CB105	86.0	0.30	8.6
CB106	82.0	0.30	8.2
CB107	309.0	0.30	30.9
CB108	401.0	0.30	40.1
CBMH203	184	0.35	21.5
		Total Volume	*193.5*

PH1B – 100 YEAR SURFACE STORAGE VOLUMES

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CBMH202	217	0.35	25.3
		Total Volume	*25.3*

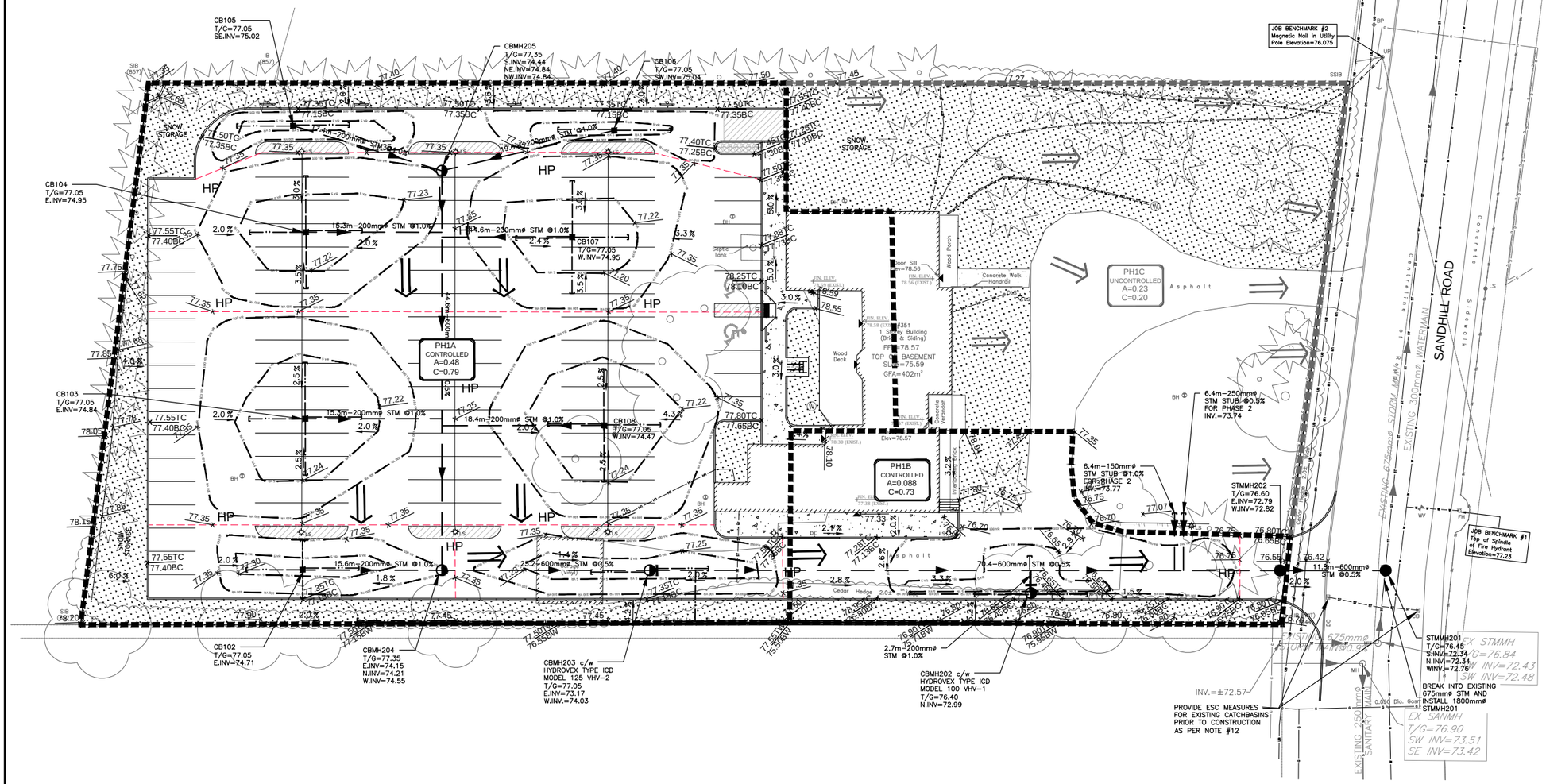






LEGEND

- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN
- LS – PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- A1 / C=0.90 / A=0.034 – DRAINAGE AREA ID, RUNOFF COEFFICIENT, AREA (ha)
- OVERLAND FLOW DIRECTION
- PARKING LOT PONDING AREAS 100 YEAR LIMIT
- PARKING LOT PONDING AREAS 5 YEAR LIMIT



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2	ISSUED FOR SITE PLAN APPROVAL	29/06/18	AE	AA
1	ISSUED FOR SITE PLAN APPROVAL	13/09/17	ML	AA

SCALE: 0 2m 4m 10m — HORIZONTAL 1:250

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• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

BASEPLAN	ML
DESIGN	ML
CHECKED	AA
CAD	ML
PROJECT MANAGER	AA
APPROVED	AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE
STORMWATER MANAGEMENT PLAN
PHASE 1

PROJECT No.	OTT-00238504-A0
SURVEY	F M & W
DATE	2016-12-09
DRAWING No.	SWM–1

#17532

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Xrefs: ex-topo.dwg
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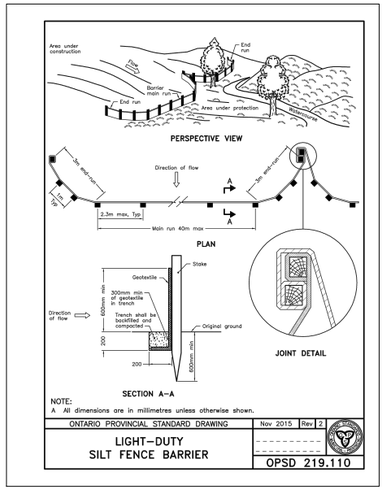
DO7-12-17-0019

EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION.

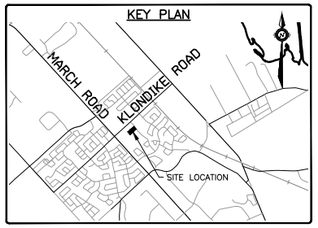
DURING ALL CONSTRUCTION ACTIVITIES, EROSION AND SEDIMENTATION SHALL BE CONTROLLED BY THE FOLLOWING TECHNIQUES:

1. LIMITING THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
2. RE-VEGETATION OF EXPOSED AREAS AS SOON AS POSSIBLE.
3. MINIMIZING THE AREA TO BE CLEARED AND DISRUPTION TO ADJACENT AREAS.
4. A SILT FENCE BARRIER (OPSD 219.110) TO BE INSTALLED AS SHOWN ON THIS DRAWING.
5. A VISUAL INSPECTION SHALL BE COMPLETED DAILY ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY. CARE WILL BE TAKEN TO PREVENT DAMAGE DURING CONSTRUCTION OPERATIONS.
6. IN SOME CASES SOME BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS WILL BE REINSTATED AT NIGHT WHEN CONSTRUCTION IS COMPLETED.
7. THE SEDIMENT CONTROL DEVICES WILL BE CLEANED OF ACCUMULATED SILT AS REQUIRED. THE DEPOSITS WILL BE DISPOSED OF AS PER THE REQUIREMENTS OF THE CONTRACT.
8. DURING THE COURSE OF CONSTRUCTION IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR WILL INSTALL ADDITIONAL SILT FENCES OR OTHER METHODS AS REQUIRED TO THE SATISFACTION OF THE ENGINEER.
9. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS TO COMPLY WITH ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) OPSS 805, AND CITY OF OTTAWA SPECIFICATIONS.
10. MUD MATT TO BE LOCATED AT THE CONSTRUCTION ENTRANCE, AS INDICATED ON THE PLAN, AND SHALL BE INSTALLED AS PER THE MUD MATT DETAIL TO PREVENT MUD TRACKING ON TO MUNICIPAL ROADS. THE ENTRANCE SHALL BE MAINTAINED IN CLEAN CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
11. EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED ON-SITE AT THE DISCRETION OF THE CITY OF OTTAWA INSPECTOR OR THE MISSISSIPPI VALLEY CONSERVATION AUTHORITY. CONTRACTOR IS RESPONSIBLE TO INSTALL MODIFICATIONS AS REQUIRED TO THE SATISFACTION OF THE APPROPRIATE AUTHORITIES.
12. IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL, GEOSYNTHETIC SYSTEMS SILTSACK OR APPROVED EQUIVALENT IS TO BE PLACED INSIDE ALL STORM MANHOLE CATCHBASINS AND CATCHBASINS. INSTALLATION, INSPECTION AND CLEANOUT ARE AS PER MANUFACTURER'S RECOMMENDATIONS.



SILT FENCE NOTES:

1. POSTS TO BE SPACED AT 2.3 METRES CENTRE TO CENTRE.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY A MINIMUM OF 500mm.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
4. WOOD POSTS TO BE HARDWOOD TYPE (50mm x 50mm).
5. GEOTEXTILE TO BE EMBEDED 200 mm INTO GROUND.
6. GEOTEXTILE TO CONFORM TO OPSS 805 STANDARDS.
7. SILT FENCE MUST BE INSTALLED BEFORE COMMENCEMENT OF CONSTRUCTION AND IN ACCORDANCE WITH DETAIL. SILT FENCE CAN BE REMOVED AFTER LANDSCAPING IS COMPLETE.
8. SEDIMENTS MUST BE CLEARED AWAY WHEN THEY REACH HALF THE HEIGHT OF THE FENCE.



LEGEND

- SIB – STANDARD IRON BAR
- IB – IRON BAR
- CB – CATCH BASIN
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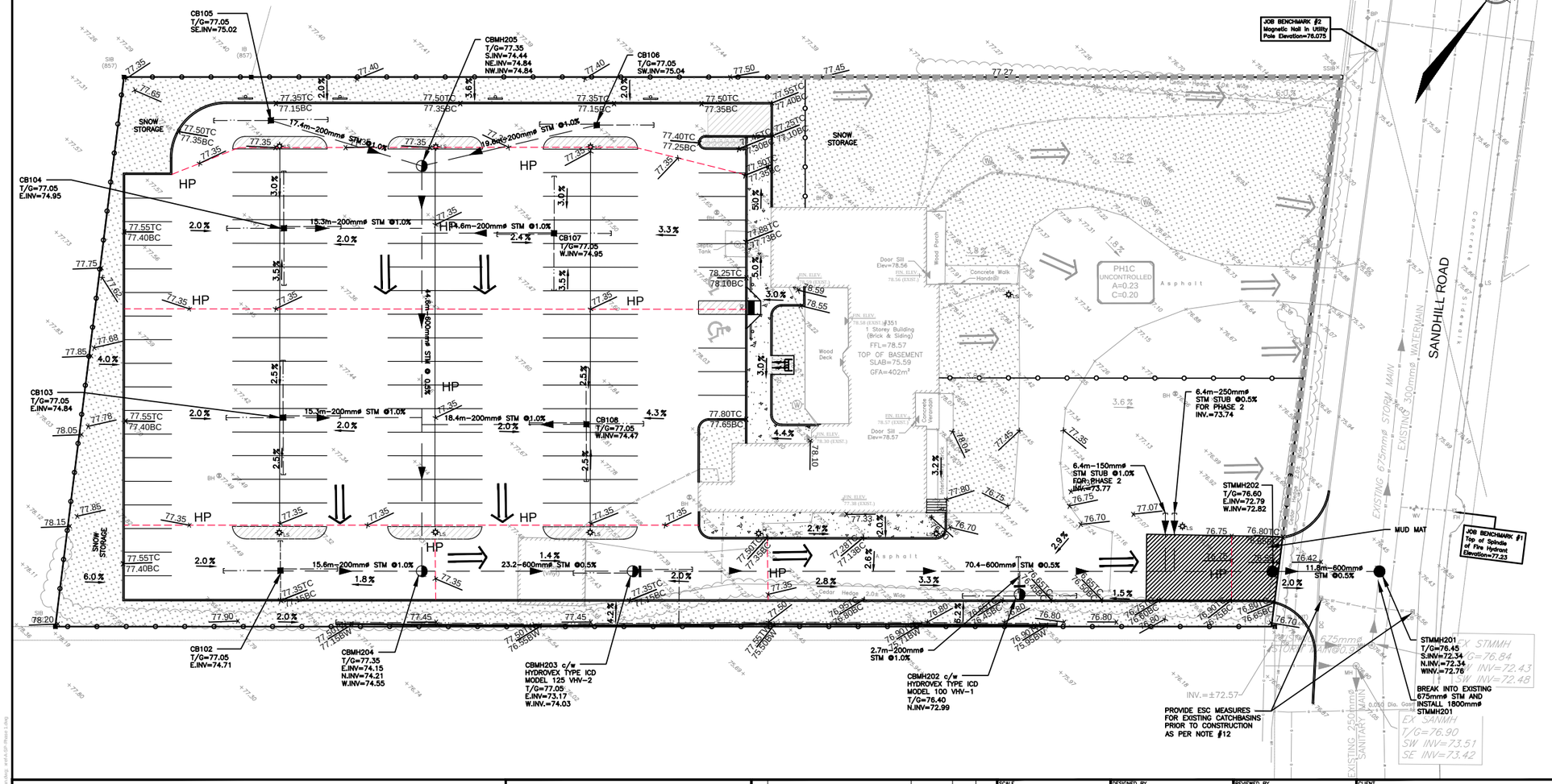
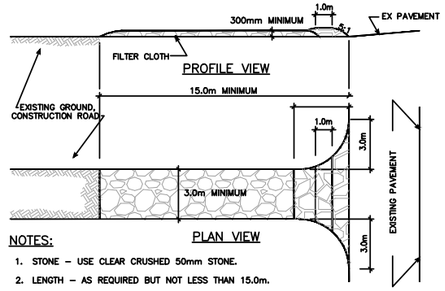
- WMH – WATER MANHOLE
- LS – LAMP STANDARD
- UP – UTILITY POLE
- WV – WATER VALVE
- FH – FIRE HYDRANT
- W – WELL
- – GUY WIRE AND ANCHOR
- WM – WATERMAIN
- OH – OVERHEAD UTILITY WIRES
- UH – UNDERGROUND HYDRO
- UB – UNDERGROUND BELL
- G – GAS MAIN
- C – CABLE (ROGERS)
- SL – STREET LIGHT
- ST – STORM SEWER
- S – SANITARY SEWER
- CURB
- PROPOSED CURB
- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- LS – PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- – EXISTING ELEVATION
- PROPOSED SILT FENCE





NOTES:

1. STONE – USE CLEAR CRUSHED 50mm STONE.
2. LENGTH – AS REQUIRED BUT NOT LESS THAN 15.0m.
3. THICKNESS – NOT LESS THAN 300mm.
4. WIDTH – 3.0m MINIMUM, NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRED PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

MUD MAT DETAIL

N.T.S

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3	REVISED AS PER CITY COMMENTS	02/11/18	AE	AA
2	ISSUED FOR SITE PLAN APPROVAL	29/06/18	AE	AA
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SCALE: 0 2m 4m 10m — HORIZONTAL 1:250
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BASEPLAN	ML
DESIGN	ML
CHECKED	AA
CAD	ML
PROJECT MANAGER	AA
APPROVED	AA

PROJECT: KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE: EROSION & SEDIMENT CONTROL PLAN
PHASE 1

PROJECT No.	OTT-00238504-A0
SURVEY	F M & W
DATE	2016-12-09
DRAWING No.	ESCP-1

#17532

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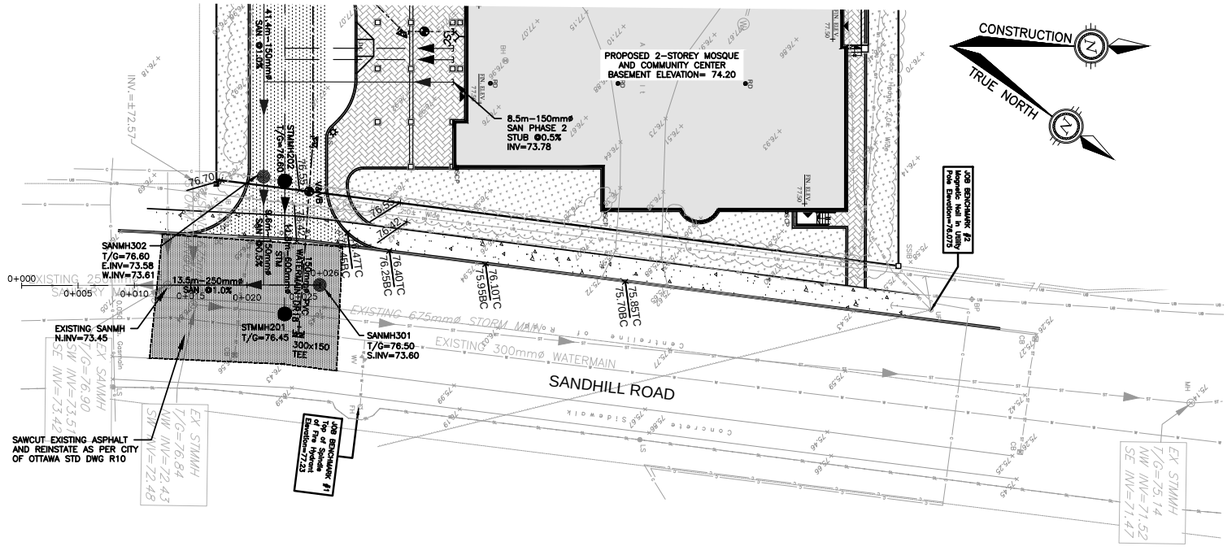
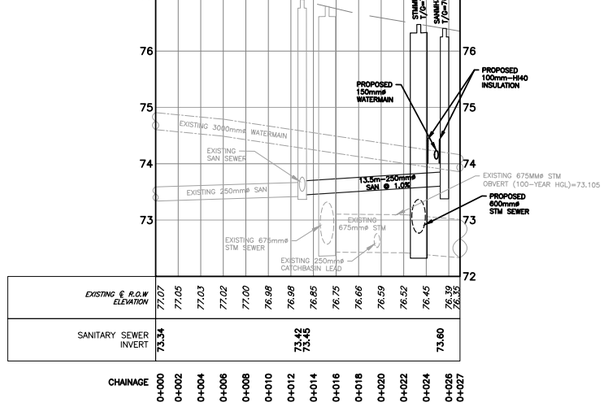
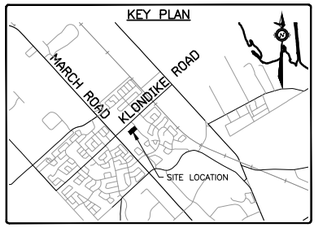
D07-12-17-0019





SANDHILL ROAD SANITARY EXTENSION

SCALE: HORIZ 1:250 VERT 1:50



LEGEND

- STANDARD IRON BAR
- IRON BAR
- CATCH BASIN
- MANHOLE
- WATER MANHOLE
- LAMP STANDARD
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- WATER VALVE
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- PROPOSED STORM MANHOLE
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1	ISSUED FOR SITE APPLICATION	02/11/18	AE	AA

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BASEPLAN	AE
DESIGN	AE
CHECKED	AA
CAD	AE
PROJECT MANAGER	AA
APPROVED	AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE
MUNICIPAL SANITARY EXTENSION
PLAN AND PROFILE

PROJECT No.	OTT-00238504-A0
SURVEY	F M & W
DATE	2018-11-12
DRAWING No.	PP

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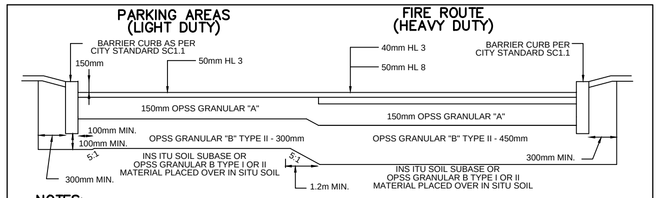
GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH exp SERVICES INC. PRIOR TO UTILIZATION.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE CONSULTANT IN WRITING.
5. CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWING SUPPLEMENTS WHERE APPLICABLE AND ONTARIO PROVINCIAL STANDARDS SHALL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.
6. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS.
7. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. REFER TO THE LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
9. FOR GEOTECHNICAL INFORMATION REFER TO THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.
10. ALL DISTURBED AREAS TO BE REINSTATED TO EQUAL OR BETTER CONDITION. ALL NEW WORK SHALL TIE INTO EXISTING.
11. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
12. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAWCUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
13. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS.
14. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO CITY OF OTTAWA AND OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
15. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
16. THE CONTRACTOR SHALL PROTECT ANY SUCH EXISTING SERVICES & FACILITIES. SUCH REQUIRED MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ENSURE ALL CONCERNED UTILITIES HAVE LOCATED THEIR PLANT PRIOR TO ANY EXCAVATING, LOCATE AND FLAG/PAINT THE LOCATIONS OF OTHER U/G PLANT WHICH MIGHT BE DAMAGED BY EXCAVATION AND CONSTRUCTION TRAFFIC, HAND DIG IN PROXIMITY TO EXISTING BURIED SERVICES TO LOCATE THEM WITHOUT ANY RESULTING DAMAGE, BRACE AND SUPPORT WHERE REQUIRED.
17. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES FOR THE PROTECTION OF THE AREA'S DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
18. DESIGN ELEVATIONS GIVEN ON THESE PLANS ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY exp SERVICES INC. SURFACE PONDING STORAGE VOLUMES AND INLET CONTROL DEVICE DIMENSIONS MUST COMPLY WITH THE DESIGN REPORT PREPARED BY exp SERVICES INC FOR THIS PROJECT.
19. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUND WATER IN A CONTROLLED AND APPROVED MANNER. THE CONTRACTOR SHALL APPLY FOR A PERMIT TO TAKE WATER FROM THE MINISTRY OF ENVIRONMENT IF MORE THAN 50,000 LITRES PER/DAY OF GROUNDWATER IS PUMPED FOR CONSTRUCTION ACTIVITIES.
20. FOR TOPOGRAPHICAL INFORMATION REFER TO PLAN PREPARED BY FAIRHALL MOFFATT & WOODLAND LTD. FOR LEGAL PROPERTY LINE DESCRIPTIONS.
21. CITY INSPECTOR IS TO NOTIFIED OF ANY WORKS IN THE ROW WITH SUFFICIENT NOTICE.
22. CLAY SEAL TO BE AS PER OPSD 802.095.
23. SHOULD ANY CONDITIONS AT THE SITE BE ENCOUNTERED WHICH DIFFER FROM THE TEST LOCATIONS IDENTIFIED IN THE GEOTECHNICAL REPORT, PATERSON'S GEOTECHNICAL ENGINEER IS TO BE NOTIFIED IMMEDIATELY IN ORDER TO PERMIT REASSESSMENT OF THE GEOTECHNICAL RECOMMENDATIONS.
24. REFER TO THE REDI-ROCK SEGMENTAL RETAINING WALL DESIGN FOR RETAINING WALL DETAILS PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.

ROADWAYS & CURBS

1. ASPHALT REINSTATEMENT AS PER CITY OF OTTAWA STANDARD DRAWING R10.
2. CURBS TO BE CONCRETE BARRIER CURBS AS PER CITY OF OTTAWA STANDARD DRAWING SC1.1.
3. THE CONTRACTOR SHALL COMPLETE ALL RESTORATION WITHIN CITY ROW's TO A CONDITION EQUAL TO ORIGINAL OR BETTER AND TO THE SATISFACTION OF THE MUNICIPAL AUTHORITIES.
4. THE EXISTING PRIVATE APPROACH IS TO BE REMOVED AS PART OF PHASE 2 WORK. RIGHT-OF-WAY TO BE REINSTATED TO THE SATISFACTION OF THE CITY OF OTTAWA.



NOTES: REMOVE ALL ORGANICS AND DELETERIOUS MATERIALS UNDERLYING PAVEMENT CONSTRUCTION. SUPPLY AND INSTALL SUBGRADE FILL THAT HAS PRIOR APPROVAL BY GEOTECHNICAL CONSULTANT. PLACE AND COMPACT SUBGRADE FILL IN MAX 300mm LIFTS. COMPACT TO MIN. 98% SPMDD.

PROOF ROLL SUBGRADE IN PRESENCE OF GEOTECHNICAL CONSULTANT. EXCAVATE SOFT AREAS AND REPLACE WITH APPROVED NATIVE OR GRANULAR MATERIAL AS DIRECTED BY GEOTECHNICAL CONSULTANT.

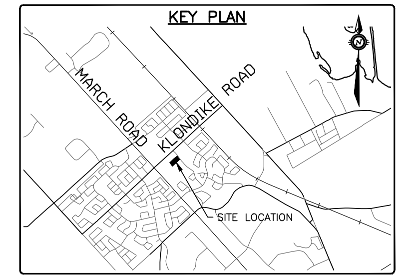
COMPACT GRANULARS TO MIN. 98% SPMDD. SUPPLY AND PLACE WATER NECESSARY TO ACHIEVE SPECIFIED COMPACTION. INSTALLED GRANULAR "B' TO BE APPROVED BY GEOTECHNICAL CONSULTANT PRIOR TO INSTALLATION OF GRANULAR "A".

MINIMUM PERFORMANCE GRADED 58-34 ASPHALT CEMENT TO BE USED. INSTALLED GRANULAR "A" SHALL BE APPROVED BY GEOTECHNICAL CONSULTANT PRIOR TO INSTALLATION OF ASPHALT.

PAVEMENT MAKE-UP AND INSTALLATION TO COMPLY WITH THE GEOTECHNICAL REPORT REPORT PREPARED BY PATERSON GROUP, DATED AUGUST 25 2017

PAVEMENT DETAIL
N.T.S.

KEY PLAN



LEGEND

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- IB – IRON BAR
- CB – CATCH BASIN
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- WMH – WATER MANHOLE
- LS – LAMP STANDARD
- UP – UTILITY POLE
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- WELL
- GUY WIRE AND ANCHOR
- —W— – WATERMAIN
- OVERHEAD UTILITY WIRES
- —UH— – UNDERGROUND HYDRO
- —UB— – UNDERGROUND BELL
- —G— – GAS MAIN
- —C— – CABLE (ROGERS)
- —SL— – STREET LIGHT
- —ST— – STORM SEWER
- —S— – SANITARY SEWER
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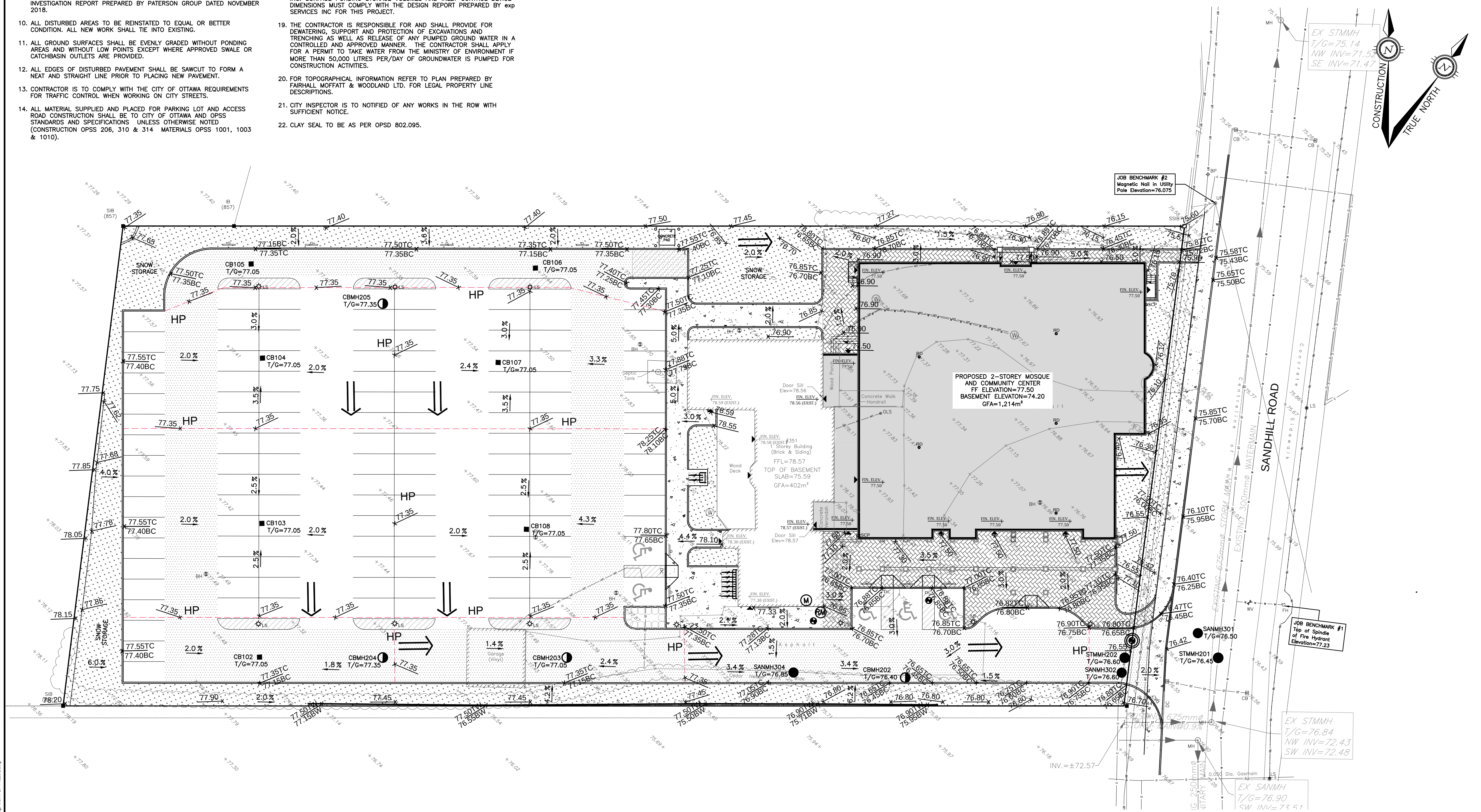
- 76.40 – PROPOSED ELEVATION
- 77.27 – EXISTING ELEVATION
- PROPOSED HEAVY DUTY PAVEMENT
- PROPOSED LIGHT DUTY PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- HP – HIGH POINT
- OVERLAND FLOW DIRECTION



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

PRELIMINARY
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SCALE 0 2m 4m 10m HORIZONTAL 1:250

NORTH

DESIGNED BY

REVIEWED BY

CLIENT
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APPROVED AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE
GRADING PLAN
PHASE 2

PROJECT No. OTT-00238504-A0
SURVEY F M & W
DATE 2016-12-09
DRAWING No. GP-2

D07-12-17-0119

#17532

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WATERMAIN

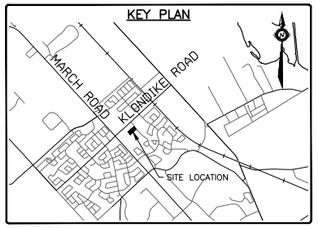
1. ALL WATERMAIN AND WATER SERVICE MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS.
2. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m. THERMAL INSULATION SHALL BE INSTALLED WHERE ADEQUATE SEPARATION CANNOT BE ACHIEVED AS PER CITY STANDARD W21, W22 AND W23.
3. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF OTTAWA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
4. WATERMAIN IS TO BE PVC DR18 WITH TRACER WIRE AS PER CITY OF OTTAWA STANDARD W36 UNLESS OTHERWISE NOTED.
5. VALVE BOXES AS PER CITY OF OTTAWA DETAIL W24.
6. ALL FIRE HYDRANTS TO BE INSTALLED AS PER CITY STANDARD W19 AND LOCATED AS PER CITY STANDARD W18 AND/OR CITY STANDARD CROSS SECTIONS.
7. WATERMAIN BEDDING IS TO BE AS PER CITY OF OTTAWA DETAIL W17.
8. THRUST BLOCKS AND RESTRAINT AS PER CITY OF OTTAWA DWGS: W25.3, W25.4, W25.5 AND W25.6.
9. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DWGS: W39, W40, W41.
10. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
11. DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
12. WATER SERVICES TO BE INSTALLED AS PER CITY OF OTTAWA STANDARD W26 AND W35.
13. WITHIN THE FROST ZONE, THE BACKFILL IN THE SERVICE TRENCHES SHOULD MATCH THE SOIL ON SIDES TO MINIMIZE DIFFERENTIAL FROST HEAVING IN THE SUBGRADE.
14. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.

STORM AND SANITARY SEWERS

1. SANITARY AND STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS AND OPSS 407 AND 410.
2. SEWER BEDDING AS PER CITY STANDARD S6 & S7.
3. ALL SANITARY SEWERS ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35.
4. ALL STORM SEWERS ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35 OR REINFORCED CONCRETE IN ACCORDANCE WITH CSA STANDARDS A257.2 AND A257.3 (JOINTS).
5. ALL MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORIZONTAL THICKNESS GRANULAR 'A'.
6. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS AND PROVIDE TEMPORARY CAPS.
7. THE CONTRACTOR SHALL CONDUCT INFILTRATION/EXFILTRATION (AS PER CURRENT OPSS) TESTING ON ALL NEWLY INSTALLED SANITARY SEWERS. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWER INSTALLATION AND SUPERVISED BY THE ENGINEER.
8. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM AND SANITARY SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED AND SUPERVISED BY THE ENGINEER.
9. ALL SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER CITY STANDARD S11 & S11.1.
10. ALL SANITARY BUILDING DRAINS TO BE EQUIPPED WITH SANITARY BACKWATER VALVES INSTALLED PER CITY OF OTTAWA STANDARD DRAWING S14.1.
11. MINIMUM SOIL COVER TO BE 2.0m TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE COVER CANNOT BE ACHIEVED, THERMAL INSULATION TO BE INSTALLED AS PER OPSD 514.010.
12. SUBDRAINS LOCATED IN THE AREA OF PAVEMENT SHALL HAVE INVERTS APPROXIMATELY 300mm BELOW THE SUBGRADE LEVEL AS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.
13. AN UNDERFLOOR DRAINAGE SYSTEM IS REQUIRED TO BE INSTALLED AS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED NOVEMBER 2018.
14. PROPOSED PHASE 2 BUILDING ROOF DRAINS TO BE WATTS ACCUTROL MODEL# RD-200-A-ADJ.

WATERMAIN TABLE

STATION	FIN/GRADE	T/W GRADE	COMMENT
0+003.5	76.65	74.25	TIE INTO EXISTING WATERMAIN PHASE 1 STUB
0+010	76.63	74.23	TOP OF WATERMAIN
0+021.5	76.70	74.30	THRUST BLOCK
0+026.1	76.72	74.32	THRUST BLOCK
0+030.6	76.90	74.50	WM CAPPED



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- UB – UNDERGROUND BELL
- G – GAS MAIN
- C – CABLE (ROGERS)
- SL – STREET LIGHT
- ST – STORM SEWER
- S – SANITARY SEWER
- CURB
- PROPOSED CURB
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED CLAY SEAL AT 60m INTERVALS
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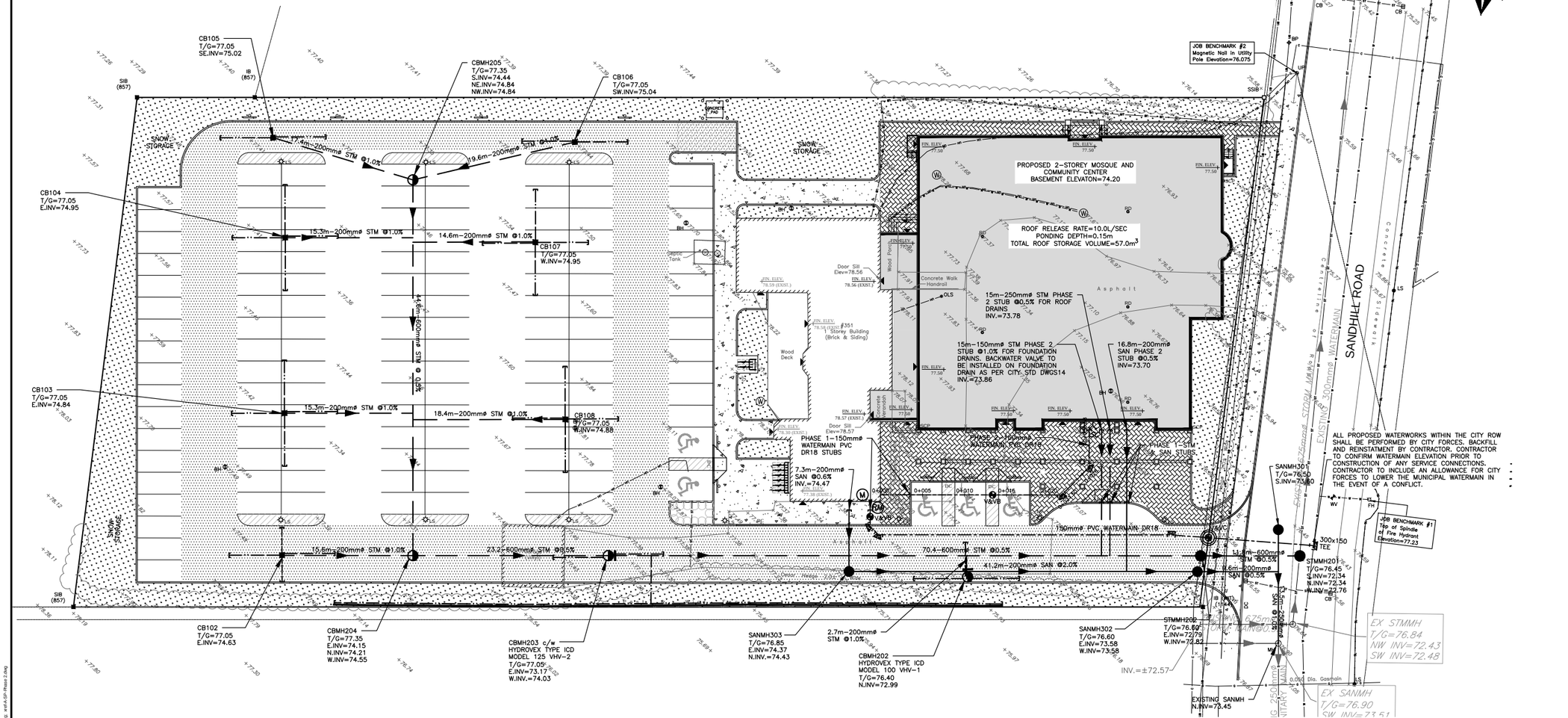
- PROPOSED LIGHT DUTY PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- PROPOSED SUBDRAIN



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SCALE: 0 2m 4m 10m — HORIZONTAL 1:250

NORTH

DESIGNED BY

REVIEWED BY

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BASEPLAN	ML
DESIGN	ML
CHECKED	AA
CAD	ML
PROJECT MANAGER	AA
APPROVED	AA

PROJECT
KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

PROJECT No.	OTT-00238504-A0
SURVEY	F M & W
DATE	2016-12-09

TITLE
SITE SERVICING
PHASE 2

DRAWING No.
SS-2

#17532

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References: exf TOPO-ADJ-PHD.dwg exf Keyplan.dwg exf ADP-Phase 2.dwg

PHASE 2 STORMWATER MANAGEMENT SUMMARY

Area ID	Area (ha)	Runoff Coefficient 'C'	2 Year Release (L/s)	2 Year storage required (m^3)	2 Year underground storage provided (m^3)	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m^3)
PH2A	0.498	0.78	28.0	35.1	35.1	29.5	173.3	193.5
PH2B	0.118	0.77	15.6	0.0	0.0	17.6	24.9	25.3
PH2C	0.145	0.90	7.0	13.9	57.0	10.0	48.7	57.0
PH2D	0.045	0.46	3.5	0.0	0.0	10.2	0.0	0.0
TOTAL	**0.81**							
		Totals:	**54.2**	**49.0**	**92.1**	**67.4**	**246.8**	**275.8**
		Total Allowable Release L/s		**68.55**				

PH2A – 100 YEAR SURFACE STORAGE VOLUMES

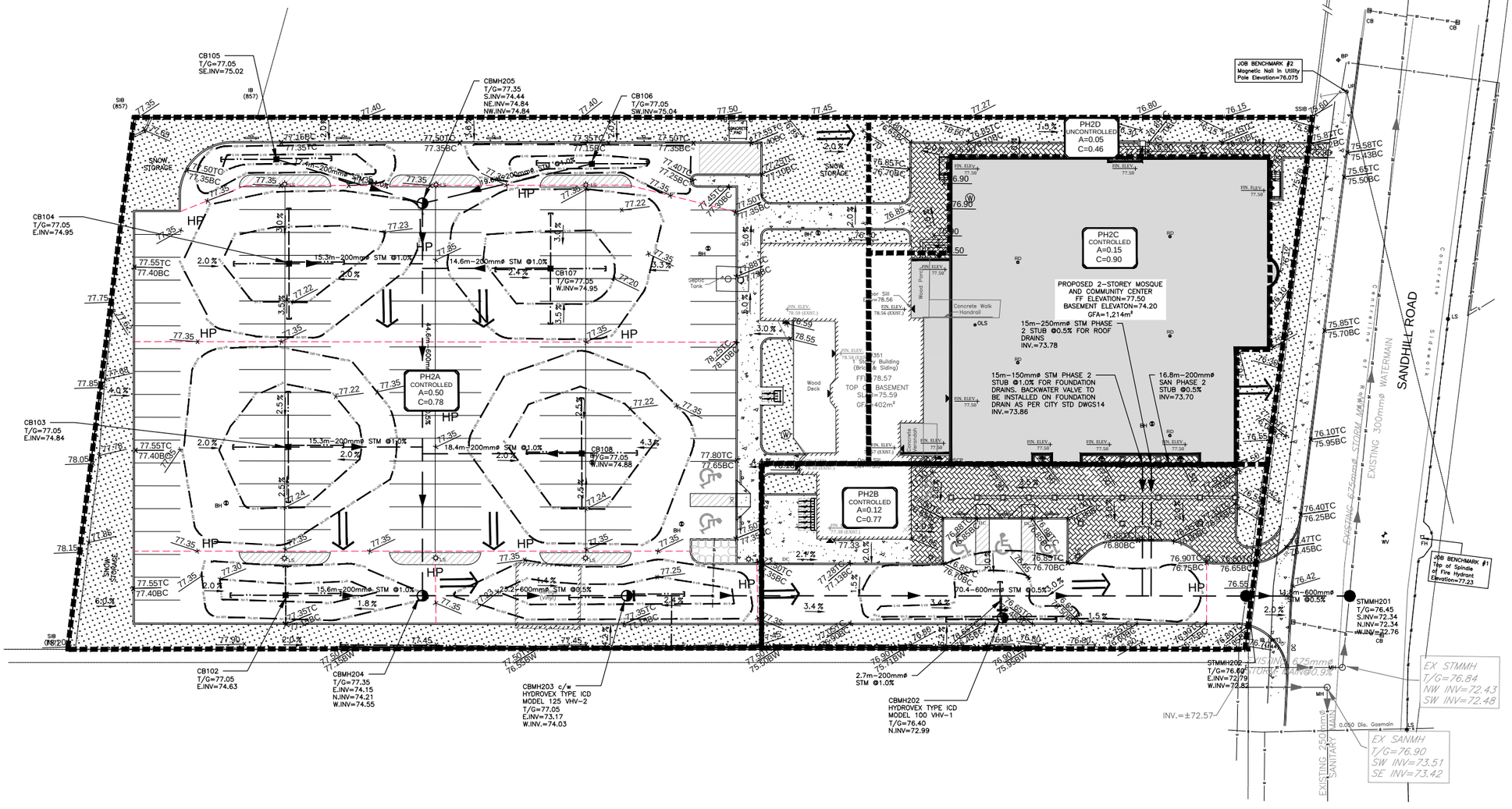
Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
CB102	132	0.30	13.2
CB103	368.00	0.30	36.8
CB104	342.00	0.30	34.2
CB105	86.0	0.30	8.6
CB106	82.0	0.30	8.2
CB107	309.0	0.30	30.9
CB108	401.0	0.30	40.1
CBMH203	184	0.35	21.5
		Total Volume	***193.5***

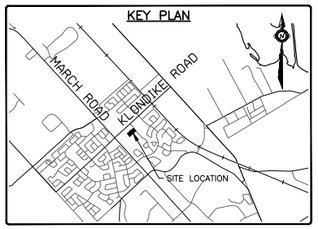
PH2B – 100 YEAR SURFACE STORAGE VOLUMES

Ponding Location	Surface Area (m2)	Ponding Depth	Volume (m3)
CBMH202	217	0.35	25.3
		Total Volume	***25.3***

PH2C – 100 YEAR SURFACE STORAGE VOLUMES

Ponding Location	Surface Area (m2)	Ponding Depth (m)	Volume (m3)
Roof	1140	0.15	57
		Total Volume	***57.0***





LEGEND

- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN
- PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- A1 / C=0.90 / A=0.034 – DRAINAGE AREA ID, RUNOFF COEFFICIENT, AREA (ha)
- OVERLAND FLOW DIRECTION
- PARKING LOT PONDING AREAS 100 YEAR LIMIT
- PARKING LOT PONDING AREAS 5 YEAR LIMIT

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SCALE: 0 2m 4m 10m — HORIZONTAL 1:250
NORTH
DESIGNED BY
REVIEWED BY

CLIENT: KANATA MUSLIM ASSOCIATION
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BASEPLAN: ML
DESIGN: ML
CHECKED: AA
CAD: ML
PROJECT MANAGER: AA
APPROVED: AA

PROJECT: KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE: STORMWATER MANAGEMENT PLAN PHASE 2

PROJECT No.: OTT-00238504-A0
SURVEY: F M & W
DATE: 2016-12-09
DRAWING No.: SWM-2

#17532

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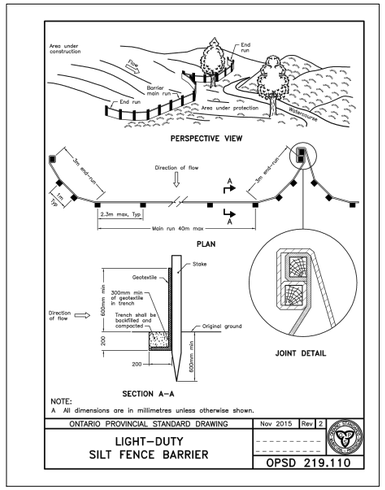
EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION.

DURING ALL CONSTRUCTION ACTIVITIES, EROSION AND SEDIMENTATION SHALL BE CONTROLLED BY THE FOLLOWING TECHNIQUES:

1. LIMITING THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
2. RE-VEGETATION OF EXPOSED AREAS AS SOON AS POSSIBLE.
3. MINIMIZING THE AREA TO BE CLEARED AND DISRUPTION TO ADJACENT AREAS.
4. A SILT FENCE BARRIER (OPSD 219.110) TO BE INSTALLED AS SHOWN ON THIS DRAWING.
5. A VISUAL INSPECTION SHALL BE COMPLETED DAILY ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY. CARE WILL BE TAKEN TO PREVENT DAMAGE DURING CONSTRUCTION OPERATIONS.
6. IN SOME CASES SOME BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS WILL BE REINSTATED AT NIGHT WHEN CONSTRUCTION IS COMPLETED.
7. THE SEDIMENT CONTROL DEVICES WILL BE CLEANED OF ACCUMULATED SILT AS REQUIRED. THE DEPOSITS WILL BE DISPOSED OF AS PER THE REQUIREMENTS OF THE CONTRACT.
8. DURING THE COURSE OF CONSTRUCTION IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR WILL INSTALL ADDITIONAL SILT FENCES OR OTHER METHODS AS REQUIRED TO THE SATISFACTION OF THE ENGINEER.
9. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS TO COMPLY WITH ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) OPSS 805, AND CITY OF OTTAWA SPECIFICATIONS.
10. MUD MATT TO BE LOCATED AT THE CONSTRUCTION ENTRANCE, AS INDICATED ON THE PLAN, AND SHALL BE INSTALLED AS PER THE MUD MATT DETAIL TO PREVENT MUD TRACKING ON TO MUNICIPAL ROADS. THE ENTRANCE SHALL BE MAINTAINED IN CLEAN CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
11. EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED ON-SITE AT THE DISCRETION OF THE CITY OF OTTAWA INSPECTOR OR THE MISSISSIPPI VALLEY CONSERVATION AUTHORITY. CONTRACTOR IS RESPONSIBLE TO INSTALL MODIFICATIONS AS REQUIRED TO THE SATISFACTION OF THE APPROPRIATE AUTHORITIES.
12. IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL, GEOSYNTHETIC SYSTEMS SILTSACK OR APPROVED EQUIVALENT IS TO BE PLACED INSIDE ALL STORM MANHOLE CATCHBASINS AND CATCHBASINS. INSTALLATION, INSPECTION AND CLEANOUT ARE AS PER MANUFACTURER'S RECOMMENDATIONS.

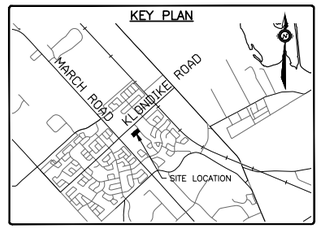


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT-DUTY SILT FENCE BARRIER		OPSD 219.110

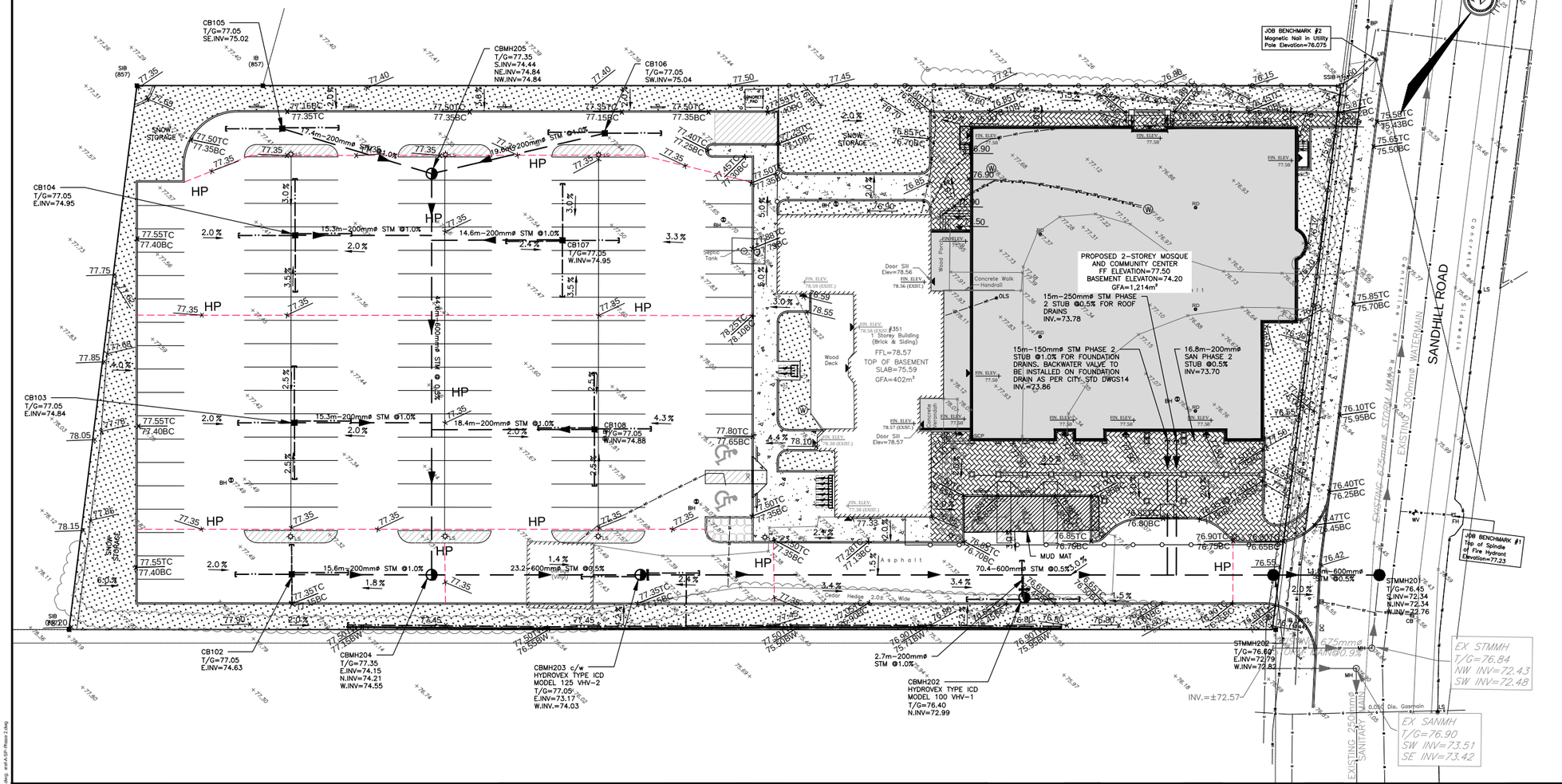
SILT FENCE NOTES:

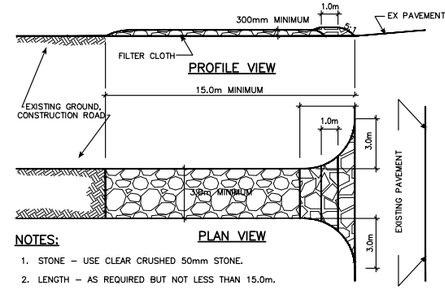
1. POSTS TO BE SPACED AT 2.3 METRES CENTRE TO CENTRE.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY A MINIMUM OF 500mm.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
4. WOOD POSTS TO BE HARDWOOD TYPE (50mm x 50mm).
5. GEOTEXTILE TO BE EMBEDED 200 mm INTO GROUND.
6. GEOTEXTILE TO CONFORM TO OPSS 805 STANDARDS.
7. SILT FENCE MUST BE INSTALLED BEFORE COMMENCEMENT OF CONSTRUCTION AND IN ACCORDANCE WITH DETAIL. SILT FENCE CAN BE REMOVED AFTER LANDSCAPING IS COMPLETE.
8. SEDIMENTS MUST BE CLEARED AWAY WHEN THEY REACH HALF THE HEIGHT OF THE FENCE.



LEGEND

- SIB – STANDARD IRON BAR
- IB – IRON BAR
- CB – CATCH BASIN
- MH – MANHOLE
- WMH – WATER MANHOLE
- LS – LAMP STANDARD
- UP – UTILITY POLE
- WV – WATER VALVE
- FH – FIRE HYDRANT
- WELL
- GUY WIRE AND ANCHOR
- W – WATERMAIN
- OVERHEAD UTILITY WIRES
- UH – UNDERGROUND HYDRO
- UB – UNDERGROUND BELL
- G – GAS MAIN
- C – CABLE (ROGERS)
- SL – STREET LIGHT
- ST – STORM SEWER
- S – SANITARY SEWER
- CURB
- PROPOSED CURB
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED CLAY SEAL AT 60m INTERVALS
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN
- PROPOSED FIRE HYDRANT
- V&VB – PROPOSED VALVE & VALVE BOX
- PROPOSED SIAMESE CONNECTION
- V&VC – PROPOSED VALVE & VALVE CHAMBER
- PROPOSED WATER METER
- RM – PROPOSED REMOTE WATER METER
- LS – PROPOSED LIGHT STANDARD
- 76.40 – PROPOSED ELEVATION
- 77.27 – EXISTING ELEVATION
- PROPOSED SILT FENCE





NOTES:

1. STONE – USE CLEAR CRUSHED 50mm STONE.
2. LENGTH – AS REQUIRED BUT NOT LESS THAN 15.0m.
3. THICKNESS – NOT LESS THAN 300mm.
4. WIDTH – 3.0m MINIMUM, NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRED PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

MUD MAT DETAIL

N.T.S

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

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BASEPLAN	ML
DESIGN	ML
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CAD	ML
PROJECT MANAGER	AA
APPROVED	AA

PROJECT: KMA MOSQUE AND COMMUNITY CENTRE
351 SANDHILL ROAD, OTTAWA, ON

TITLE: EROSION & SEDIMENT CONTROL PLAN
PHASE 2

PROJECT No.	OTT-00238504-A0
SURVEY	F M & W
DATE	2016-12-09
DRAWING No.	ESCP-2

#17532

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