Site Servicing & Stormwater Management Report
Haven Baptist Church – 4000 Strandherd Drive

Client:

Haven Baptist Church

Project Number:

OTT-22029363-A0

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Reviewed By: Alam Ansari, M.Sc., P. Eng.

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Date Submitted:
July 24, 2023
Revised: January 11, 2024
Revised: April 1, 2024

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1 Introduction

EXP Services Inc. (EXP) was retained by Havens Baptist Chruch. to provide Site Servicing and Stormwater Management report for the proposed addition to the existing Church building and parking lot located at 4000 Standherd Drive, Ottawa, ON.

The site is 0.537 hectares in area and is bound by Strandherd Drive on the south-east and Harthill Way on the north-west.

Development proposal for the subject site includes ~244 m^2 of additional floor space to the existing church building and expanding the existing parking lot. This site servicing and stormwater management report will address the existing servicing adequacy for the proposed addition as well as stormwater management quality and quantity control strategy as per the criteria set by the City of Ottawa.

Refer to Figure 1 in Appendix A for the site location.

2 Existing Conditions

The subject property currently have a church building with ~447m^2 area and an existing parking lot, with some landscaping and vegetation around it. The topography of the site is fairly flat. The stormwater drainage in existing condition is achieved by sheet drainage towards Strandherd Drive and Harthill Way.

Existing municipal and private services within and near the subject property is listed below. This information was achieved from as-built drawings received by the City of Ottawa. Municipal infrastructure along Standherd Drive was recently upgraded by the City of Ottawa and as-built drawings are not available as of the date of this report. Therefore, the information listed below for Strandherd Drive municipal infrastructure is based on the latest IFC drawings received from the City of Ottawa, included in **Appendix F**.

Within the Property (As per as-built drawing prepared by Oliver Mangione McCalla & Associates Ltd., dated October 1996):

150mm PVC Sanitary Service (Confirmed by CCTV Inspection, Refer to **Appendix E**).

25mm Copper Type K Water Service.

150mm Storm Service (Confirmed by CCTV Inspection, Refer to **Appendix E**).

Within Strandherd Drive (As per IFC drawing prepared by Parsons and Novatech, dated 26th June, 2020):

1200mm dia. Concrete 100-D Storm Sewer.

250mm dia. PVC Sanitary Sewer.

406mm Dia. PVC Watermain.

Within Harthill Way (As per as-built drawing prepared by Oliver Mangione McCalla & Associates Ltd., dated October 1996 and as-built drawing prepared by IBI Group, dated 1st February, 2010):

525mm dia. Storm Sewer draining towards Halley Street.

250mm dia. Storm Sewer.

2100mm dia. Storm Sewer draining towards Opal Lane.

250mm dia. Sanitary Sewer collecting sanitary flows from the subject site and draining towards Halley Street.

150mm dia. Watermain.

Further information regarding the existing services can be found on the as-built drawings as well as the Servicing and Grading Plan included in **Appendix F**.

3 References

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

- Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa (Guidelines) including:
  - Technical Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2016)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
  - Technical Bulletin ISDTB-2019-02 (08 July 2019)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
  - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
  - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Ontario Ministry of Transportation (MTO) Drainage Manual, 1995-1997
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 2020
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing

4 Watermain Design

4.1 Required Fire Flow

The fire flow demand calculations were prepared based on the Fire Underwriters Survey (FUS, 2020) criteria. The proposed as well as existing building's type of construction is classified as wood frame. The building will not have a sprinkler system and the combustibility content of the building will be limited combustible. There are no exposures noted within 30m distance from the existing and proposed church building. The required fire flow was determined to be 133.3 L/s (8000 L/min). Refer to **Appendix B** for detailed fire flow demand calculations and the architect's confirmation email regarding type of construction.

4.2 Watermain Design

There is an existing municipal 150mm diameter watermain on Harthill Way. The existing church building is being serviced by the existing watermain on Harthill Way via. 25mm copper water service connection. The proposed building addition will be serviced by the same water service lateral as the existing building.

The total domestic water demands for the existing and proposed buildings were calculated as per the City of Ottawa Water Design Guidelines (July 2010). The institutional average consumption rate of 28,000 L/gross ha/day was used. The institutional peak factors were 1.5 and 1.8 for the max. day and peak hour demands respectively. Refer to **Appendix B** for detailed calculations. With the gross site area of 0.537ha, the domestic demands for the existing and proposed addition were calculated as follows:

Institutional Water Demand

Average daily demand = 0.17 L/s

Maximum daily demand = 0.26 L/s

Maximum hourly daily demand = 0.47 L/s

4.3 Pressure Check

The boundary conditions provided by the City of Ottawa indicates that the minimum and maximum pressure in the existing municipal 150mm diameter watermain at the connection point on Harthill Way is 72.4 psi (499.33 kPa) and 86.5 psi (596.45 kPa), respectively. With the existing 25mm copper water service, the anticipated residual pressure at the building FFE during average day, max day and peak hour demands will be 85.4 psi, 70.9 psi and 69.3 psi, respectively. Residual pressure at the building is anticipated to be higher than 80 psi, therefore pressure reducing measures will be required.

In addition to the domestic demands, the subject site will be serviced for fire demands via the existing 400mm dia. and 200mm dia. watermains on Strandherd Drive. The residual pressure of 75.6 psi (520.9 kPa) was indicated by the city during max day + fire flow demand of 133.6 L/s.

Based on the available pressures in the existing watermain along Harthill Way, the existing 25mm water supply will have adequate capacity to meet the domestic demands. Based on the available pressures in the existing watermain along Strandherd Drive, the existing church building and proposed addition can be serviced for fire demands without issues. Refer to **Appendix B** for detailed calculations.

4.4 Review of Hydrant Spacing

A review of the hydrant spacing was completed to ensure compliance with Appendix I of Technical Bulletin ISTB-2018-02. As per Section 3 of Appendix I all hydrants within 150 meters were reviewed to assess the total possible contribution of flow from these hydrants. For each hydrant, the distance to the proposed building was determined to arrive at the contribution of fire flow. A review of the available fire hydrant within 150m distance along the fire route from the building was carried out which is summarized in the table below.

Table 4-1: Summary of SWM Storage Requirements

Hydrant #	Location	City / Private	Color Code	Distance from the Building (m)	Fire Flow Contribution for Class AA Hydrant (L/min)
362014H204	Strandherd Drive	City	BLUE	70	5700
362014H174	Strandherd Drive	City	BLUE	97	3800
362013H031	Strandherd Drive	City	BLUE	120	3800
				Total:	***13,300***

Please refer to **Figure A2** in **Appendix A** for location of the above noted hydrants. As noted in the table above, there are 3 accessible hydrants available within 150m from the building to access the required fire flow of 8000 L/min. Therefore, no new hydrants are proposed.

5 Sanitary Sewer Design

5.1 Peak Design Flow

There is an existing 150mm dia. PVC sanitary service connected to 250mm dia. municipal sanitary sewer on Harthill Way, flowing from south to north eventually discharging into 300mm dia. municipal sanitary sewer on Halley Street. There are no capacity constraints noted by the City on these sanitary sewers. The anticipated peak sanitary flows from the existing and proposed institutional site have been calculated as per the City of Ottawa Sewer Design Guidelines (October 2012). The anticipated peak sanitary flows are calculated as follows:

Design Flows

Institutional Design Flow:	28,000 L/gross ha/day
Development Area:	0.537 hectares
Peak Factor:	1.5
Extraneous Flow:	0.33 L/s/ha
Peak Design Flow:	=(28000L/ha/day)(0.537ha)(1.5)(1/86400)+(0.537ha)(0.33L/s/ha)
	=**0.44 L/s**

The existing 150mm dia. PVC sanitary service at 1.0% slope has a full flow capacity of 14.7 L/sec and a full flow velocity of 1.21 m/s, which will be sufficient to service the existing church as well as the proposed addition. Refer to the sanitary sewer design sheet in **Appendix C** and the Site Servicing and Grading plan (dwg #C200) in **Appendix F** for further details.

6 Stormwater Management

6.1 Storm Design Criteria

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

- The sites allowable release rate shall be controlled post-to-pre with any flows exceeding the existing total release rate being stored on site.
- The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
- A calculated time of concentration (Cannot be less than 10 minutes).
- No on-site quality control requirements as the proposed works drains into municipal minor system which is treated by an end-of-pipe stormwater manager facility on Strandherd Drive (Kennedy-Burnette Stormwater Management Facility).
- Maximum allowable surface ponding depth is 300 mm.
- Estimated storage volumes based on the Modified Rational Method.
- Average run-off coefficient of 0.20 for soft landscaping and 0.9 for hard surfaces.

6.2 Pre-Development Conditions

In existing condition, 0.537ha site at 4000 Stranherd Drive is occupied by a ~447m^2 church building with around 1830m^2 of asphalt parking and concrete surfaces surrounded by ~3057m^2 of soft landscaping and vegetation. In existing condition, stormwater from majority of the property sheet drains uncontrolled towards Strandherd Drive, identified as drainage area E1 (0.428ha). The soft landscaping along the north-west property line sheet drains uncontrolled towards the roadside ditch along Harthill Way identified as drainage area E2 (0.109ha). There is no existing stormwater infrastructure within the subject property. Stormwater drainage is entirely achieved by uncontrolled overland sheet drainage towards the municipal ROW.

Table D1 to D3 in **Appendix D** provides detailed calculation for pre-development average run-off coefficient, time of concentration and peak run-off rates during 2-year, 5-year and 100-year storm events. With average run-off coefficient of 0.58 and time of concentration of 10 mins, pre-dev runoff rates from drainage area E1 (towards Strandherd Drive) were calculated to be 51.99 L/sec, 70.53 L/sec and 151.08 L/sec during 2-year, 5-year and 100-year storm events, respectively. With average run-off coefficient of 0.22 and time of concentration of 10 mins, pre-dev runoff rates from drainage area E2 (towards Harthill Way) were calculated to be 5.55 L/sec, 7.53 L/sec and 16.13 L/sec during 2-year, 5-year and 100-year storm events, respectively.

6.3 Allowable Release Rate

Based on the stormwater management criteria identified by the City during pre-consultation meeting, the allowable release rates were calculated using a maximum average runoff coefficient of 0.50 or pre-dev, whichever is less. For drainage area E1 (towards Strandherd Drive), the allowable release rates based on average run-off coefficient of 0.50 were calculated as 44.86 L/sec, 60.85 L/sec and 130.36 L/sec during 2-year, 5-year and 100-year storm events, respectively. For drainage area E2 (towards Harthill Way), the allowable release rates will remain same as pre-development run-off rates noted in section 6.2 above.

Table D4 in **Appendix D** provides detailed calculation of allowable release rates.

6.4 Post-Development Conditions

In post-development condition, there will be an additional ~244m^2 of building added to the existing ~447m^2 church building. Additionally, the asphalt parking lot will be expanded to accommodate the additional parking spaces. The proposed development is aimed to make no grade changes to the existing hard surfaces. Therefore, the post-development stormwater management strategy is also based on the overland sheet drainage.

In post-development condition, the site is divided into three (3) drainage areas. Areas A1 and A2 draining towards Strandherd Drive ROW and area A3 draining towards Harthill Way roadside ditch. Table 6-1 provides summary of pre-development and post-development drainage areas contributing to Strandherd Drive and Harthill Way along with average run-off coefficient. Please note that in the post-development conditions, drainage area A3 remains same as pre-development conditions drainage area E2 as no changes have been proposed.

Table 6-1: Summary of Pre-Dev and Post-Dev Storm Catchments

Outlet	Pre-Dev			Post-Dev		
	Area ID	Area (ha)	Runoff Coeff.	Area ID	Area (ha)	Runoff Coeff.
Strandherd Drive	E1	0.4202	0.58	A1, A2	0.427	0.76
Harthill Way	E2	0.1170	0.22	A3	0.1101	0.24

Post-development uncontrolled run-off towards Strandherd Drive was calculated as 69.11 L/sec, 93.76 L/sec and 193.52 L/sec during 2-year, 5-year and 100-year storm events, respectively. Post-dev run-off towards Strandherd Drive will be controlled to meet the allowable release rates, as explained in the following section.

Post-development discharge rates towards Harthill Way were calculated as 5.68 L/sec, 7.71 L/sec and 16.51 L/sec during 2-year, 5-year and 100-year storm events, respectively. Which are slightly higher than pre-development run-off rates of 5.55 L/sec, 7.53 L/sec and 16.13 L/sec, respectively. Therefore, no stormwater quantity control measures are proposed in drainage area A3.

6.4.1 Storage Requirements and Allocation

Drainage areas A1 and A2 contribute to post-development run-off towards Strandherd Drive. Drainage area A1 consist of pitched roof of the existing and proposed building, existing and new asphalt parking lot which will be directed overland towards the new stormwater storage trench to provide quantity control. Area A2 consist of pitched building roof and surrounding landscaped area. Area A2 will be directed to the new stormwater storage trench via proposed swale and culvert for quantity control as well.

Run-off from area A1 and A2 will be controlled at proposed storage trench along the southern property line. Using the modified rational method, the maximum required storage volume for drainage areas A1 and A2 was calculated to be 48.7 m^3 during 100-year storm event (Refer to **Table D6 and D7** in **Appendix D**). The required storage volume will be achieved by the proposed storge trench. Which will consist of 0.75m deep storage layer filled with 50mm dia. clear stone (40% void). The proposed trench will have total available volume of 47.34 m^3. Additional 3.5 m^3 storage will be available in 250mm culvert and proposed swale in area A2. Therefore, total available storage will be 50.86 m^3. During major storm events greater than 100-year storm events, stormwater form the trench will over flow towards the City ROW at the southern corner of the property.

Refer to Site Servicing and Grading drawing #C200 included in **Appendix F** for further details and stage storage volume **Table D11** included in **Appendix D**.

6.4.2 Flow Control Device Sizing

Flow attenuation will be achieved by a 137mm dia. Circular orifice plate mounted on 250mm dia. Outlet pipe from the catchbasin proposed at the bottom of trench. Another 250mm dia. PVC storm pipe is

proposed at a higher elevation within the trench equipped with 245mm dia. orifice plate. Detailed orifice calculations are included in **Appendix D** (**Table D8, D9** and **D10**). 137mm dia. orifice will attenuate flow rates for up-to 5-year storm events. 245mm dia. orifice will attenuate up-to 100-year storm events. During the storm events greater than 100-year, the trench will overflow towards Strandherd Drive ROW.

Controlled release rates from the orifices are estimated using the orifice equation as noted below:

$Q_{ORIFICE} = C\ A\ (2\ g\ H)^{0.5}$

Where;
C = Discharge Coefficient
A = Area of the Orifice
g = 9.81 m/sec^2
H = Head of water over Orifice

Refer to **Table D8, D9** and **D10** in **Appendix D** for detailed orifice calculations.

Therefore, the controlled release rates towards Strandherd Drive during 2-year, 5-year and 100-year storm events from drainage area A1 and A2 will be 36.70 L/sec, 57.80 L/sec and 119.70 L/sec, respectively. Which is well below the allowable release rates calculated in section 6.3 above.

Refer to Civil drawings in **Appendix F** and refer to **Appendix D** for the detailed stormwater management spreadsheet calculations.

6.4.3 Storm Servicing

Proposed stormwater storage trench will be serviced by a 375mm dia. PVC storm sewer installed at 1.5% slope, having a full flow capacity of 201.9 L/sec. The proposed storm sewer will be connected to the existing 1200mm dia. municipal storm sewer within Strandherd Drive ROW. Refer to **Table D12** in **Appendix D** for detailed storm sewer sizing calculations.

6.4.4 Quality Control

Rideau Valley Conservation Authority (RVCA) was contacted for the applicable quality control criteria for the proposed site. RVCA had noted that no quality control is required for this site. RVCA had deferred to the City of Ottawa for the quality control requirements. City of Ottawa had provided the quality control requirement of enhanced level (80% TSS removal) for the areas not discharging directly to the municipal minor system. In the proposed design, all the asphalt areas are proposed to discharge to the municipal minor system. There is a municipal stormwater management facility downstream of the subject property (Kennedy Burnette SWM Facility), which will provide the necessary quality control. Therefore, no additional on-site quality control measures are provided. Please refer to the email correspondence included in **Appendix E**.

6.4.5 ECA Requirement

Generally, an Environmental Compliance Approval (ECA) would be obtained from the Ministry of Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Climate Change (MOECC), for any onsite private Sewage Works; however, an Approval Exemption under Ontario Regulation 525/98 can be applied. Under Section 3 of O'Reg 525/98, Section 53 (1) and (3) do not apply to the alteration, extension, replacement, or a change to a stormwater management facility that 1) is designed to service one lot or parcel of land, b) discharges into a storm sewer that is not a combined sewer, c) does not service industrial land or a structure located on industrial land, and finally d) is not located on

industrial land. The onsite Sewage Works would generally include the onsite stormwater works such as flow controls, associated stormwater detention, and treatment works.

Proposed stormwater management infrastructure complies with all of the above noted exemption requirements. Therefore, the proposed private stormwater management infrastructure would not require an ECA.

7 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;
- 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.

8 Conclusions

This report addresses the adequacy of the existing municipal services to service the existing church building and proposed addition at 4000 Strandherd Drive. Based on the analysis provided in this report, the conclusions are as follows:

- Existing and proposed Church building will be serviced by the existing 25mm dia. water service, which will adequately service the proposed development for the domestic demands. 400mm and 200 mm dia. municipal watermains along Strandherd Drive have sufficient pressure and flow to service the proposed development for fire flow demands.
- The proposed building will be serviced by the existing 150mm diameter sanitary sewer which has adequate capacity to service the existing and proposed church building.
- Stormwater Management quantity control criteria for the subject site will be achieved by a storage trench and a 137mm dia. circular orifice as well as a 245mm dia. circular orifice. Post-dev run-off rates during all storm events up to and including 100-year storm event will be matched with pre-dev run-off rates with max. runoff coefficient of 0.5.

- A 375mm dia. storm sewer is proposed to connect to the 1200mm dia. municipal storm sewer within the Strandherd Drive ROW for stormwater management.
- Temporary erosion and sediment control measures for the subject site have been identified.

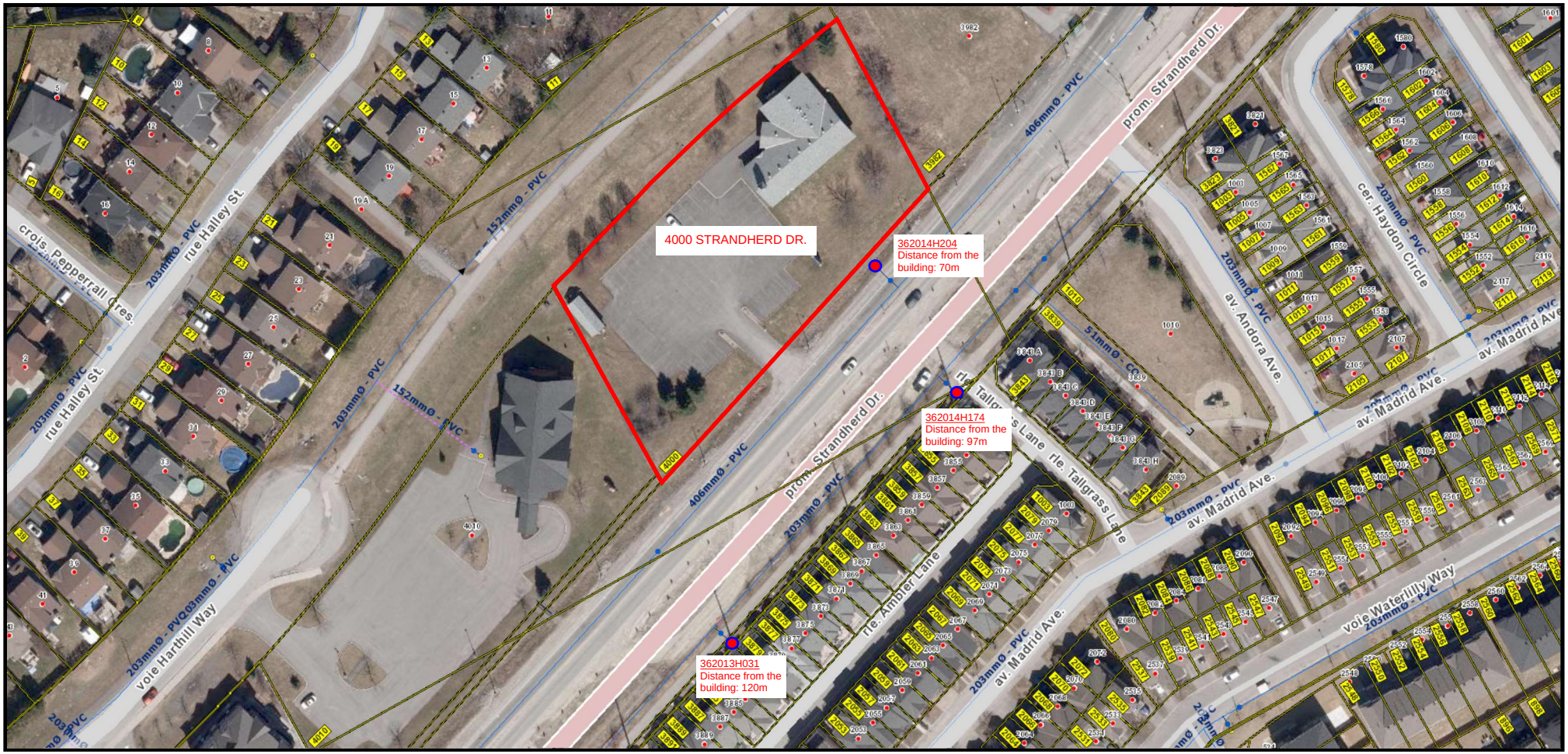
Appendix A – Figures

Figure A1: Site Location Plan

Figure A2: Hydrant Location Plan

FIGURE A1: SITE LOCATION PLAN

FIGURE A2: HYDRANT LOCATION PLAN



Appendix B – Water Servicing

Table B1 : Water Demand Chart

Table B2 : Fireflow Requirements Based on Fire Underwriters Survey (FUS) 2020

Table B3 : Estimated Water Pressure At Building

TABLE B1: Water Demand Chart

Location: 4000 Strandherd Drive
Project No: OTT-22029363-A0
Designed by: A. Jariwala
Checked By: A. Ansari
Date Revised: April 2023

Water Consumption
Institutional = **28,000** L/gross ha/day

Location	Institutional						Total Demands (L/sec)		
	Area (m^2)	Avg Demand (L/day)	Peaking Factors (x Avg Day)		Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Max Hour (L/s)
			Max Day	Peak Hour					
4000 Strandherd Dr.	5,372	15,042	1.50	1.80	22,563	40,613	***0.17***	***0.26***	***0.47***

TABLE B2: FIRE FLOW REQURIEMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 2020
PROJECT: 4000 Strandherd
Building No: **Existing + Proposed Addition**

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	Wood Frame	1.5	
	Ordinary Construction	1			
	Non-combustible Construction	0.8			
	Fire Resistive Construction	0.6			
	First Floor		730	730.0 m²	
	Basement (At least 50% below grade, not included)		0		
Fire Flow (F)	F = 220 * C * SQRT(A)				8,916
Fire Flow (F)	Rounded to nearest 1,000				**9,000**

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%	-1,350	7,650
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	No Sprinkler	0%	0	7,650
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Not Standard Water Supply or Unavailable	0%	0	7,650
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Not Fully Supervised or N/A	0%	0	7,650
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Side 1 (West)	59	5	30.1 to 45	Type V	12.1	2	24.2	6	0%	0%	0	7,650
	Side 2 (East)	93	5	30.1 to 45	Type V	0	0	0	6	0%			
	Front (South)	53	5	30.1 to 45	Type V	76	4	304	6	0%			
	Back (North)	55	5	30.1 to 45	Type V	86.5	8	692	6	0%			
Obtain Required Fire Flow											Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =		**8,000**
											Total Required Fire Flow, L/s =		**133.3**

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

Type V	Wood Frame
Type IV-III (U)	Mass Timber or Ordinary with Unprotected Openings
Type IV-III (P)	Mass Timber or Ordinary with Protected Openings
Type II-I (U)	Noncombustible or Fire Resistive with Unprotected Openings
Type II-I (P)	Noncombustible or Fire Resistive with Protected Openings

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	5

TABLE B3

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Q (m3/sec)	Area (m2)	C	Vel (m/s)	Slope of HGL (m/m)	Head Loss (m)	Elev From (m)	Elev To (m)	*Elev Diff (m)	Pressure From kPa	(psi)	Pressure To kPa	(psi)	Pressure Drop (psi)
Avg Day Conditons																				
Exsiting 25mm water service	Main	Building	0.17	22 m	25	0.025	0.0002	0.000491	110	0.3547	0.01223	0.2727	94.20	94.70	-0.5	596.4	(86.5)	588.9	(85.4)	1.1
Max Day Conditons																				
Exsiting 25mm water service	Main	Building	0.26	22 m	25	0.025	0.0003	0.000491	110	0.532	0.02591	0.5778	94.20	94.70	-0.5	499.3	(72.4)	488.8	(70.9)	1.5
Peak Hour Conditons																				
Exsiting 25mm water service	Main	Building	0.47	22 m	25	0.025	0.0005	0.000491	110	0.9576	0.07695	1.7161	94.20	94.70	-0.5	499.3	(72.4)	477.6	(69.3)	3.2

Water Demand Info

Average Demand =	0.17	L/sec
Max Day Demand =	0.26	L/sec
Peak Hr Deamand =	0.47	L/sec
Fireflow Requriement =	133.3	L/sec
Max Day Plus FF Demand =	133.6	L/sec

Pipe Lengths

From watermain to building =	22 m
Hazen Williams C Factor for Friction Loss in Pipe, C=	110

Boundary Conditon

	Min HGL	Max HGL	Max Day + Fireflow	
HGL (m)	145.1	155	146.5	(From City of Ottawa)
Approx Ground Elev (m) =	94.20	94.20	93.40	
Approx Bldg FF Elev (m) =	94.70	94.70	94.70	
Pressure (m) =	50.9	60.8	53.1	
Pressure (Pa) =	499,329	596,448	520,911	
Pressure (psi) =	72.4	86.5	75.6	

Appendix C – Sanitary Sewer Design Sheet

Table C1: Sanitary Sewer Calculation Sheet

TABLE C1 - SANITARY SEWER CALCULATION SHEET

LOCATION				RESEDENTIAL AREAS AND POPULAITONS												COMMERCIAL			INDUSTRIAL			INSTITUTIONAL			INFILTRATION			TOTAL	SEWER DATA						
Street	U/S MH	D/S MH	Desc	Area (ha)	NUMBER OF UNITS							POPULATION		Peak Factor	Peak Flow (L/sec)	AREA (ha)		Peak Flow (L/sec)	AREA (ha)		Peak Factor (per	AREA (Ha)	ACCU AREA (Ha)	Peak Flow (L/sec)	AREA (ha)		INFILT FLOW (L/s)	TOTAL FLOW (L/s)	Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
					Singles	Semis	Towns	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	4-Bed Apt.	INDIV	ACCU			INDIV	ACCU		INDIV	ACCU					INDIV	ACCU									
Site	BLDG	EX. SANMH																				0.54	0.5372	0.26114	0.537	0.537	0.18	0.44	150	148.01	1.00	54.500	14.7	3%	1.21
	EX. SANMH	EX. SANMH																					0.5372	0.26114		0.537	0.18	0.44	250	251.46	1.00	40.000	60.4	1%	1.21
																									0.537									

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 3.0
or L/gross ha/sec =	0.324				Residential Peaking Factor, M =	1 + (14/(4+P^0.5)) * K	Semi-Detached 2.7
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. Jariwala, M.Eng.	4000 Strandherd
Checked:	Location:
A. Ansari, M.Sc., P.Eng.	4000 Strandherd Drive, Ottawa, ON
File Reference:	Page No:
22029363 - FUS Fire Flow Calcs.xlsx	**1 of 1**

Appendix D – Stormwater Management Design Sheet

TABLE D1

CALCULATION OF AVERAGE RUNOFF COEFFICIENTS FOR PRE-DEVELOPMENT CONDTIONS

Area No.	Roof Areas C=0.90		Asphalt Areas C=0.90		Concrete / Pavers C=0.90		Grassed Areas C=0.20		Sum AC	Total Area (m^2)	C_{AVG}
	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C			
E1	446	402	1831	1648		0	1924.080	384.816	2434.800	4201.840	0.58
E2	37	33	0	0	0	0	1133.260	226.652	259.952	1170.260	0.22
Site									**2694.752**	**5372.100**	**0.50**

TABLE D2

CALCULATION OF CATCHMENT TIME OF CONCENTRATION FOR PRE-DEVELOPMENT CONDITIONS

Catchment No.	Area (ha)	High Elev (m)	Low Elev (m)	Flow Path Length (m)	Indiv Slope	Avg. C	Time of Conc. Tc (mins)	Description
E1	0.4202	94.39	93.56	52.3	1.6	0.58	2.96	See Note 2
E2	0.1170	94.60	93.8	19.6	4.1	0.22	7.93	See Note 1

Notes

1) For Catchments with Runoff Coefficient less than C=0.40, Time of Concentration Based on Federal Aviation Formula (Airport Method), from MTO Drainage Manual Equation 8.16, where: T_C

2) For Catchments with Runoff Coefficient greater than C=0.40, Time of Concentration Based on Bransby Williams Equation, from MTO Drainage Manual Equation 8.15, where: $T_C = 0.057*L$

TABLE D3

CALCULATION OF PEAK RUNOFF FOR PRE-DEVELOPMENT CONDTIONS

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_2 (L/sec)	I_5 (mm/hr)	Cavg	Q_5 (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100} (L/sec)
E1	Strandherd	0.4202	10.00	76.81	0.58	**51.99**	104.19	0.58	**70.53**	178.56	0.72	**151.08**
E2	Harthill Way	0.1170	10.00	76.81	0.22	**5.55**	104.19	0.22	**7.53**	178.56	0.28	**16.13**
Total						**57.54**			**78.06**			**167.21**

Notes

1) Intensity, $I = 732.951/(Tc+6.199)^{0.810}$ (2-year)

2) Intensity, $I = 998.071/(Tc+6.053)^{0.814}$ (5-year)

3) Intensity, $I = 1735.688/(Tc+6.014)^{0.820}$ (100-year)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) The standard minimium Time of Concentraion of 10 minutes was used, rather then the calaculted time, since calcualted time was less than 10 minutes.

TABLE D4

CALCULATION OF ALLOWABLE RELEASE RATE BASED ON C=0.5 OR PRE-DEV, WHICHEVER IS LESS

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_2 (L/sec)	I_5 (mm/hr)	Cavg	Q_5 (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100} (L/sec)
E1	Strandherd	0.4202	10.00	76.81	0.50	**44.86**	104.19	0.50	**60.85**	178.56	0.63	**130.36**
E2	Harthill Way	0.1170	10.00	76.81	0.22	**5.55**	104.19	0.22	**7.53**	178.56	0.28	**16.13**
Total						**50.41**			**68.38**			**146.49**

Notes

1) Intensity, $I = 732.951/(Tc+6.199)^{0.810}$ (2-year)

2) Intensity, $I = 998.071/(Tc+6.053)^{0.814}$ (5-year)

3) Intensity, $I = 1735.688/(Tc+6.014)^{0.820}$ (100-year)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) The standard minimium Time of Concentraion of 10 minutes was used, rather then the calaculted time, since calcualted time was less than 10 minutes.

TABLE D5

AVERAGE RUNOFF COEFFICIENTS FOR POST-DEVELOPMENT CONDITIONS

			$C_{ASPH/CONC}$ = 0.90		C_{ROOF} = 0.90		C_{SLA} = 0.20		C_{PP} = 0.40				
Area No.	Asphalt & Conc Areas (m^2)	A * C_{ASPH}	Roof Areas (m^2)	A * C_{ROOF}	Soft Landscaped Areas (m^2)	A * C_{SLA}	Permeable Pavement Areas (m^2)	A * C_{PP}	Sum AC	Total Area (m^2)	C_{AVG} (see note)	Comment
A1	2440.7	2196.6	605.5	545.0	311	62.2		0.0	2803.8	3357	0.84	Ex. BLDG, Ex. & new parking lot
A2	139.000	125.1	218.7	196.8	555	111.1		0.0	433.0	913	0.47	New Bldg Roof and Landscaping
A3	28.40	25.6	37.2	33.5	1035	207.0		0.0	266.1	1101	0.24	Uncontrolled to Harthill Way
Totals									**3503**	**5371**	**0.65**	
Notes: Areas for each land-use are taken from CAD												

TABLE D6

SUMMARY OF POST-DEVELOPMENT PEAK FLOWS (Uncontrolled and Controlled)

			Storm = 2 yr				Storm = 5 yr				Storm = 100 yr				
Area No	Area (ha)	Time of Conc, Tc (min)	C_{AVG}	I_5 (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_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	Comments
A1	0.3357	10	0.84	76.81	59.87	***36.70***	0.84	104.19	81.21	***57.80***	1.00	178.56	166.66	***119.70***	Controlled flow to Strandherd Dr.
A2	0.0913	10	0.47	76.81	9.25		0.47	104.19	12.54		0.59	178.56	26.87		
A3	0.1101	10	0.24	76.81	5.68	5.68	0.24	104.19	7.71	7.71	0.30	178.56	16.51	16.51	Uncontrolled flow to Harthill Way
Total to Harthill Way	**0.5371**				**5.68**	5.68			**7.71**	7.71			**16.51**	16.51	
Allowable to Harthill Way						**5.55**				**7.53**				**16.13**	
Total to Strandherd Dr.					**69.11**	***36.70***			**93.76**	***57.80***			**193.52**	***119.70***	
Allowable to Strandherd Dr.						**44.86**				**60.85**				**130.36**	

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year)

2) Intensity, I = 998.071/(Tc+6.053) $^{0.814}$ (5-year)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) Time of Concentration, Tc = ***10 mins***

6) Controlled release rate is indicated by, ***49.53***

Table D7 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: A1, A2

C_{AVG} = 0.76 (2-yr)

C_{AVG} = 0.76 (5-yr)

C_{AVG} = 0.95 (100-yr, Max 1.0)

Time Interval = 5.00 (mins)

Drainage Area = 0.4270 (hectares)

Actual Release Rate (L/sec) = 119.70

Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 119.70

Duration (mins)	Release Rate = 36.70 (L/sec), Return Period = 2 (years), IDF Parameters, A = 733.0, B = 0.810, (I = A/(T_c+C)), C = 6.199					Release Rate = 57.80 (L/sec), Return Period = 5 (years), IDF Parameters, A = 998.1, B = 0.814, (I = A/(T_c+C)), C = 6.053					Release Rate = 119.70 (L/sec), Return Period = 100 (years), IDF Parameters, A = 1735.7, B = 0.820, (I = A/(T_c+C)), 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	167.2	150.5	36.7	113.8	0.0	230.5	207.4	57.8	149.6	0.0	398.6	448.4	119.7	328.7	0.0
5	103.6	93.2	36.7	56.5	16.9	141.2	127.0	57.8	69.2	20.8	242.7	273.0	119.7	153.3	46.0
10	76.8	69.1	36.7	32.4	19.4	104.2	93.8	57.8	36.0	21.6	178.6	200.8	119.7	81.1	48.7
15	61.8	55.6	36.7	18.9	17.0	83.6	75.2	57.8	17.4	15.6	142.9	160.7	119.7	41.0	36.9
20	52.0	46.8	36.7	10.1	12.1	70.3	63.2	57.8	5.4	6.5	120.0	134.9	119.7	15.2	18.3
25	45.2	40.6	36.7	3.9	5.9	60.9	54.8	57.8	-3.0	-4.5	103.8	116.8	119.7	-2.9	-4.3
30	40.0	36.0	36.7	-0.7	-1.2	53.9	48.5	57.8	-9.3	-16.7	91.9	103.3	119.7	-16.4	-29.5
35	36.1	32.4	36.7	-4.3	-8.9	48.5	43.7	57.8	-14.1	-29.7	82.6	92.9	119.7	-26.8	-56.3
40	32.9	29.6	36.7	-7.1	-17.1	44.2	39.8	57.8	-18.0	-43.3	75.1	84.5	119.7	-35.2	-84.4
45	30.2	27.2	36.7	-9.5	-25.6	40.6	36.6	57.8	-21.2	-57.4	69.1	77.7	119.7	-42.0	-113.5
50	28.0	25.2	36.7	-11.5	-34.4	37.7	33.9	57.8	-23.9	-71.8	64.0	71.9	119.7	-47.8	-143.3
55	26.2	23.5	36.7	-13.2	-43.4	35.1	31.6	57.8	-26.2	-86.4	59.6	67.1	119.7	-52.6	-173.7
60	24.6	22.1	36.7	-14.6	-52.6	32.9	29.6	57.8	-28.2	-101.4	55.9	62.9	119.7	-56.8	-204.6
65	23.2	20.8	36.7	-15.9	-61.9	31.0	27.9	57.8	-29.9	-116.5	52.6	59.2	119.7	-60.5	-235.9
70	21.9	19.7	36.7	-17.0	-71.3	29.4	26.4	57.8	-31.4	-131.8	49.8	56.0	119.7	-63.7	-267.5
75	20.8	18.7	36.7	-18.0	-80.9	27.9	25.1	57.8	-32.7	-147.2	47.3	53.2	119.7	-66.5	-299.5
80	19.8	17.8	36.7	-18.9	-90.5	26.6	23.9	57.8	-33.9	-162.7	45.0	50.6	119.7	-69.1	-331.7
85	18.9	17.0	36.7	-19.7	-100.2	25.4	22.8	57.8	-35.0	-178.4	43.0	48.3	119.7	-71.4	-364.1
90	18.1	16.3	36.7	-20.4	-110.0	24.3	21.9	57.8	-35.9	-194.1	41.1	46.2	119.7	-73.5	-396.7
95	17.4	15.7	36.7	-21.0	-119.9	23.3	21.0	57.8	-36.8	-209.9	39.4	44.4	119.7	-75.3	-429.5
100	16.7	15.1	36.7	-21.6	-129.8	22.4	20.2	57.8	-37.6	-225.8	37.9	42.6	119.7	-77.1	-462.4
Max =					**19.4**					**21.6**					**48.7**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximum Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$

50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$

25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$

10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$

5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

TABLE D8 - Flow Through Inlet Control Device - 1 (Orifice Equation)

Elev (m)	Head Over Orifice (m)	Orifice Flow (l/s)
92.07	0.00	0.0
92.17	0.10	12.6
92.27	0.20	17.8
92.37	0.30	21.8
92.47	0.40	25.2
92.57	0.50	28.1
92.67	0.60	30.8
92.77	0.70	33.3
92.87	0.80	35.6
92.92	0.85	36.7
92.94	0.87	37.1
92.97	0.90	37.7
93.02	0.95	38.7
93.07	1.00	39.7
93.12	1.05	40.7
93.17	1.10	41.7
93.22	1.15	42.6
93.27	1.20	43.5
93.32	1.25	44.4
93.35	1.28	45.0

$Q_{ORIFICE} = C\ A\ (2\ g\ H)^{0.5}$

Size (mm) =	137.00
C/L Orifice Elev =	92.07
Max. Ponding Elev=	93.35
C = Discharge Coeff =	0.61
A = Orifice Area (mm^2) =	14,734
A = Orifice Area (m^2) =	0.0147
Max head over Orifice =	1.28

TABLE D9 - Flow Through Inlet Control Device - 2 (Orifice Equation)

Elev (m)	Head Over Orifice (m)	Orifice Flow (l/s)
92.92	0.00	0.0
92.94	0.02	18.0
92.95	0.03	20.1
92.97	0.05	28.5
93.02	0.10	40.3
93.07	0.15	49.3
93.12	0.20	56.9
93.17	0.25	63.7
93.22	0.30	69.7
93.27	0.35	75.3
93.30	0.38	78.5
93.32	0.40	80.5
93.35	0.43	83.5

$Q_{ORIFICE} = C\ A\ (2\ g\ H)^{0.5}$

Size (mm) =	245.00
C/L Orifice Elev =	92.92
Max. Ponding Elev=	93.35
C = Discharge Coeff =	0.61
A = Orifice Area (mm^2) =	47,120
A = Orifice Area (m^2) =	0.0471
Max head over Orifice =	0.43

TABLE D10 - Total ICD Ouflow Summary

Elev (m)	Outflow From Orifice #1	Outflow From Orifice #2	Total Orifice Flow (l/s)
92.07	0.00	0.00	0.0
92.17	12.59	0.00	12.6
92.27	17.80	0.00	17.8
92.37	21.80	0.00	21.8
92.47	25.18	0.00	25.2
92.57	28.15	0.00	28.1
92.67	30.84	0.00	30.8
92.77	33.31	0.00	33.3
92.87	35.61	0.00	35.6
92.92	36.70	0.00	36.7
92.94	37.13	18.01	55.1
92.97	37.66	20.13	57.8
93.02	38.70	28.47	67.2
93.07	39.71	40.26	80.0
93.12	40.70	49.31	90.0
93.17	41.66	56.94	98.6
93.22	42.60	63.66	106.3
93.27	43.52	69.73	113.3
93.32	44.42	75.32	119.7
93.35	44.95	78.48	123.4

TABLE D11
STAGE STORAGE VOLUME FOR SWM TRENCH

Trench Layer	Contour Elevation (m)	Contour Area (m^2)	Depth (m)	Incremental Volume (m^3)	Pipe Storage	Cumulative Volume (m^3)	
Storage Layer (c/w 50mm Clear Stone, void ratio 0.4)	92.60	15.83	N/A	N/A	0.00	0.00	
	92.70	129.78	0.10	5.19	0.00	5.19	
	92.80	162.00	0.10	6.48	0.00	11.67	
	92.87	162.00	0.07	4.54	0.00	16.21	
	92.90	162.00	0.03	1.94	0.00	18.15	
	92.92	162.00	0.02	1.30	0.00	19.45	2-Yr Elev
	92.94	162.00	0.02	1.30	0.00	20.74	
	92.97	162.00	0.03	1.94	0.00	22.69	5-Yr Elev
	93.00	162.00	0.03	1.94	0.00	24.63	
	93.10	162.00	0.10	6.48	1.80	32.91	
	93.20	175.27	0.10	7.01	0.00	39.92	
	93.30	177.17	0.10	7.09	0.00	47.01	
	93.32	190.60	0.02	1.52	0.00	48.53	100-Yr Elev
	93.35	194.00	0.03	2.33	0.00	50.86	

Table D12 5-YEAR STORM SEWER CALCULATION SHEET

Return Period Storm = **5** (5-years, 100-years)
Default Inlet Time= 10 (minutes)
Manning Coefficient = 0.013 (dimensionless)

LOCATION			AREA (hectares)				FLOW (UNRESTRICTED - RATIONAL METHOD)							SEWER DATA									
Location	From Node	To Node	Area No.	Area (ha)	∑ Area (ha)	Average R	Indiv. 2.78*A*R	Accum. 2.78*A*R	Tc (mins)	I (mm/h)	Indiv. Flow (L/sec)	Return Period	Q (L/sec)	Dia (mm) Actual	Dia (mm) Nominal	Type	Slope (%)	Length (m)	Capacity (L/sec)	Velocity (m/s) Vf	Velocity (m/s) Va	Time in Pipe, Tt (min)	Hydraulic Ratios Qa/Qf	Hydraulic Ratios Va/Vf
	STMMH 101	1200mm dia. STM	A1, A2	0.42703	0.427	0.76	0.90	0.90	10.00	104.19	93.76	5.00	93.8	366.42	375	PVC	1.50	35.31	201.9	1.94	1.37	0.43	0.46	0.71

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:
Ottawa Rainfall Intensity Values: From Sewer Desing Guidelines, 2004

	5yr	100yr
a =	998.071	1735.688
b=	0.814	0.820
c =	6.053	6.014

Designed: **Aaditya Jariwala, M.Eng, P.Eng**
Project: **4000 Strandherd Drive**
Checked: **Alam Ansari, PEng.**
Location: **Ottawa, Ontario**
Dwg Reference: **C200**
File Ref: **22023462 - STM Design Sheet**
Sheet No: **1 of 1**

Appendix E – Additional Information

- **4000 Strandherd Water Boundary Conditions**
- **Engineering Pre-Consultation Meeting Notes from City**
- **Pre-Consultation Applicant's Study and Plan Identification List**
- **Responses from the Architect for FUS 2020 Fire flow calculations**
- **Quality Control Criteria Responses from RVCA and the City**
- **CCTV Inspection Reports for Existing SAN and STM Laterals**

Boundary Conditions
4000 Strandherd Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	10	0.17
Maximum Daily Demand	16	0.26
Peak Hour	28	0.47
Fire Flow Demand #1	7,998	133.30

Location

Results

Connection 1 – Harthill Way

Pressure Zone 3SW

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL[1]	155.0	86.4
Peak Hour [1]	145.1	72.4
Max Day plus Fire Flow[2]	146.5	75.5
[1] Ground Elevation =	94.2	m
[2] Ground Elevation =	93.4	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.

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.

Please see the engineering comments for the SPC application at 4000 Strandherd Drive below:

List of Reports and Plans (Site Plan Control):

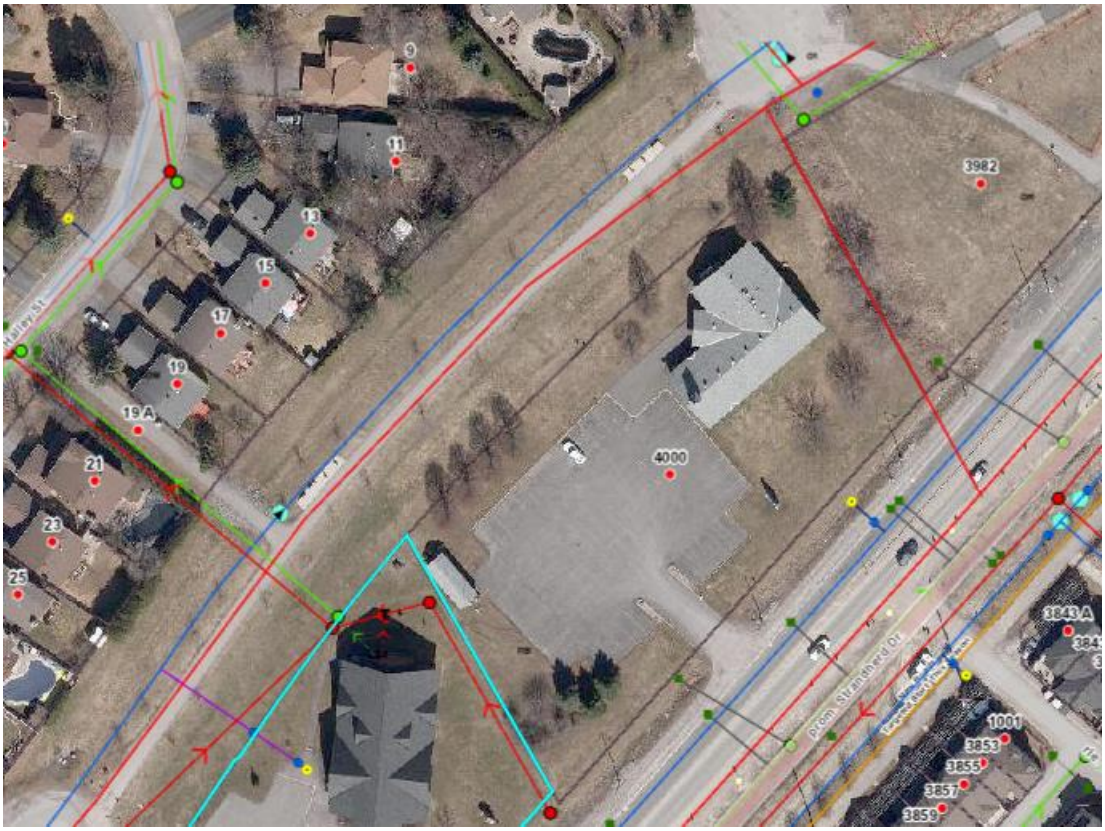
1. Site Servicing Plan
2. Grading Plan
3. Erosion and Sediment Control Plan
4. Storm Drainage / Ponding Plan
5. Stormwater Management and Site Servicing Report
6. Geotechnical Investigation Report

Please note the following information regarding the engineering design submissions for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans
2. Servicing and site works shall be in accordance with the following documents:
   - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including, Technical Bulletin PIEDTB-2016-01 and ISTB-2018-01
   - Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02
   - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - City of Ottawa Park and Pathway Development Manual (2012)
   - City of Ottawa Accessibility Design Standards (2012)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455
4. The Stormwater Management Criteria, for the subject site, is to be based on the following:
   - The sites allowable release rate shall be controlled post-to-pre with any flows exceeding the existing total release rate being stored on site.
   - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
   - Flows to the storm sewer in excess of the allowable release rate must be detained on site for storms up to the 1:100-year return. No surface ponding is permitted for events up to and including the 5-year event.

- Ensure no overland flow for all storms up to and including the 100-year event.
- The 2-yr storm or 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- A calculated time of concentration (Cannot be less than 10 minutes).
- Quality control requirements provided by Rideau Valley Conservation Authority (RVCA).

5. Deep Services:



i. A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:

a. Connections (Existing):

i. 150 mm dia. STM PVC service
ii. 150 mm dia. SAN PVC service
iii. 100 mm dia. WM PVC service

ii. If any existing services are being abandoned, contact the City of Ottawa Project Manager for new connection locations.

iii. *Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.*

iv. *Provide information on the monitoring manhole requirements – should be in an accessible location on private property near the property line (ie. Not in a parking area).*

v. *Provide information on the type of connection permitted*

Sewer connections to be made above the spring line of the sewer main as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less than 50% the diameter of the sewer main,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewer main,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewer main. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. *No submerged outlet connections.*

6. Required Fire Flow shall be calculated per the Fire Underwriters Survey (FUS) 2020 "Water Supply for Public Fire Protection" and be confirmed that there is adequate water supply and fire hydrant coverage for the final structure.

7. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

- Location of service(s)
- Type of development and the amount of fire flow required (as per FUS, 1999).
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s.
- Hydrant location and spacing to meet City's Water Design guidelines.
- Water supply redundancy will be required for more than 50 m3/day water demand.

8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

9. MECP ECA Requirements (Standard) –

All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);

- Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant, it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.
- The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
- Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca) for information only
- Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)
- Site plan Approval, or Draft Approval, is required before an application is sent to the MECP

10. General/ additional comments:

- Only one watermain connection per site. However, looping would be required if proposed demand is 50m3/day or greater.

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer here:

S/A	ENGINEERING		S/A
S	1. Site Servicing Plan	2. Site Servicing Study / Assessment of Adequacy of Public Services	
S	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S
	5. Composite Utility Plan	6. Groundwater Impact Study	
	7. Servicing Options Report	8. Wellhead Protection Study	
	9. Transportation Impact Assessment (TIA)	10.Erosion and Sediment Control Plan / Brief	S
S	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis	
	13.Hydraulic Water main Analysis	14.Noise / Vibration Study	
	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study	

S/A	PLANNING / DESIGN / SURVEY		S/A
	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage	
	19.Draft Plan of Condominium	20.Planning Rationale	S
S	21.Site Plan	22.Minimum Distance Separation (MDS)	
	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study	
	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement	
S	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)	
S	29.Survey Plan	30.Shadow Analysis	
	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)	
	33.Wind Analysis		

S/A	ENVIRONMENTAL		S/A
S	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site	
	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features	
	38.Record of Site Condition	39.Mineral Resource Impact Assessment	
	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species	
	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)	

S/A	ADDITIONAL REQUIREMENTS		S/A
S	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.Site Lighting Plan	**S**
A	46. Site Lighting Certification Letter	47.	

Meeting Date: November 7, 2022 Application Type: *Site Plan Control*

File Lead (Assigned Planner): Craig Hamilton Infrastructure Approvals Project Manager: Tyler Cassidy

Site Address (Municipal Address): 4000 Strandherd Dr *Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

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

Aaditya Jariwala

From: Angelo Spadola <angelomspadola@gmail.com>
Sent: Tuesday, April 25, 2023 2:31 PM
To: Aaditya Jariwala
Subject: Re: 4000 Stranherd

Aaditya,

Can you please clarify the following items:

Aaditya,

Here are my answers,

1. Is there a basement under the existing church? No
2. Will there be a basement under the proposed building? No
3. What is the construction material for the existing building and proposed addition? Existing is Wood Frame , Proposed Wood Frame.
4. Is the existing building sprinklered? Will the proposed addition be sprinklered? No Sprinklers required
5. Will there be any fire walls? No Fire Walls

Regards

On Tue, Apr 25, 2023 at 1:23 PM Aaditya Jariwala <Aaditya.Jariwala@exp.com> wrote:

> Hi Angelo,
>
> Can you please clarify the following items:
>
> 1. Is there a basement under the existing church?
> 2. Will there be a basement under the proposed building?
> 3. What is the construction material for the existing building and proposed addition?
> 4. Is the existing building sprinklered? Will the proposed addition be sprinklered?
> 5. Will there be any fire walls?

I'm trying to request the water boundary conditions from the City and these information will be useful.

Thanks,

Aaditya Jariwala, M.Eng
EXP | Engineering Designer
t : +1.613.688.1899, 63240 | m : +1.613.816.5961 | e : aaditya.jariwala@exp.com
2650 Queensview Drive
Suite 100
Ottawa, ON K2B 8H6
CANADA

--

Angelo M Spadola Architect
200-1645 Russell Road
Ottawa, On. K1G 4G5
Tel: 613. 228. 7190
fax: 613. 228. 8690
angelomspadola@gmail.com

Aaditya Jariwala

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: Wednesday, October 25, 2023 3:42 PM
To: Aaditya Jariwala
Cc: Angelo Spadola; Alam Ansari; Scott Alain
Subject: RE: 4000 Strandherd - SWM Requirements

Hi Aaditya,

Thank you for reaching out for me for clarification, I'm hoping the information I provide will be of use to you. The comment in question was meant to elicit a response or paragraph in the report regarding the quality control for the site. Fortunately, quality control for this site, to the tune of 80% TSS removal, can be provided by an end-of-pipe facility that lies just downstream the site, the Kennedy-Burnette Stormwater Management Facility. You can determine this by following the municipal storm system downstream to the facility (and by confirming that the site's stormwater flows are entering the municipal minor system – note that previously your proposal was not outletting to the municipal minor system, therefore other quality control measures should have been investigated).

In short, what is being requested is that your consultancy add a section to the report stating how the enhanced quality control criteria is being satisfied.

I trust the above is sufficient to satisfy your inquiry.

Thank you,

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Aaditya Jariwala <Aaditya.Jariwala@exp.com>
Sent: October 23, 2023 4:50 PM
To: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Cc: Angelo Spadola <angelomspadola@gmail.com>; Alam Ansari <alam.ansari@exp.com>; Scott Alain <alain@fotenn.com>
Subject: RE: 4000 Strandherd - SWM Requirements

Hello Tyler,

We received the engineering comments for our first pre-consultation submission for the above noted site address. There is a comments regarding quality control (80% TSS Removal). Does that apply to the entire site? As noted previously, this is a community based development with minimal upgrades to the existing condition with no storm services on site. Can you please advise if the quality control requirement can be deferred for this development?

Appreciate your prompt response.

Thanks,

Aaditya Jariwala, M.Eng, P.Eng.
EXP | Engineering Designer
t : +1.613.688.1899, 63240 | m : +1.613.816.5961 | e : aaditya.jariwala@exp.com
exp.com | legal disclaimer
keep it green, read from the screen

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: Friday, March 17, 2023 12:01 PM
To: Scott Alain <alain@fotenn.com>
Cc: Aaditya Jariwala <Aaditya.Jariwala@exp.com>; Angelo Spadola <angelomspadola@gmail.com>
Subject: RE: 4000 Strandherd - SWM Requirements

Hi Scott,

In the interest of moving this community based proposal forward and recognizing the community benefits of such a project, I support your suggestion of recognizing the exiting conditions on site and scoping the stormwater management to the area of new development only. Please have your civil consultant provide a pre-post stormwater management analysis which only includes the area(s) of development. If you are making any minor changes to the grading or to the existing hard surfacing (extra parking, removal of soft landscaping), please do include these areas in the analysis. Note that the other criteria for stormwater management that have been provided in the pre-application consultation meeting notes will still apply.

I welcome you to invite your Civil Consultant to reach out to me during detailed design prior to first submission to ensure we are properly capturing the areas of development.

I'm always available for a discussion if any questions arise.

Thank you,

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Scott Alain <alain@fotenn.com>
Sent: March 14, 2023 2:17 PM
To: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Cc: Aaditya Jariwala <Aaditya.Jariwala@exp.com>; Angelo Spadola <angelomspadola@gmail.com>
Subject: 4000 Strandherd - SWM Requirements

Hi Tyler,

As we prepare our submission for the above-noted file I wanted to touch base with you regarding your pre-consultation notes. In the meeting notes, you have identified stormwater management requirements for the property which would require regrading of almost the entire site, installing infrastructure such as storm sewers, catchbasins, manholes, Inlet Control Devices and possibly an underground storage tank.

Given that the proposal intends to basically maintain the entirety of the parking lot as an existing condition and otherwise intends to build an addition to an already established building, I am wondering if there is a way to scope the requirements down – we are not proposing any new hardscaping. I have also attached a copy of the Site Plan for your reference.

Considering the scale of works necessary to pull out the entire parking lot and then re-establish it in the same manner as it exists currently in order to establish an addition on another segment of the lands, it challenges the viability of proceeding with this project.

Please let me know your thoughts on whether it is possible to recognize an existing condition on the site and scope the SWM requirements to the new construction only.

Happy to chat on this further. I have copied Aaditya Jariwala from EXP here who is better equipped than I to discuss any technical design matters relating to SWM.

Thank you,

Scott Alain, RPP, MCIP (he/him)
Senior Planner

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'

Aaditya Jariwala

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: Thursday, March 23, 2023 11:36 AM
To: Aaditya Jariwala
Cc: Alam Ansari
Subject: RE: Quality Control Requirements for 4000 Stranherd Drive

Hi Aaditya,

The City now handles the review of quality control requirements. While the RVCA would not have triggered requirements, I defer you to the City as part of your site plan application.

Cheers,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Aaditya Jariwala <Aaditya.Jariwala@exp.com>
Sent: Thursday, March 23, 2023 10:05 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Alam Ansari <alam.ansari@exp.com>
Subject: Quality Control Requirements for 4000 Stranherd Drive

Hello Eric,

We are applying for a Site Plan Control application with the City of Ottawa for above noted address. The development includes addition of a small building to the existing building only. Can you please provide quality control requirements for this development?

Let me know if you need further information.

Regards,

Aaditya Jariwala, M.Eng
EXP | Engineering Designer
t : +1.613.688.1899, 63240 | m : +1.613.816.5961 | e : aaditya.jariwala@exp.com
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514.738.9762

CLEAN WATER WORKS INC.

INTEGRATED SEWER SOLUTIONS

4000 Strandherd

Ottawa, Ontario

DRAIN CCTV INSPECTION REPORT

Report ID
119067

Sewer Use
Sanitary & Storm

Completion Date
August 08, 2022

Inspected Length
44.20 meters

Table of contents

1. Index of pipes

2 items

Inspected length : 44.20
Total length : 0.00

Pipe	Start/End	Direction	Road	Date	Inspected	Total	Page
Accesible Toilet Flange	Toilet Flange --> End	Direction of flow	4000 Strandherd	08/08/2022 11:18 AM	30.2		5
Cleanout by Water Meter	Cleanout --> End	Direction of flow	4000 Strandherd	08/08/2022 11:03 AM	14		12

2. Internal condition grade

2 items

1 - Acceptable structural condition (2 of 2 items)

Total	Peak	Pipe	Start/End	Direction	Road	Page
0	0	Accesible Toilet Flange	Toilet Flange --> End	Direction of flow	4000 Strandherd	5
0	0	Cleanout by Water Meter	Cleanout --> End	Direction of flow	4000 Strandherd	12

3. Operational performance grade

2 items

Grade: 1 (2 of 2 items)

Total	Peak	ICG	Pipe	Start/End	Direction	Road	Page
0	0	1	Accesible Toilet Flange	Toilet Flange --> End	Direction of flow	4000 Strandherd	5
0	0	1	Cleanout by Water Meter	Cleanout --> End	Direction of flow	4000 Strandherd	12

4. Pipe summary and condition details

Pipe identification

Pipe:	Accesible Toilet Flange	**Direction of inspection:**	Toilet Flange --> End
Direction of flow:	Toilet Flange --> End	**Direction:**	Direction of flow

Pipe location

			UPSTREAM	DOWNSTREAM
Road:	4000 Strandherd	**Easting (X):**		
Crossroad:		**Northing (Y):**		
Drainage Area:		**Elevation (Z):**		
City:	Ottawa			
Location:		**GPS Accuracy:**		
Owner:	Angelo Spadola	**Corrdinate System:**		
Road segment:		**Vertical Datum:**		

Pipe characteristics

Category:	Sanitary	**Size:**	3
Shape:		**Width:**	
Material:	ABS	**Total length:**	
Lining:		**Pipe unit length:**	
Type:	Lateral	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Inspection standard:	WRC 3rd edition	**Survey Abandoned:**	
Date:	08/08/2022 11:18 AM	**Inspected length:**	30.2
Project Number:		**Pre-cleaning:**	☐
Contractor project #:		**Blocked flow:**	☐
Client:	COD - 4000 Strandherd 119067	**Regular CCTV:**	☐
Purpose:		**Reinspect with ZOOM:**	☐
Weather:		**Medium #:**	
Operator:	AVR	**Start position:**	
Analyst:		**End position:**	

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

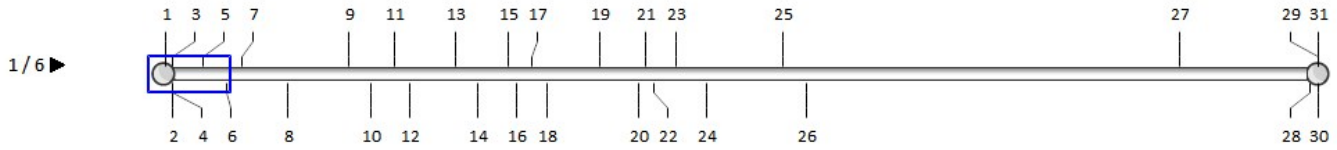
Grade: 1
Total: 0
Peak: 0

Comments

Other information

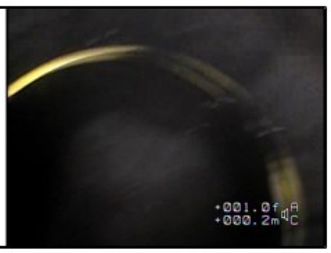
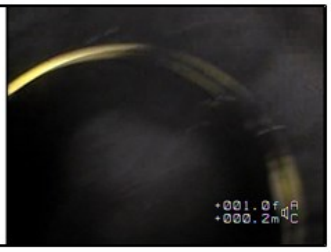
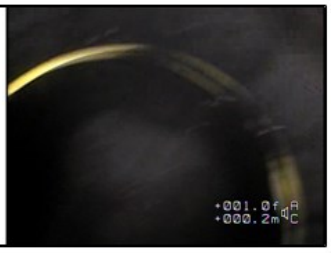
Date:	August-08-2022	**Information 7:**	
Work Order#:		**Information 8:**	
Start of Location:	Accesible Toilet Flange	**Information 9:**	
End of Location:	30.2m	**Information 10:**	
Location:		**PI5 (MAMR):**	0
Information 6:		**PI6 (MAMR):**	0

4. Pipe summary and condition details



Upstream
Toilet Flange

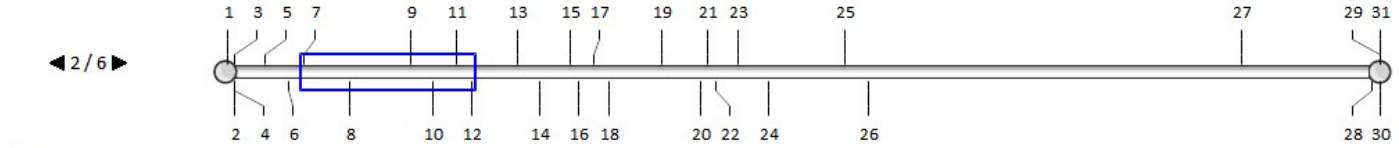
Invert
NA

1	0.00	SOI - START OF INSPECTION, Toilet Flange	
2	0.20	LBS - LINE BENDS STRAIGHT	
3	0.20	MC - MATERIAL CHANGE, ABS to PVC	
4	0.20	DC - DIAMETER CHANGE, 3" to 4"	
5	1.00	LBL - LINE BENDS LEFT, WYE	
6	1.60	SC - SERVICE CONNECTION, at 3 o'clock	

Invert
NA

Downstream
End

4. Pipe summary and condition details

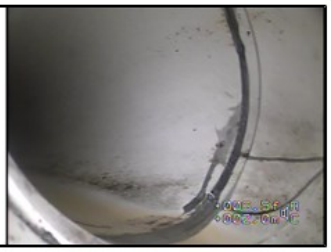


Upstream
Toilet Flange

Invert
NA

7 ↓ **2.00**

LBL - LINE BENDS LEFT



8 ↓ **3.20**

SC - SERVICE CONNECTION, at 10 o'clock

9 ↓ **4.80**

SC - SERVICE CONNECTION, at 9 o'clock

10 ↓ **5.40**

SC - SERVICE CONNECTION, at 3 o'clock

11 ↓ **6.00**

SC - SERVICE CONNECTION, at 9 o'clock

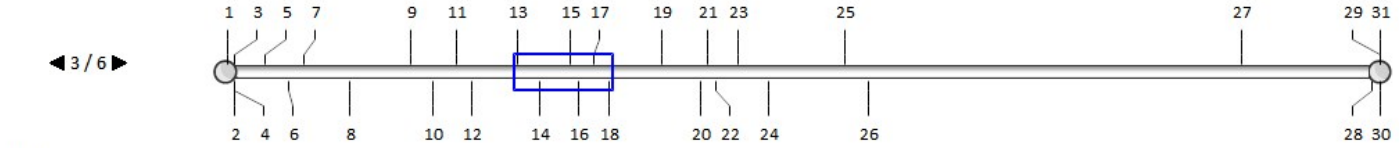
12 ↓ **6.40**

SC - SERVICE CONNECTION, at 3 o'clock

Invert
NA

Downstream
End

4. Pipe summary and condition details

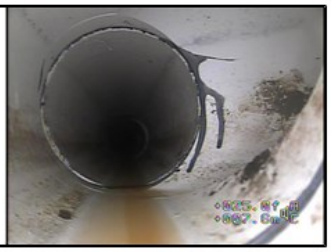


Upstream
Toilet Flange

Invert
NA

13 ↓ **7.60**

SC - SERVICE CONNECTION, at 3 o'clock



14 ↓ **8.20**

SC - SERVICE CONNECTION, at 3 o'clock

15 ↓ **9.00**

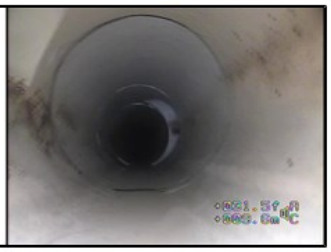
SC - SERVICE CONNECTION, at 3 o'clock

16 ↓ **9.20**

SC - SERVICE CONNECTION, at 3 o'clock

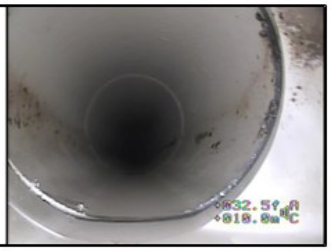
17 ↓ **9.60**

SC - SERVICE CONNECTION, at 10 o'clock



18 ↓ **10.00**

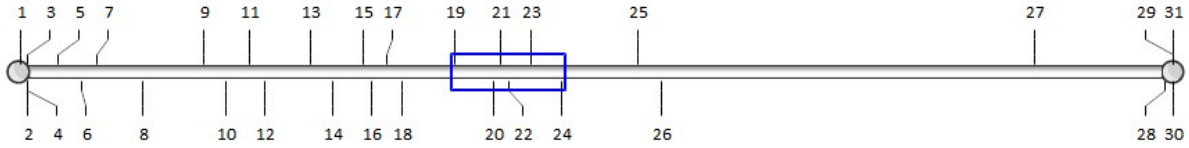
SC - SERVICE CONNECTION, at 3 o'clock



Invert
NA

Downstream
End

4. Pipe summary and condition details



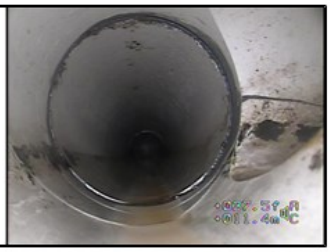
◀ 4 / 6 ▶

Upstream
Toilet Flange

Invert
NA

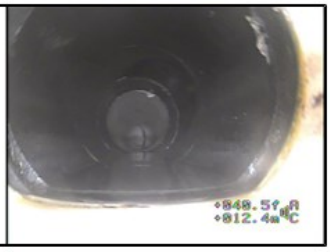
19 ↓ **11.40**

SC - SERVICE CONNECTION, at 3 o'clock



20 ↓ **12.40**

MC - MATERIAL CHANGE, PVC to ABS

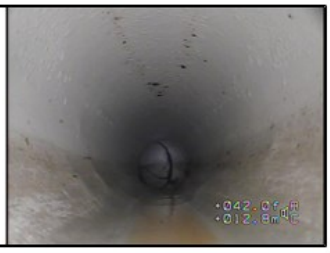


21 ↓ **12.60**

SC - SERVICE CONNECTION, at 2 o'clock

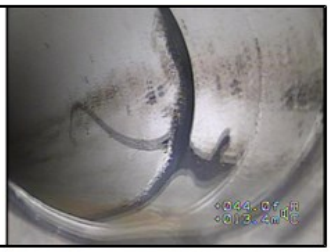
22 ↓ **12.80**

MC - MATERIAL CHANGE, ABS to PVC



23 ↓ **13.40**

LBL - LINE BENDS LEFT



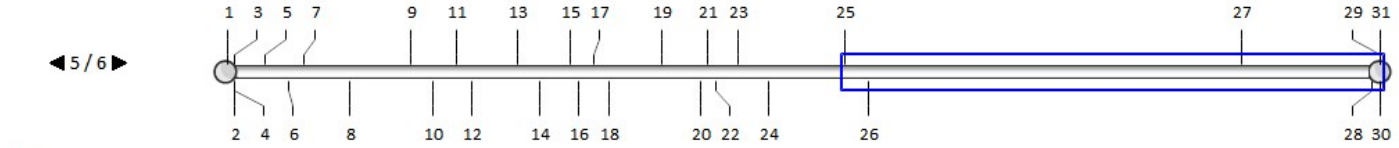
24 ↓ **14.20**

LBL - LINE BENDS LEFT

Invert
NA

Downstream
End

4. Pipe summary and condition details



Upstream
Toilet Flange

Invert
NA

25 ↓ **16.20**

LBR - LINE BENDS RIGHT

26 ↓ **16.80**

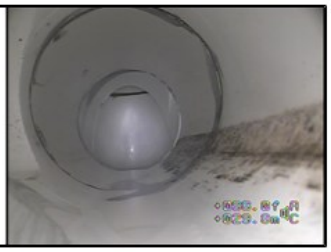
LBR - LINE BENDS RIGHT

27 ↓ **26.60**

LBL - LINE BENDS LEFT

28 ↓ **30.00**

SC - SERVICE CONNECTION, at 9 o'clock



29 ↓ **30.20**

SC - SERVICE CONNECTION, at 12 o'clock

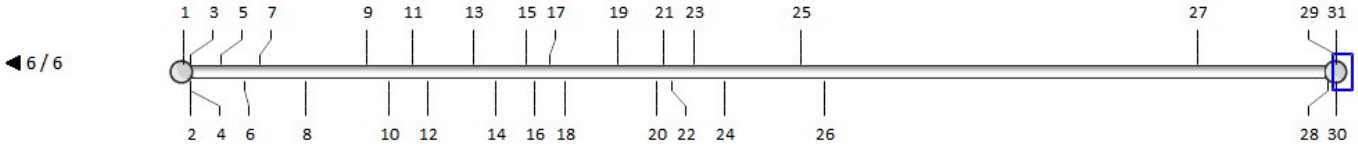
30 ↓ **30.20**

LBD - LINE BENDS DOWN

Invert
NA

Downstream
End

4. Pipe summary and condition details



Upstream
Toilet Flange

Invert
NA

Invert
NA

Downstream
End

31 ↓ 30.20 END - END OF INSPECTION	

4. Pipe summary and condition details

Pipe identification

Pipe:	Cleanout by Water Meter	**Direction of inspection:**	Cleanout --> End
Direction of flow:	Cleanout --> End	**Direction:**	Direction of flow

Pipe location

Road:	4000 Strandherd		UPSTREAM	DOWNSTREAM
Crossroad:		**Easting (X):**		
Drainage Area:		**Northing (Y):**		
City:	Ottawa	**Elevation (Z):**		
Location:				
Owner:	Angelo Spadola	**GPS Accuracy:**		
Road segment:		**Corrdinate System:**		
		Vertical Datum:		

Pipe characteristics

Category:	Storm	**Size:**	4
Shape:		**Width:**	
Material:	Polyvinyl chloride	**Total length:**	
Lining:		**Pipe unit length:**	
Type:	Lateral	**Year laid:**	
Invert (upstream):		**Invert (downstream):**	
Depth (upstream):		**Depth (downstream):**	
Cover level (upstream):		**Cover level (downstream):**	

Additional details

Inspection standard:	WRC 3rd edition	**Survey Abandoned:**	
Date:	08/08/2022 11:03 AM	**Inspected length:**	14
Project Number:		**Pre-cleaning:**	☐
Contractor project #:		**Blocked flow:**	☐
Client:	COD - 4000 Strandherd 119067	**Regular CCTV:**	☐
Purpose:		**Reinspect with ZOOM:**	☐
Weather:		**Medium #:**	
Operator:	AVR	**Start position:**	
Analyst:		**End position:**	

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

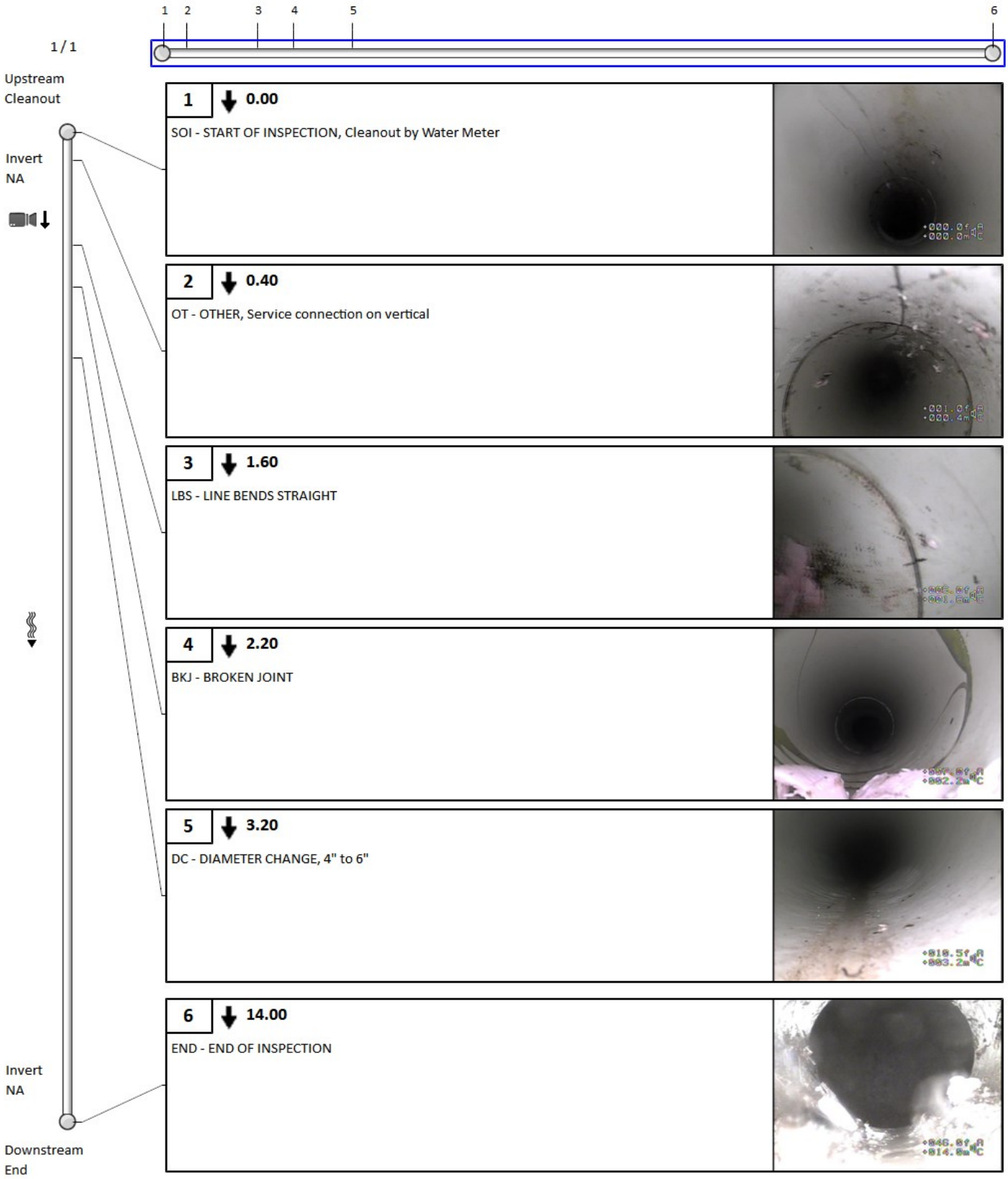
Grade: 1
Total: 0
Peak: 0

Comments

Other information

Date:	August-08-2022	**Information 7:**	
Work Order#:	119067	**Information 8:**	
Start of Location:	Cleanout	**Information 9:**	
End of Location:	14.0m	**Information 10:**	
Location:	Sunday School Room	**PI5 (MAMR):**	0
Information 6:		**PI6 (MAMR):**	0

4. Pipe summary and condition details



1 ↓ **0.00**

SOI - START OF INSPECTION, Cleanout by Water Meter

2 ↓ **0.40**

OT - OTHER, Service connection on vertical

3 ↓ **1.60**

LBS - LINE BENDS STRAIGHT

4 ↓ **2.20**

BKJ - BROKEN JOINT

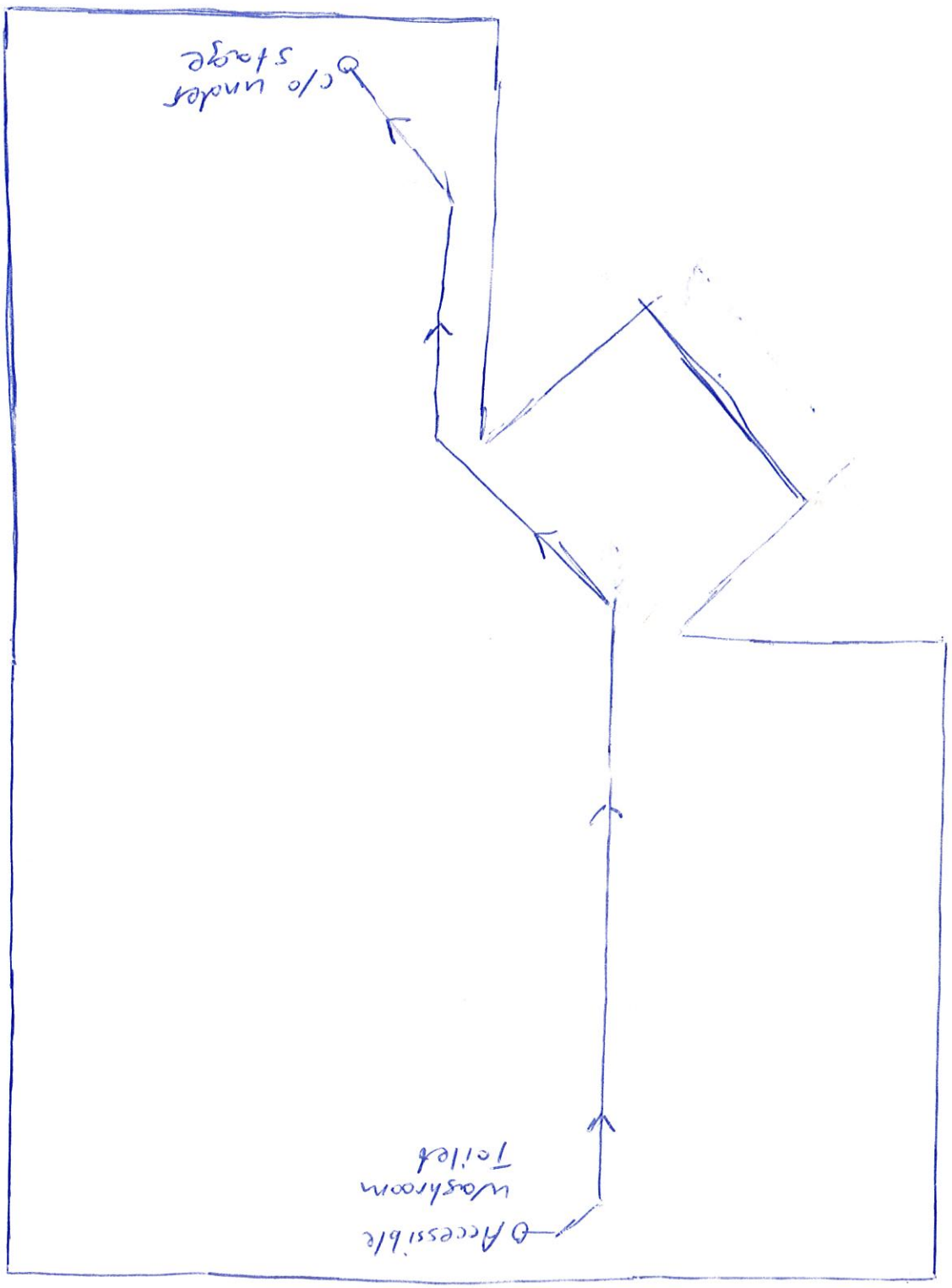
5 ↓ **3.20**

DC - DIAMETER CHANGE, 4" to 6"

6 ↓ **14.00**

END - END OF INSPECTION

CLEAN WATER WORKS INC.	PAGE 2 OF 2	SEWER LATERAL LOCATE FORM
CLIENT: COD	LOCATE PERFORMED BY: AvR	DATE: Aug 8/22
LOCATION: 4000 Strandherd	MAY BE USED FOR EXCAVATION? ☐ YES ☑ NO	



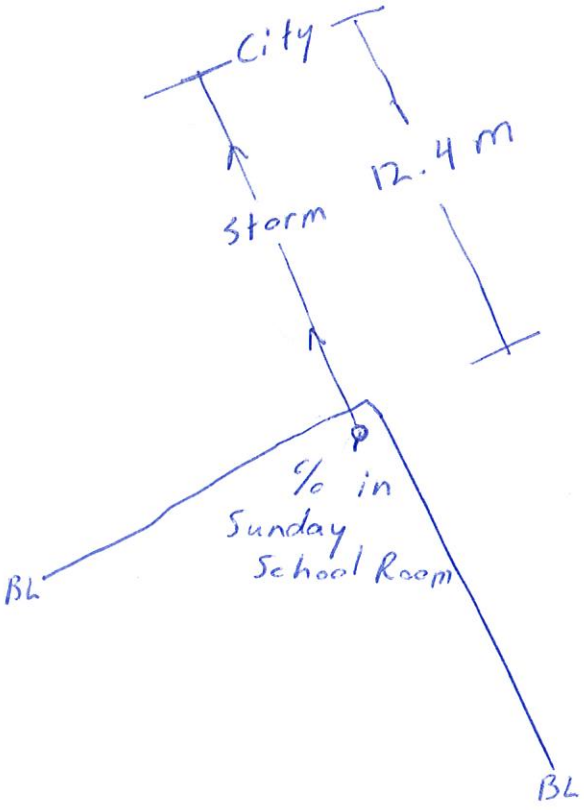
NOT TO SCALE

This is a locate for the Sanitary and Storm pipes only. Locates for other private and public utilities are required prior to any excavation (Ontario One Call 1-800-400-2255).

LEGEND	
Building Line	--BL--
Street Line	--SL--
Fence Line	--FL--
Road Edge	--RE--
Sanitary Service	--SAN--
Manhole	MH
Catch Basin	CB
Sidewalk	--SW--
Pole	O
Pedestal	X
Gas Main	--GM--
Gas Service	--GS--
Hydrant	
Water/Sewer MH	

COMMENTS: Sanitary Sewer

CLEAN WATER WORKS INC.	PAGE 1 OF 2	SEWER LATERAL LOCATE FORM
CLIENT: CoD	LOCATE PERFORMED BY: AvR	DATE: Aug 8/22
LOCATION: 4000 Strandherd	MAY BE USED FOR EXCAVATION? ☐ YES ☒ NO	



LEGEND	
Building Line	--BL--
Street Line	--SL--
Fence Line	--FL--
Road Edge	--RE--
Sanitary Service	--SAN--
Manhole	MH
Catch Basin	CB
Sidewalk	--SW--
Pole	O
Pedestal	X
Gas Main	--GM--
Gas Service	--GS--
Hydrant	
Water/Sewer MH	

NOT TO SCALE

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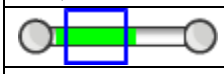
COMMENTS:

Storm Sewer

Vision Report© Legend

	The numbers sequentially identify each observation. They allow you to find complete descriptions and related photos throughout the pages. Note that when the pipe contains too many observations, the Vision© report hides the least important observations to optimize the display*.
60	A number with neither a square nor circle indicates a general observation.
	A circled number indicates a structural anomaly. The color of the circle indicates the severity of the anomaly on a scale of 1 to 5, 5 being the most severe: green=1, blue=2, magenta=3, orange=4 and red=5.
	A number in a square indicates an operation and maintenance anomaly. The color of the square indicates the severity of the anomaly on a scale of 1 to 5, 5 being the most severe: green=1, blue=2, magenta=3, orange=4 and red=5.
◀ 3 / 31 ▶	Indicates the current page number of the inspection report.
	The blue square indicates a section of the pipe; this section is covered in detail on the current page of the report.
	The green line indicates the inspected part of the pipe. The remaining white line indicates the uninspected part of the pipe.
	Indicates the hold points on the camera during an inspection.
	Indicates the hold points on the camera during the reverse inspection.
	Indicates that a reverse inspection was carried out, however the camera did not reach the initial inspection hold point. (the hold point of the initial inspection)
	Indicates that a reverse inspection was carried out and that it has joined (has arrived at) the initial inspection hold point.
401-059B	Identifies the start manhole number. Note that this manhole is not necessarily the upstream manhole of the pipe.
401-631	Identifies the end manhole number. Note that this manhole is not necessarily the downstream manhole of the pipe.
ou	A downward arrow indicates that the inspection was carried out in the direction of the current, whereas an upward arrow indicates an inspection against the current. Note that the manhole located on the upper left of the page is always the start manhole, but not necessarily the upstream manhole of the pipe.
	This camera followed by a downward arrow is located on the upper left of the vertical pipe; it indicates that an inspection was done from this manhole.
	When the second camera appears on the bottom left page it means that a reverse inspection was carried out. Information about the reverse inspection is included in the report, thereby combining both inspections.
Invert 3.40	The measurement shown under the word <Invert> indicates the measurements between the frame and the pipe captured during the inspection. This measurement is available at the top left for the start manhole and the bottom left for the end manhole. If the invert was not measured during the inspection, an <NA> mark will be displayed.
	The downward bold arrow to the right of the observation number indicates that this observation was captured during the initial inspection.
	The blank arrow pointing upwards and located to the right of the observation number indicates that this observation was taken during the reverse inspection period, thereby confirming that this report combined both inspections.
18.40 m	Located to the right of the observation number is a number identifying the observation distance in relation to the start of the pipe.
SRV - Armature visible	A full description of the observation code according to the protocol used.

*Any hidden observations are readily accessible from the database as well as in other CTSpec report templates.

** CTSpec inc. reserves the right to modify, eliminate or add to the product features described in this pamphlet without notice.

Appendix F – Drawings

- **Topographical Survey (Reduced Size 11x17)**
- **Architectural Plans (Reduced Size 11x17)**
- **Background Drawings from City (Reduced Size 11x17)**
- **Civil Drawings (Included Separately)**

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of

PART OF BLOCK 123
REGISTERED PLAN 4M-538
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 16th day of November, 2018.

Dec 10/18
Date

V. Andrew Shelp
Ontario Land Surveyor

PART 2
THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED: December 10, 2018

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to Haven Baptist Church ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	=	Survey Monument Found
SIB	=	Standard Iron Bar
IB	=	Iron Bar
(WIT)	=	Witness
(AOG)	=	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	=	Measured
(P1)	=	Plan 4R-12455
(P2)	=	(AOG) Plan April 10, 1997
(P3)	=	Plan 4R-22534
(P4)	=	Plan 4R-22408
○ MH–ST	=	Maintenance Hole (Storm Sewer)
○ MH-S	=	Maintenance Hole (Sanitary)
○ MH-B	=	Maintenance Hole (Bell)
OHW	=	Overhead Wires
○ UP	=	Utility Pole
T/G	=	Top of Grate
□ GM	=	Gas Meter
▫ TB–B	=	Bell Terminal Box
▫ TB–H	=	Hydro Terminal Box
▫—▫ TSP	=	Traffic Signal Post
○	=	Deciduous Tree
✳	=	Coniferous Tree
○ B	=	Bollard
△ S	=	Sign
□ MB	=	Mail Box
Ø	=	Diameter
×65.00	=	Location of Elevations
+65.00	=	Location of Top of Curb Elevation
C/L	=	Centreline
P	=	Pillar
T/P	=	Top of Pipe
CSP	=	Corrugated Steel Pipe
TOS	=	Top of Slope

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2078223

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Bearings are grid, derived from The Northerly Limit of Part 14 on Plan 4R-8965, shown to be N41°48'30"E and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES

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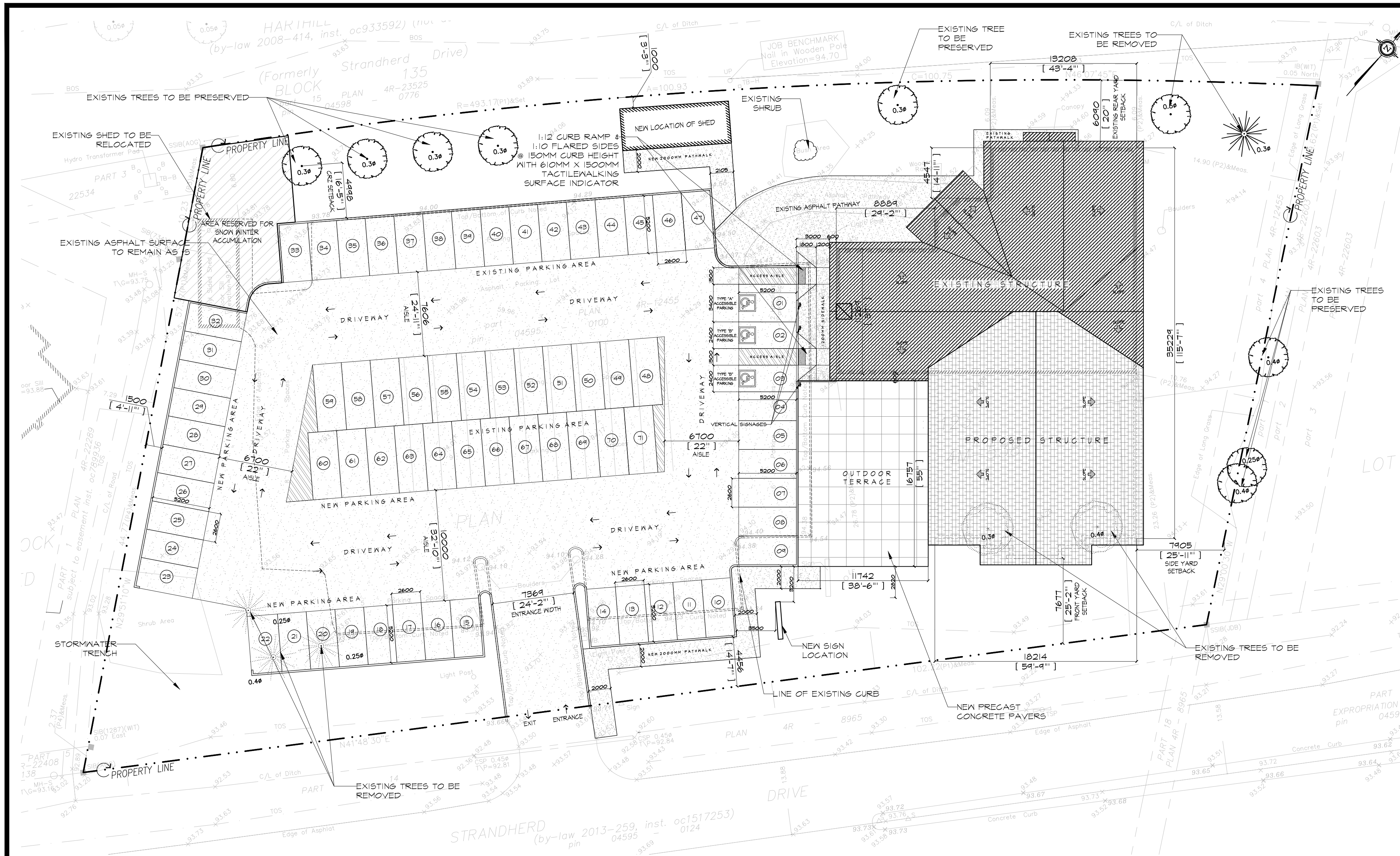
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Ontario Land Surveyors

Job No. I7984-IB Haven Baptist Church PtBlk123 4M-538 D F | AA



PROJECT DATA:	
BUILDING USE	- PLACE OF WORSHIP (CHURCH)
ZONING TYPE	- I1B
LAND AREA	- 5,366.38 Sqm. - (57,763.17 Sqft) (0.54 ha)

EXISTING BUILDING		PROPOSED BUILDING	
EXIST. BUILDING AREA (GROSS FLOOR AREA)	- 446.49 Sqm. (4,804.23 Sqft.)	NEW BUILDING AREA (GFA)	- 726.22 Sqm. (7816.96 Sqft)
EXIST. WORSHIP & FELLOWSHIP AREA	- 113.76 Sqm. 1,224.05 Sqft.	BUILDING ADDITION AREA (GFA)	- 279.51 Sqm. (3008.62 Sqft)
		NEW ASSEMBLY AREA (GFA)	- 329 Sqm. (3541.33 Sqft.)
		FELLOWSHIP HALL	- 93.00 Sqm
		NEW WORSHIP AREA	- 236 Sqm
		NEW ASSEMBLY GFA	- 329 Sqm
LANDSCAPE VS BUILT FORM	- 3142.51 Sqm. (56% LANDSCAPE AREA)	LANDSCAPE VS BUILT FORM	- 2461.17 Sqm. (46% LANDSCAPE AREA)
BUILDING HEIGHT (TOP OF ROOF)	- 7.96 M. approx.	BUILDING HEIGHT (TOP OF ROOF)	- 8.76 M.
TOWER HEIGHT	- 12.10 M. approx.	TOWER HEIGHT	- 12.10 M. approx.
PARKING PROVISIONS:		PARKING PROVISIONS:	
PARKING STALLS	- 53 PARKING SPACES	PARKING STALLS	- 68 PARKING SPACES
HANDICCAPED PARKING	- 3 PARKING SPACE	HANDICCAPED PARKING	- 3 PARKING SPACE
TOTAL EXISTING = 56 PARKING SPACES		TOTAL PARKING SPACES PROVIDED = 71 PARKING SPACES	

ZONING MECHANISMS

EXISTING		PROPOSED		REQUIRED	
PROVISIONS	AREA/LENGTH			PROVISIONS	AREA/LENGTH
LOT AREA	5,366.38 m2 (57,763.17 ft2)	LOT AREA	5,366.38 m2 (57,763.17 ft2)	MINIMUM LOT AREA	1000 m2. (10763.9 ft2)
LOT FRONTAGE	102.21 m (335.33 ft)	LOT FRONTAGE	102.21 m (335.33 ft)	MINIMUM LOT FRONTAGE	30.00 m (98.42 ft)
FRONT YARD SETBACK	23.26 m (76.31 ft)	FRONT YARD SETBACK	7.67 m (25.16 ft)	MINIMUM FRONT YARD SETBACK	6 m (19.7 ft)
INTERIOR SIDE YARD SETBACK	10.76 m (35.30 ft)	INTERIOR SIDE YARD SETBACK	7.90 m (25.91 ft)	MINIMUM INTERIOR SIDE YARD SETBACK	7.5 m (24.6 ft)
REAR YARD SETBACK	6.09 m (19.68 ft)	REAR YARD SETBACK	6.09 m (19.68 ft) (EXISTING)	MINIMUM REAR YARD SETBACK	7.5 m (24.6 ft)
BUILDING HEIGHT	7.96 m (26.11 ft)	BUILDING HEIGHT	8.76 m (28.74 ft)	MAXIMUM BUILDING HEIGHT	18.00 m (59.05 ft)

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(P2)	"	(AOG) Plan April 10, 1997
(P3)	"	Plan 4R-22534
(P4)	"	Plan 4R-22408
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MH-S	"	Maintenance Hole (Sanitary)
MH-B	"	Maintenance Hole (Bell)
OHW	"	Overhead Wires
UP	"	Utility Pole
T/G	"	Top of Grate
GM	"	Gas Meter
TB-B	"	Bell Terminal Box
TB-H	"	Hydro Terminal Box
TSP	"	Traffic Signal Post
	"	Deciduous Tree
	"	Coniferous Tree
B	"	Bollard
S	"	Sign
MB	"	Mail Box
Ø	"	Diameter
+65.00	"	Location of Elevations
+65.00	"	Location of Top of Curb Elevation
C/L	"	Centreline
P	"	Pillar
T/P	"	Top of Pipe
CSP	"	Corrugated Steel Pipe
TOS	"	Top of Slope

ASSOCIATION OF ONTARIO LAND SURVEYORS
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3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 17884-18 Haven Baptist Church PtBlk123 4M-538 D F | AA

ANGELO MATTIA SPADOLA
ARCHITECT
200-1645 RUSSELL ROAD OTTAWA, ONTARIO K1G 4G5
T: 613.228.7190 F: 613.228.8690 ANGELOMSPADOLA@GMAIL.COM

1	PRESENTATION & APPROVAL	2022 04 01
2	ISSUED FOR CLIENTS APPROVAL	2022 04 05
3	ISSUED FOR CLIENTS APPROVAL	2022 04 12
4	ISSUED TO CIVIL ENGINEER	2022 04 27
5	ISSUED FOR CLIENTS APPROVAL	2022 04 29
6	ISSUED FOR CLIENTS FINAL APPROVAL	2022 05 06
7	APPROVED DESIGN DRAWINGS	2022 05 10
8	ISSUED FOR CONSULTANT CO-ORDINATION DRWG.	2022 06 03
9	ISSUED TO CONSTRUCTION MANAGER	2022 06 27
10	ISSUED FOR BUILDING PERMIT	2022 07 15
11	ISSUED FOR CITY COMMENTS	2022 08 25
12	ISSUED FOR CITY COMMENTS	2023 02 03
13	ISSUED FOR SITE PLAN APPROVAL	2023 03 08
14	ISSUED FOR SITE PLAN APPROVAL (PHASE 3 PRE-CONSULTATION)	2023 10 31
15	ISSUED FOR SITE PLAN APPROVAL (PHASE 3 FINAL SUBMISSION)	2023 12 06
16	ISSUED FOR SITE PLAN APPROVAL (PHASE 3 FINAL SUBMISSION)	2024 03 28

GENERAL NOTES:

1. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE ARCHITECT FOR HIS WRITTEN PERMISSION BEFORE PROCEEDING WITH THE WORK.
2. NOT FOR CONSTRUCTION UNLESS SIGNED BY THE ARCHITECT.
3. NOT TO BE SCALED OR REPRODUCED WITHOUT WRITTEN PERMISSION.

CONSULTANTS:

STRUCTURAL ENGINEERS:
DALY ENGINEERING INC.
Structural Design & Engineering
G1-300 Lett Street, Ottawa Ontario, K1R 0R8
Telephone: 705-816-5554 Email: info@dalyengineering.ca

MECHANICAL & ELECTRICAL:
B.A. DESIGN LIMITED
1470 Lagan Way, Unit 2, Ottawa Ontario K1V 3S6

CIVIL & GEOTECH. INVESTIGATION.:
EXP SERVICES INC.
100 - 2650 Queensview Drive Ottawa Ontario K2B 8H6

PLANNING & LANDSCAPE ARCHITECTURE:
FOTENN PLANNING + DESIGN
396 Cooper Street, Suite 300, Ottawa Ontario K2P 2H7

HAVEN BAPTIST CHURCH

4000 Strandherd Drive , Nepean, Ontario K2J 4R8

PROJECT DATA

SITE PLAN W/ SITE SURVEY

DATE:	April 2022
SCALE:	
PROJ. #:	AMS/BC-22/06
DRAWN BY:	EF. / VR.
CHECKED BY:	AMS

SHEET NUMBER:

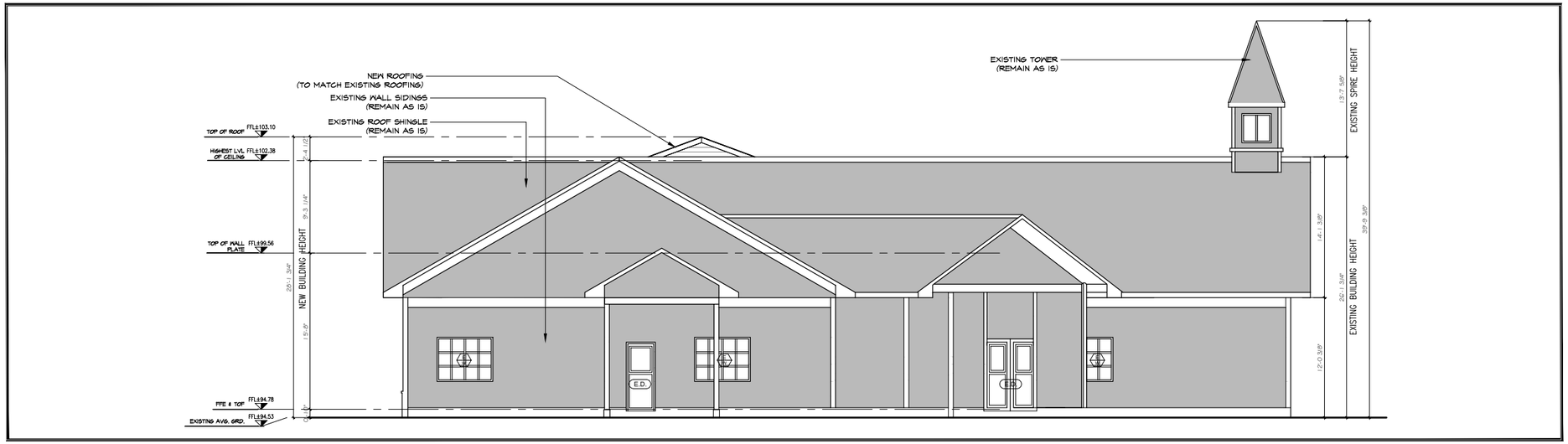
A0.2

REV. NO.

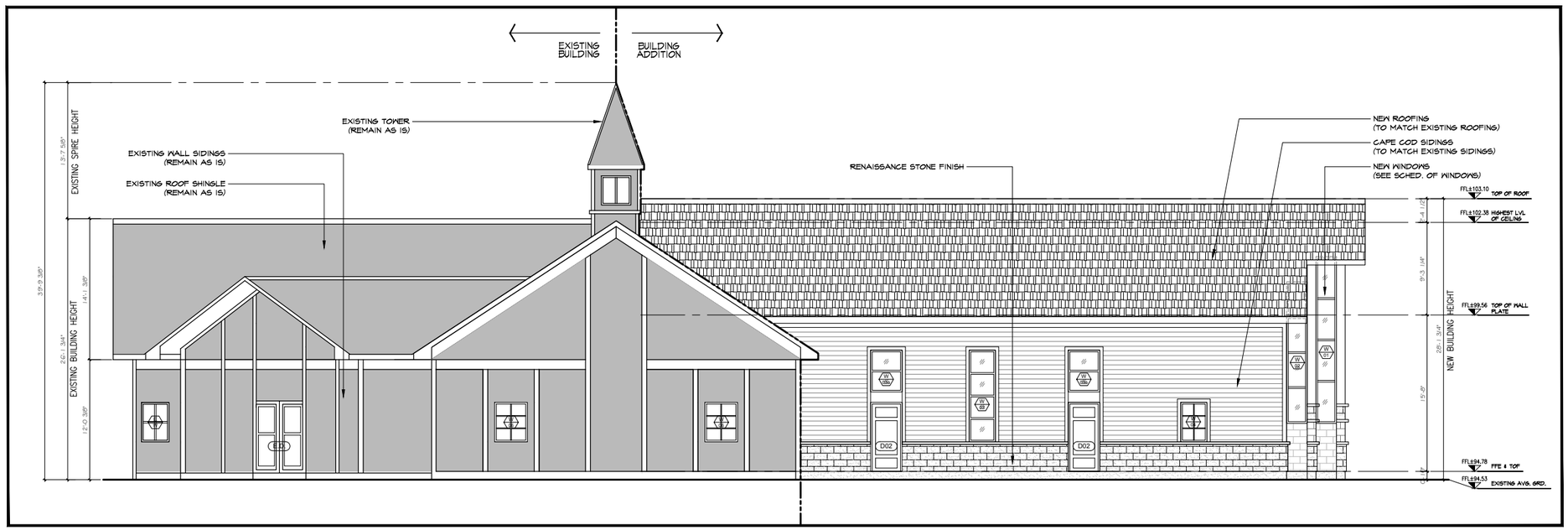
DATE :

ONTARIO ASSOCIATION OF ARCHITECTS
ANGELO M. SPADOLA
LICENCE
4339

2022-08-25 10:00 am



01 A2.0 NORTH ELEVATION
SCALE: 3/16" = 0'-0"



02 A2.0 WEST ELEVATION
SCALE: 3/16" = 0'-0"

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T: 613.228.7190 F: 613.228.8690 ANGELOMSPADOLA@GMAIL.COM

1	PRESENTATION & APPROVAL	2022 04 01
2	ISSUED FOR CLIENTS APPROVAL	2022 04 05
3	ISSUED FOR CLIENTS APPROVAL	2022 04 12
4	ISSUED TO CIVIL ENGINEER	2022 04 27
5	ISSUED FOR CLIENTS APPROVAL	2022 04 29
6	ISSUED FOR CLIENTS FINAL APPROVAL	2022 05 06
7	APPROVED DESIGN DRAWINGS	2022 05 10
8	ISSUED FOR CONSULTANT CO-ORDINATION DRWG.	2022 06 03
9	ISSUED TO CONSTRUCTION MANAGER	2022 06 27
10	ISSUED FOR BUILDING PERMIT	2022 07 15
11	ISSUED FOR CITY COMMENTS	2022 08 25
12	ISSUED FOR CITY COMMENTS	2023 02 03
13	ISSUED FOR SITE PLAN APPROVAL	2023 03 08
14	ISSUED FOR SITE PLAN APPROVAL (PHASE 3 PRE-CONSULTATION)	2023 10 31
15	ISSUED FOR SITE PLAN APPROVAL (PHASE 3 FINAL SUBMISSION)	2023 12 06

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1470 Lagan Way, Unit 2, Ottawa Ontario K1V 3S6

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FOTENN PLANNING + DESIGN
396 Cooper Street, Suite 300, Ottawa Ontario K2P 2H7

HAVEN BAPTIST CHURCH

4000 Strandherd Drive , Nepean , Ontario K2J 4R8

NORTH ELEVATION
WEST ELEVATION

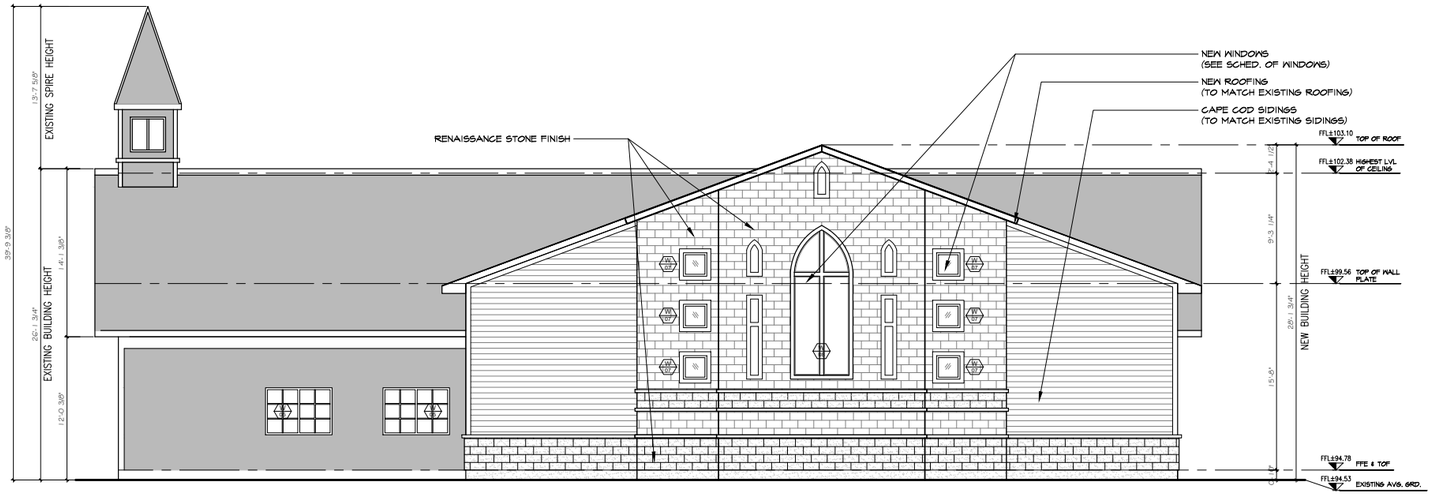
DATE:	April 2022
SCALE:	3/16"=1'-0"
PROJ. #:	AMS/BC-22/06
DRAWN BY:	EF. / VR.
CHECKED BY:	AMS

SHEET NUMBER:
A2.0

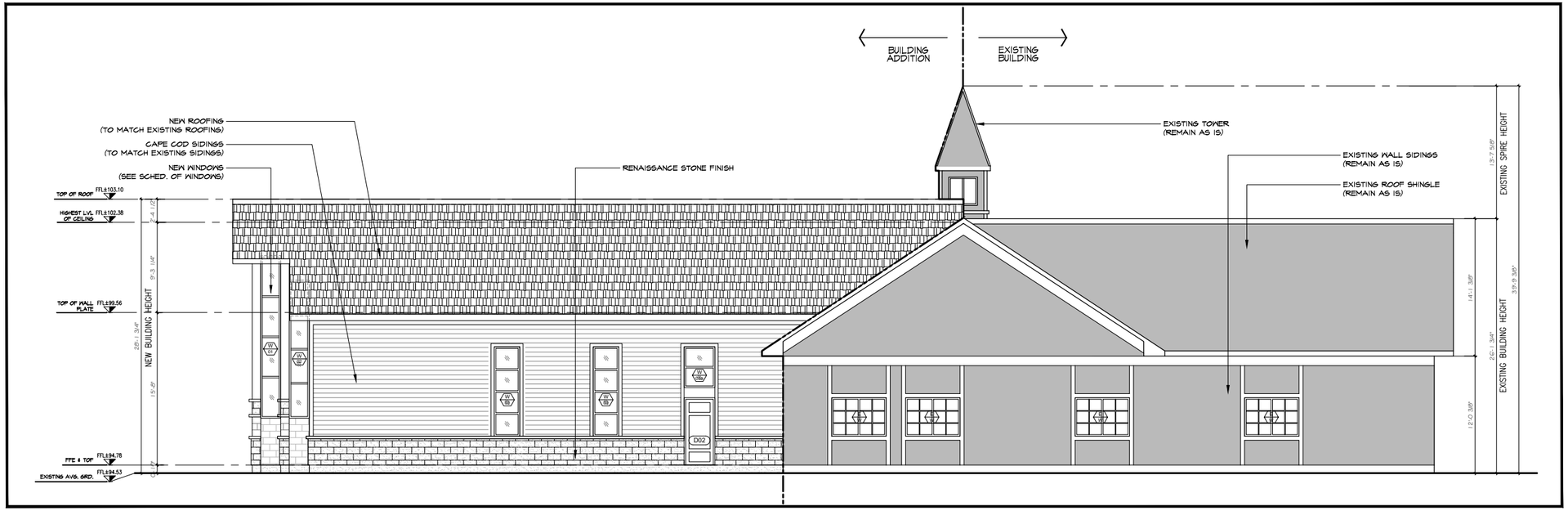
REV. NO. 05
DATE : 2022.05.10

ONTARIO ASSOCIATION OF ARCHITECTS
ANGELO M. SPADOLA
LICENCE 4339

2022-08-25 10:00 am



01 A2.1 SOUTH ELEVATION
SCALE: 3/16" = 0'-0"



02 A2.1 EAST ELEVATION
SCALE: 3/16" = 0'-0"

ANGELO MATTIA SPADOLA
ARCHITECT
200-1645 RUSSELL ROAD OTTAWA, ONTARIO K1G 4G5
T: 613.228.7190 F: 613.228.8690 ANGELOMSPADOLA@GMAIL.COM

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3	ISSUED FOR CLIENTS APPROVAL	2022 04 12
4	ISSUED TO CIVIL ENGINEER	2022 04 27
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HAVEN BAPTIST CHURCH

4000 Strandherd Drive ,
Nepean , Ontario K2J 4R8

SOUTH ELEVATION
EAST ELEVATION

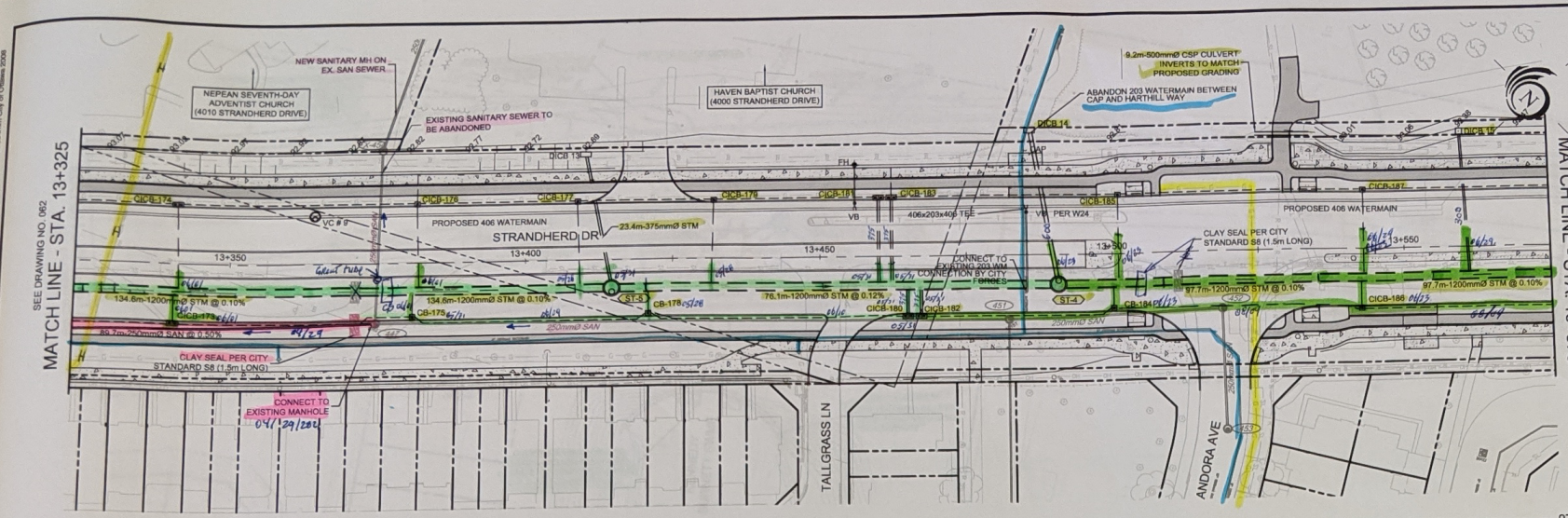
DATE:	April 2022
SCALE:	3/16"=1'-0"
PROJ. #:	AMS/BC-22/06
DRAWN BY:	EF. / VR.
CHECKED BY:	AMS

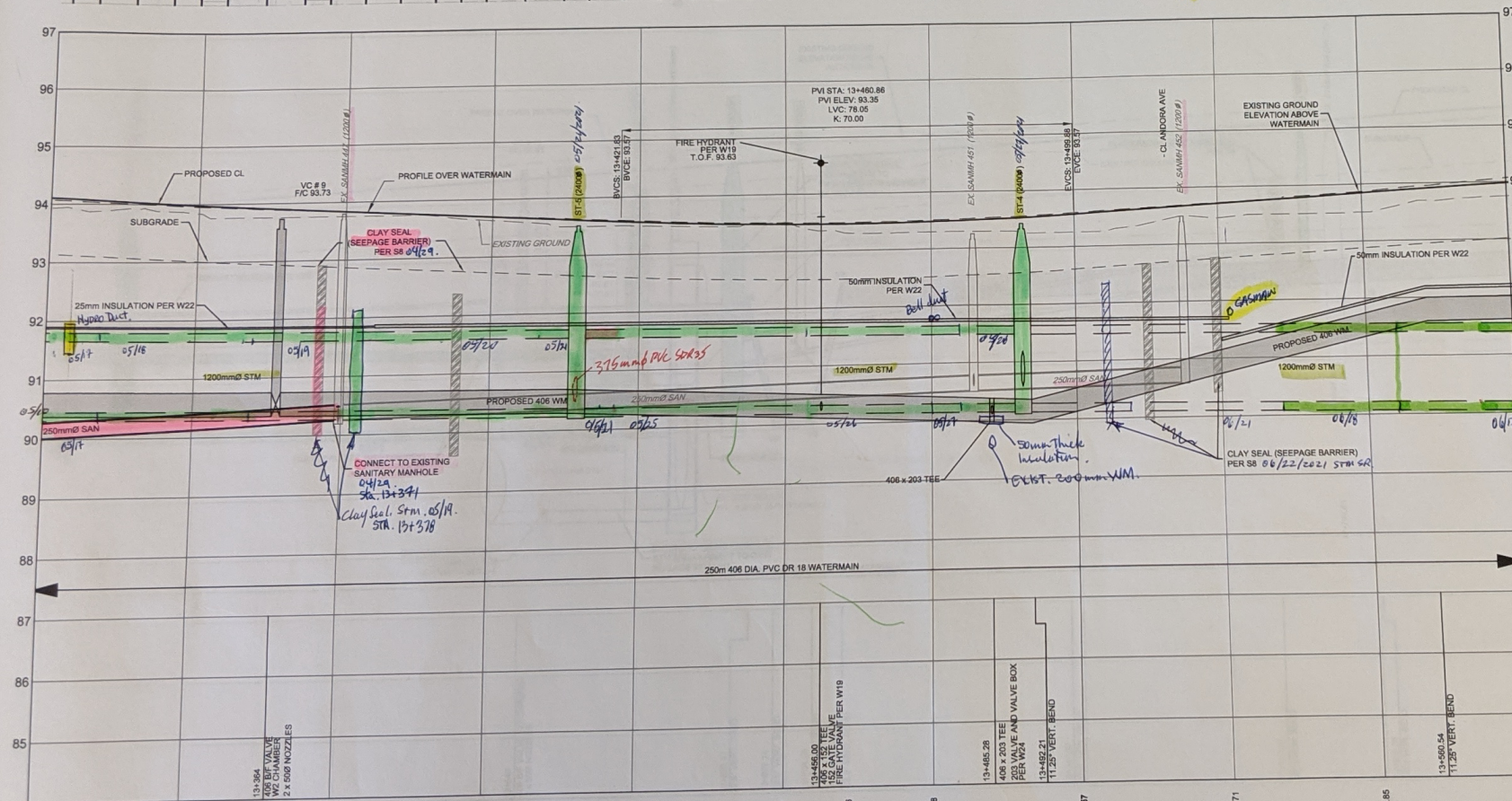
SHEET NUMBER:
A2.1

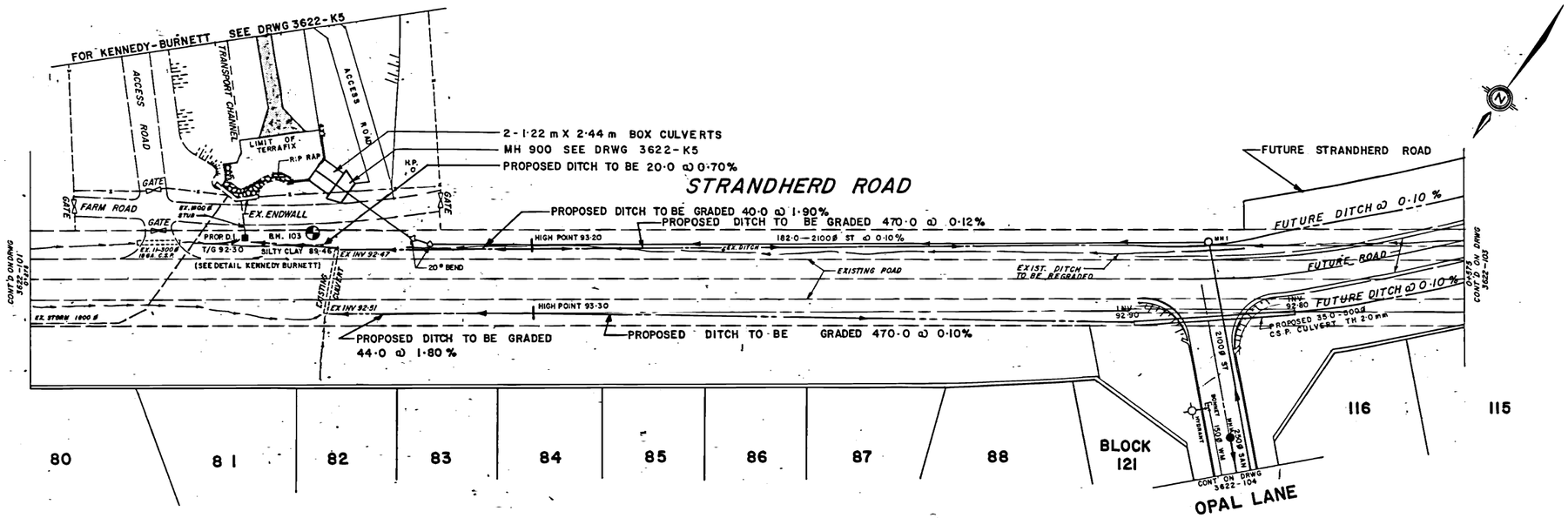
REV. NO. 05
DATE : 2022.05.10

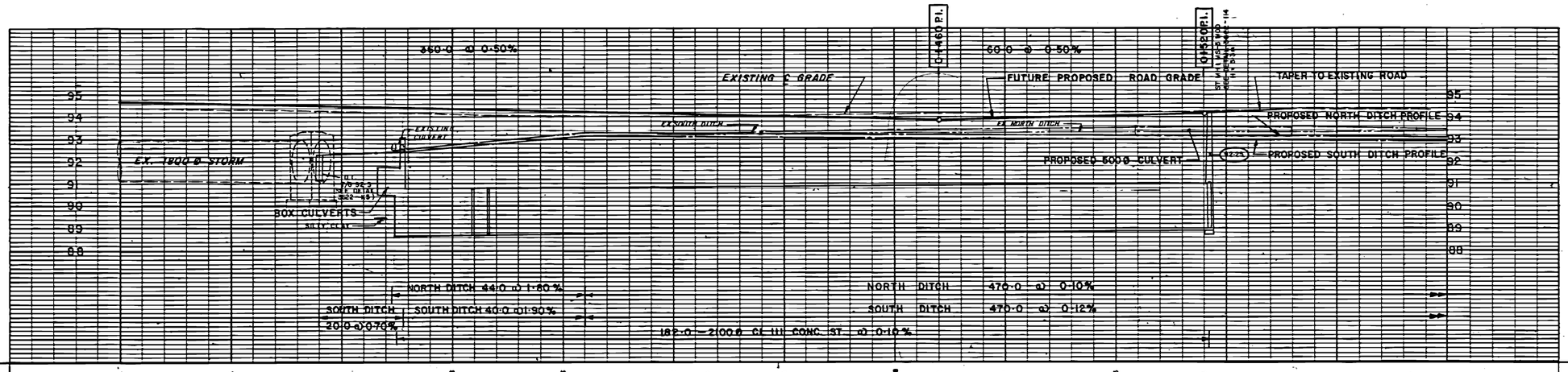
ONTARIO ASSOCIATION OF ARCHITECTS
ANGELO M. SPADOLA
LICENCE 4339

2022-08-25 10:00 am









PROPOSED ROAD GRADE	94.76		94.63		94.51		94.38		94.26		94.13		94.01		93.88	93.83	93.91		94.03		94.13		
NORTH DITCH GRADE				92.64				93.30		93.28		93.28		93.23				93.21		93.18		93.16	
SOUTH DITCH GRADE		92.30			92.44				93.20		93.18		93.15		93.12		93.09		93.06		93.03		
STORM SEWER INVERTS				88.704 88.704																	88.858 88.858 90.350N 88.958N		
EXISTING GRADE			94.28		94.23					94.03		94.05		94.13			94.21		94.32			94.39	
℄ ROAD CHAINAGE	+275		0+300				+350			0+400				+450					0+500		0+520 ℄ OPAL LANE	+550	

NO	REVISIONS	DATE	INITIAL
3	AS BUILTS, ST. SEWER	86/11/04	M.M.
2	REVISE FOR PHASE III & IV	86/06/11	G.T.
*1	REVISE - STORM SEWER & K-B OUTLET	85/12/05	D.D.

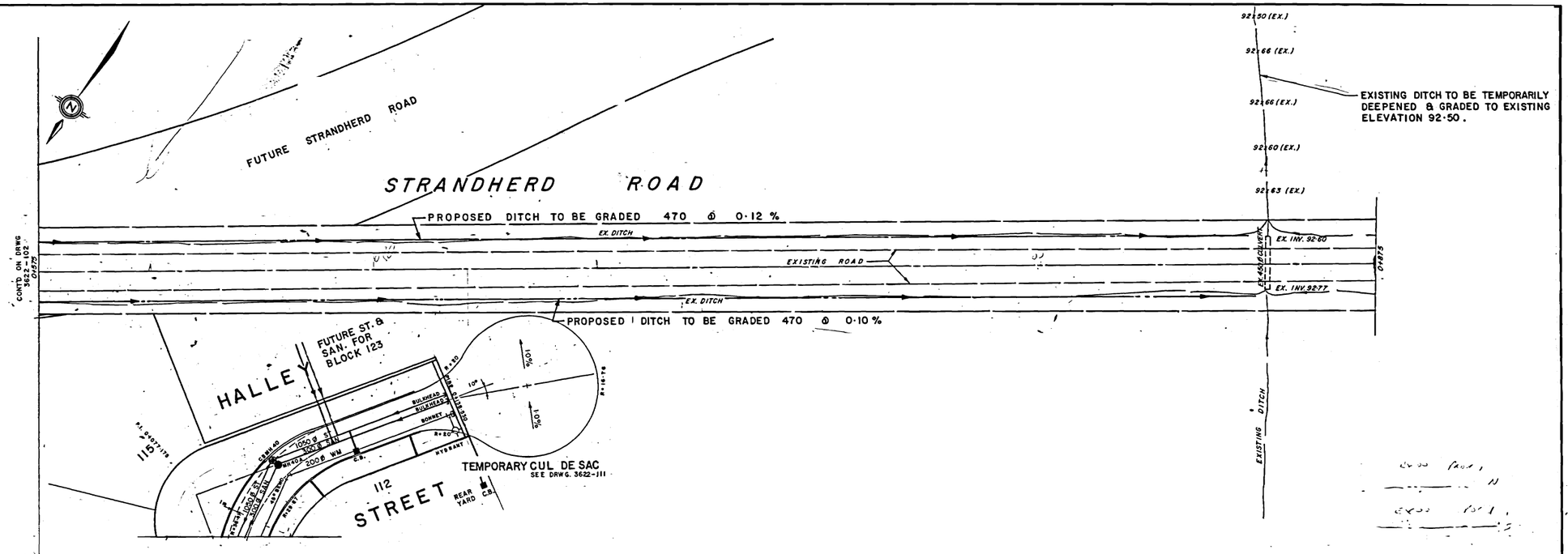
CITY OF NEPEAN
BARRHAVEN PROPERTIES

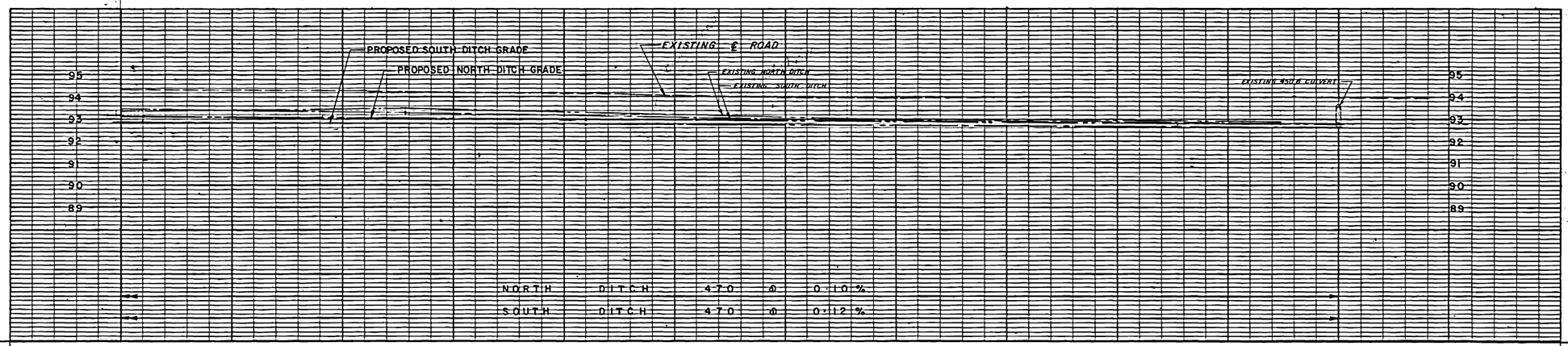
STRANDHERD ROAD
STA 0+275 TO STA 0+575

CLARKE-COCKBURN & ASSOCIATES LIMITED
CONSULTING MUNICIPAL ENGINEERS
OTTAWA - BROCKVILLE - TORONTO - WATERLOO

L.D. BRADLEY

SCALE	HOR. = 1:500 VER. = 1:100
DRAWN BY	D.S.
CHECKED	L.D.B. DESIGNED K.H.
DATE	OCT 1985
FIELD BOOK	
DRWG. No.	3622-102





PROPOSED ROAD GRADE				PROPOSED ROAD GRADE
NORTH DITCH GRADE	93.11 93.10	93.08	93.06	EX.93.31 EX.93.48 93.03 93.01 93.00 92.98 92.96 92.93 EX.93.20 EX.93.07 92.93 92.91 92.90 2.70 92.88 92.86 92.86 EX.92.87 EX.92.77 92.85 92.60
SOUTH DITCH GRADE	92.97 92.96	92.94	92.91	EX.93.31 92.88 92.85 92.84 92.82 92.79 92.76 92.73 92.72 92.70 92.67 EX.92.87 92.65 92.60
SANITARY SEWER INVERTS				SANITARY SEWER INVERTS
EXISTING GRADE	94.32	94.29	94.19	94.07 93.99 93.95 94.00 94.01 94.01 93.98 EXISTING GRADE
℄ ROAD CHAINAGE	0+575	0+600	0+650	0+700 0+750 0+800 0+850 0+875 ℄ ROAD CHAINAGE

NO	REVISIONS	DATE	INITIAL
2	REAR YARD C.B. ADDED	JAN. 27/86	J.S.
1	REVISED AS PER CITY OF NEPEAN	DEC. 05/85	J.S.

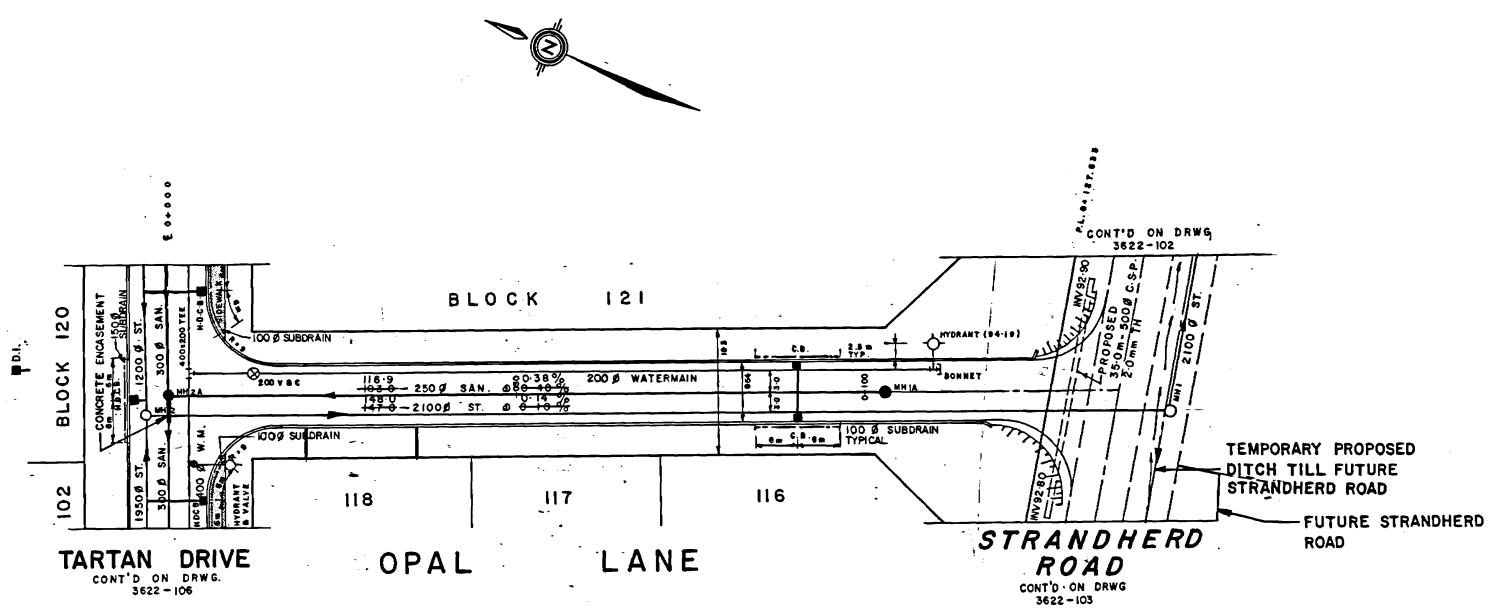
CITY OF NEPEAN
BARRHAVEN PROPERTIES

STRANDHERD ROAD
STA 0+575 TO STA 0+875

CUMMING – COCKBURN & ASSOCIATES LIMITED
CONSULTING MUNICIPAL ENGINEERS
OTTAWA - BROCKVILLE - TORONTO - WATERLOO

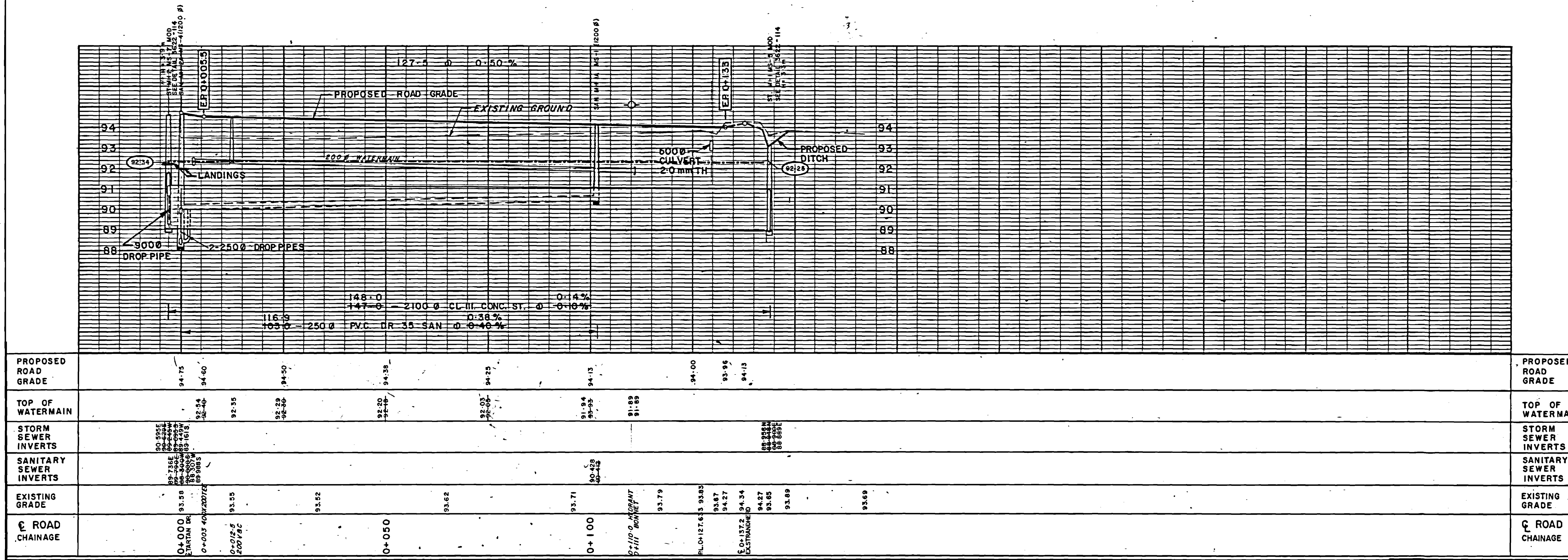
L.D. BRADLEY

SCALE	HOR. = 1:500 VER. = 1:100
DRAWN BY	F.C.
CHECKED	L.D.B. DESIGNED K.H.
DATE	OCT. 85
FIELD BOOK	
DRWG. No.	3622-103



NOTE:

1. FOR LEGAL INFORMATION SEE SURVEYOR'S PLAN.
2. (92·89) DENOTES HYDRAULIC GRADE LINE
3. HYDRANT (94·19) - BOTTOM OF BOTTOM FLANGE MIN. ELEVATION



NO	REVISIONS	DATE	INITIAL
7	AS BUILTS, WATERMAIN & SEWERS	86/11/04	M.M.
6	ADD & REVISE SUBDRAIN	86/04/17	D.D.
5	ADD SUBDRAIN AS PER CITY 86/03/05	86/03/06	J.S.
4	REVISE WM OPAL LANE AS PER R.M.O.C.	FEB 14/86	D.D.
3	D.I. ADDED ON BLOCK 120	JAN 27/86	J.S.
2	REVISE AS PER R.M.O.C.	DEC 19/85	K.H.
1	REVISE AS PER CITY OF NEPEAN	DEC. 05/85	J.S.

CITY OF NEPEAN

BARRHAVEN PROPERTIES

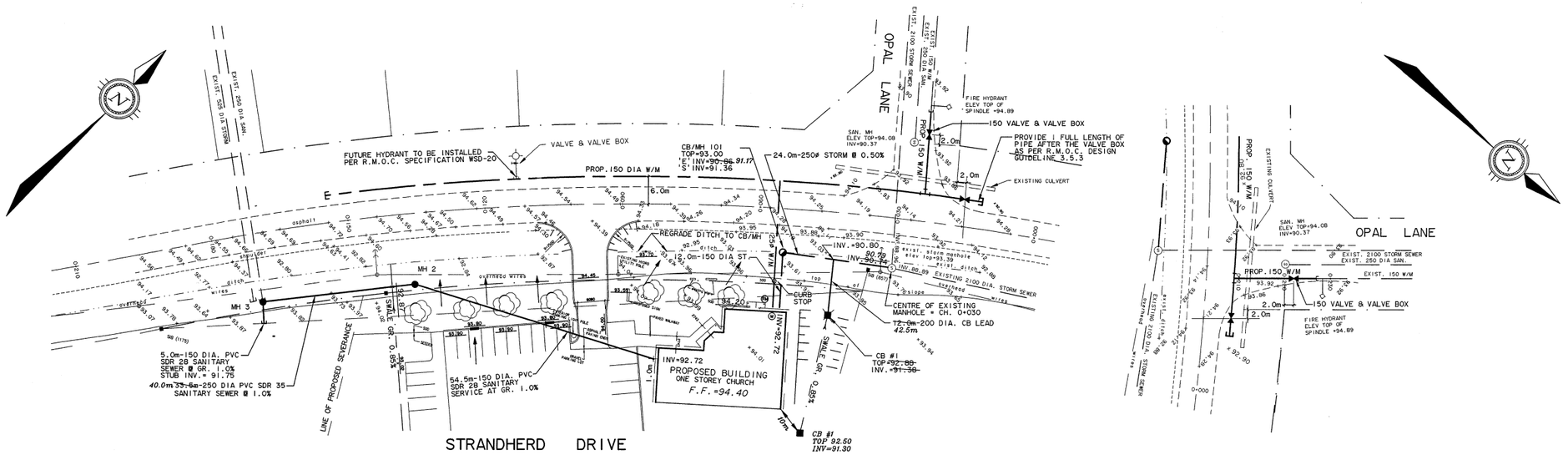
OPAL LANE

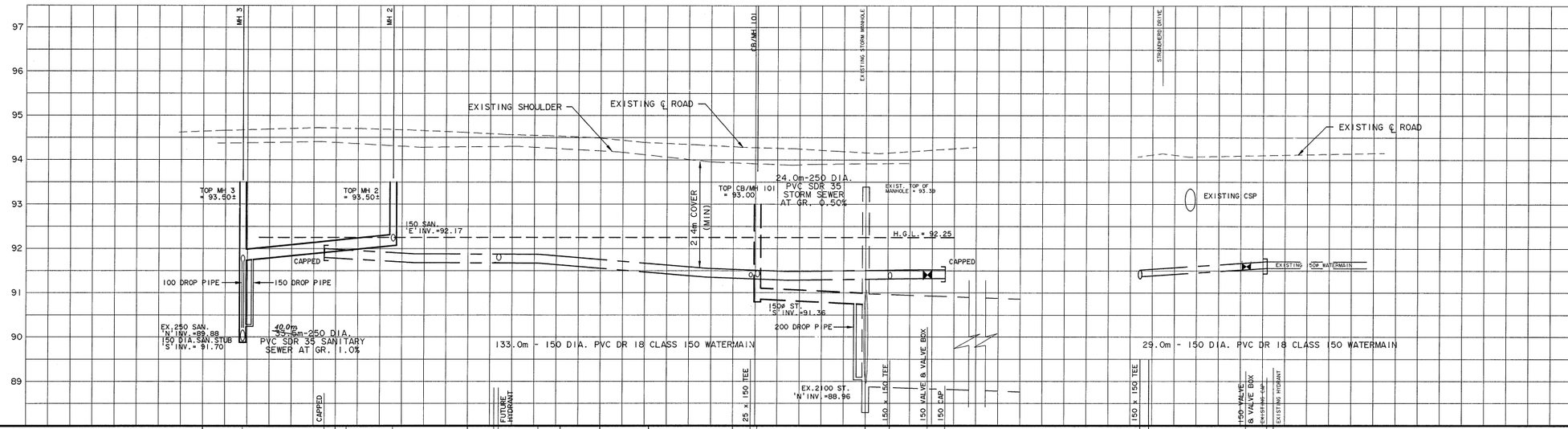
STA 0+000 TO STRANDHERD RD

CUMMING – COCKBURN & ASSOCIATES LIMITED
CONSULTING MUNICIPAL ENGINEERS
OTTAWA - BROCKVILLE - TORONTO - WATERLOO

L.D. BRADLEY

SCALE	HOR. = 1:500 VER. = 1:100
DRAWN BY	J.S.
CHECKED	L.D.B. DESIGNED K.H.
DATE	OCT 1985
FIELD BOOK	
DRWG. No.	3622-104





RECORD DRAWING

DATE: 4/12/02

NO.	REVISIONS	DATE	BY
6	AS CONSTRUCTED	4/12/02	MMR
5	REVISED AS PER OWNER	20/10/97	MMR
4	REVISED AS PER OWNER	12/7/97	MMR
3	REVISED AS PER CITY OF NEPEAN	28/11/96	BB
2	REVISED AS PER RMOC	6/11/96	BB
1	GENERAL REVISIONS	30/10/96	BB

APP'D

DESIGN S.A.D.
DRAWN B.C.B.(ACAD)
CHECKED S.J.P.

CLIENT: BIBLE BAPTIST CHURCH

PROJECT: BIBLE BAPTIST CHURCH

TITLE: PLAN & PROFILE

OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
Consulting Engineers, Hydrogeologists & Planners — Nepean, Ontario

DATE: OCTOBER, 1996 | SCALE: 1:500 | DRAWING NO. 96-10751-1 | REV. 6

11992

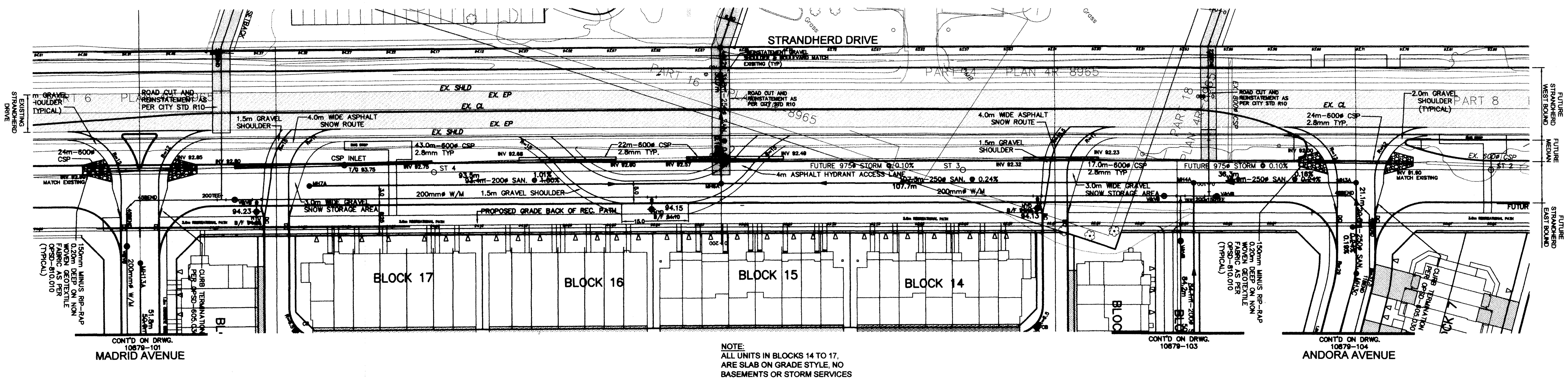
LEGEND :

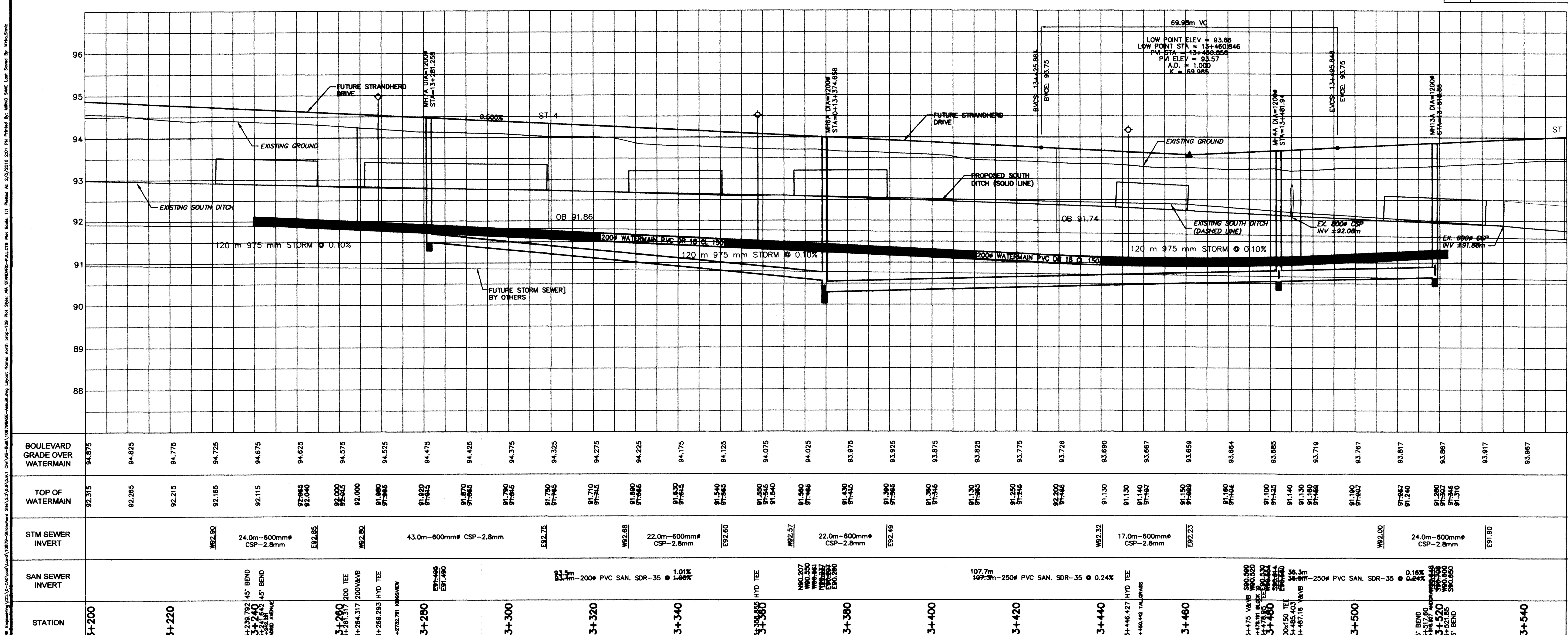
REINSTATE DISTURBED AREAS TO MATCH OR EXCEED EXISTING CONDITIONS

ROAD CUT AND REINSTATEMENT AS PER CITY STANDARD R10

NOTES :

1. ALL WATERMAIN CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
2. ALL SEWER AND ROADWAY CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
3. ALL CONNECTIONS TO EXISTINGS WATERMAIN BY CITY OF OTTAWA FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
4. CATHODIC PROTECTION AS PER CITY OF OTTAWA STANDARDS.
5. INSULATION AT ALL STRUCTURES PER CITY OF OTTAWA DETAIL W23.
6. ALL STREET AND REAR YARD CB'S TO HAVE INLET RESTRICTURES SEE DRAWING 3603-LD-300.
7. FOR LEGAL BOUNDARY INFORMATION REFER TO REGISTEREDPLAN 4M- BY J. D. BARNES LTD.
8. ALL CATCHBASINS AND MAINTENANCE HOLES TO HAVE GEOTEXTILE FILTER FABRIC LOCATED BETWEEN THE STRUCTURE FRAME AND COVER. CONTRACTOR TO MAINTAIN AND REMOVE AFTER ASPHALT, CURBS AND SODDING COMPLETED.
9. A ½ DIAMETER BULKHEAD IS TO BE INSTALLED IN MH18 TO TRAP SEDIMENTS DURING CONSTRUCTION.
10. DUE TO WATERMAIN PRESSURE THAT MAY EXCEED 80psi BUILDER SHALL INSTALL A PRESSURE REDUCING VALVE IN THE UNITS AS REQUIRED BY THE BUILDING CODE.
11. SANITARY SEWERS TO BE PVC SDR-35 RING-TITE OR APPROVED EQUIVALENT.





No.	REVISIONS	By	Date
17	AS-BUILTS		10:02:01
16	REVISED AS PER CITY COMMENTS		08:03:19
15	ISSUED FOR PHASE 2 TENDER	DGY	08:02:21
14	REVISE REC PATH	DGY	07:11:30
13	REVISE AS PER CITY COMMENTS	DGY	07:11:07
12	REVISE DITCH GRADES	DGY	07:09:12
11	REVISE AS PER CITY COMMENTS	DGY	07:08:24
10	REVISE AS PER NEW LEGAL	DGY	07:08:20
9	REVISE AS PER MAY 24 LEGAL	DGY	07:06:04
8	REVISE PER APRIL 10 SITE PLAN	DGY	07:04:20
7	REVISE AS PER CITY COMMENTS	DGY	07:03:22
6	REVISE SANITARY MH3A TO MH7A	DGY	07:02:15
5	REVISED AS PER DEC LEGAL	DGY	07:01:31
4	REVISE PER SEPT 25 SITE PLAN	DGY	06:11:23
3	REVISED AS PER CITY COMMENTS	DGY	06:09:18
2	ADD NOTES AND LEGEND	DGY	06:08:21
1	ISSUED FOR REVIEW	DGY	06:07:31

MATTAMY

IBI GROUP
333 Preston Street
Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title
BARRHAVEN MEWS

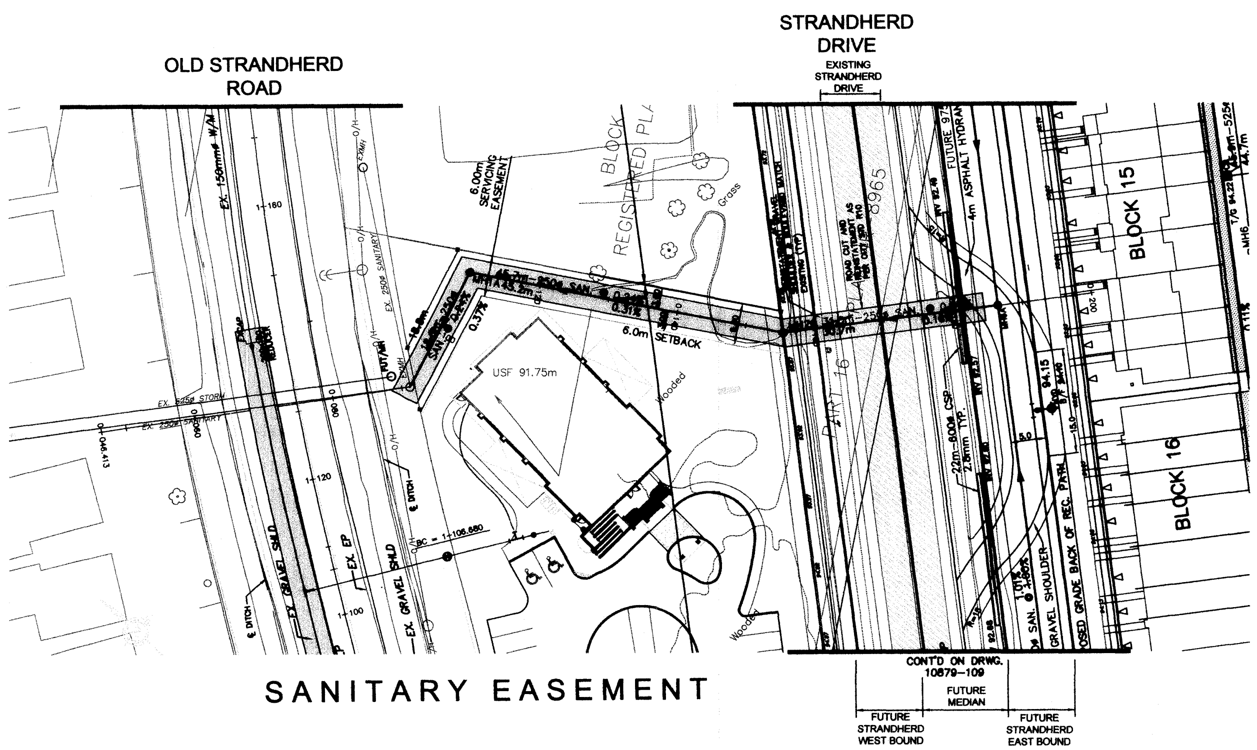
REGISTERED PROFESSIONAL ENGINEER
R.W. WINGATE
PROVINCE OF ONTARIO

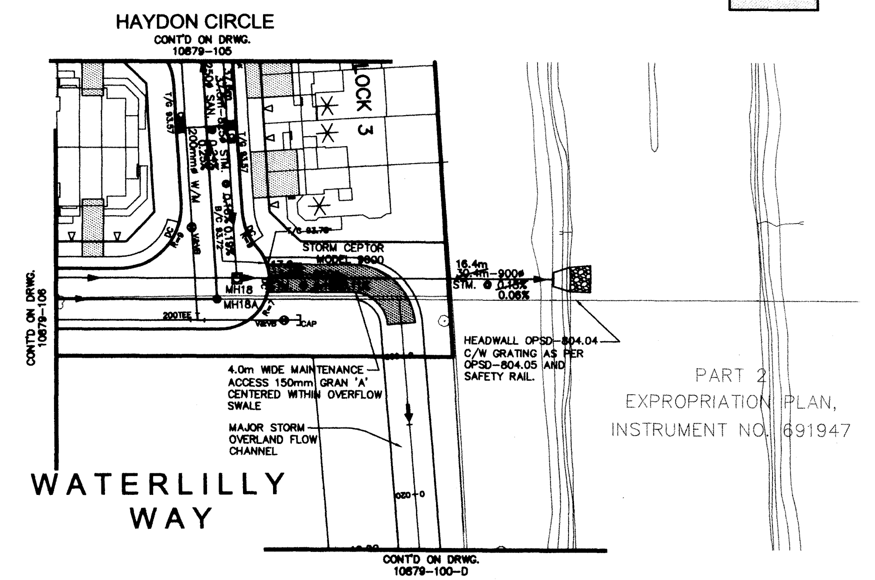
Drawing Title
NORTH PROP

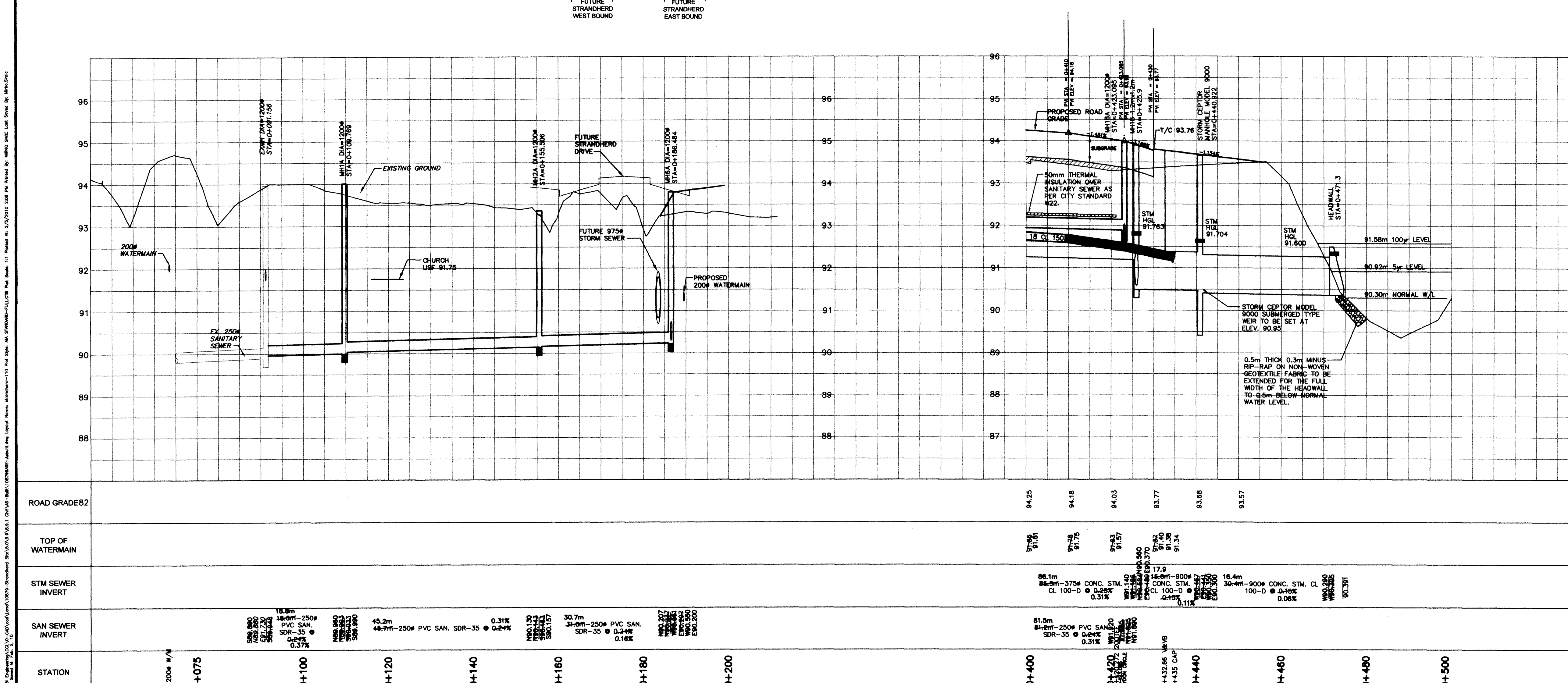
Scale
HORIZ 1:500
VERT 1:50

Design	Date
D.G.Y.	JULY 2006
Drawn	Checked
D.D.	
Project No.	Drawing No.
10879	109

14796







LEGEND :

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- ROAD CUT AND REINSTATEMENT AS PER CITY STANDARD R10

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2. ALL SEWER AND ROADWAY CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
3. ALL CONNECTIONS TO EXISTINGS WATERMAIN BY CITY OF OTTAWA FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
4. CATHODIC PROTECTION AS PER CITY OF OTTAWA STANDARDS.
5. INSULATION AT ALL STRUCTURES PER CITY OF OTTAWA DETAIL W23.
6. ALL STREET AND REAR YARD CB'S TO HAVE INLET RESTRICTURES SEE DRAWING 3603-LD-300.
7. FOR LEGAL BOUNDARY INFORMATION REFER TO REGISTEREDPLAN 4M- BY J. D. BARNES LTD.
8. ALL CATCHBASINS AND MAINTENANCE HOLES TO HAVE GEOTEXTILE FILTER FABRIC LOCATED BETWEEN THE STRUCTURE FRAME AND COVER. CONTRACTOR TO MAINTAIN AND REMOVE AFTER ASPHALT, CURBS AND SODDING COMPLETED.
9. A ½ DIAMETER BULKHEAD IS TO BE INSTALLED IN MH18 TO TRAP SEDIMENTS DURING CONSTRUCTION.
10. DUE TO WATERMAIN PRESSURE THAT MAY EXCEED 80psi BUILDER SHALL INSTALL A PRESSURE REDUCING VALVE IN THE UNITS AS REQUIRED BY THE BUILDING CODE.
11. SANITARY SEWERS TO BE PVC SDR-35 RING-TITE OR APPROVED EQUIVALENT.

No.	REVISIONS	By	Date
14	AS-BUILT		10:02:01
13	REVISED PER OWNER COMMENTS		08:04:03
12	REVISE CONTROL CHAMBER	DGY	08:03:28
11	REVISED AS PER CITY COMMENTS	DGY	08:03:19
10	ISSUED FOR PHASE 2 TENDER	DGY	08:02:21
9	ADD RIP-RAP TO OUTLET	DGY	07:09:27
8	REVISE CHURCH SITE	DGY	07:09:12
7	REVISE SAN. MH1A TO EXMH	DGY	07:09:06
6	REVISE AS PER CITY COMMENTS	DGY	07:08:24
5	REVISE AS PER NEW LEGAL	DGY	07:08:20
4	REVISE AS PER MAY 24 LEGAL	DGY	07:06:04
3	REVISE SAN FROM EXMH-MH6A	DGY	07:04:19
2	REVISE AS PER CITY COMMENTS	DGY	07:03:22
1	ADD WATER AND SAN EASEMENT AND RE-ISSUE DRAWING 110	DGY	07:02:15

MATTAMY

IBI GROUP
333 Preston Street
Suite 400
Ottawa, Ontario
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Tel (613)225-1311
FAX (613)225-9868

Project Title

BARRHAVEN MEWS

REGISTERED PROFESSIONAL ENGINEER R.W.WINGATE PROVINCE OF ONTARIO

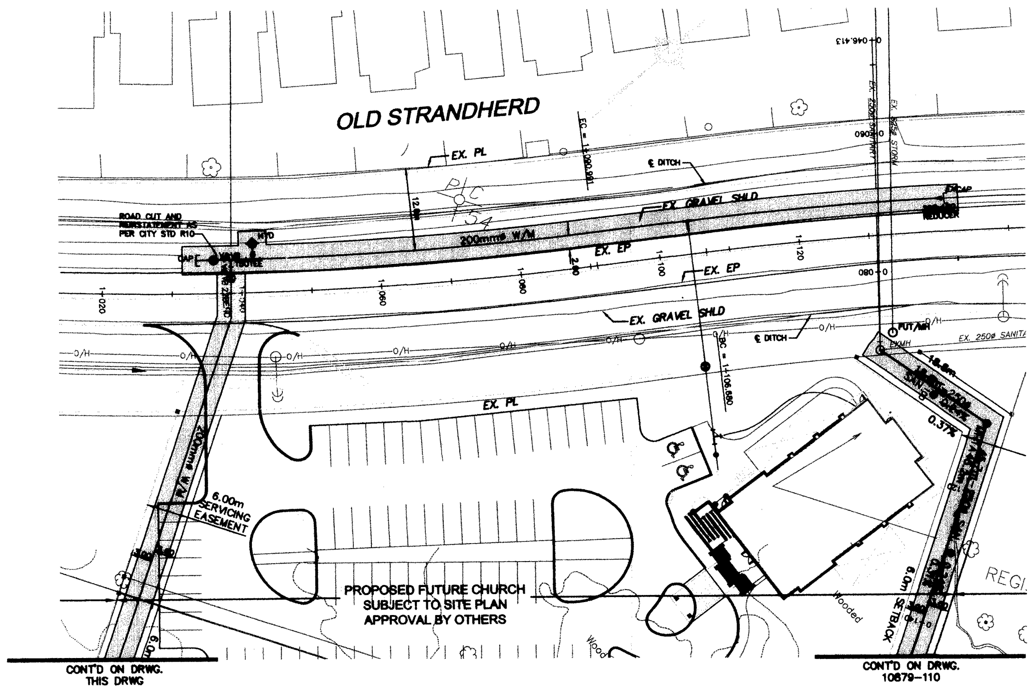
N

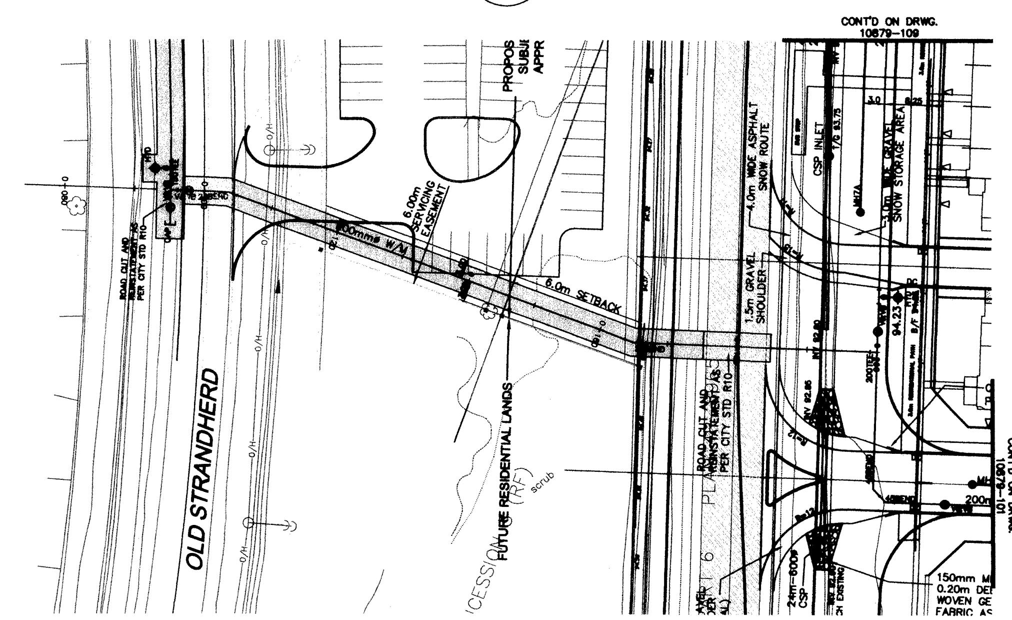
Drawing Title

SANITARY EASEMENT
FROM OLD STRANDHERD TO STRANDHERD
WATERLILLY WAY
FROM STA. 0+400 TO STA. 0+480

Scale HOR. 1:500 VER. 1:50	
Design D.G.Y	Date FEB. 2007
Drawn D.P.S.	Checked D.G.Y.
Project No. 10879	Drawing No. 110

14796





LEGEND :

- REINSTATE DISTURBED AREAS TO MATCH OR EXCEED EXISTING CONDITIONS
- ROAD CUT AND REINSTATEMENT AS PER CITY STANDARD R10

NOTES :

1. ALL WATERMAIN CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
2. ALL SEWER AND ROADWAY CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
3. ALL CONNECTIONS TO EXISTINGS WATERMAIN BY CITY OF OTTAWA FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
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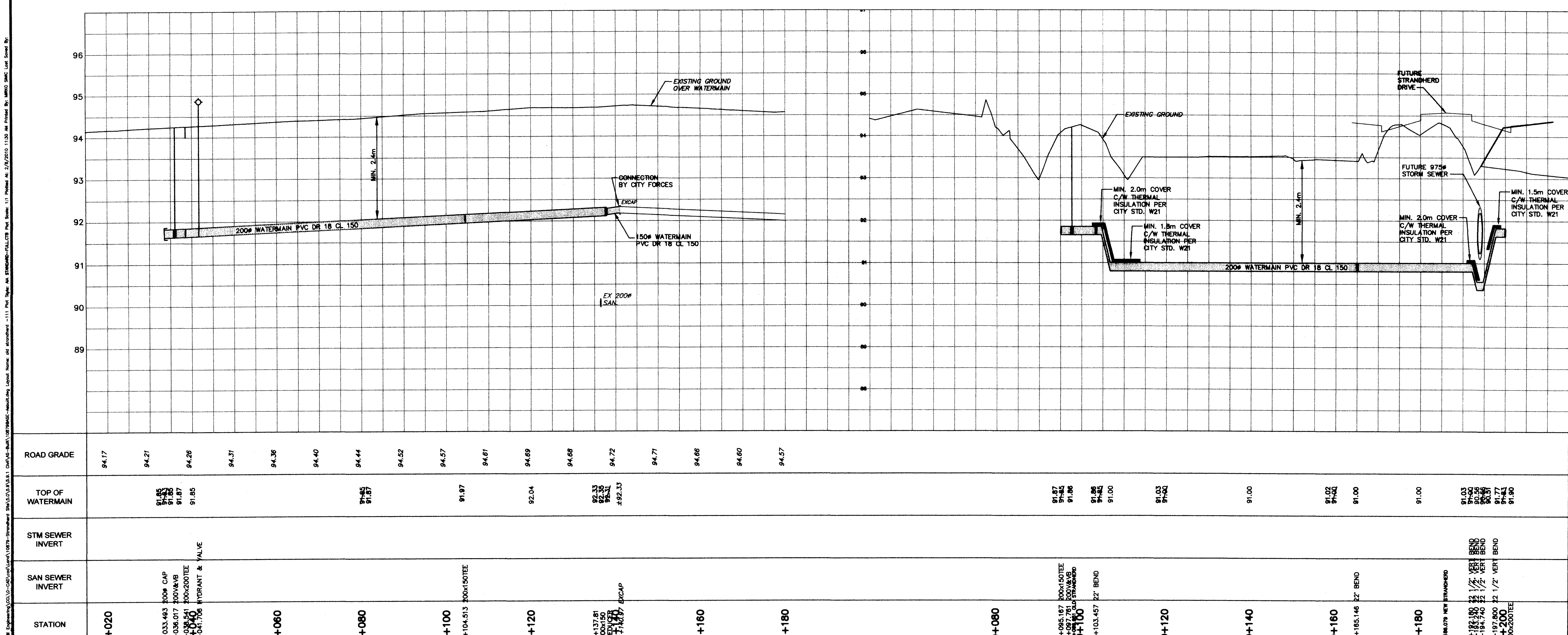
11. SANITARY SEWERS TO BE PVC SDR-35 RING-TITE OR APPROVED EQUIVALENT.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	ASBUILT		10:02:01
4	REVISE CHURCH SITE		07:09:12
3	REIVSE AS PER CITY COMMENTS	DGY	07:08:24
2	GENERAL REVISONS	DGY	07:08:20
1	ISSUED FOR REVIEW	DGY	07:04:20



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Project Title
BARRHAVEN MEWS

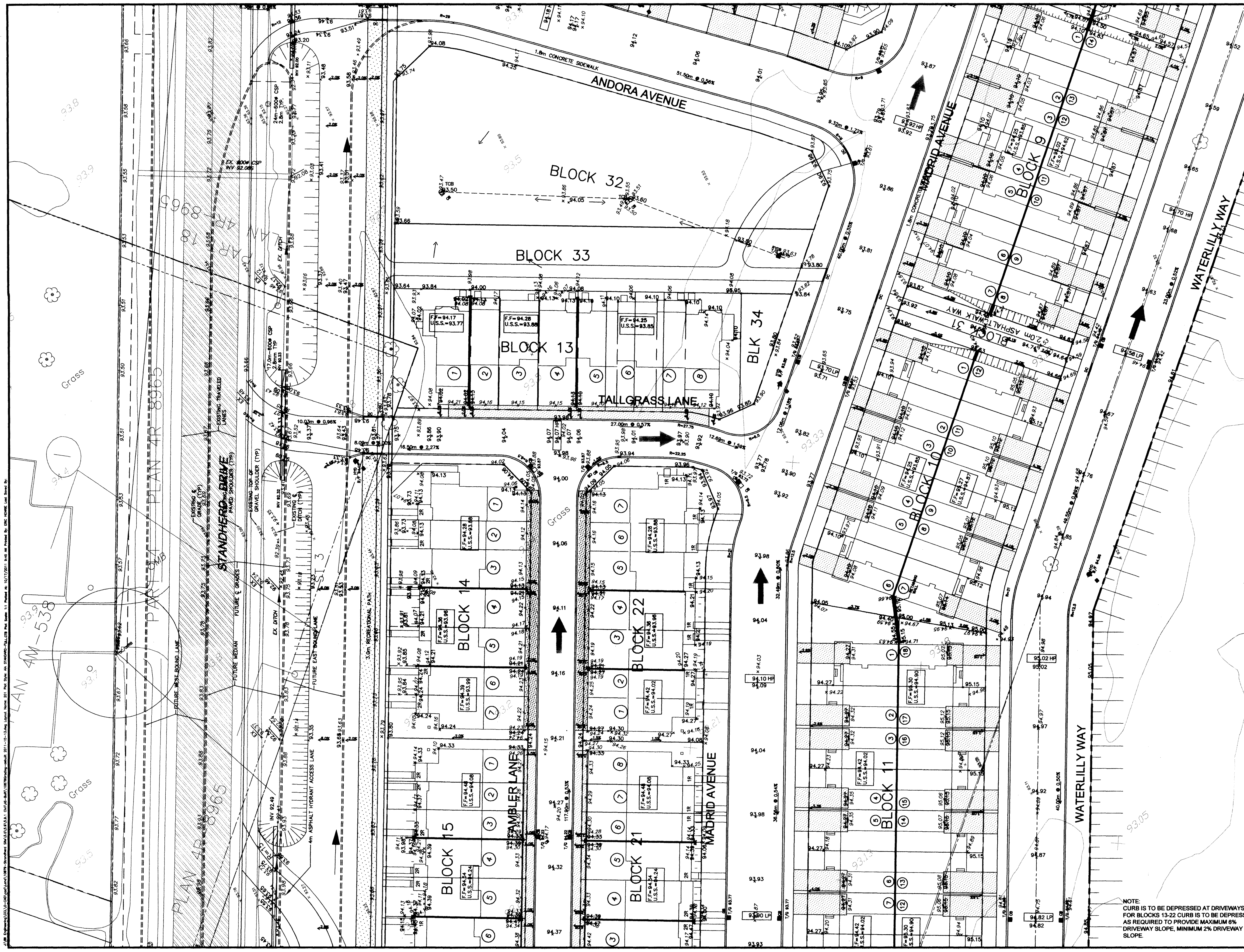
REGISTERED PROFESSIONAL ENGINEER
R.W.WINGATE
PROVINCE OF ONTARIO

Drawing Title
OLD STRANDHERD DRIVE 200Ø WATERMAIN
FROM STA. 1+020 TO STA. 1+180
6.0m CHURCH EASEMENT
FROM OLD STRANDHERD TO STA. 0+200

Scale
HOR. 1:500
VER. 1:50

Design	Date
D.G.Y	APR. 2007
Drawn	Checked
D.P.S.	D.G.Y.
Project No.	Drawing No.
10879	111

14796



NOTE:
CURB IS TO BE DEPRESSED AT DRIVEWAYS FOR BLOCKS 13-22 CURB IS TO BE DEPRESSED AS REQUIRED TO PROVIDE MAXIMUM 6% DRIVEWAY SLOPE, MINIMUM 2% DRIVEWAY SLOPE.

LEGEND:

PROPOSED GRADES

FOR UNITS WITH BASEMENTS

- F.F= 95.82 — FINISHED FLOOR
- U.S.F.= 93.00 — UNDERSIDE OF FOOTING
- M.T.F.= 94.80 — MINIMUM TOP OF FOUNDATION

FOR SLAB ON GRADE UNITS

- F.F= 95.82 — FINISHED FLOOR
- U.S.S.= 93.00 — UNDERSIDE OF SLAB

(3)	NUMBER OF RISERS
DC	DEPRESSED CURB
	MAJOR FLOW ROUTE
2.0%	SURFACE FLOW DIRECTION
CBMH T/G 115.05	CATCHBASIN MANHOLE TOP OF GRATE
CB T/G 115.05	CATCHBASIN TOP OF GRATE
CICB	CURB INLET CATCHBASIN
HYD B/F 124.50	HYDRANT & BOTTOM OF FLANGE ELEVATION
x72.36	PROPOSED GRADE
122	EXISTING CONTOUR
x71.91	EXISTING GRADE
72.36 H.P.	HIGH POINT
72.36 L.P.	LOW POINT
	TERRACE 3:1 MAX
	CURB
	FUTURE CURB
94.58 ~~94.52~~	ASBUILT GRADE
94.58	ASBUILT ROAD GRADE
95.58 (DS)	ASBUILT DOOR SILL ELEVATION

No.	REVISIONS	By	Date
14			
13			
12	AS-BUILT GRADING		11:10:17
11	REVISED AS PER CITY COMMENTS	DGY	08:03:19
10	ISSUED FOR PHASE 2 TENDER	DGY	08:02:21
9	REVISE AS PER CITY COMMENTS	DGY	07:11:06
8	GENERAL REVISIONS	DGY	07:09:05
7	REVISE AS PER NEW LEGAL	DGY	07:08:22
6	ADD PONDING VOLUMES	DGY	07:07:30
5	REVISE PER APRIL SITE PLAN	DGY	07:04:30
4	REVISE AS PER CITY COMMENTS	DGY	07:03:22
3	REVISE PER SITE PLAN	DGY	07/03/02
2	REVISE AS PER CITY COMMENTS	DGY	06/09/18
1	ISSUED FOR REVIEW	DGY	06/07/31

MATTAMY

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Project Title

BARRHAVEN MEWS

LICENSED PROFESSIONAL ENGINEER
Oct 17/11
D. G. Yannakopoulos
PROVINCE OF ONTARIO

N

Drawing Title

ASBUILT GRADING PLAN

Scale 1:250

Design: D.G.Y.	Date: JULY 2006
Drawn: D.P.S.	Checked: D.G.Y.
Project No.: 10879	Drawing No.: 201

14731

LEGEND:

PROPOSED GRADES

FOR UNITS WITH BASEMENTS

F.F= 95.82 — FINISHED FLOOR
U.S.F.= 93.00 — UNDERSIDE OF FOOTING
M.T.F.= 94.80 — MINIMUM TOP OF FOUNDATION

FOR SLAB ON GRADE UNITS

F.F= 95.82 — FINISHED FLOOR
U.S.S.= 93.00 — UNDERSIDE OF SLAB

(3) NUMBER OF RISERS

DC DEPRESSED CURB

MAJOR FLOW ROUTE

2.0% SURFACE FLOW DIRECTION

CBMH T/G 115.05 CATCHBASIN MANHOLE TOP OF GRATE

CB T/G 115.05 CATCHBASIN TOP OF GRATE

CICB CURB INLET CATCHBASIN

HYD B/F 124.50 HYDRANT & BOTTOM OF FLANGE ELEVATION

72.36 PROPOSED GRADE

72 EXISTING CONTOUR

x71.91 EXISTING GRADE

72.36 H.P. HIGH POINT

72.36 L.P. LOW POINT

TERRACE 3:1 MAX

CURB

FUTURE CURB

94.58 ASBUILT GRADE

94.58 ASBUILT ROAD GRADE

95.58 (DS) ASBUILT DOOR SILL ELEVATION

No.	REVISIONS	By	Date
14			
13	AS-BUILT GRADING		11:10:17
12	REVISED AS PER CITY COMMENTS	DGY	08:03:19
11	ISSUED FOR PHASE 2 TENDER	DGY	08:02:21
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6	REVISE PER MAY 24 LEGAL	DGY	07:06:18
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4	REVISE AS PER CITY COMMENTS	DGY	07:03:22
3	REVISE PER SITE PLAN	DGY	07/03/02
2	REVISED AS PER CITY COMMENTS	DGY	06/09/18
1	ISSUED FOR REVIEW	DGY	06/07/31

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FAX (613)225-9868

Project Title

BARRHAVEN MEWS

LICENSED PROFESSIONAL ENGINEER D. G. Young & Associates PROVINCE OF ONTARIO

Drawing Title

ASBUILT GRADING PLAN

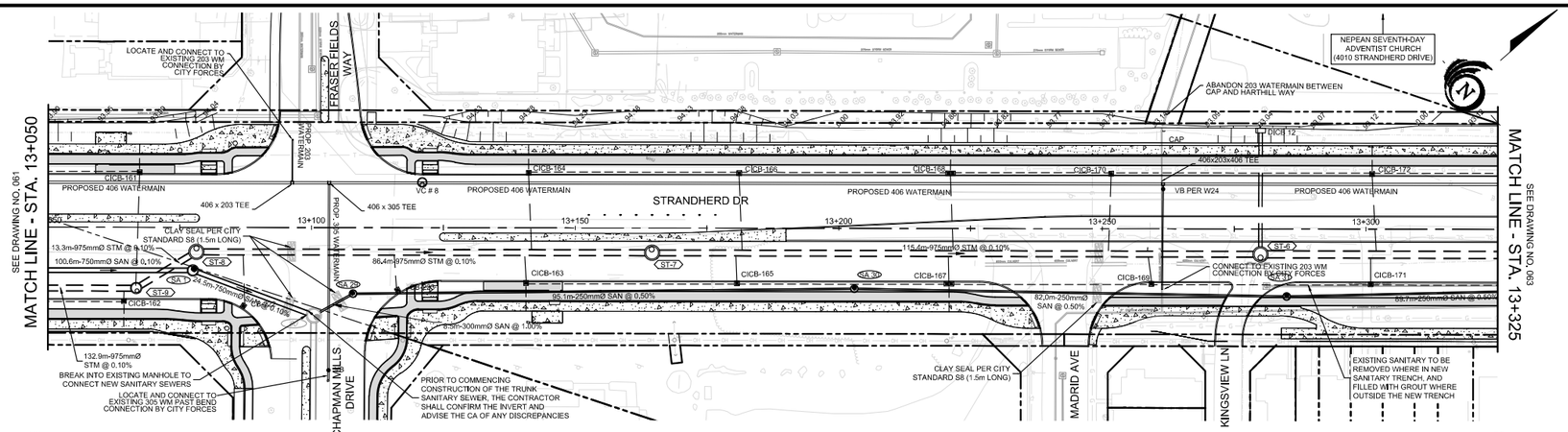
Scale 1:250

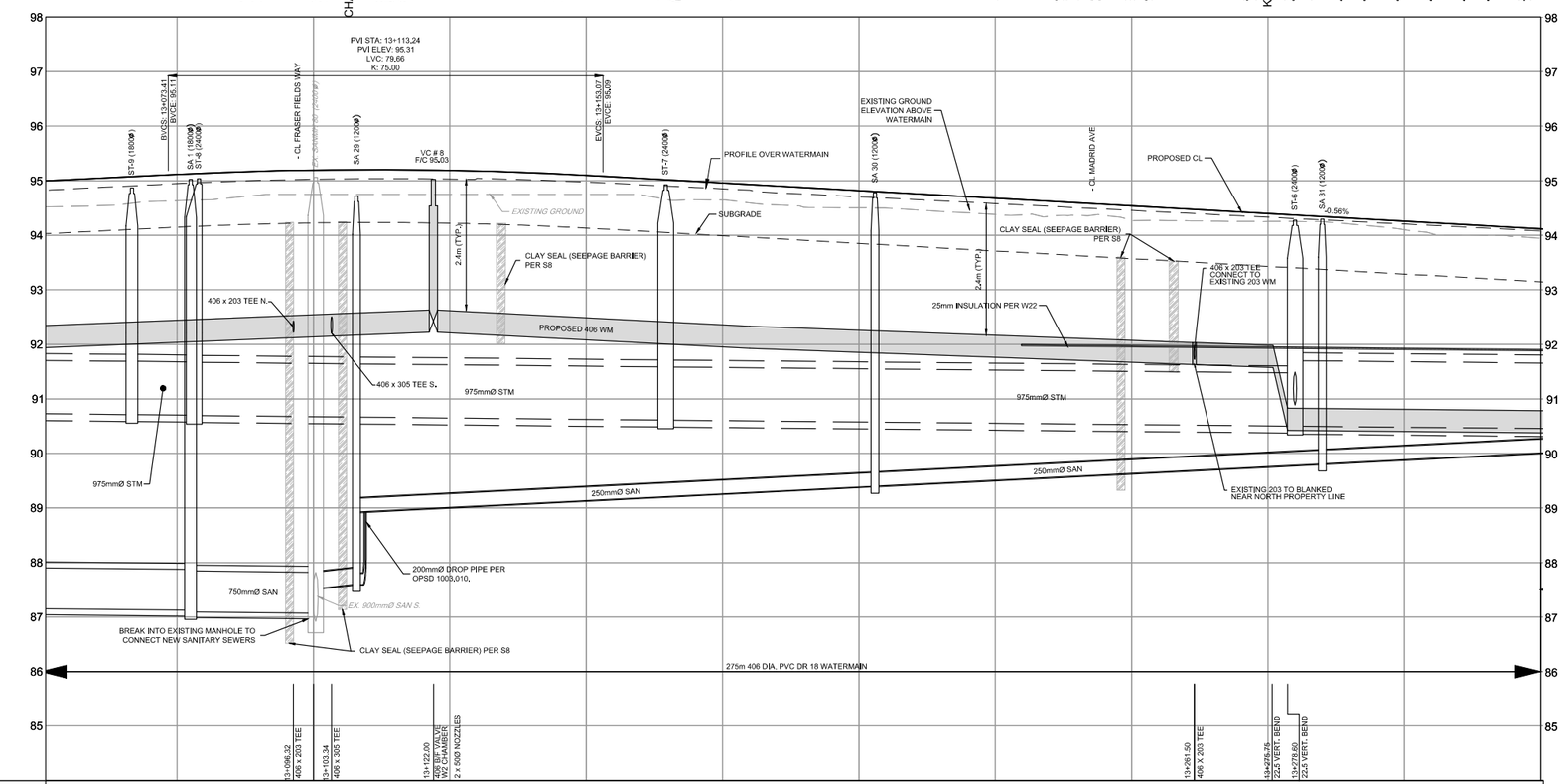
Design	Date
D.G.Y.	JULY 2006
Drawn	Checked
D.P.S.	D.G.Y.
Project No.	Drawing No.
10879	200

NOTE:
CURB IS TO BE DEPRESSED AT DRIVEWAYS FOR BLOCKS 13-22 CURB IS TO BE DEPRESSED AS REQUIRED TO PROVIDE MAXIMUM 6% DRIVEWAY SLOPE, MINIMUM 2% DRIVEWAY SLOPE.

SECTION A-A
N.T.S.

14731





STRANDHERD DRIVE WIDENING

MARAVISTA DRIVE TO JOCKVALE ROAD

GRADING & DRAINAGE 10
STRANDHERD DRIVE
STA. 13+050 TO STA. 13+325

C. DUCLOS, P.Eng., *Acting Director*
J. VALLEE, P.Eng., *Project Manager*

PARSONS | NOVATECH Engineers, Planners & Landscape Architects

Ottawa

Contract No.	Dwg. No.
CP000217	062

Sheet 062 of

Asset No.

Asset Group

Des.	Chk'd.
TPB	RJD
Dwn.	Chk'd.
TPB	RJD

Utility Circ. No. CTY1810119 | Index No. 17676

Const. Inspector

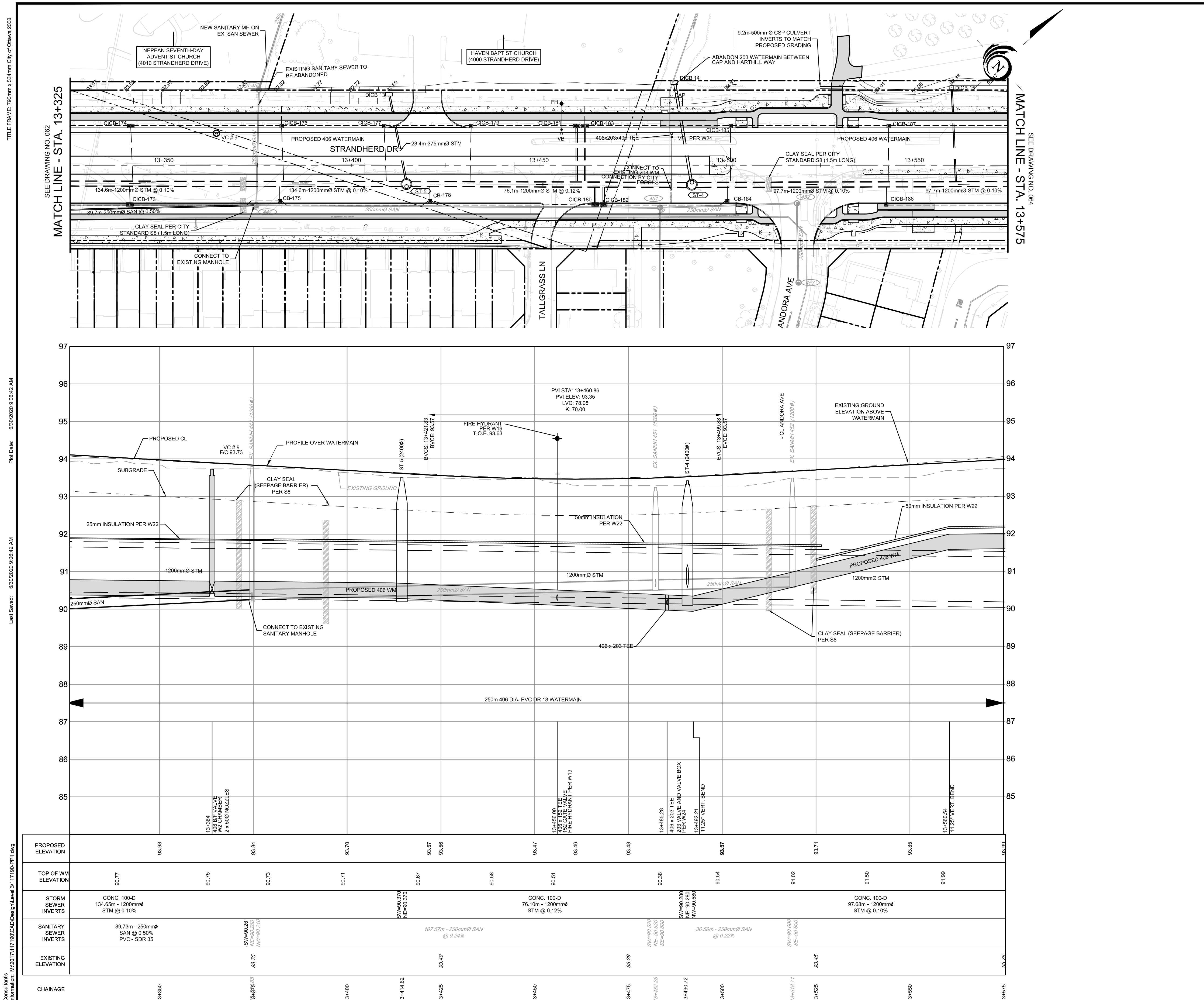
Scale: 1:500 H (0 5 10 15 20) 1:50 V (0 1 2)

LICENSED PROFESSIONAL ENGINEER R. J. DOWDALL 100219927 2020-06-26 PROVINCE OF ONTARIO

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1.	ISSUED FOR CONSTRUCTION	RJD	26/06/20



STRANDHERD DRIVE WIDENING MARAVISTA DRIVE TO JOCKVALE ROAD	Ottawa
GRADING & DRAINAGE 11 STRANDHERD DRIVE STA. 13+325 TO STA. 13+575	Contract No. CP000217 · Dwg. No. 063 Sheet 063 of
C. DUCLOS, P.Eng. *Acting Director* · J. VALLEE, P.Eng. *Project Manager*	Asset No. Asset Group
PARSONS · NOVATECH Engineers, Planners & Landscape Architects	Des. TPB · Chk'd. RJD Dwn. TPB · Chk'd. RJD Utility Circ. No. CTY1810119 · Index No. 17676 Const. Inspector Scale: 1:500 H, 1:50 V

LICENSED PROFESSIONAL ENGINEER R. J. DOWDALL 100219927 2020-06-26 PROVINCE OF ONTARIO

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1.	ISSUED FOR CONSTRUCTION	RJD	26/06/20

TITLE FRAME: 790mm x 534mm City of Ottawa 2008
Plot Date: 6/30/2020 9:06:42 AM
Last Saved: 6/30/2020 9:06:42 AM
Consultant's Information: M:\2017\117190\CAD\Design\Level 3\117190-PP1.dwg