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39 Years

Southbridge Port Hope

Servicing and Stormwater Management Report

SERVICING AND STORMWATER MANAGEMENT REPORT

SOUTHBRIDGE PORT HOPE
20 HOPE STREET,
PORT HOPE, ONTARIO

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

June 14, 2021

Novatech File: 120226
Ref No. R-2021-091

NOVATECH
Engineers, Planners & Landscape Architects

June 14th, 2021

Municipality of Port Hope
5 Mill Street South
Port Hope, ON
L1A 2S6

Attention: Tom Dodds, Director of Community Development

Dear Sir:

Reference: Southbridge Port Hope
20 Hope Street, Port Hope, ON
Servicing and Stormwater Management Report
Our File No. : 120226

Please find enclosed the revised 'Servicing and Stormwater Management Report' for the above noted development.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P. Eng.
Senior Project Manager | Land Development Engineering

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed Southbridge Long Term Care Facility at 20 Hope Street within the Municipality of Port Hope. This report will support a Site Plan Application for the subject development. **Figure 1** Key Plan shows the site location.

2.0 EXISTING CONDITIONS

The site is currently 1.08 hectares in size. The site is bounded to the west by Princess Street, to the north by Ward Street, to the east by Hope Street and the south by residential homes. There are currently 4 buildings and associated parking areas within the property including a large two storey brick building which is the Hope Street Terrace long term care home (20 Hope Street), a two storey brick residential building (18 Hope Street), a one storey brick maintenance building and a three storey brick building which was previously the Port Hope Villa (hospital facility, 65 Ward Street). The topography generally slopes towards the north western corner towards the intersection of Princess Street and Ward Street. **Figure 2** shows the existing site conditions.

3.0 PROPOSED DEVELOPMENT

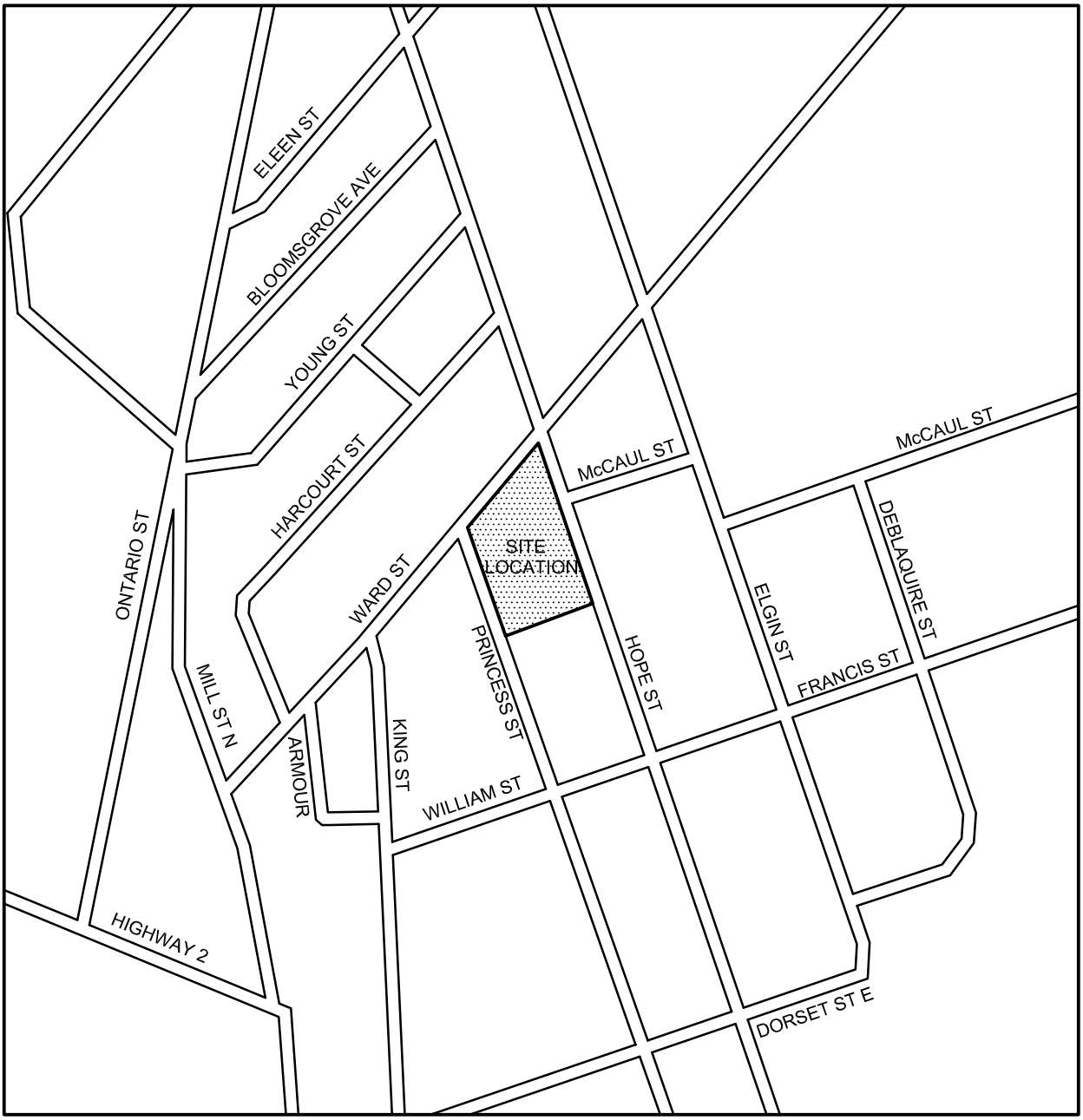
It is proposed to develop the site with a 7-storey long term care facility. The existing Hope Terrace long term care facility will be maintained and operational while the new facility is built. Once the new facility is built and operational the existing facility will be demolished. Refer to **Figure 3** for the proposed site layout.

4.0 SITE CONSTRAINTS

A geotechnical investigation was completed for the subject development entitled 'Geotechnical Investigation, Proposed Residential Building, 65 Ward Street, Port Hope, Ontario' prepared by Terraprobe Inc., dated December 11, 2019. The report noted that the site has a fill layer underlain by glacial till consisting of clayey silt or silty sand. No bedrock was encountered in any of the boreholes. Also, an Environmental Activity and Sector Registry (EASR) may be required for dewatering purposes depending on groundwater conditions at the time of construction.

5.0 WATER SERVICING

There is an existing 150mm diameter watermain along Princess Street, an existing 150mm diameter watermain along Ward Street and a 100mm diameter watermain along Hope Street. It is proposed to service the building by connecting a 200mm diameter water service to the existing watermain along Princess Street. There are existing hydrants along Princess Street, Ward Street and Hope Street that can provide fire protection. The existing hydrant along Ward Street is within 45 metres of the proposed siamese connection at the front of the proposed building. Refer to the General Plan of Services (120226-GP2) for water servicing information.



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20 HOPE STREET
PORT HOPE, ONTARIO

KEY PLAN

MAY 2021 120226 FIG 1

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20 HOPE STREET
PORT HOPE, ONTARIO

EXISTING CONDITIONS PLAN

MAY 2021 120226 FIG 2

PRINCESS STREET

GENERATOR

GARBAGE AREA

LOADING

PROPOSED 7 STOREY NURSING HOME
FF=101.00

SW

WARD STREET

LAY-BY LANE

LAY-BY LANE

HOPE STREET

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20 HOPE STREET
PORT HOPE, ONTARIO

PROPOSED DEVELOPMENT

MAY 2021 120226 FIG 3

The MOE Design guidelines provides a range for domestic water demands between 270 to 450 L/cap/day. Therefore, to determine a specific demand for the proposed development, the OBC Section 8: Sewer Systems was used. Table 8.2.1.3.B allocates a daily design sanitary flow of 450L/bed/day for "Long-Term Care Homes". The flow rate of 450L/bed/day was used for the average water demand for the proposed nursing home. The water demand has been calculated based on 192 beds and the results are summarized as follows:

Avg Day = 1.00 L/s
Max. Day = 2.75 L/s
Peak Hourly Demand = 4.13 L/s

The required fire demand was calculated using the Fire Underwriters Survey (FUS) Guidelines. The proposed building is to be sprinklered with the siamese connection located by the front entrance of the building. The required fire demand was calculated to be 1,321 USGPM (or 5,000 L/min). Refer to **Appendix A** for a copy of the water calculations.

Water demands and fire flow calculations have been provided to CIMA to add to the Municipality's water model and provide boundary conditions. Upon receipt this information will be included into this report prior to site plan approval.

6.0 SANITARY SERVICING

There is an existing 200mm diameter sanitary sewer on each of Princess Street, Ward Street and Hope Street. It is proposed to construct a private 200mm diameter sanitary service that will connect into the existing sanitary sewer on Princess Street. Refer to the General Plan of Services (120226-GP2) for sanitary servicing information.

The Ontario Building Code Section 8: Sewage Systems was used to calculate the theoretical sanitary flows for the 7-storey nursing home. The sanitary flows are based on 192 beds and an average daily flows of 450L/day per bed. The total theoretical peak flow for the development is calculated to be 3.57L/s. The existing facility and buildings within the site are being demolished. The sanitary flows from the existing buildings are estimated to be 3.09 L/s. Therefore, the increase in sanitary flow from the proposed building will be approximately 0.48 L/s and will have minimal impact on the existing sanitary system. Sanitary flow calculations are included in **Appendix B** for reference.

7.0 STORM SERVICING

Stormwater from Princess Street drains into roadside ditches which drain to a catchbasin by the intersection of Princess Street and Ward Street. The existing catchbasin outlets to an existing 300mm diameter storm sewer which connects to the existing 525mm diameter and 900mm diameter storm sewer along Ward Street. There is also an existing 375mm diameter and 450mm diameter storm sewer along Hope Street.

It is proposed to service the property with a private storm sewer system ranging in size from 300mm to 450mm diameter. The private storm sewer system will outlet to the existing 525mm

diameter storm sewer on Ward Street. The parking lot and landscaped area surface drainage will be directed towards catchbasins and conveyed to the private storm sewer system. Roof and foundation drainage from the proposed building will also be directed to the private storm sewer system. The storm servicing information is shown on the General Plan of Services (120226-GP2).

8.0 STORMWATER MANAGEMENT

8.1 Stormwater Management Criteria

A document entitled 'Technical and Engineering Guidelines for Stormwater Management Submissions', prepared by the Ganaraska Region Conservation Authority, dated December 2014 provides the stormwater management criteria for the proposed development. The subject site is located within the Ganaraska River watershed. The stormwater management criteria for this watershed is as follows:

- Quantity control of stormwater is required to pre-development conditions for storms up to and including the 100-year storm event.
- Quality control is to be provided to a normal level or 70% removal of total suspended solids.

8.2 Quantity Control

Stormwater from storms up to and including the 100-year storm event will be controlled to pre-development conditions prior to outletting to the existing 525mm diameter storm sewer along Ward Street. A runoff coefficient of 0.54 was used to calculate the allowable release rate of 153.6L/s.

Stormwater storage will be provided by ponding stormwater on the roof of the building as well as underground in storm sewers and on the surface in a landscaped area. Orifice controls in catchbasins and manholes and roof drain controls will be used to control the release of stormwater to the allowable release rate prior to outletting to the existing storm sewer along Ward Street.

A Post-Development Drainage Plan is provided in **Appendix C** which shows the proposed drainage areas and limits of 5 and 100 year storm event surface ponding. Stormwater management calculations including runoff coefficients, flows, storage required and storage provided for each of the drainage areas is provided in **Appendix C**. **Table 8** below summarizes these calculations.

Table 8: Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	5 Year Storm Event			100 Year Storm Event			
			Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
A1	0.190	0.90	9.4	0.06	28.95	11.6	0.13	79.01	80.43
A2-A5	0.230	0.44	26.9	N/A	0.0	29.0	N/A	12.10	12.16
A6-A11	0.650	0.58	98.8	N/A	0.0	102.1	0.30	46.3	46.31
A12	0.010	0.20	0.6	N/A	N/A	1.2	N/A	N/A	N/A
Total			**135.6**			**143.9**			
Allowable			**153.6**			**153.6**			

8.3 Quality Control

Oil Grit Separator (OGS) Unit

Quality control of stormwater shall be provided to a Normal level of treatment or 70% removal of total suspended solids. Quality control of stormwater for the site will be provided through the installation of an oil grit separator unit. The proposed OGS unit is a PMSU2015_4 which will provide normal levels of water quality prior to discharging into the municipal sewers. The target level of protection for long term removal of 70% total suspended solids with an overall treatment of over 90% of the total runoff.

Refer to **Appendix C** for the CDS unit design, performance and annual TSS removal efficiency data.

Best Management Practices

Best Management Practices shall also be implemented to reduce transport of sediments and promote on-site groundwater recharge. The Best Management Practices to be implemented are as follows:

- The drainage system for the development will consists of grassed swales to convey runoff from primarily landscaped areas. Drainage from the hard-surfaced parking lots will discharge to a storm sewer which will directly convey stormwater to the oil grit system prior to its release from the site.
- Swales are to be vegetated and constructed at minimum grade, where possible.
- Stormwater from roof areas is considered to be ‘clean’ and with roof leaders draining to grassed yards and grassed swales, quality control of stormwater in these areas is not required.

8.4 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the existing road allowances surrounding the site (Princess Street, Ward Street and Hope Street). The major overland system is shown on the Grading Plan (Interim and Ultimate Conditions) (dwg 120226-GR1 & 2).

9.0 EROSION AND SEDIMENT CONTROL

9.1 Temporary Measures

Temporary erosion and sediment control measures will be implemented during construction. Silt fence, mud mats and filter socks in catchbasins will be used as erosion and sediment control measures.

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Grading Plan (Interim and Ultimate Conditions) (dwg 120226-GR1 & 2) for additional information.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- Water servicing for the proposed development will be provided by a private 200mm diameter water service that connects to the existing 150mm diameter watermain in Princess Street.
- Sanitary servicing will be provided by a private 200mm diameter sanitary service that will connect to the existing 200mm sanitary sewer on Princess Street.
- Quantity control of stormwater will be provided for storms up to and including the 100-year storm event. Stormwater will be stored underground in the storm sewer system, on the surface by ponding around catchbasins in landscaped areas and on building roofs. The allowable release rate for the site is 153.6 L/s and the post-development stormwater release rates are 135.6 L/s and 143.9 L/s for the 5 and 100-year events respectively.
- Quality control of stormwater will be provided through the installation of an Oil and Grit Separator Unit.
- An overland flow route is provided;
- Erosion and sediment control measures will be implemented prior to and during construction.

NOVATECH

Prepared by:

Larry Colbran
Senior Design Technologist
Land Development Engineering

Reviewed by:

Cara Ruddle, P.Eng
Senior Project Manager
Land Development Engineering

APPENDIX A
Water Servicing Information

NOVATECH
Engineers, Planners & Landscape Architects

20 Hope Street
Southbridge Nursing Home
Water Demand

JOB NO. 120226
May 2021

Water Demand						
Node	Residential			Demand (L/s)		
	Units	Total Pop		Avg Day	Max. Daily	Peak Hour
	Beds					
1	192	192		1.00	2.75	4.13

Notes:

from Ontario Building code Table 8.2.1.3B:		
- Nursing Homes, Rest Homes	450	L/Bed/Day
Avg. Daily Demand:		
- OBC	450	L/Bed/Day
Max. Daily Demand:		
- Domestic (MOE Drinking Water Design Guideline)	2.75	x Avg. Day
Peak Hourly Demand:		
- Domestic (MOE Drinking Water Design Guideline)	4.13	x Avg. Day

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120226
Project Name: Southbridge Port Hope
Date: 6/11/2021
Input By: Paul Newcombe
Reviewed By: Cara Ruddle

Legend: Input by User; No Information or Input Required

Building Description: 7 Storey Long Term Care Home
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1900			
		Number of Floors/Storeys	7			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**2,850**	
	F	**Base fire flow without reductions**				**7,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,975**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**1,785**
		East Side	20.1 - 30 m		10%	
		South Side	> 45.1m		0%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	1.75
		Required Volume of Fire Flow (m^3)			m^3	525

FUS - Fire Flow Calculations - User Guide - Fire Resistive

Novatech Project #: 120226
Project Name: Southbridge Port Hope
Date: 6/11/2021
Input By: Paul Newcombe
Reviewed By: Cara Ruddle

- Please use the notes below as a guide when completing the FUS Fire Flow Calculations
- When in doubt, confirm construction material, firewalls, etc. with architect/owner
- When in doubt, err on conservative side

Note: This form only applies for Fire Resistive

Enter a description of the building or unit being considered, i.e. use/most stringent condition/address

Summary		
Construction Type	Fire Resistive Construction	
Floor Area Considered	2,850	m^2
Occupancy Reduction	-15%	
Sprinkler Reduction	-50%	
Exposure Surcharge	30%	
Total Fire Flow	5,000	L/min

Project Manager Review
Date: _____
Name: _____
Signature: _____

Base Fire Flow

Construction Material

1
Does not apply for this form
Does not apply for this form
Does not apply for this form
Only Use if can be confirmed with client/architect (ISO Cl 5)
Only Use if can be confirmed with client/architect (ISO Cl 6)

Floor Area

2
If considered gross floor area, then enter 1 floor/storey. If Fire wall, then reduce footprint accordingly.
Un-Protected **5** = number of floors above first 2, up to max of 10 floors total
Do vertical openings have minimum 1 hour rating between floors? Confirm this with the architect.
Protected **2** =number of additional immediately adjoining floors to be considered, up to 2

Do vertical openings have minimum 1 hour rating between floors? Confirm this with the architect.

Reductions or Surcharges

Occupancy hazard reduction or surcharge

3
Residential - with no garage
Residential - with garage
General Commercial - Generally, no reduction
Check usage with FUS
Check usage with FUS

Sprinkler Reduction

4
Only Use if can be confirmed with client/architect
Only Use if can be confirmed with client/architect

Exposure Surcharge (cumulative %)

5
For Fire walls: FUS considers a Fire wall to have a minimum 2 hour rating per NBC.

Results

6
NOTE: Refer to City Technical Bulletin ISDTB-2014-02 for additional considerations to cap this value at 10,000L/min

If IGPM is needed, divide USGPM by 1.20095

7
For Rural areas, or where required

APPENDIX B
Sanitary Servicing Information

PROJECT #: 120226
PROJECT NAME: SOUTHBRIDGE NURSING HOME
LOCATION: 20 HOPE STREET, PORT HOPE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: JUNE 2021

Sanitary Design Sheet

LOCATION	DOMESTIC			INFILTRATION		Total Flow (l/s)
AREA	TOTAL Pop.	Peak Factor	Peak Flow (l/s)	Total Area (ha)	Infilt. Flow (l/s)	
Existing Hospital/Care Home	161	3.3	2.80			
Existing Administration Building	10	3.3	0.03	1.1	0.25	3.09
Existing Maintenance Building	2	3.3	0.01			

Design Parameters:

from Ontario Building code Table 8.2.1.3B:

- Average Domestic Flow (Rest/Nursing Homes)	450	L/person/day
- Average Domestic Flow (Administration Building)	75	L/employee/day
- Extraneous Flows	0.23	l/s/ha
Residential Peaking Factor	Harmon Equation	

PROJECT #: 120226
PROJECT NAME: SOUTHBRIDGE NURSING HOME
LOCATION: 20 HOPE STREET, PORT HOPE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: MAY 2021

Sanitary Design Sheet

LOCATION			DOMESTIC				INFILTRATION		Total Flow (l/s)	PIPE					
AREA	FROM	TO	TOTAL				Total Area (ha)	Infilt. Flow (l/s)		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
			Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)									
1	BUILDING	SANMH 1	192	192	3.3	3.32	1.1	0.25	3.57	200	1.00	25.0	32.8	1.04	10.9%

Design Parameters:

from Ontario Building code Table 8.2.1.3B:
- Average Domestic Flow (Rest/Nursing Homes) 450 L/person/day
- Extraneous Flows 0.23 l/s/ha

Residential Peaking Factor Harmon Equation

APPENDIX C
Stormwater Management Calculations

RATIONAL METHOD

The Rational Method was used to determine both the allowable runoff as well as the post-development runoff for the proposed site. The equation is as follows:

$Q=2.78\ CIA$

Where:
Q is the runoff in L/s
C is the weighted runoff coefficient*
I is the rainfall intensity in mm/hr**
A is the area in hectares

*The weighted runoff coefficient is determined for each of the catchment areas as follows:

$$C = \frac{(A_p \times C_p) + (A_{imp} \times C_{imp})}{A_{tot}}$$

Where:
A_p is the pervious area in hectares
C_p is the pervious area runoff coefficient (C_{perv}=0.20)
A_{imp} is the impervious area in hectares
C_{imp} is the impervious area runoff coefficient (C_{imp}=0.90)
A_{tot} is the catchment area ($A_{perv} + A_{imp}$) in hectares

** The rainfall intensity is taken from the Port Hope Stormwater Management Guidelines and can be calculated as follows:

5 Year Design Storm
$I=2464 / (t + 16)$

100 Year Design Storm
$I=2819 / (t + 16)$

Note: The post-development C values are to be increased by 25% for the 1:100 year event (max. C_{imp}=1.0).

Project: Southbridge Nursing Home
Location: 20 Hope Street, Port Hope

DATE: May 2021

NOVATECH ENGINEERING CONSULTANTS LTD.

Storm Sewer Design Sheet

LOCATION		AREA (Ha)			FLOW					PROPOSED SEWER							
FROM	TO	TOTAL AREA	R= 0.2	R= 0.9	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
CBMH 4	OGS UNIT	0.230	0.150	0.080	0.28	0.28	10.00	94.77	26.90	304.8	1.00	96.0	100.98	1.38	1.16	74.08	0.27
CB 6	OGS UNIT	0.650	0.300	0.350	1.04	1.04	10.00	94.77	98.80	381.0	0.40	120.0	115.80	1.01	1.97	17.00	0.85
BUILDING	STMMH 5	0.190	0.000	0.190	0.48	0.48	10.00	94.77	9.40	254.0	1.00	5.0	62.10	1.22	0.07	52.70	0.15
OGS UNIT	STMMH 6	0.000	0.000	0.000	0.00	1.80	11.97	88.09	135.60	381.0	0.85	64.9	168.81	1.48	0.73	33.21	0.80

Definitions
Q = 2.78 AIR
Q = Peak Flow, in Litres per second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Port Hope Rainfall-Intensity Curve
2) Min Velocity = 0.76 m/sec.
3) Highlighted peak flows are controlled flows

PROJECT #: 120226
PROJECT NAME: SOUTHBRIDGE NURSING HOME
LOCATION: PORT HOPE, ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: MAY 2021

TABLE 1A: Allowable Runoff Coefficient "C"

Area	"C"
Total	0.54
1.080	

TABLE 1B: Allowable Flows

Outlet Options	Area (ha)	"C"	Tc (min)	$Q_{5\ Year}$ (L/s)
Princess Street	1.080	0.54	10.0	**153.6**

Time of Concentration	Tc=	10.0	min
Intensity (5 Year Event)	I_5=	94.77	mm/hr
Intensity (100 Year Event)	I_{100}=	147.05	mm/hr

100 year Intensity = 5588 / (Time in min + 28)
5 year Intensity = 2464 / (Time in min + 16)

Equations:
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, Port Hope IDF
A is the total drainage area

PROJECT #: 120226
PROJECT NAME: SOUTHBRIDGE NURSING HOME
LOCATION: PORT HOPE, ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: MAY 2021

TABLE 2A: Post-Development Runoff Coefficient "C" - A1 Controlled Roof Area

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.000	0.90	0.90	1.00	1.00
0.190	Roof	0.190	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 2B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A1 Controlled Roof Area

0.19 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	68.44	32.54	9.4	23.16	27.79
	25	60.10	28.57	9.4	19.19	28.79
	30	**53.57**	**25.46**	**9.4**	**16.09**	**28.95**
	35	48.31	22.97	9.4	13.59	28.54
	40	44.00	20.92	9.4	11.54	27.69

TABLE 2C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A1 Controlled Roof Area

0.19 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	50	71.64	37.84	11.6	26.25	78.74
	55	67.33	35.56	11.6	23.97	79.10
	60	**63.50**	**33.54**	**11.6**	**21.95**	**79.01**
	65	60.09	31.74	11.6	20.14	78.56
	70	57.02	30.12	11.6	18.53	77.81

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, Port Hope IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 2D: Roof Drain Flows

Roof Drains		
Roof Area	1900	m^2
Qty	14	
Type	Accutrol RD-100-A-ADJ	
Setting	1/4 Open	
Design Head	0.05-0.15	m
Design Flow 1" of head	0.32	L/s (ea)
Design Flow 2" of head	0.63	L/s (ea)
Design Flow 3" of head	0.71	L/s (ea)
Design Flow 4" of head	0.79	L/s (ea)
Design Flow 5" of head	0.87	L/s (ea)
Design Flow 6" of head	0.95	L/s (ea)

Table 2E: Total Roof Storage

Storm Event	Roof Drain ID	**Avg Area Per Roof Drain (m^2)	Avg Ponding Depth Per Roof Drain (m)	*Total Volume Per Drain (m^3)	Total Roof Storage Volume (m^3)	Total Volume (m^3) Required
5 Year	RD 1-25	135.7	0.0635	2.87	40.22	28.95
Max Storage	RD 1-25	135.7	0.1270	5.75	80.43	79.01

*Note: Ponding volumes calculated using cone equation:
**Note: Roof Drain Area accounts for 10% loss for roof furniture

TABLE 3A: Post-Development Runoff Coefficient "C" - A2-A5

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.080	0.90	0.44	1.00	0.51
0.230	Roof	0.000	0.90		1.00	
	Soft	0.150	0.20		0.25	

TABLE 3B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A2-A5

0.230 =Area (ha)
0.443 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	**10**	**94.77**	**26.87**	**26.9**	**0.00**	**0.00**
	15	79.48	22.54	26.9	-4.33	-3.90
	20	68.44	19.41	26.9	-7.46	-8.95
	25	60.10	17.04	26.9	-9.83	-14.74
	30	53.57	15.19	26.9	-11.68	-21.03

TABLE 3C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A2-A5

0.23 =Area (ha)
0.511 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	10	147.05	48.03	29.0	19.03	11.42
	15	**129.95**	**42.45**	**29.0**	**13.45**	**12.10**
	20	116.42	38.03	29.0	9.03	10.83
	25	105.43	34.44	29.0	5.44	8.16
	30	96.34	31.47	29.0	2.47	4.45

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, Port Hope IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 3D: Structure information

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv IN	Inv OUT
CBMH 4	1200	1.13	95.75	98.11	98.06
CBMH 3	1200	1.13	99.70	98.24	98.19
CBMH 2	1200	1.13	100.50	98.80	98.75
CB 1	600	0.37	100.50	N/A	99.05

TABLE 3E: Pipe information

Structures	Size Dia.(mm)	Length	Inv UP	Inv DOWN
CB1 - CBMH4	300	85.00	99.05	98.11

TABLE 3F: Storage Provided - A2-A5

Area A-3: Storage Table								
Elevation (m)	System Depth (m)	CBMH 4 Volume (m^3)	CBMH 3 Volume (m3)	CBMH 2 Volume (m3)	CB 1 Volume (m^3)	Pipe Volume (m^3)	Underground Volume (m^3)*	**Total Volume (m^3)**
98.060	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
98.310	0.25	0.28	0.14	0.00	0.00	3.00	0.42	**3.42**
98.560	0.50	0.57	0.42	0.00	0.00	6.01	0.57	**6.57**
98.810	0.75	0.85	0.70	0.07	0.00		0.63	**7.21**
99.060	1.00	1.13	0.98	0.35	0.00		0.85	**8.06**
99.310	1.25	1.41	1.27	0.63	0.10		0.94	**9.00**
99.560	1.50	1.70	1.55	0.92	0.19		0.94	**9.94**
99.810	1.75	1.98	1.83	1.20	0.28		0.94	**10.88**
100.100	2.04	2.31	2.16	1.53	0.39		1.09	**11.97**
100.150	2.09	2.36	2.22	1.58	0.41		0.19	**12.16**

TABLE 3G: Orfice Sizing information - A2-A5

Control Device					
Tempest MHF		B			
Design Event	**Flow (L/S)**	**Head (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Volume (m^3)**
1:5 Year	26.9	1.89	100.10	300.00	0.00
1:100 Year	29.0	1.94	100.15	300.00	12.10

**The design Head is calculated based on the centre of the pipe

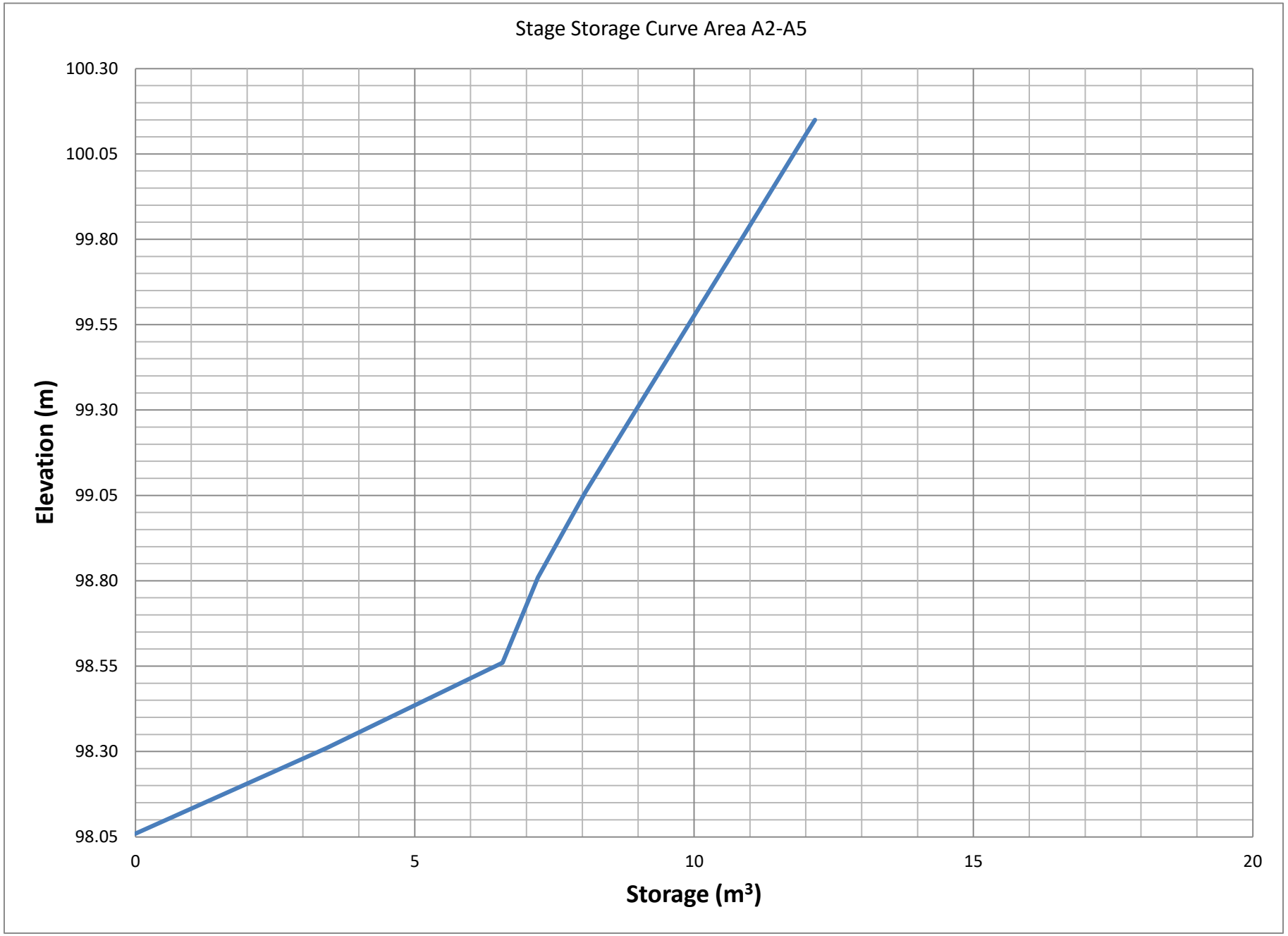

Stage Storage Curve Area A2-A5
100.30
100.05
99.80
99.55
99.30
99.05
98.80
98.55
98.30
98.05
Elevation (m)
0
5
10
15
20
Storage (m³)

TABLE 4A: Post-Development Runoff Coefficient "C" - A6-A11

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.350	0.90	0.58	1.00	0.65
0.650	Roof	0.000	0.90		1.00	
	Soft	0.300	0.20		0.25	

TABLE 4B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A6-11

0.65 =Area (ha)
0.58 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	**10**	**94.77**	**98.80**	**98.8**	**0.00**	**0.00**
	15	79.48	82.86	98.8	-15.94	-14.34
	20	68.44	71.35	98.8	-27.45	-32.94
	25	60.10	62.65	98.8	-36.15	-54.22
	30	53.57	55.84	98.8	-42.96	-77.32

TABLE 4C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A6-11

0.65 =Area (ha)
0.65 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	169.33	200.07	102.1	97.97	29.39
	10	147.05	173.74	102.1	71.64	42.99
	15	**129.95**	**153.54**	**102.1**	**51.44**	**46.30**
	20	116.42	137.55	102.1	35.45	42.54
	25	105.43	124.57	102.1	22.47	33.71

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, Port Hope IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 4D: Structure information

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv IN	Inv OUT
CBMH 12	1200	1.13	99.70	98.10	98.09
CBMH 11	1200	1.13	99.70	98.33	98.22
STMMH 10	1200	1.13	99.70	98.54	98.49
CBMH 8	1200	1.13	99.70	98.61	98.56
CBMH 7	1200	1.13	99.70	98.71	98.66
CB 9	600	0.36	99.70	N/A	98.78
CB 6	600	0.36	99.70	N/A	98.93

TABLE 4E: Pipe information

Structures	Size Dia.(mm)	Length	Inv UP	Inv DOWN
CB1 - CB2	250	18.30	98.93	98.10

TABLE 4F: Storage Provided - A6-A11

Area A-4: Storage Table												
Elevation (m)	System Depth (m)	CBMH 12 Volume (m^3)	CBMH 11 Volume (m3)	STMMH 10 Volume (m3)	CBMH 8 Volume (m3)	CBMH 7 Volume (m3)	CB 9 Volume (m3)	CB 6 Volume (m^3)	Pipe Volume (m^3)	Underground Volume (m^3)*	Surface Ponding Volume (m^3)	**Total Volume (m^3)**
98.090	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
98.490	0.40	0.45	0.31	0.00	0.00	0.00	0.00	0.00	8.66	9.42	0.00	**9.42**
98.890	0.80	0.90	0.76	0.45	0.37	0.26	0.04	0.00	17.32	20.11	0.00	**20.11**
99.290	1.20	1.36	1.21	0.90	0.83	0.71	0.18	0.13		22.64	0.00	**22.64**
99.690	1.60	1.81	1.66	1.36	1.28	1.16	0.33	0.27		25.19	0.00	**25.19**
99.800	1.71	1.93	1.79	1.48	1.40	1.29	0.37	0.31		25.89	0.59	**26.48**
99.850	1.76	1.99	1.84	1.54	1.46	1.35	0.39	0.33		26.21	2.02	**28.23**
99.900	1.81	2.05	1.90	1.59	1.52	1.40	0.40	0.35		26.53	4.92	**31.45**
99.950	1.86	2.10	1.96	1.65	1.57	1.46	0.42	0.37		26.85	7.75	**34.60**
100.050	1.96	2.22	2.07	1.76	1.69	1.57	0.46	0.40		27.49	18.82	**46.31**

TABLE 4G: Orfice Sizing information - A6-A11

Control Device					
Tempest HF		E			
Design Event	**Flow (L/S)**	**Head (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Volume (m^3)**
1:5 Year	98.8	1.49	99.70	250.00	0.00
1:100 Year	102.1	1.79	100.00	250.00	46.30

**The design Head is calculated based on the centre of the pipe

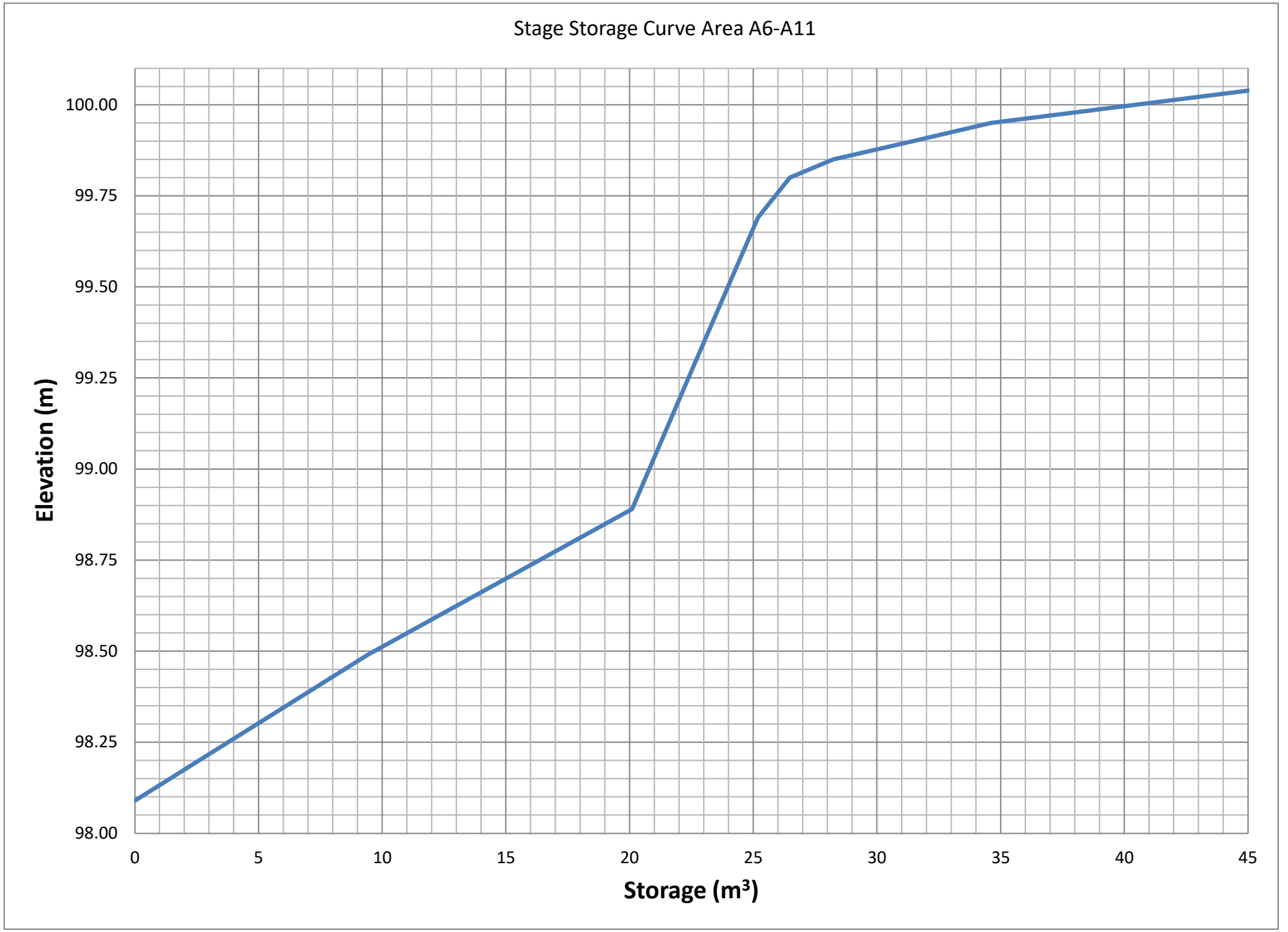

Stage Storage Curve Area A6-A11
100.00
99.75
99.50
99.25
99.00
98.75
98.50
98.25
98.00
Elevation (m)
0
5
10
15
20
25
30
35
40
45
Storage (m³)

TABLE 5A: Post-Development Runoff Coefficient "C" - A12

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$^*C_{avg}$
Total	Hard	0.000	0.90	0.20	1.00	0.25
0.010	Roof	0.000	0.90		1.00	
	Soft	0.010	0.20		0.25	

TABLE 6B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-12

0.010 =Area (ha)
0.20 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	**10**	**104.19**	**0.58**	**0.58**	**0.00**	**0.00**
	15	83.56	0.46	0.58	-0.12	-0.10
	20	70.25	0.39	0.58	-0.19	-0.23
	25	60.90	0.34	0.58	-0.24	-0.36
	30	53.93	0.30	0.58	-0.28	-0.50

TABLE 6C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-12

0.01 =Area (ha)
0.25 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	**10**	**178.56**	**1.24**	**1.24**	**0.00**	**0.00**
	15	142.89	0.99	1.24	-0.25	-0.22
	20	119.95	0.83	1.24	-0.41	-0.49
	25	103.85	0.72	1.24	-0.52	-0.78
	30	91.87	0.64	1.24	-0.60	-1.08

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

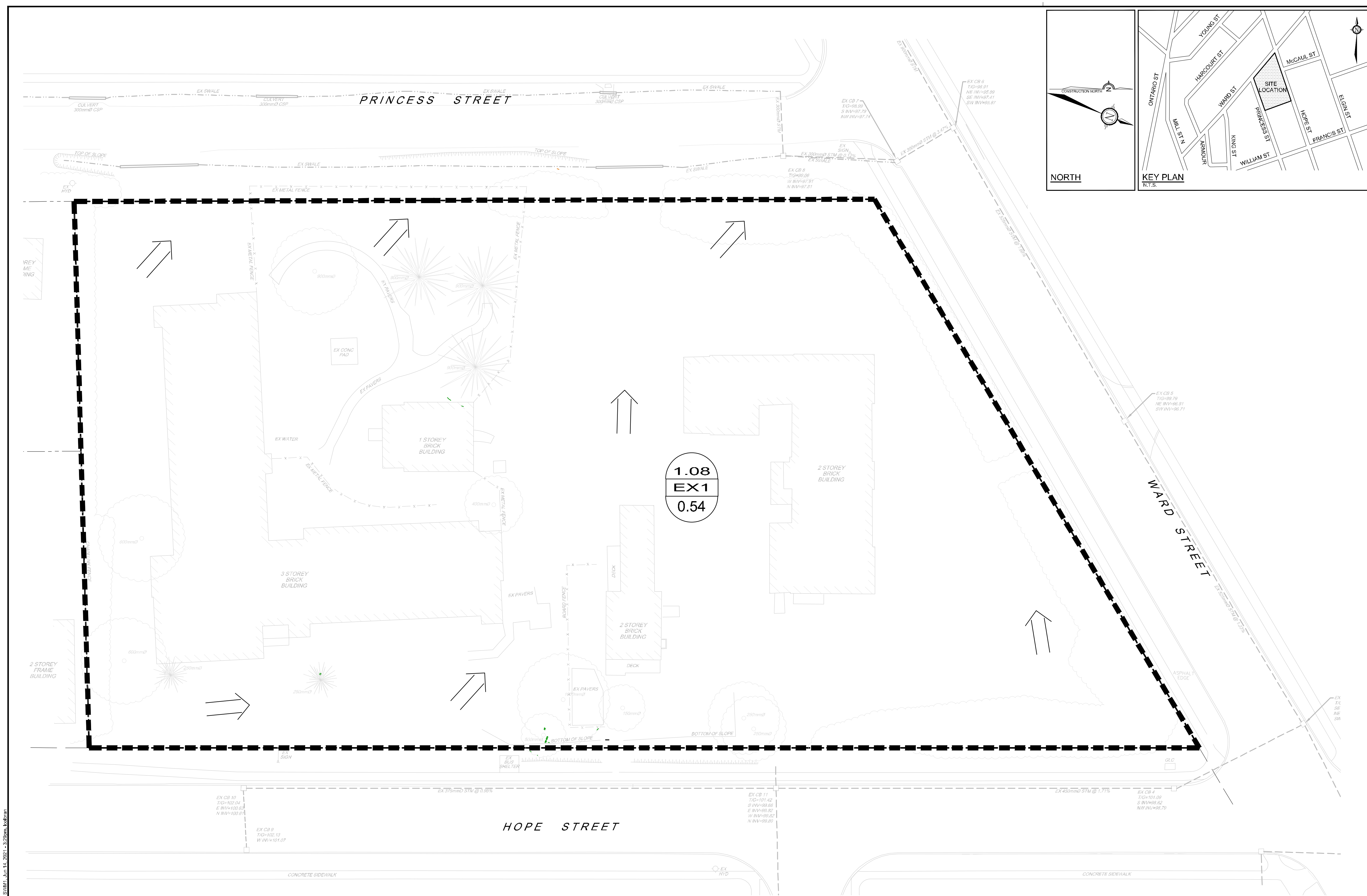
Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 8: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	Oulet Location	Orifice	5 Year Storm Event				100 Year Storm Event			
					Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
A1	0.190	0.90	STMMH 5	RD-100-A-ADJ	9.4	0.06	28.95	40.22	11.6	0.13	79.01	80.43
A2-A5	0.230	0.44	CBMH 4	TEMPEST MHF B	26.9	1.89	0.00	12.16	29.0	1.94	12.10	12.16
A6-A11	0.650	0.58	CBMH 12	TEMPEST HF E	98.8	1.49	0.00	46.31	102.1	1.79	46.30	46.31
A12	0.010	0.20	WARD ST	N/A	0.6	N/A	N/A	N/A	1.2	N/A	N/A	N/A
Total					**135.6**				**143.9**			
Allowable					**153.6**				**153.6**			



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

No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPLICATION	JUNE 14/21	CJR

SCALE		
N.T.S.	DESIGN	LSC
	CHECKED	CJR
	DRAWN	LSC
	CHECKED	CJR
	APPROVED	CJR

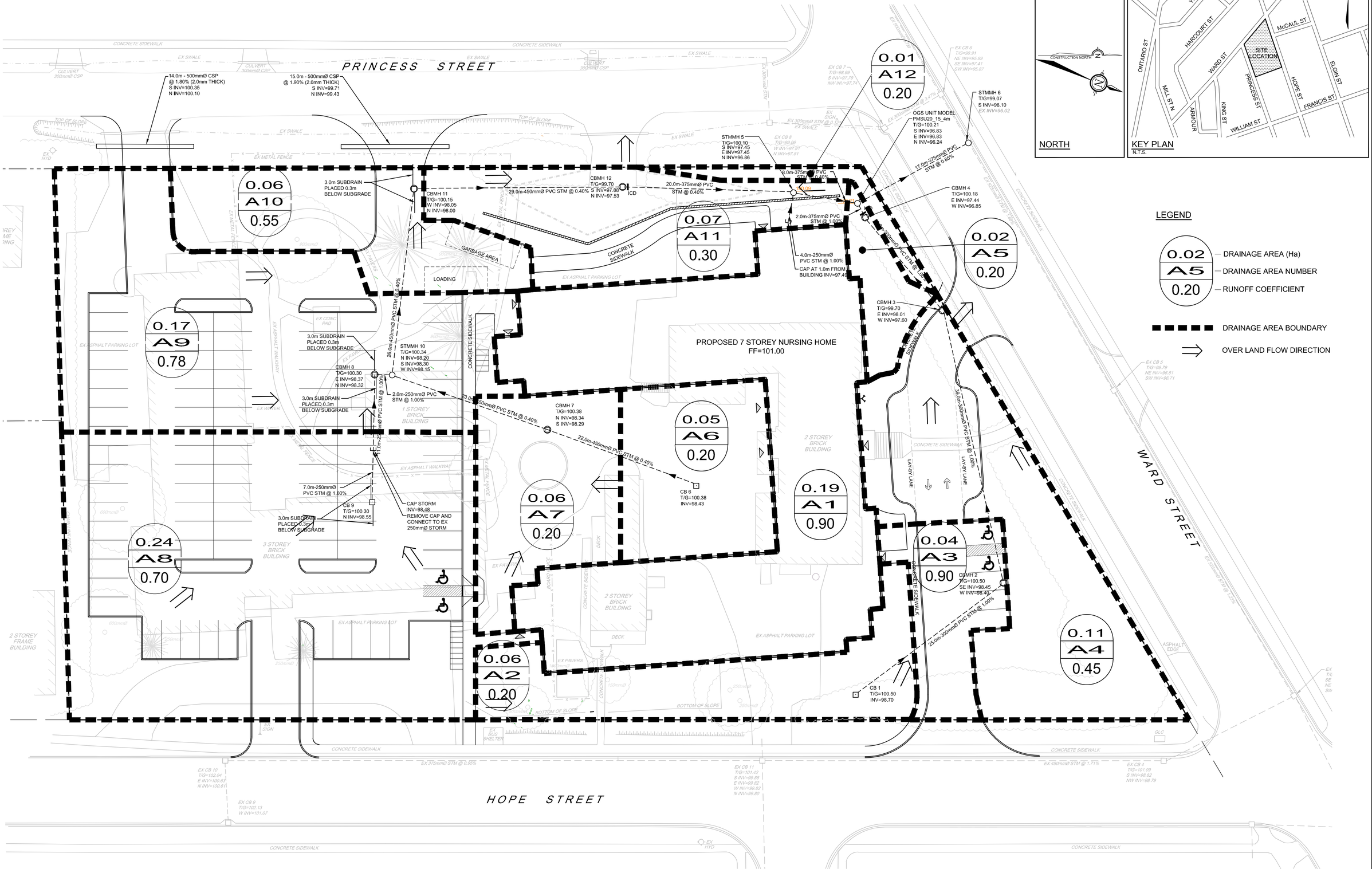
FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
MUNICIPALITY OF PORT HOPE
20 HOPE STREET SOUTH

DRAWING NAME
SOUTHBRIDGE CARE HOMES
PORT HOPE NURSING HOME
PRE-DEVELOPMENT STORMWATER MANAGEMENT DRAINAGE AREA PLAN

PROJECT No. 120226
REV REV 1
DRAWING No. 120226-SWM1



NOTE:
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No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPLICATION	JUNE 14/21	CJR

SCALE 1:250

1:250
0 2.5 5 7.5 10

DESIGN LSC
CHECKED CJR
DRAWN LSC
CHECKED CJR
APPROVED CJR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER C.J. RUDDLE PROVINCE OF ONTARIO

NOVATECH
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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
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Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
MUNICIPALITY OF PORT HOPE
20 HOPE STREET SOUTH

DRAWING NAME
SOUTHBRIDGE CARE HOMES
PORT HOPE NURSING HOME
POST-DEVELOPMENT STORMWATER MANAGEMENT DRAINAGE AREA PLAN - ULTIMATE CONDITIONS

PROJECT No. 120226
REV REV 1
DRAWING No. 120226-SWM2

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PLAN1.DWG - 594mmx841mm

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name:	20 Hope Street, Long Term Care Home	**Engineer:**	**NOVATECH**
Location:	Port Hope	**Contact:**	**Paul Newcombe, EIT**
OGS #:	OGS	**Report Date:**	June-1-2021

Area	1.1	ha	**Rainfall Station #**	211	
Weighted C	0.61		**Particle Size Distribution**	FINE	
CDS Model	2015-4		**CDS Treatment Capacity**	20	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.5%	9.5%	0.9	0.9	4.7	97.5	9.3
1.0	10.4%	19.9%	1.9	1.9	9.4	96.2	10.0
1.5	8.9%	28.8%	2.8	2.8	14.1	94.8	8.5
2.0	8.1%	36.9%	3.7	3.7	18.8	93.5	7.6
2.5	7.3%	44.2%	4.7	4.7	23.5	92.1	6.7
3.0	5.6%	49.9%	5.6	5.6	28.2	90.8	5.1
3.5	5.1%	55.0%	6.5	6.5	32.9	89.4	4.6
4.0	4.1%	59.0%	7.5	7.5	37.6	88.1	3.6
4.5	3.2%	62.2%	8.4	8.4	42.3	86.7	2.8
5.0	3.3%	65.5%	9.3	9.3	47.0	85.4	2.8
6.0	6.4%	71.9%	11.2	11.2	56.5	82.7	5.3
7.0	4.7%	76.6%	13.1	13.1	65.9	80.0	3.8
8.0	4.1%	80.7%	14.9	14.9	75.3	77.3	3.2
9.0	2.8%	83.5%	16.8	16.8	84.7	74.6	2.1
10.0	2.0%	85.5%	18.7	18.7	94.1	71.9	1.4
15.0	7.3%	92.8%	28.0	19.8	100.0	49.7	3.6
20.0	3.7%	96.5%	37.3	19.8	100.0	37.3	1.4
25.0	2.5%	99.1%	46.6	19.8	100.0	29.8	0.8
30.0	0.2%	99.3%	56.0	19.8	100.0	24.9	0.0
35.0	0.5%	99.7%	65.3	19.8	100.0	21.3	0.1
40.0	0.3%	100.0%	74.6	19.8	100.0	18.6	0.0
45.0	0.0%	100.0%	83.9	19.8	100.0	16.6	0.0
50.0	0.0%	100.0%	93.3	19.8	100.0	14.9	0.0
							82.6

Removal Efficiency Adjustment[2] = 6.5%

Predicted Net Annual Load Removal Efficiency = 76.1%

Predicted % Annual Rainfall Treated = 94.0%

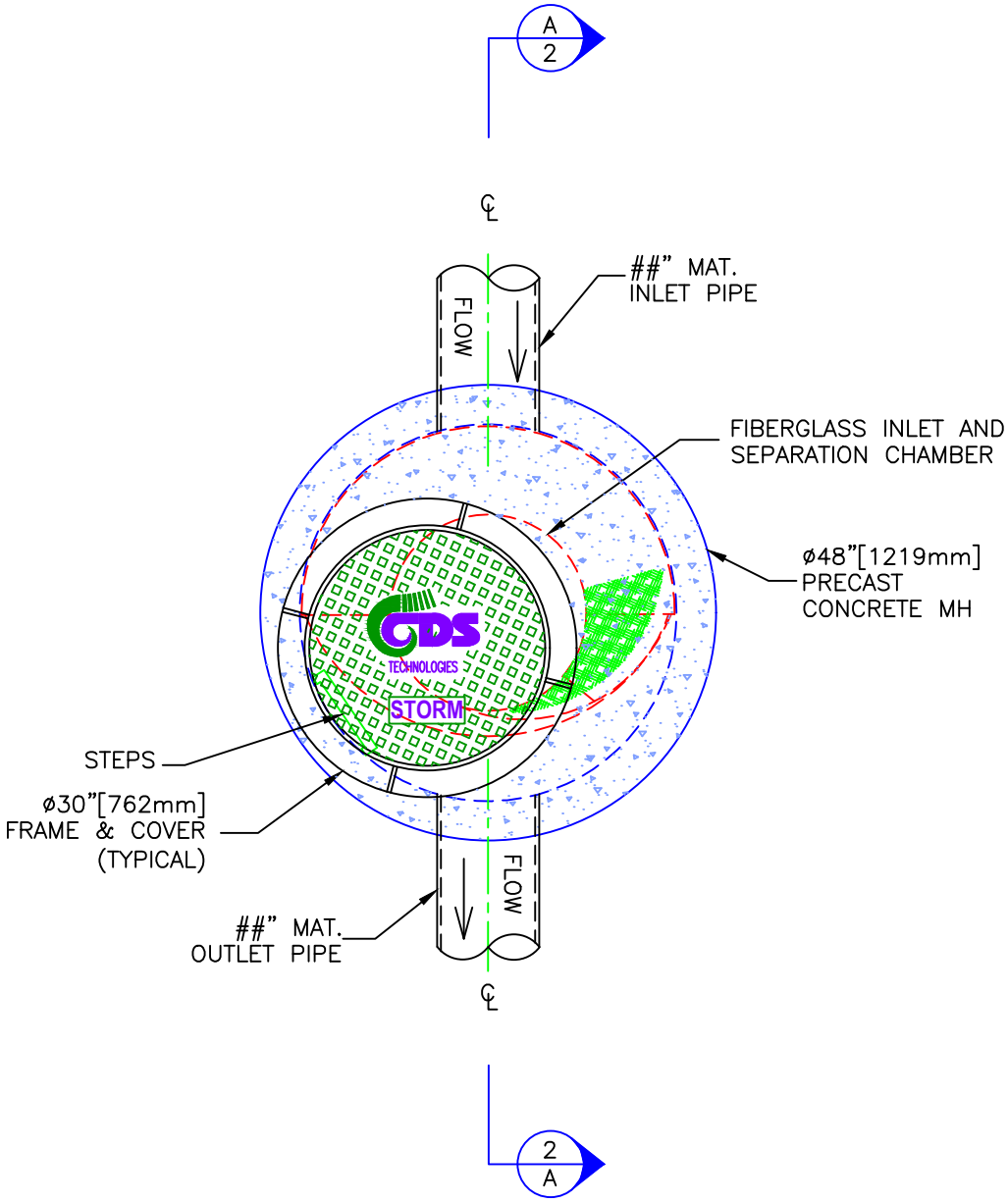
1 - Based on 32 years of hourly rainfall data from Canadian Station 6166418, Peterborough ON

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

3 - CDS Efficiency based on testing conducted at the University of Central Florida

4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications

PLAN VIEW

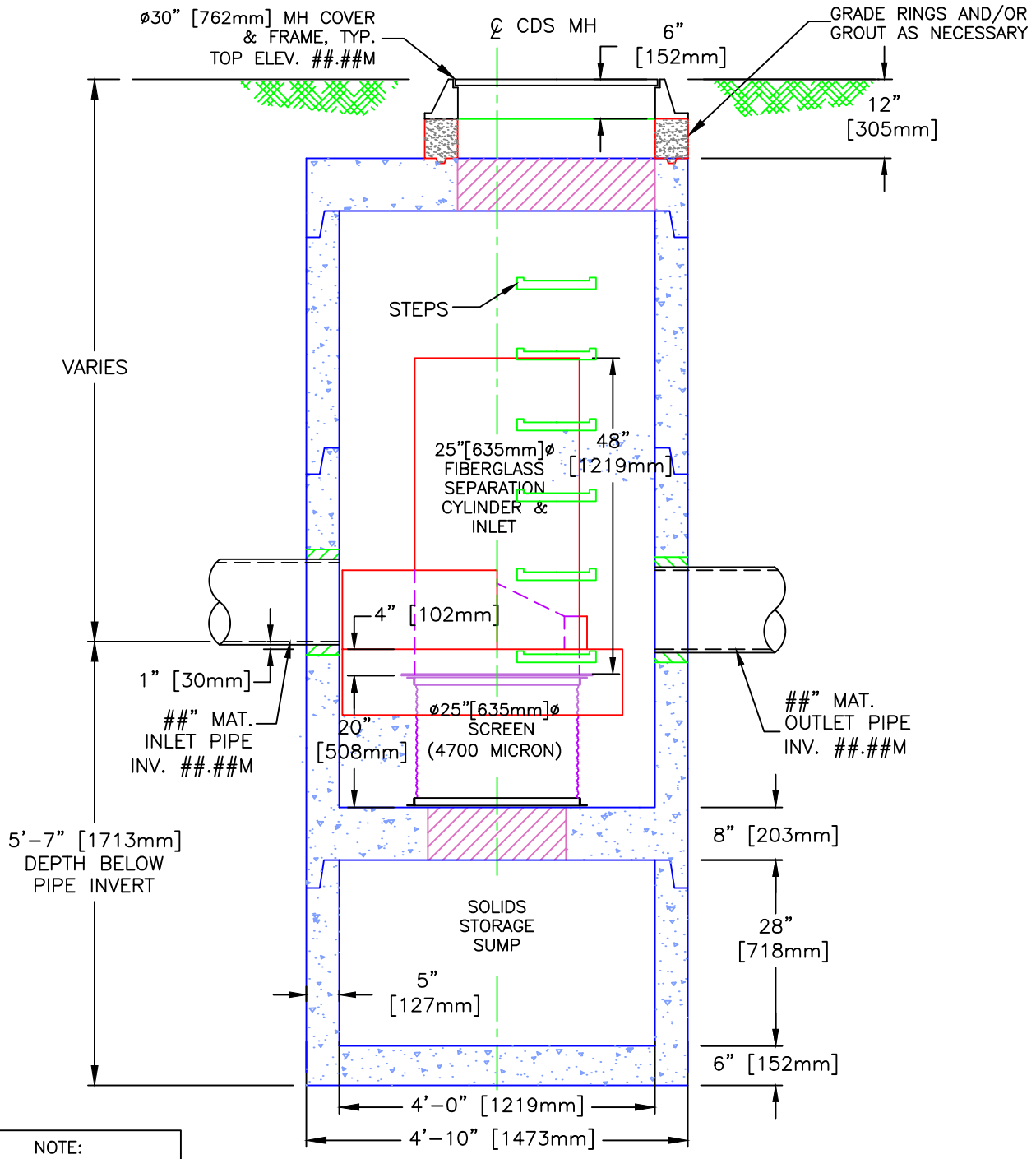


CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, PROVINCE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET 1
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

SECTION A–A
ELEVATION VIEW



NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS OF OR CONCRETE SECTIONS

CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS

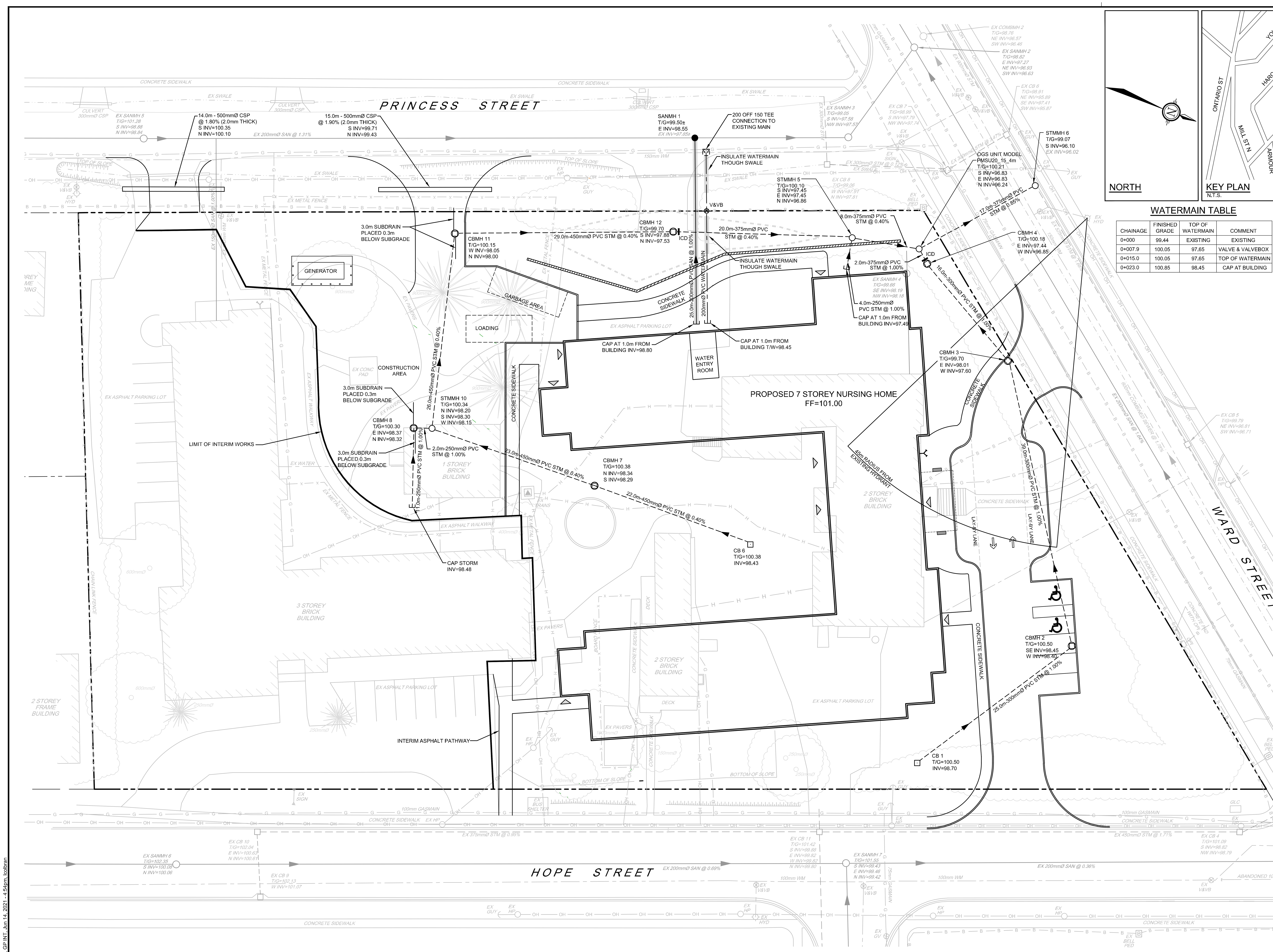
PROJECT NAME
CITY, PROVINCE

JOB#	XX–##–###	SCALE 1" = 2'
DATE	##/##/##	SHEET 2
DRAWN	INITIALS	
APPROV.		

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

APPENDIX D
Drawings

General Plan of Services Interim Conditions	(120226-GP1)
General Plan of Services Ultimate Conditions	(120226-GP2)
Grading Plan Interim Conditions	(120226-GR1)
Grading Plan Ultimate Conditions	(120226-GR2)
Noted and Details Plan	(120226-NDP)



WATERMAIN TABLE

CHAINAGE	FINISHED GRADE	TOP OF WATERMAIN	COMMENT
0+000	99.44	EXISTING	EXISTING
0+007.9	100.05	97.65	VALVE & VALVEBOX
0+015.0	100.05	97.65	TOP OF WATERMAIN
0+023.0	100.85	98.45	CAP AT BUILDING

LEGEND

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED WATER SERVICE
- PROPOSED VALVE AND VALVE BOX
- PROPOSED CAP
- PROPOSED FIRE HYDRANT
- PROPOSED SANITARY SERVICE c/w MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED SANITARY SEWER WITH INSULATION
- PROPOSED BUILDING AND SERVICE ENTRANCE
- DIRECTION OF FLOW
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- GAS METER
- PROPOSED WATER METER
- PROPOSED WATER REMOTE METER
- PROPOSED INLET CONTROL DEVICE
- SWALE
- PROPOSED RETAINING WALL
- PROPOSED TRANSFORMER LOCATION
- EXISTING WATERMAIN C/W VALVE & VALVE CHAMBER
- EXISTING HYDRANT C/W VALVE & LEAD
- EXISTING SANITARY MANHOLE & SEWER
- EXISTING STORM MANHOLE & SEWER
- EXISTING CATCHBASIN
- EXISTING SWALE

NORTH

KEY PLAN
N.T.S.

NOTE:
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SCALE 1:250

DESIGN LSC
CHECKED CJR
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C.J. RUDDLE
PROVINCE OF ONTARIO

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LOCATION
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20 HOPE STREET SOUTH

DRAWING NAME
SOUTHBRIDGE CARE HOMES
PORT HOPE NURSING HOME
GENERAL PLAN OF SERVICES
INTERIM CONDITIONS

PROJECT No. 120226
REV: REV 2
DRAWING No. 120226-GP1

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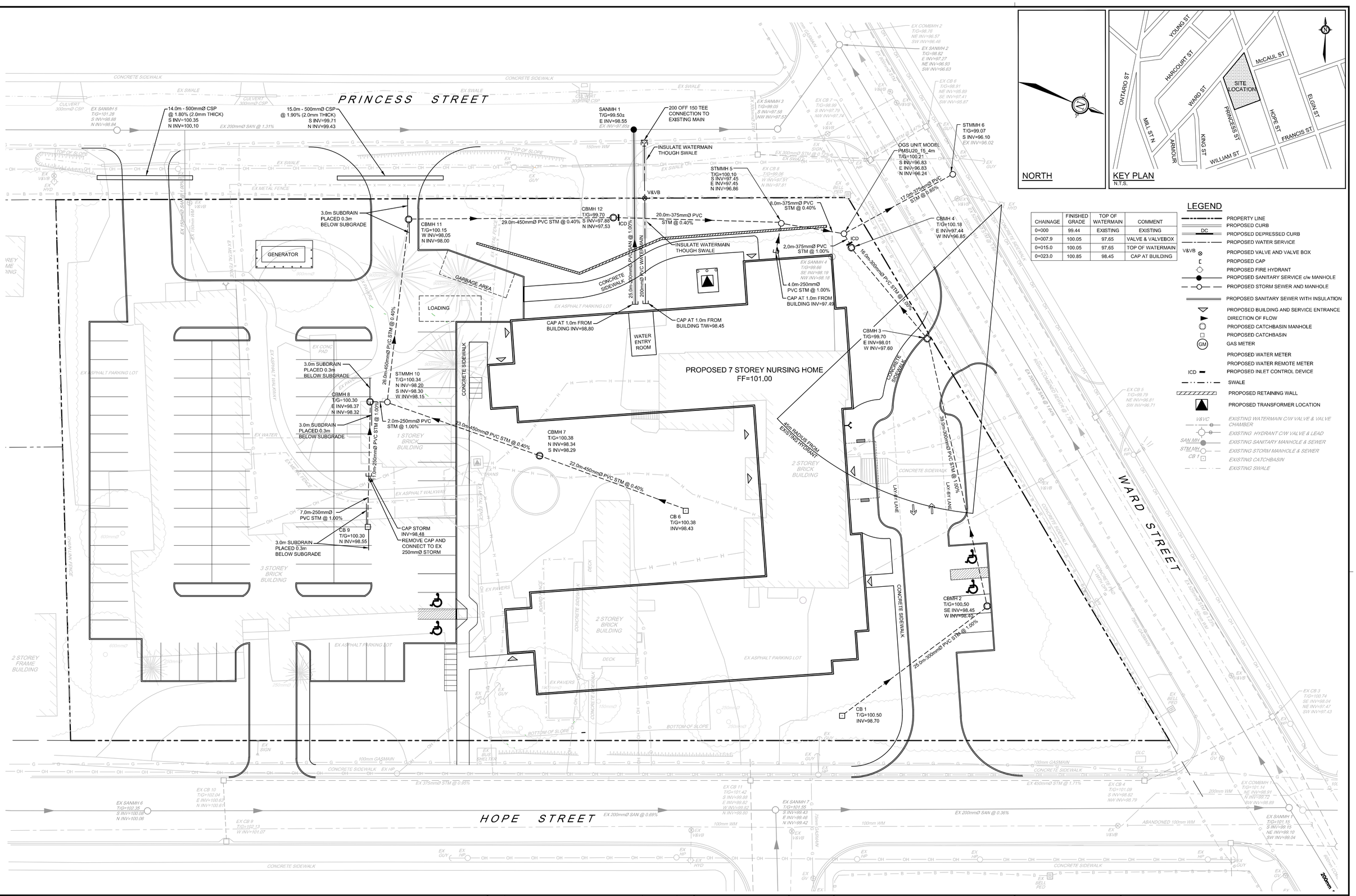

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- EXISTING HYDRANT C/W VALVE & LEAD
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- STM MH — EXISTING STORM MANHOLE & SEWER
- CB 1 — EXISTING CATCHBASIN
- EXISTING SWALE

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GENERAL PLAN OF SERVICES
ULTIMATE CONDITIONS

PROJECT No. 120226
REV REV 2
DRAWING No. 120226-GP2

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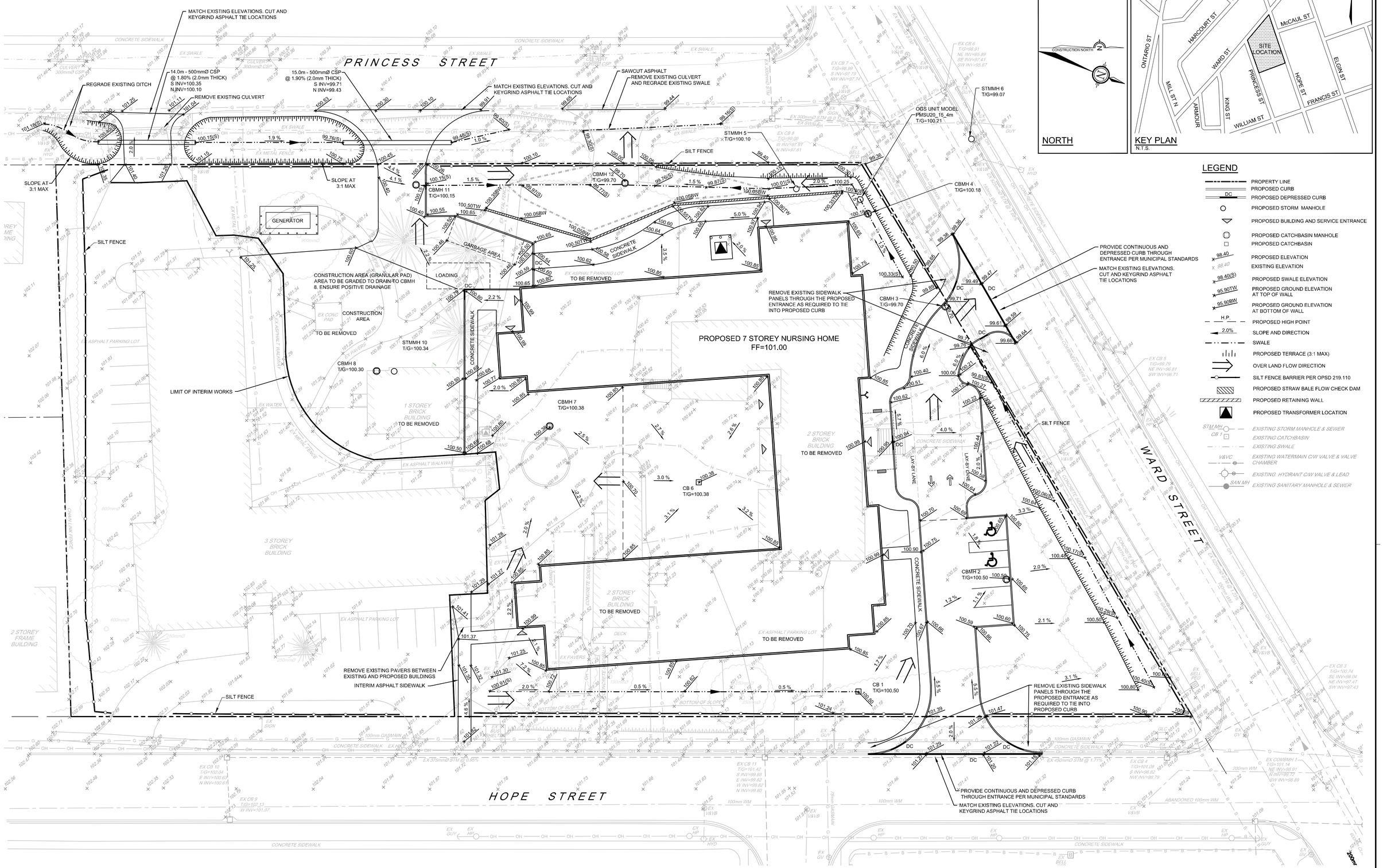

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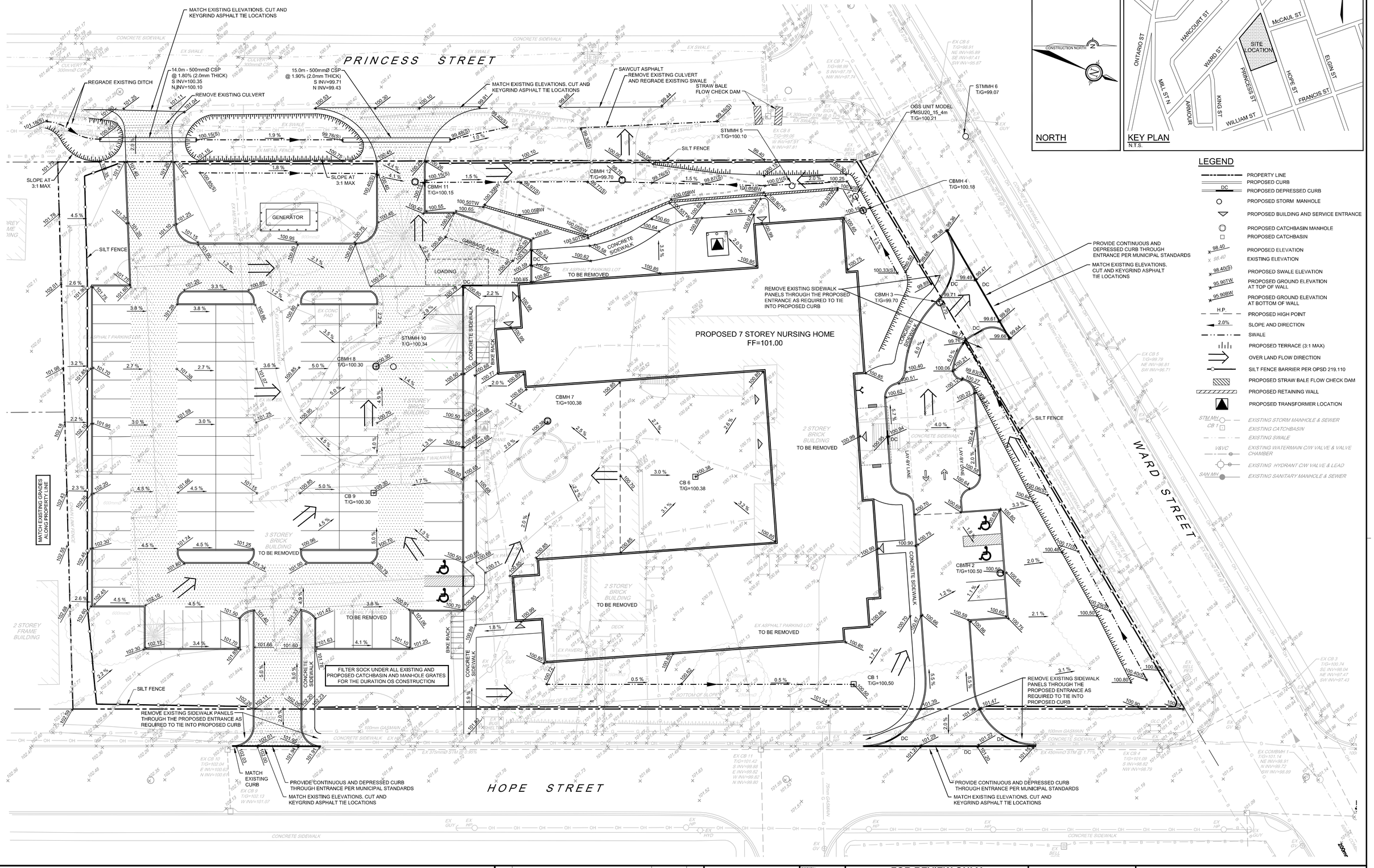

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REV REV 2
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GENERAL NOTES:

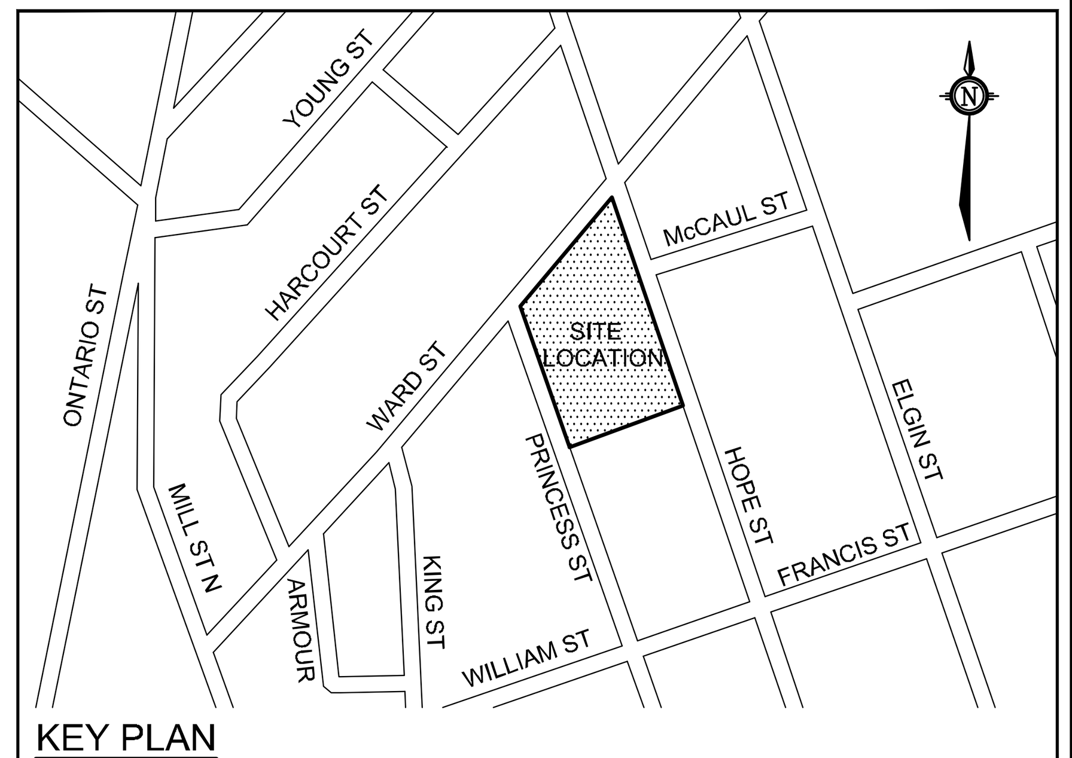
1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPALITY OF PORT HOPE BEFORE COMMENCING CONSTRUCTION. AN EXCAVATION PERMIT WILL BE REQUIRED FROM THE MUNICIPALITY PRIOR TO ANY WORKS ON PUBLIC PROPERTY.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED AND THE MUNICIPALITY OF PORT HOPE AS THIRD PARTY.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE MUNICIPALITY OF PORT HOPE.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ALL ORGANIC MATERIAL AND DEBRIS. ALL CONTAMINATED MATERIAL (IF ANY) SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
8. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS.
9. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES AND GRADING PLAN INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS, ANY ALIGNMENT CHANGES, AND ALL SURFACE ELEVATION AS BUILT GRADES.
10. ASPHALT REINSTATEMENT LIMITS SHALL BE MARKED IN THE FIELD AND APPROVED BY THE MUNICIPALITY OF PORT HOPE PRIOR TO ASPHALT REINSTATEMENT COMMENCING.
11. ALL ELEVATIONS ARE GEODETIC. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO THE CGVD1928: 1978 GEODETIC DATUM AND ARE DERIVED FROM BENCH MARK AND 00819658142 HAVING PUBLISHED ORTHOMETRIC ELEVATION OF 95.64 . REFER TO ELLIOTT AND PARR (PETERBOROUGHLTD. TOPOGRAPHIC PLAN OF LOTS 21-31 SMITH ESTATE PLAN IN THE MUNICIPALITY OF PORT HOPE COUNTY OF NORTHUMBERLAND.
2. REFER TO GEOTECHNICAL INFORMATION PROVIDED BY TERRAPROBE INC., FILE NO. 1-19-0660-01 DATED DECEMBER 11, 2019 FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
13. REFER TO THE DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT NO. R-2021-091, DATED JUNE 14, 2021 PREPARED BY NOVATECH.
14. REFER TO THE MUNICIPALITY OF PORT HOPE MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND APPROVAL OF MUNICIPAL INFRASTRUCTURE AND RESIDENTIAL, COMMERCIAL AND INDUSTRIAL DEVELOPMENT, SECTION 4 FOR ALL REQUIRED ROAD REINSTATEMENTS.

EROSION AND SEDIMENT CONTROL NOTES:

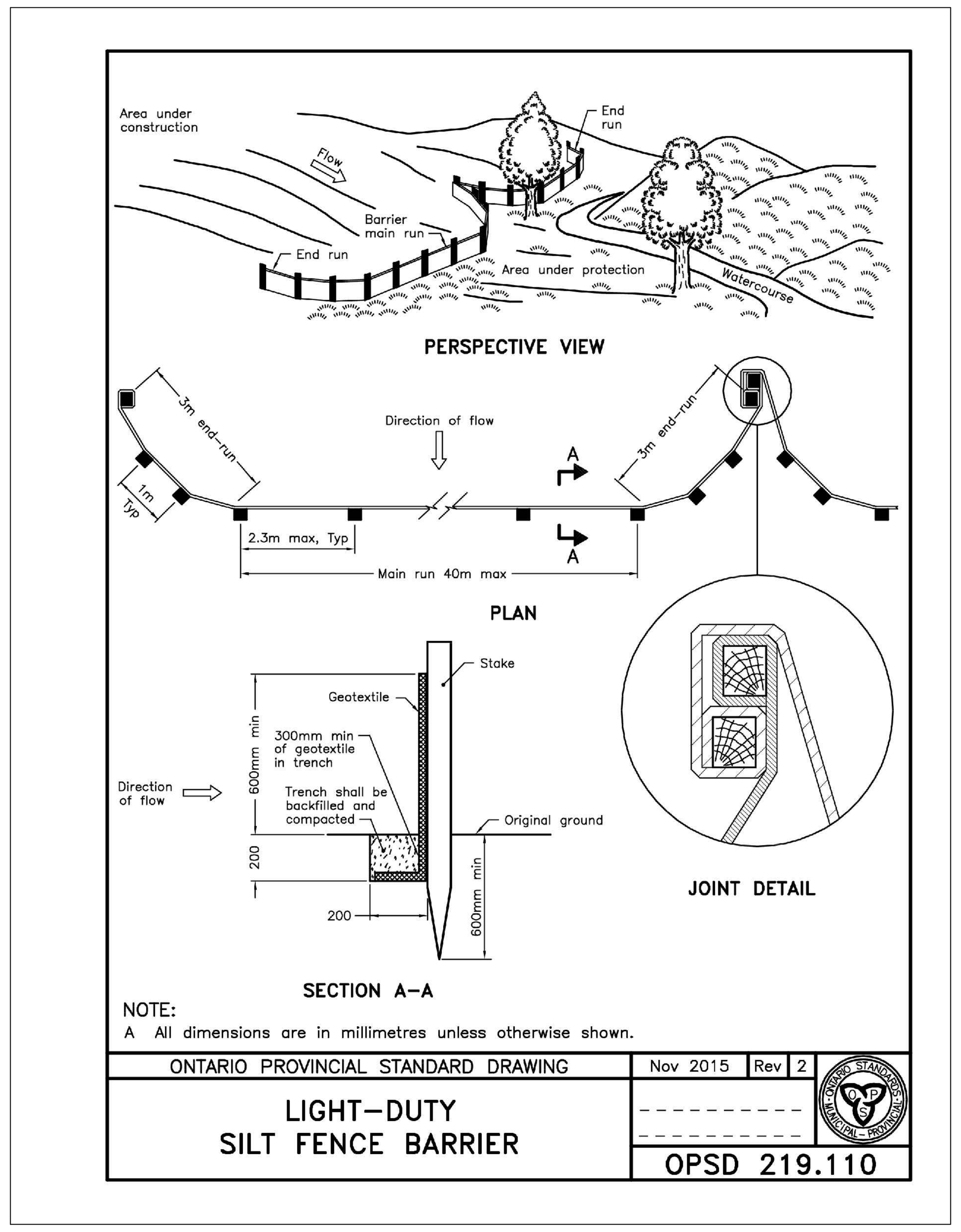
1. THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE MUNICIPALITY OF PORT HOPE, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
2. THE CONTRACTOR SHALL PLACE FILTER SOCKS UNDER THE EXISTING AND PROPOSED CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
3. LIGHT DUTY SILT FENCE AS PER OPSD 219.110 SHALL BE INSTALLED FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
4. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
5. PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFFSITE.

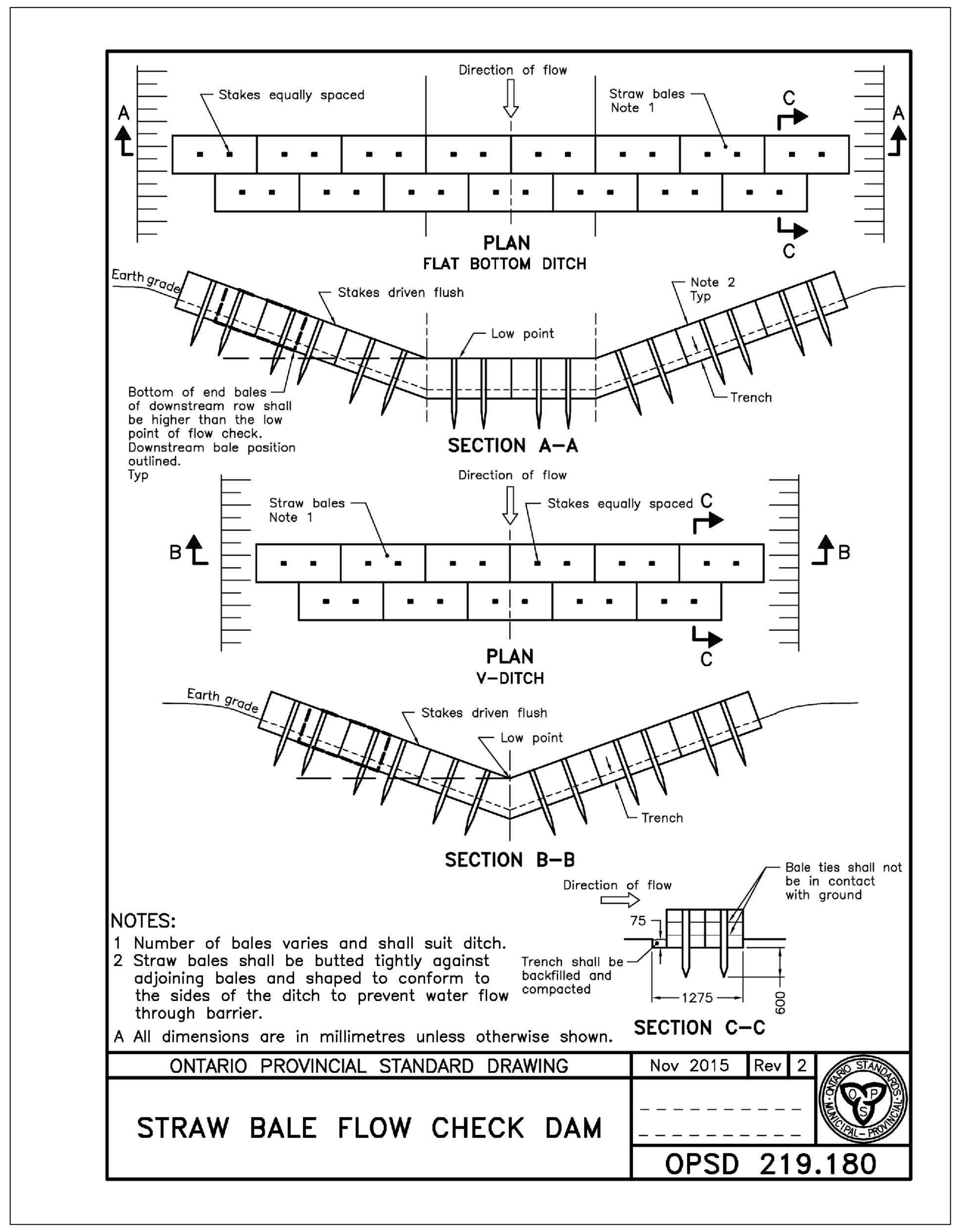
GRADING NOTES:

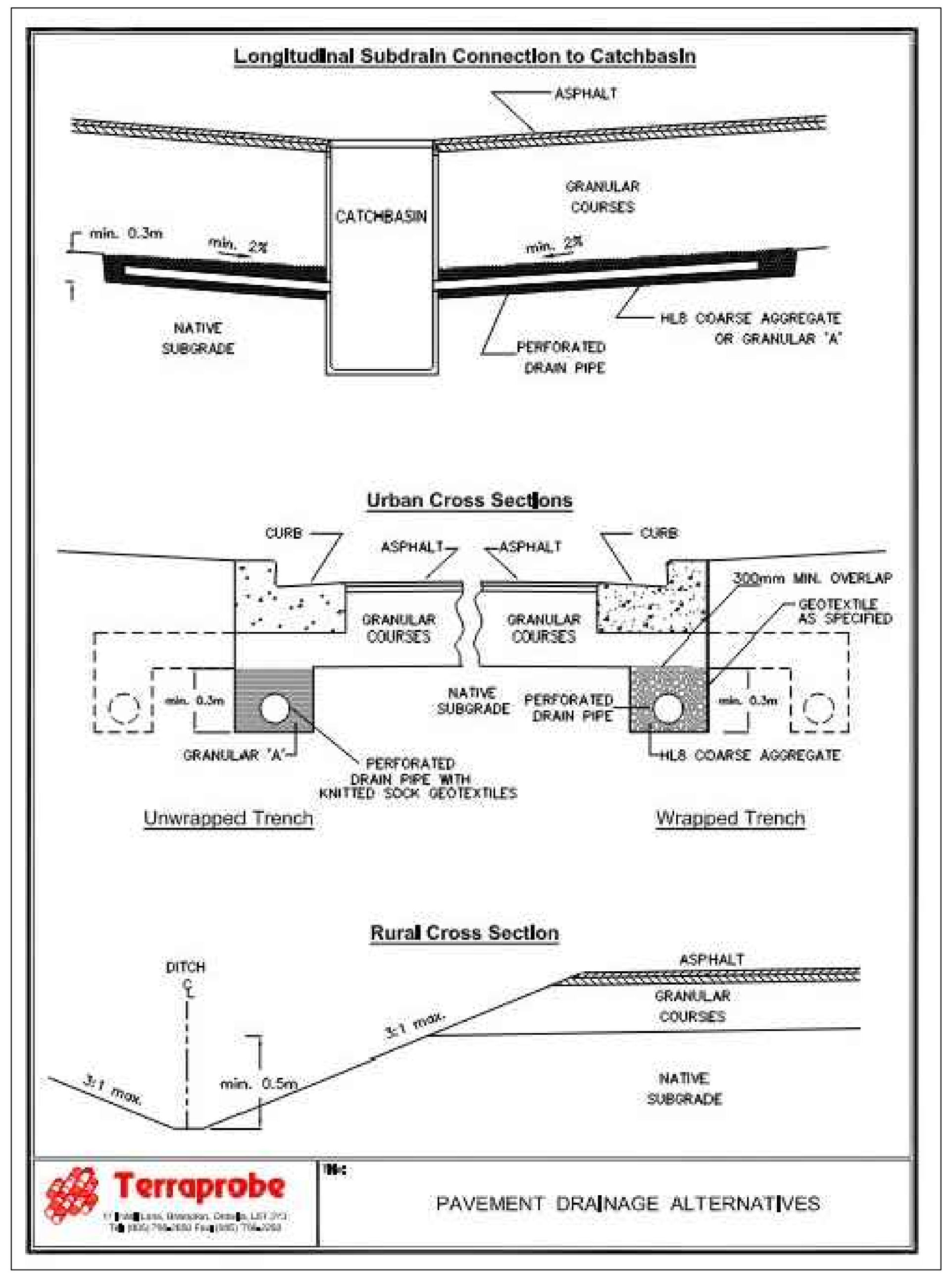
1) ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS.
2) EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL CONSULTANT.
3) ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS.
4) THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5) GRADE AND/OR FILL BEHIND PROPOSED CURB AND BETWEEN BUILDINGS AND CURBS, WHERE REQUIRED TO PROVIDE POSITIVE DRAINAGE.
6) MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
7) ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER OPSD 600.110.



KEY PLAN
N.T.S.







WATERMAIN NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	701	OPSS
THERMAL INSULATION IN SHALLOW TRENCHES	1109.030	OPSD
HYDRANT INSTALLATION	1105.010	OPSD
WATERMAIN (50mmØ +)	PVC DR 18 (UNLESS SPECIFIED OTHERWISE)	
WATERMAIN (<50mmØ)	PEX SDR9	
WATER SERVICES	PEX SDR9	

2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL, RESTORATION, CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.25m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.
6. DEVELOPERS CONTRACTOR IS TO FOLLOW THE MUNICIPALITY'S WATER COMMISSIONING PROTOCOL.
7. IT WILL BE THE RESPONSIBILITY OF THE DEVELOPER'S CONTRACTOR TO PERFORM ANY WATERMAIN CONNECTION(S) REQUIRED. THIS SHALL BE COMPLETED IN THE PRESENCE OF A DESIGNATED MUNICIPAL WATER OPERATOR AND THE SELECTED CONTRACTOR SHALL PROVE TO THE SATISFACTION OF THE MUNICIPALITY THAT THEY ARE COMPETENT TO PERFORM THE WORKS

SEWER NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
STORM / SANITARY MANHOLE (1200Ø)	701.010	OPSD
CATCHBASIN (600x600mm)	705.010	OPSD
CB, FRAME & COVER	400.020	OPSD
STORM / SANITARY MH FRAME & COVER	401.010	OPSD
SANITARY COVER	401.020	OPSD
SEWER TRENCH	410	OPSS
SANITARY SEWER	PVC SDR 35 (UNLESS SPECIFIED OTHERWISE)	
STORM SEWER (<450mmØ)	PVC SDR 35 (UNLESS SPECIFIED OTHERWISE)	
STORM SEWER (450mmØ +)	CONC CLASS 65D (UNLESS SPECIFIED OTHERWISE)	
WATERTIGHT FRAME & COVER	401.030	OPSD
SEWER INSULATION SHALLOW TRENCH	1109.030	OPSD

2. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
3. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
4. DYE TESTING IS TO BE COMPLETED ON SANITARY SERVICE TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN.
5. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
6. SUBDRAIN INVERTS SHOULD BE APPROXIMATELY 300mm BELOW SUBGRADE LEVEL. THE SUBGRADE SURFACE SHOULD BE SHAPED TO PROMOTE WATER FLOW TO THE DRAINAGE LINES.
7. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
8. LEAKAGE TESTING AS PER OPSS 410.07.16, 410.07.16.04 AND 407.07.24. IS TO BE COMPLETED ON ALL SANITARY SERVICES AND THE RESULTS ARE TO BE SUBMITTED TO THE MUNICIPALITY OF PORT HOPE - PUBLIC WORKS DEPARTMENT FOR CONSIDERATION IN SECURITY RELEASE FOLLOWING CONSTRUCTION.

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- PROPOSED WATER METER
- PROPOSED WATER REMOTE METER
- ICD — PROPOSED INLET CONTROL DEVICE
- 98.40 — PROPOSED ELEVATION
- 98.40 — EXISTING ELEVATION
- 98.40(S) — PROPOSED SWALE ELEVATION
- 95.90TW — PROPOSED GROUND ELEVATION AT TOP OF WALL
- 95.90BW — PROPOSED GROUND ELEVATION AT BOTTOM OF WALL
- H.P. — PROPOSED HIGH POINT
- 2.0% — SLOPE AND DIRECTION
- SWALE
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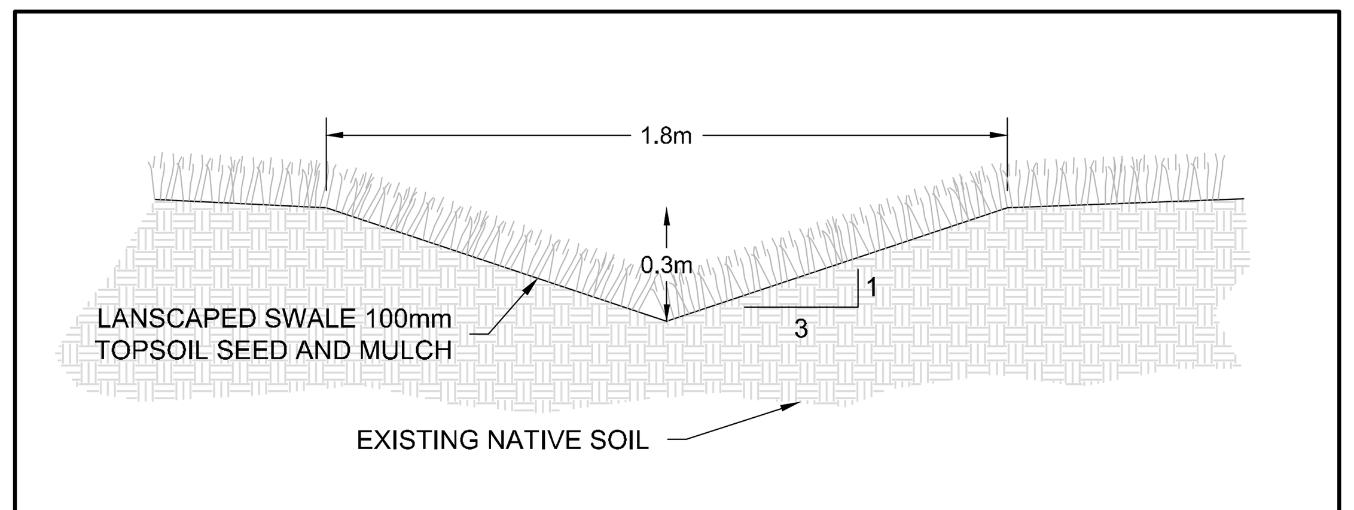
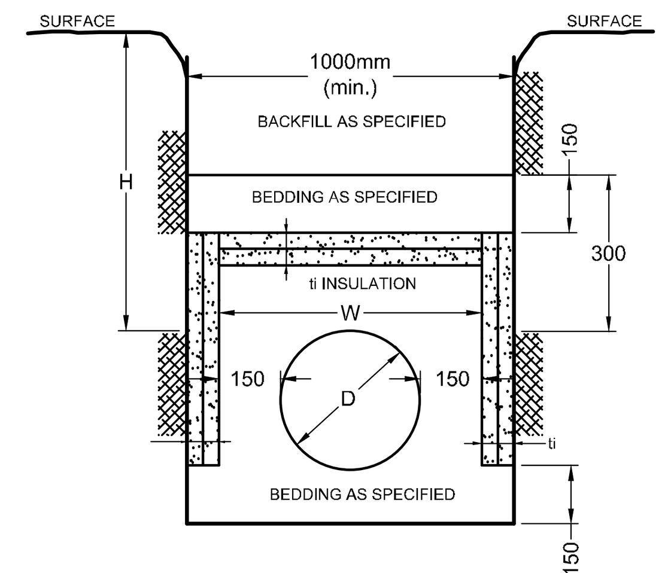


SWALE DETAIL

PAVEMENT STRUCTURE:

LIGHT DUTY PAVEMENT
50mm HL3
150mm GRANULAR "A"
375mm OPSS GRANULAR "B" TYPE II

HEAVY DUTY PAVEMENT
40mm HL3
80mm HL8
150mm OPSS GRANULAR "A"
450mm OPSS GRANULAR "B" TYPE II



INSULATION DETAIL FOR SHALLOW SEWERS & WATERMAIN

SEWER & WATERMAIN INSULATION NOTES:

1. INSULATE ALL SEWER PIPES THAT HAVE LESS THAN 1.5m COVER AND ALL WATERMAIN WITH LESS THAN 2.4m OF COVER WITH EXPANDED POLYSTYRENE INSULATION AS PER OPSD 1109.030.
2. WHERE INSULATION IS REQUIRED PROVIDE MINIMUM 100mm THICKNESS. WATERMAINS TO HAVE NO LESS THAN 1.5m OF COVER AND SEWERS TO HAVE NO LESS THAN 1.2m OF COVER AT ANY POINT.

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

No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPLICATION	JUNE 14/21	CJR

SCALE: N.T.S.
DESIGN: LSC
CHECKED: CJR
DRAWN: LSC
CHECKED: CJR
APPROVED: CJR

FOR REVIEW ONLY

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LOCATION
MUNICIPALITY OF PORT HOPE
20 HOPE STREET SOUTH

DRAWING NAME
SOUTHBRIDGE CARE HOMES
PORT HOPE NURSING HOME
NOTES AND DETAILS PLAN

PROJECT No. 120226
REV: REV 1
DRAWING No. 120226-NDP

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