STORMWATER MANAGEMENT REPORT

Times Group Corp.

Type of Document:
Final Report

Project Name:
1544 & 1546 Four Mile Creek Road, Niagara on the Lake

Project Number:
ALL-24011473-A0

Prepared and Reviewed By:
Roshawn Nunes and Scott Passmore, P.Eng.
EXP
220 Commerce Valley Drive West, Suite 110
Markham, ON, L3T 0A8
t: +1.905.695.3217
f: +1.289.695.2411

Approved By:
Scott Passmore, P.Eng.

Date + Time Submitted:
2025-04-21

Table of Contents

List of Figures

List of Tables

List of Appendices

1. Introduction

EXP Services Inc. has been retained by Times Group Corp. ("Owner") to prepare a Stormwater Management (SWM) Report ("report") in support of an application (ZBA) requesting the removal of the Holding Provision for the redevelopment of the site located at 1544 & 1546 Four Mile Creek Road, ("site") in the Town of Niagara-on-the-Lake.

The subject site is approximately 1.07 ha in area and is located on the west side of Four Mile Creek Road, just north of the Line 2 Road and Four Mile Creek Road intersection. The site is currently occupied with a residential home and commercial garage with driveway access to Four Mile Creek Road. The site is bound by Four Mile Creek Road to the east, existing residential homes to the south, woodlot lands and reservoir (Lower Virgil Reservoir) to the west and north. Finally, due to various hazards associated with the woodlot and reservoir lands to the west a small portion of the site is regulated by the Niagara Peninsula Conservation Authority (NPCA). Refer to Figure 1 for the Location Plan.

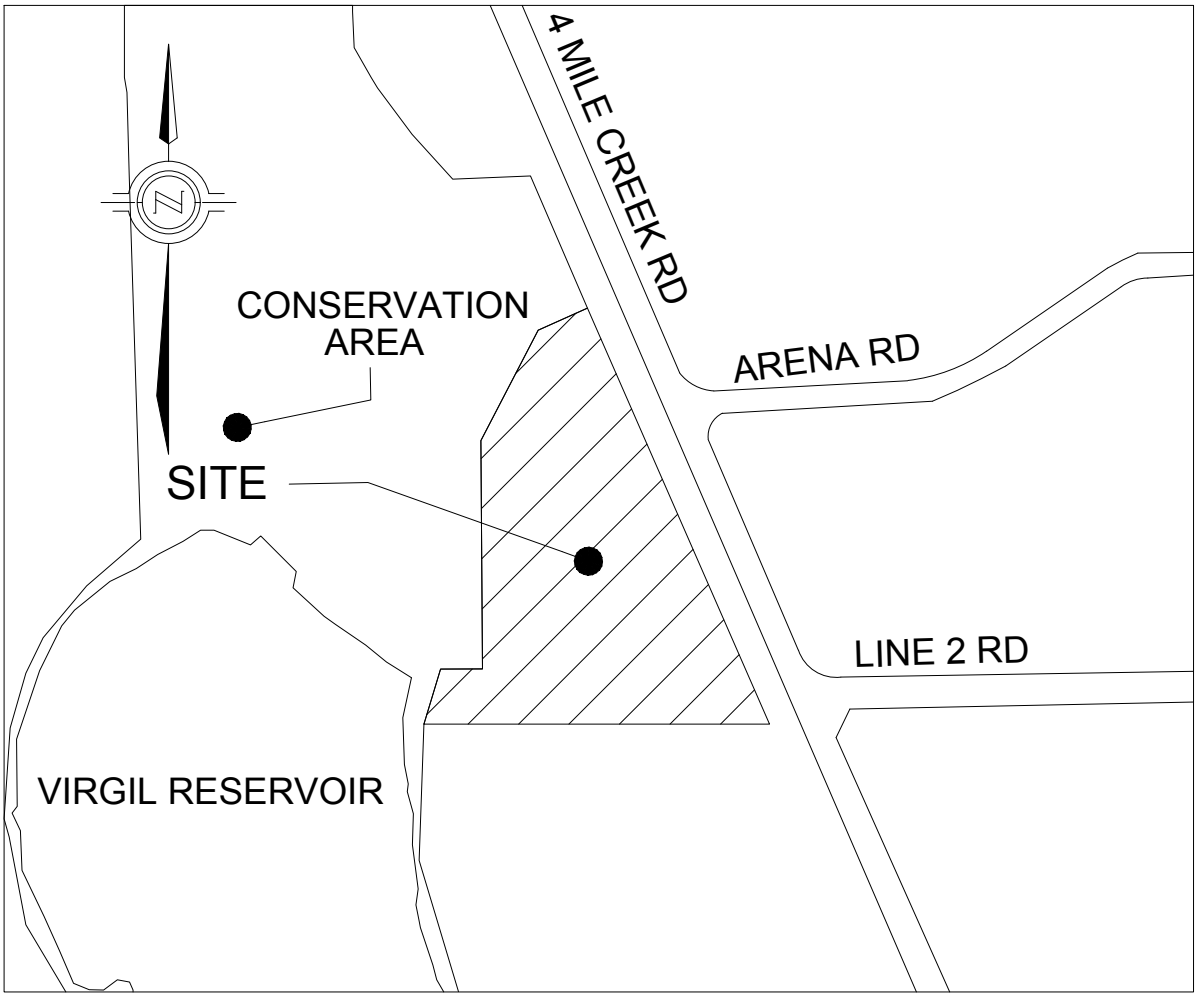
This report is intended to provide the proposed SWM strategy for the site while demonstrating conformance to Town of Niagara-on-the-Lake standards and no negative impact to neighbouring properties from the proposed development.

2. Proposed Development

The proposed redevelopment of site includes mixed commercial and residential use with two (2) separate buildings as follows:

- One (1) 2-storey commercial building of 3,699 m^2 GFA on the east side of the site;
- One (1) 4-storey residential building of 3,718 m^2 GFA and 29 units on the west side of the site;
- An underground parking structure with an envelope of approx. 4,200 m^2;
- Two (2) driveway access locations to Four Mile Creek Road; and,
- Various above ground parking and landscaping across the site including boulevard improvements along Four Mile Creek Road.

Each building is to be designed with separate servicing allowances and easements for separate ownership of each building. Finally, at the southwest corner of the site there is an existing irrigation pump house connected to the Lower Virgil Reservoir where an existing irrigation line spans the south side of the site across to Four Mile Creek Road which is to be maintained. For additional details refer to the Site Plan prepared by the Icke Brochu Architects Inc in Appendix A.



exp.	Project: 1544 & 1546 FOUR MILE CREEK RD, NIAGARA-ON-THE-LAKE, ON		
	Title: LOCATION PLAN		
	Approved by: S.P	Date: FEB, 2025	Project No.: ALL-24011473-A0
	Drawn by: R.N	Scale: N.T.S.	Figure no.: FIG-01

E:\MRK\ALL-24011473-A0\60 Execution\65 Drawings\Civil\24011473-FIG-01 LOCATION PLAN.dwg

3. Existing Topography and Drainage Conditions

3.1 Site Topography

To assess the existing site topography within and surrounding the site, EXP staff reviewed topographic survey information and Town record drawings for the surrounding municipal roads. A site visit was then completed by EXP staff on February 14th, 2025 to further review existing conditions. After the review, some of the key characteristics of the existing topography can be summarized as follows.

- The majority of the site shows existing elevations generally falling in the westerly and northwesterly direction where grades fall in the approx range of 1 to 3 m;
- Along the west side of the site there is an existing steep slope with a grade change in the range of 2 m;
- A small portion of the site shows existing elevations falling in the easterly direction towards Four Mile Creek Road with shallow slopes; and,
- There is very minimal to no external drainage is observed to be conveyed across the site.

As previously mentioned, a small portion of the west side of the site is regulated by the NPCA for various hazards including floodplain and erosion setback requirements. EXP staff contacted the NPCA to obtain the most current floodplain mapping and flood elevations and transposed the elevations against the actual topographic survey completed for the site. The floodplain mapping review showed that all flood elevations (and 7.5 m development setbacks) were clear of the proposed building locations. Finally, as part of the various studies prepared by the Owner, a slope stability study was completed by EXP to ensure the appropriate setbacks are maintained. For NPCA background information refer to Appendix A.

3.2 Existing Municipal Storm Sewers

Available record drawings showing the following existing municipal storm sewers and drainage features surrounding the site:

- 525 to 1050 mm diameter storm sewers located on the west side of Four Mile Creek Road flowing in the northerly direction;
- Various roadside ditches and culverts under driveways within the Four Mile Creek Road right of way conveying flows in the northerly direction; and,
- An existing storm sewer concrete headwall outlet located within the NPCA lands adjacent to the north side of the site discharging the flows from the municipal storm sewer system on Four Mile Creek Road.

Based on the review of the available records, it is believed that there aren't any existing storm sewer service connections to the existing storm sewer on Four Mile Creek Road for each of the properties within the site. The Town's record drawings showing the storm sewer information can be found in Appendix A for reference.

3.3 Existing Conditions Peak Flows

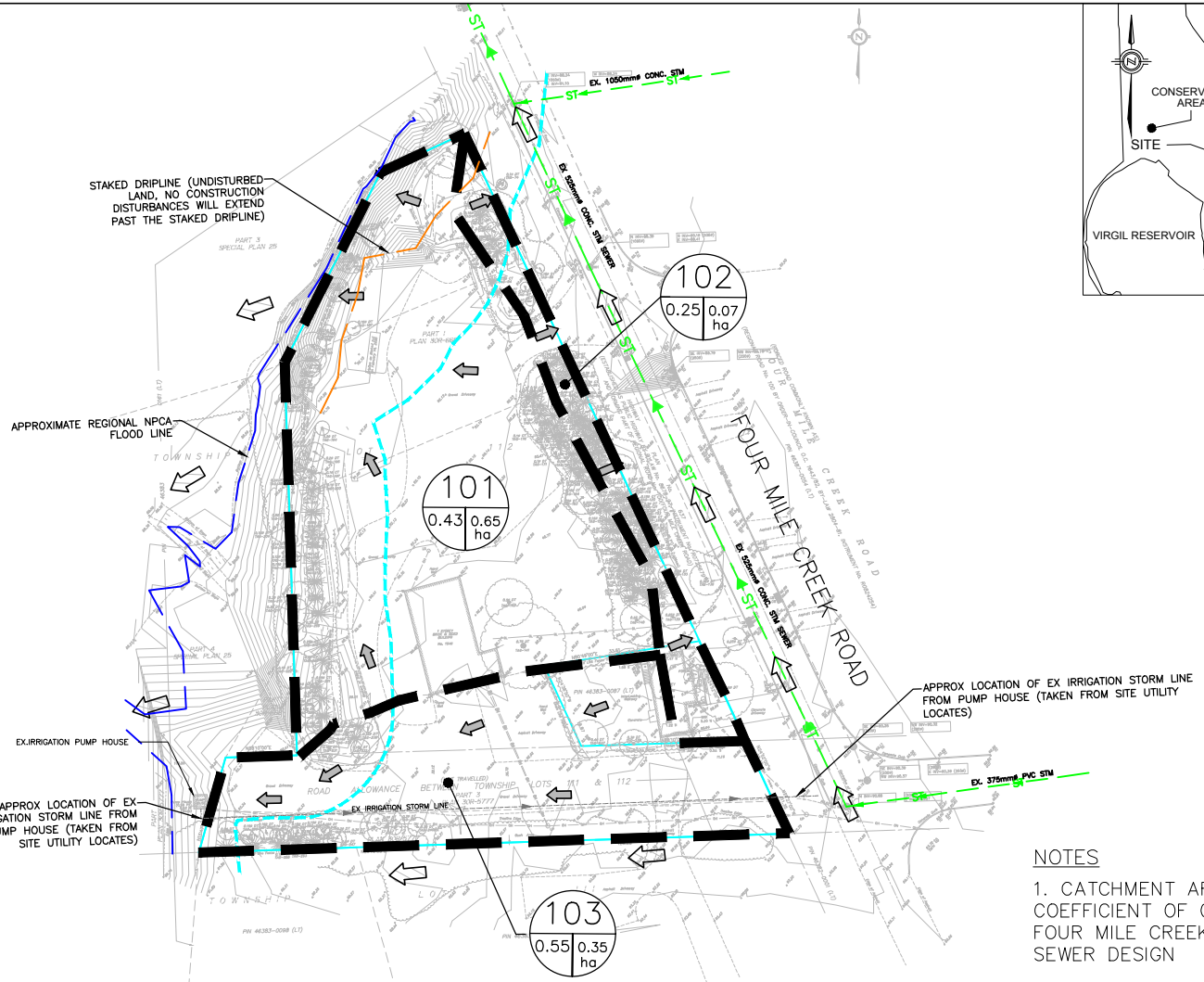
To simulate the existing drainage conditions, EXP staff calculated the peak flows using the design parameters outlined within the Town of Niagara-on-the-Lake standards and the modified Rational Method. The resultant peak flows for all storm events under existing conditions are summarized in Table 1 below:

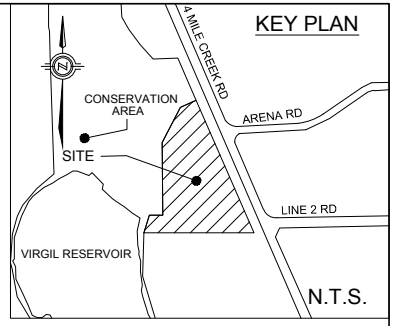
Table 1: Peak Flow Summary (Existing Conditions)

Outlet Location	Catchment Area ID#	Area (ha)	Runoff Coefficient	Peak Flow (L/sec)	
				5-Year	100-Year
Four Mile Creek Road (East)*	102	0.07	0.25	4.4	7.0
	Sub-Total =	**0.07**	**0.25**	**4.4**	**7.0**
NPCA Conservation Lands (West)	101	0.65	0.43	69.8	112.0
	103	0.35	0.55	48.1	77.1
	Sub-Total =	**1.00**	**0.47**	**117.9**	**189.1**
	Total=	**1.07**	**0.45**	**122.3**	**196.1**

**Note: It is estimated that a minimum allowance of 0.4 ha @ C=0.65 was provided in the Four Mile Creek Road municipal storm sewer design as allocation for the site (see next section in SWM report for details) for the 5-year storm = 64.9 L/s*

As previously mentioned, based on the existing topography and the high point drainage divide along the east side of the site, the majority of the site drains in the westerly direction to the NPCA Conservation Lands located to the west of the property. EXP staff then reviewed available record drawings for the existing municipal storm sewer along Four Mile Creek Road to review the possible design allowances within the previous storm sewer design. After the review, it was confirmed that a previous allocation of 0.40 ha (at C=0.65) should have been maintained for the site and should be referenced when considering allowable release rates prior to discharging to the existing municipal storm sewer. The details of the proposed servicing design and SWM control release rates are discussed further in the next section. For details regarding the Existing Drainage Conditions Plan refer to Figure 2. The Peak flow runoff calculations can be found in Appendix B.





NOTES

1. CATCHMENT AREA OF 0.4 ha @ COEFFICIENT OF 0.65 ASSUMED WITHIN FOUR MILE CREEK MUNICIPAL STORM SEWER DESIGN

LEGEND

- PROPERTY LINE
- EXISTING STORM SYSTEM
- EXISTING GRADE
- OVERLAND FLOW DIRECTION
- EXTERNAL FLOW DIRECTION
- STORM DRAINAGE ID NUMBER
- AREA (ha)
- RUNOFF COEFFICIENT
- APPROX. NPCA REGULATED LIMITS
- EXISTING STORM IRRIGATION LINE
- CATCHMENT BOUNDARY

Project:

1544 & 1546 FOUR MILE CREEK ROAD, NIAGARA-ON-THE-LAKE, ONTARIO

Title:

EXISTING CONDITIONS DRAINAGE PLAN

Approved by:	S.P	Date:	APR, 2025	Project No.:	ALL-24011473-A0
Drawn by:	R.N	Scale:	1:1500	Figure no.:	FIG-02

4. Proposed Drainage Conditions

4.1 Proposed Grading

The proposed preliminary grading design for the site was completed in concert with the proposed stormwater management strategy for the site which included various pre-consultations with the owner. Some of the key features of the preliminary grading design can be summarized as follows:

- Meeting all existing elevations along the south, west and north property lines adjacent to the site;
- Modifying existing elevations along the east side of the site adjacent to the Four Mile Creek Road right of way to ensure positive drainage as part of boulevard improvement works;
- Maintaining maintenance access to the existing Lower Virgil Reservoir gates and irrigation pumphouse located at the southwest corner of the site;
- Incorporating a network of high and low points with various inlets designed to capture and convey the 100-year storm event; and,
- Grading such that major overland flow is directed away from the buildings to the Four Mile Creek Road right of way or NPCA lands in accordance to allowable release rates ensuring positive drainage across the site.

For additional grading details refer to the Preliminary Grading Plan Drawing SG-1 provided in Appendix A.

4.2 Background Information and Methodology

Some of the key documents that were referenced for completing the SWM design for the site can be summarized as follows:

- Township of Niagara-on-the-Lake Municipal Engineering Standards, dated November 2020;
- Niagara Region Water and Wastewater Master Servicing Plan 2021;
- Development Charges Background Study dated May 2022;
- Niagara Region Stormwater Management Guidelines dated December 2022;
- Niagara Peninsula Conservation Authority (NPCA) Stormwater Management Guidelines (2022);
- Niagara Peninsula Conservation Authority (NPCA) Flood Plain Mapping; and,
- Ministry of Environment, Conservation and Parks - Stormwater Management Planning and Design Manual (2003).

For any detailed peak flow runoff calculations, the Modified Rational Method was used.

4.3 Proposed Conditions Peak Flows

Based on the proposed grading and servicing design for the site, the drainage areas were reviewed to assess the runoff coefficients for each catchment. The proposed drainage from the site was then generally divided into two (2) main catchments where the corresponding drainage areas and runoff coefficients are shown on the Proposed Conditions Drainage Plan on Figure 3.

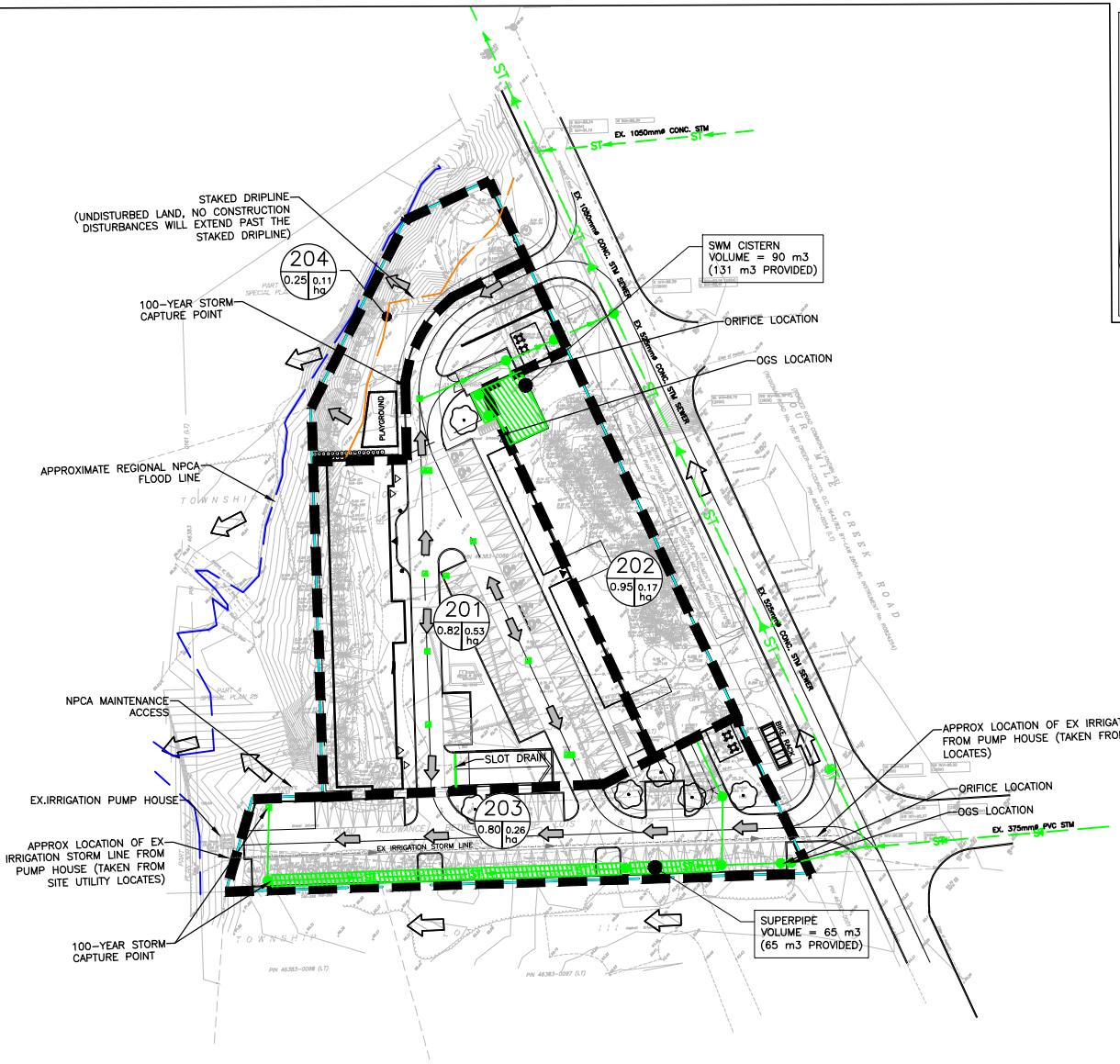
The resultant peak flows for the proposed conditions without any SWM controls and assuming 100-year storm capture are summarized in Table 2 below:

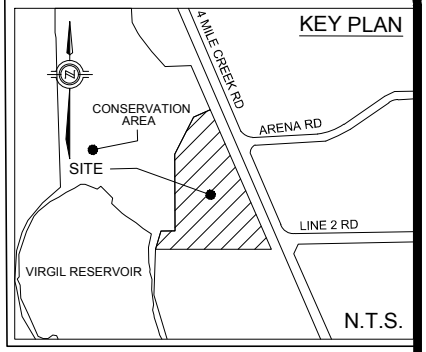
Table 2: Peak Flow Summary (Proposed Conditions– No SWM Controls)

Outlet	Catchment ID No.	Area (ha)	Runoff Coefficient	Peak Flow (L/sec)	
				5-Year	100-Year
Four Mile Creek Road (East)	201	0.53	0.82	108.5	174.2
	202	0.17	0.95	40.3	64.7
	203*	0.26	0.80	51.9*	70.5
Sub-Total =		**0.96**	**0.80**	**200.7**	**309.4**
NPCA Conservation Lands (West)	*203**	*N/A**	*0.80*	*0.0*	*12.8*
	204	0.11	0.25	6.9	11.0
Sub-Total=		**0.11**	**0.40**	**6.9**	**23.8**
Total=		**1.07**	**0.75**	**207.6**	**333.2**

**Note: For Catchment Area #203, the 5-year flow to discharge to Four Mile Creek Road as part of the minor system and balance of major overland flow to discharge west to NPCA Conservation Lands*

Therefore, resultant peak flow rates during proposed conditions showed an increase in runoff during the 100-year storm event of approximately 137.1 L/s (333.2 L/s proposed – 196.1 L/s existing). EXP staff then reviewed the requirements for the SWM quantity control for each of the two catchments which are discussed further in the next section. The Peak flow runoff calculations can be found in Appendix C.





CATCHMENT 201:
ALL STORM EVENTS UP TO AND INCLUDING 100 YEAR STORM ARE CONTROLLED BY SWM CISTERN AND DISCHARGES TO MUNICIPAL SEWER SYSTEM ON FOUR MILE CREEK ROAD

CATCHMENT 202:
ALL STORM EVENTS UP TO AND INCLUDING 100 YEAR ARE CONTROLLED AND DISCHARGES TO SOUTH SEWER SYSTEM IN CATCHMENT 203

CATCHMENT 203:
ALL STORM EVENTS UP TO AND INCLUDING 100 YEAR STORM ARE CONTROLLED AND DISCHARGES TO MUNICIPAL SEWER SYSTEM ON FOUR MILE CREEK ROAD WITH A SMALL AMOUNT SPILLING TO NPCA LANDS

CATCHMENT 204:
ALL STORM EVENTS UP TO AND INCLUDING 100 YEAR STORM ARE UNCONTROLLED

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m / 1.0m)
- EXISTING GRADE
- OVERLAND FLOW DIRECTION
- EXTERNAL FLOW DIRECTION
- PROP. STORM SEWER
- PROP. STORM M.H.
- STORM DRAINAGE ID NUMBER
- AREA (ha)
- RUNOFF COEFFICIENT
- EXISTING IRRIGATION LINE
- CATCHMENT BOUNDARY

Project:	1544 FOUR MILE CREEK ROAD, NIAGARA-ON-THE-LAKE, ONTARIO
Title:	PROPOSED CONDITIONS DRAINAGE PLAN
Approved by: S.P	Date: APR, 2025
Drawn by: R.N	Scale: 1:1500
Project No.: ALL-24011473-A0	Figure no.: FIG-03

4.4 Proposed SWM Quantity Controls

In order to determine the required SWM quantity controls for the site, EXP staff first carefully reviewed the Niagara Region's record drawings and municipal engineering design standards. Municipal design criteria state that all post development flows must be controlled to existing conditions for all storm events up to and including the 100-year storm event. As previously mentioned, in order to provide an acceptable storm outlet for the site into the municipal storm system, EXP carefully reviewed the design allocation for the existing 525 mm diameter storm sewer along Four Mile Creek Road where it was calculated that an allocation of 0.40 ha (C=0.65) should be considered for the site, all pending Town approval.

Therefore, the allowable release rate for proposed storm connection from the site was calculated as follows:

North Storm Service Connection (Residential Building & U/G Parking Envelope):

To calculate the existing storm flows that tributary existing 525 mm diameter municipal sewer on Four Mile Creek Road, the following calculations were made:

Site area contribution to sewer (A) = 0.26 ha
Run off coefficient (C) = 0.65
Time of Concentration (Tc) = 10 min

Niagara Region's 5-year Intensity (I) Formula: $I = A/(T_c+B)^{C}$
Where:
I = Rainfall intensity in mm/hour
Tc = time of concentration in hours
A = 664, B = 4.7 C =0.744

Therefore: Intensity (I) = (664/ (10+4.7) ^0.744)
= 89.88 mm/hr

Rational Method Formula: Q = 2.78*C*I*A
Therefore: Q = 2.78*0.65*89.88*0.26
= **42.2 L/s**

South Storm Service Connection (Commercial Building & South Parking Areas):

To calculate the existing storm flows that tributary to existing 525 mm diameter municipal sewer on Four Mile Creek Road, the following calculations were made:

Site area contribution to South sewer (A) = 0.14 ha
Run off coefficient (C) = 0.65
Time of Concentration (Tc) = 10 mins

Niagara Region's 5-year Intensity (I) Formula: $I = A/(T_c+B)^{C}$
Where:
I = Rainfall intensity in mm/hour
Tc = time of concentration in hours
A = 664, B = 4.7 C =0.744

Therefore: Intensity (I) = (664/ (10+4.7) ^0.744)
= 89.88 mm/hr

Rational Method Formula: Q =2.78*C*I*A
Therefore: Q =2.78*0.65*89.88*0.14
= **22.7 L/s**

EXP staff then moved forward to develop the proposed stormwater management (SWM) quantity controls for the site which can be summarized as follows:

- Minor storm sewer systems to be designed for a maximum allowable storm release rate to existing 525 mm storm sewer on Four Mile Creek Road 42.2 L/s (North) and 22.7 L/s (South) for the site
- Any major overland flow spilling to the NPCA Conservation Lands to the west to not exceed existing conditions
- For the north system, provide an underground SWM cistern within underground parking envelope of approximately 90 m3 volume; and,
- For the south system, provide an underground Superpipe system as part of the site storm servicing design of approximately 65 m3 volume.

As previously mentioned, in order to meet the maximum allowable release rate for the site, the proposed storm servicing design incorporated the use of Two (2) orifice controls: 100 mm diameter (North), 85 mm diameter (South). The orifice controls are positioned upstream of the proposed SWM quality controls (Oil Grit Separator) prior to connecting to the existing municipal storm sewer systems at each outlet point.

The resultant peak flows under proposed with the implementation of the proposed SWM controls can be summarized in Table 3 below:

Table 3: Peak Flow Summary (Proposed Conditions – with SWM Controls)

Outlet	Catchment ID No.	Area (ha)	Runoff Coeff	Allowable Release Rate (L/s)	Peak Flow (L/sec) To be controlled		Storage Required (m^3)	Storage Provided (m^3)
					5-Year	100-Year		
Four Mile Creek Road (East)	201	0.53	0.82	42.22	108.5	174.2	90	100 (41 L/s release rate)
	202	0.17	0.95	22.73	40.3	64.7	65	65 (22 L/s release rate)
	203**	0.26	0.80		43.9	70.5		
Sub-Total=		**0.96**	**0.80**	**64.95**	**192.7**	**309.4**	**155**	**165 (flow rate < 64.9 L/s**
NPCA Conservation Area (West)	203**	N/A**	0.80	87.25	0.0	*12.8*	*N/A*	*N/A*
	204*	0.11	0.25	11.00	6.9	11.0	*N/A*	*N/A*
Sub-Total =		**0.11**	**0.40**	**98.25**	**6.9**	**23.8**	*N/A*	*N/A*
Total=		**1.07**	**0.74**	**163.15**	**199.6**	**333.2**	**155**	

** Note: Area is uncontrolled without any SWM controls*
***Note: For Catchment Area #203, the 5-year flow to discharge to Four Mile Creek Road as part of the minor system and balance of major overland flow to discharge west to NPCA Conservation Lands*

Overall, the actual release rates of the proposed SWM quantity controls can meet the maximum allowable release rates for the site before connecting to the municipal storm system. For additional details regarding the Proposed Drainage Conditions Plan refer to Figure 3. For additional reference, the Preliminary Site Grading and Servicing Plans have been provided in Appendix A. Finally, the peak flow runoff calculations can be found in Appendix C.

4.5 Proposed SWM Quality Controls

The Town of Niagara-on-the-Lake requires the long-term average removal of 80% total suspended solids (TSS) on an annual loading basis from all runoffs leaving the proposed development site based on the post development level of imperviousness. This requirement for the long-term removal average of 80% TSS is consistent with the "Enhanced Protection" levels recommended in MECP SWM Planning and Design Manual. After review of the owner's site development, it was determined that two (2) oil and grit separators (OGS) are required downstream of orifice controls to treat storm flows prior to being discharged to the municipal storm sewer on Four Mile Creek Road. The OGS specifications are to be finalized as part of the future detailed site SWM design during the SPA stage.

5. Erosion and Sediment Controls during Construction

During construction it is imperative that the contractor installs and maintains all the necessary erosion and sediment control (ESC) measures to ensure there is no negative impact to surrounding properties and the local municipal sewer systems.

Outside the site, sediment control measures such as catchbasin silt sacks are to be installed inside the existing catchbasins along Four Mile Creek Road immediately adjacent to the site. These silt sacks are to be monitored and maintained after all rainfall events.

Within the site, silt fencing is required to be installed around the perimeter of the site during grading and building activity to ensure sediment is not transported overland during a rainfall event to neighbouring properties and Four Mile Creek. Similar to the required silt sacks within the catchbasins along Four Mile Creek Road, the silt fence is to be monitored after every rainfall event and repaired as necessary. Mud tracking from construction truck transport is to be mitigated through the use of mud mats and any other maintenance requirements necessary by the contractor before driving back on existing municipal roads.

Additional ESC measures not mentioned may be required through the development of the detailed design for the site and the permitting process through the Town of Niagara-on-the-Lake and the NPCA.

6. Conclusions

In summary, based on the findings in this report the proposed SWM strategy can meet the requirements of the Town and NPCA standards, where the results can be summarized as follows:

- Based on the completed topographic survey, the majority of the existing site drainage is observed to flow overland in the westerly and northwesterly directions to the existing woodlot and reservoir lands along the west side of the site as part of the Four Mile Creek watershed
- Based on the NPCA regulated mapping, a small portion of the site is regulated for various hazards including floodplain along the west side of the site due to Four Mile Creek
- Based on the Town's record drawings, there is an existing 525 mm dia storm sewer on Four Mile Creek Road conveying flows in the northerly direction to an outlet discharging to Four Mile Creek located immediately north of the site, where it is believed a pre-existing site allocation to the storm sewer of 0.40 ha (C=0.65) can be considered pending Town approval
- Storm servicing can be provided with the two (2) proposed storm service connections to the existing 525 mm diameter municipal storm sewer on Four Mile Creek Road
- SWM quantity controls can be provided by a proposed underground SWM cistern located within the underground parking envelope and underground superpipe located along the south side of the site, all releasing flows to the allowable release rates to the existing storm sewer on Four Mile Creek Road
- SWM quality controls can be provided by the use of two (2) oil and grit separators designed to meet the Town storm sewer discharge by law parameters including TSS removals
- Temporary erosion and sediment control measures during construction can be provided without any negative impact to neighbouring properties or the municipal storm sewer system
- Adequate flood protection can be provided to the proposed buildings based on the proposed preliminary grading design all in accordance with NPCA standards and MNRF technical guidelines
- Emergency overland flow (flows beyond the 100-year storm) can be safely conveyed in the westerly direction towards the woodlot and reservoir lands along the west side of the site without any negative impact to neighbouring properties

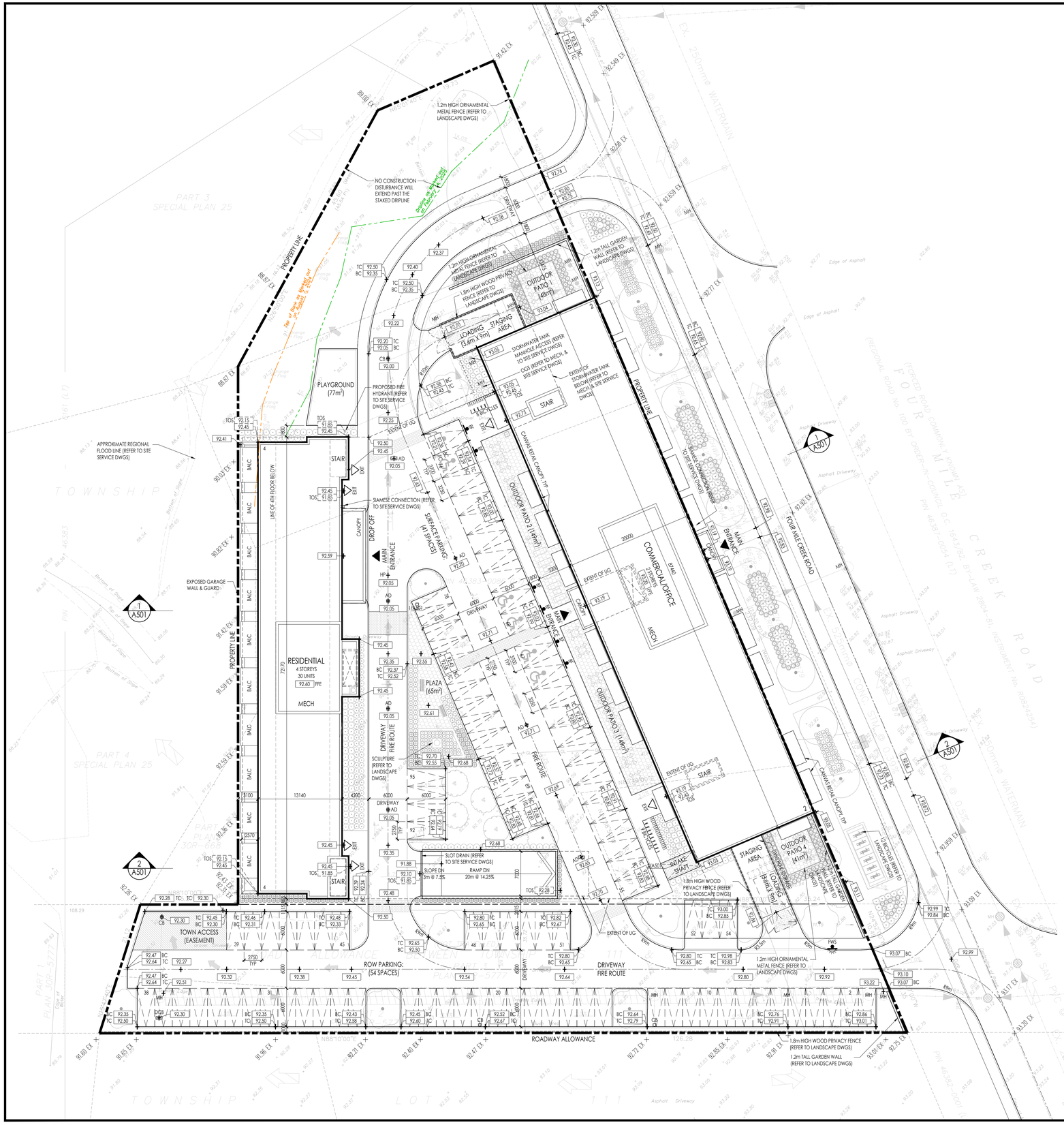
Sincerely,

EXP Services Inc.

Scott Passmore, P.Eng.
Project Manager, Land Development

Roshawn Nunes
Project Designer, Land Development

Appendix A – Site Plan, Topographic Survey, Background Information



1. ZONING

ZONING	

2. SITE AREA

	SQ. FEET (ft²)	SQ. METER (m²)	ACRES (ac)	HECTARES (ha)
SUBJECT PROPERTY	89,316.8ft²	8,297.8m²	2.05 ac	0.83 ha
ROAD ALLOWANCE	25,732.2ft²	2,390.6m²	0.59 ac	0.24 ha
TOTAL	115,049.0ft²	10,688.4m²	2.64 ac	1.07 ha

3. UNIT MIX

	STUDIO	1B	1B+D	2B	2B+D	3B/3B+D	TOTAL
GROUND FLOOR	-	-	2	5	-	0	7
2ND FLOOR	-	-	4	6	-	0	10
3RD FLOOR	-	-	-	4	-	2	6
4TH FLOOR	-	-	-	4	-	2	6
TOTAL	-	-	6	19	-	4	29

* OF WHICH 15% ARE BARRIER FREE

4. BUILDING HEIGHT (OVERALL HEIGHT MEASURED FROM MEASURED FROM GF TO MAIN ROOF)

PROPOSED RESIDENTIAL BUILDING HEIGHT:	4 STOREY
PROPOSED COMMERCIAL & OFFICE BUILDING HEIGHT:	2 STOREY

5. FLOOR AREA

"FLOOR AREA" - MEANS THE AGGREGATE AREA OF A BUILDING CONTAINED WITHIN THE EXTERIOR WALLS, BUT DOES NOT INCLUDE ATTIC OR BASEMENT SPACE UNLESS OTHERWISE SPECIFIED BY THIS BY-LAW.

	NO. FLS x SQ METER (m²)	SQ METER (m²)	SQ FEET(ft²)
RESIDENTIAL			
GROUND FLOOR		974m²	
2ND FLOOR		974m²	
3RD-4TH FLOOR	2 FLRS x 778m²	1,556m²	
MECH PENTHOUSE/STAIR		195m²	
TOTAL		*3,699m²	39,816ft²
COMMERCIAL & OFFICE			
GROUND FLOOR		1,749m²	
COMMERCIAL		1,670m²	
SERVICE SPACE		79m²	
2ND FLOOR (OFFICE)		1,749m²	
MECH PENTHOUSE/STAIR		220m²	
TOTAL		3,718m²	40,020ft²
TOTAL		7,417m²	79,836ft²
* OF WHICH 85m2 IS INDOOR AMENITY			

6. DENSITY

GROSS FLOOR AREA / LOT AREA	7,417m² / 10,688.4m²	0.69

7. PARKING

TOTAL PARKING REQUIRED:	90 (1/18.5m²)	63 (1/28m²)	13 (1/30m²)	29 (1 SP/U)	195 *
	COMMERCIAL (GF)	OFFICE (2ND FL)	OUTDOOR PATIO	RESIDENTIAL	TOTAL
SURFACE	82	0	13	0	95
P1 UNDERGROUND	0	63	0	42	105
TOTAL PROVIDED	82 (1/21m²)	63 (1/28m²)	13 (1/30m²)	42 (1.44 SP/U)	200

* OF WHICH 6 ARE REQUIRED TO BE BARRIER-FREE (CITY BY-LAW REQUIREMENTS)

8. LOCKER STORAGE

P1 UNDERGROUND	29 (1 LOCKER/U)

9. BICYCLE PARKING

REQUIRED BICYCLE PARKING:	PROVIDED BICYCLE PARKING:
COMMERCIAL (REQUIRE MIN. 8 @ 1/200m²)	8 (@ SURFACE)
OFFICE (REQUIRE MIN. 7 @ 1/250m²)	7 (UNDERGROUND)
OUTDOOR PATIO (REQUIRE MIN. 8 @ 2/100m²)	21 (@ SURFACE)
TOTAL PROVIDED	36

10. INDOOR & OUTDOOR AREA

	SQ METER (m²)	SQ FEET(ft²)
RESIDENTIAL		
INDOOR AMENITY	85m²	
OUTDOOR AMENITY TERRACE	77m²	
PLAYGROUND	43m²	
PLAZA	65m²	
TOTAL	270m²	2,906ft²
COMMERCIAL		
OUTDOOR PATIO 1	48m²	
OUTDOOR PATIO 2	149m²	
OUTDOOR PATIO 3	149m²	
OUTDOOR PATIO 4	44m²	
TOTAL	390m²	4,798ft²

11. COVERAGE

	SQ. METER (m²)	SQ. FEET (ft²)	%
BUILDING	2,904m²		27%
LANDSCAPED AREAS	3,508.4m²		33%
DRIVEWAY AREAS	4,276m²		40%
TOTAL	10,688.4m²		100%

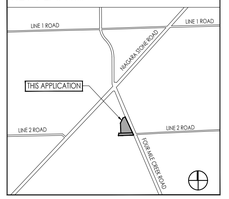
12. LOT FRONTAGE

LOT FRONTAGE (FOUR MILE CREEK DRIVE)	87.44m

13. LOADING AREA

LOADING AREAS (3.6m x 9m)	2

KEY PLAN NTS



SURVEY INFORMATION

PLAN OF SURVEY (DATE: FEB 18, 2025)	PART OF TOWNSHIP LOT 112 & PART OF ROAD ALLOWANCE BETWEEN TOWNSHIP LOTS 111 & 112 IN THE TOWN OF NIAGARA-ON-THE-LAKE REGIONAL MUNICIPALITY OF NIAGARA
NOTES	DISTANCES, ELEVATION AND CO-ORDINATES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048 ELEVATIONS ARE GEODETIC ORIGIN (CGVD-1928: 78), AND ARE DERIVED FROM REAL TIME NETWORK, (RTN) OBSERVATIONS AND NATURAL RESOURCES CANADA'S GEOID MODEL HT2.0 REVISED TO SHOW REMOVED BERM & CURBS ON EAST SIDE OF FOUR MILE CREEK ROAD & NEW DRIPLINE AS MARKED OUT THIS PLAN WAS PREPARED FOR REZEN HOLDING CORPORATION AND THE UNDERSIGHED ASSUMES NO RESPONSIBILITY FOR USE BY OTHER PARTIES.
SURVEYOR CONTACT INFORMATION	BARICH GRENKIE SURVEYIING LTD. 301 HWY NO.8 (2ND FLOOR) - STONEY CREEK, ON L8G 1E5 TEL: (905) 662-6767

SITE PLAN LEGEND NTS

- MAIN ENTRANCE
- 0.000 EXISTING GRADE DATUM
- 000.000 FIN FLOOR ELEVATION
- 000.000 EST ESTABLISHED GRADE
- 000.000 PROPOSED GRADE DATUM
- EXISTING TREE (REFFER TO SURVEY) CANOPY NOT TO SCALE
- PROPOSED TREE (REFER TO LANDSCAPE DWGS)
- EXISTING HYDRANT (REFER TO SURVEY)
- SIAMESE CONNECTION (REFER TO MECH/CIVIL DWGS)
- SANITARY MANHOLE (REFER TO CIVIL DWGS)
- STORM SEWER MANHOLE (REFER TO CIVIL DWGS)
- CATCHBASIN SEDIMENT TRAP (REFER TO CIVIL DWGS)
- CATCHBASIN (REFER TO CIVIL DWGS)
- EXISTING STREET LIGHT (REFER TO SURVEY/ELEC)
- EXISTING UTILITY POLE (REFER TO SURVEY/ELEC)
- EXISTING GUY WIRE (REFER TO SURVEY/ELEC)
- AREA DRAIN
- HOSE BIB (REFER TO MECH/CIVIL DWGS)
- SIGNAGE (REFER TO TRAFFIC REPORT)
  BF = BARRIER FREE PARKING
  FWS = FLASHING WARNING SYSTEM
  CM = WALL MOUNTED CONVEX MIRROR

PARKING LEGEND NTS

- DRIVE ISLE - 6M MINIMUM
- PROPOSED HORIZONTAL BICYCLE PARKING (600X1800) - ALSO REFER TO LANDSCAPE DWGS
- PROPOSED PARKING SPACE (2750X6000) - TYPICAL PARKING SPACE
- PROPOSED VISITOR PARKING SPACE (2750X6000) - TYPICAL PARKING SPACE
- PROPOSED BARRIER-FREE PARKING SPACE (3700X6000) PARKING SPACE
- PROPOSED LOADING SPACE (3600X9000)

GENERAL NOTES

1. LOADING SPACE AND STAGING PAD TO BE LEVEL (+ - 2%) AND CONSTRUCTED OF MINIMUM 200mm REINFORCED CONCRETE. MINIMUM 6.1m UNENCUMBERED VERTICAL CLEARANCE REQUIRED
2. ACCESS DRIVEWAYS TO BE USED BY COLLECTION VEHICLES TO HAVE A MINIMUM VERTICAL CLEARANCE OF 4.4m THROUGHOUT
3. ANY DRIVEWAY OR COLLECTION AREA REQUIRING A COLLECTION VEHICLE TO DRIVE ONTO OR OVER A SUPPORTED STRUCTURE TO BE RATED TO SAFELY SUPPORT THE REQUIRED LOADS

ANDRÉ BROCHU
DIPL. ARCH., OAA MRAIC DATE

NO.	DATE	ISSUE	BY
Issued			

ICKE | BROCHU ARCHITECTS INC
517 Wellington St W., Suite 201, Toronto, Ontario, M5V 1G1
T 647 288 1800 ibarchitects.net

1544 & 1546 FOUR MILE CREEK RD RESIDENTIAL DEVELOPMENT

FOUR MILE CREEK — NIAGARA-ON-THE-LAKE, ONTARIO

Drawing title
SITE PLAN

Date	MARCH, 2025	Drawn By	PL/YL
Scale	1:300	Reviewed By	AB
Project No.	23.11	Drawing No.	A102
Plot Date	April 02, 2025		

PLAN OF SURVEY
(WITH TOPOGRAPHIC DETAIL) OF

PART OF TOWNSHIP LOT 112 & PART OF ROAD ALLOWANCE BETWEEN TOWNSHIP LOTS 111 & 112

(GEOGRAPHIC TOWNSHIP OF NIAGARA)
IN THE

TOWN OF NIAGARA–ON–THE–LAKE

REGIONAL MUNICIPALITY OF NIAGARA

SCALE & NOTES

Scale 1:300

5 0 5 10 15 20 METRES

BARICH GRENKIE SURVEYING LTD.
A DIVISION OF GEOMAPLE

METRIC

DISTANCES, ELEVATIONS AND CO–ORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

ELEVATION NOTE

ELEVATIONS ARE GEODETIC ORIGIN (CGVD–1928:78), AND ARE DERIVED FROM REAL TIME NETWORK (RTN) OBSERVATIONS AND NATURAL RESOURCES CANADA'S GEOID MODEL HT2.0

BEARING NOTE

BEARINGS ARE UTM GRID, DERIVED FROM GPS OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17 (81° 00' WEST LONGITUDE) NAD83 (CSRS) (2010.0).

HORIZONTAL DATUM NOTE

PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (UTM, ZONE 17, CM 81°00'W)

DATUM: NAD83 (CSRS)(2010.0)

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999872.

OBSERVED REFERENCE POINTS (ORPs) DERIVED FROM GPS OBSERVATIONS USING REAL TIME NETWORK (RTN) OBSERVATIONS UTM ZONE 17, NAD83 (CSRS)(2010.0).
COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

OBSERVED REFERENCE POINTS		
MONUMENT ID	NORTHING	EASTING
Ⓐ IB	4786944.166	652494.398
Ⓑ IB	4786733.649	652592.005

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE–ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THIS PLAN WAS PREPARED FOR REZEN HOLDING CORPORATION AND THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
OU	DENOTES	ORIGIN UNKNOWN
539	DENOTES	D. G. URE, O.L.S.
567	DENOTES	R. B. ERWIN, O.L.S.
744	DENOTES	R. J. MATTHEWS, O.L.S.
1497	DENOTES	J. P. NOUWENS, O.L.S.
JDB	DENOTES	J. D. BARNES, O.L.S.
P1	DENOTES	PLAN BY J. D. BARNES LTD. DATED JULY 19, 2022
P2	DENOTES	SPECIAL PLAN 85
MH	DENOTES	MANHOLE
CB	DENOTES	CATCHBASIN
LS	DENOTES	LIGHT STANDARD
TC	DENOTES	TOP OF CURB ELEVATION
GUT	DENOTES	GUTTER ELEVATION
OH	DENOTES	OVERHEAD UTILITY CABLES
DT	DENOTES	DECIDUOUS TREE
CT	DENOTES	CONIFEROUS TREE
UP	DENOTES	UTILITY POLE
FF	DENOTES	FINISHED FLOOR ELEVATION
GF	DENOTES	GARAGE FLOOR ELEVATION
CLF	DENOTES	CHAIN LINK FENCE
PWF	DENOTES	POST & WIRE FENCE
RPWF	DENOTES	REMAINS OF POST & WIRE FENCE
GL	DENOTES	GASLINE
BRK	DENOTES	BRICK
TNFH	DENOTES	TOP NUT OF FIRE HYDRANT
CRW	DENOTES	CONCRETE RETAINING WALL

REVISED NOTE

REVISED TO SHOW REMOVED BERM & CURBS ON EAST SIDE OF FOUR MILE CREEK ROAD & NEW DRIPLINE AS MARKED OUT

FEBRUARY 19, 2025

ERIC G. SALZER
O.L.S., O.L.I.P

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 REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON JANUARY 25, 2024.

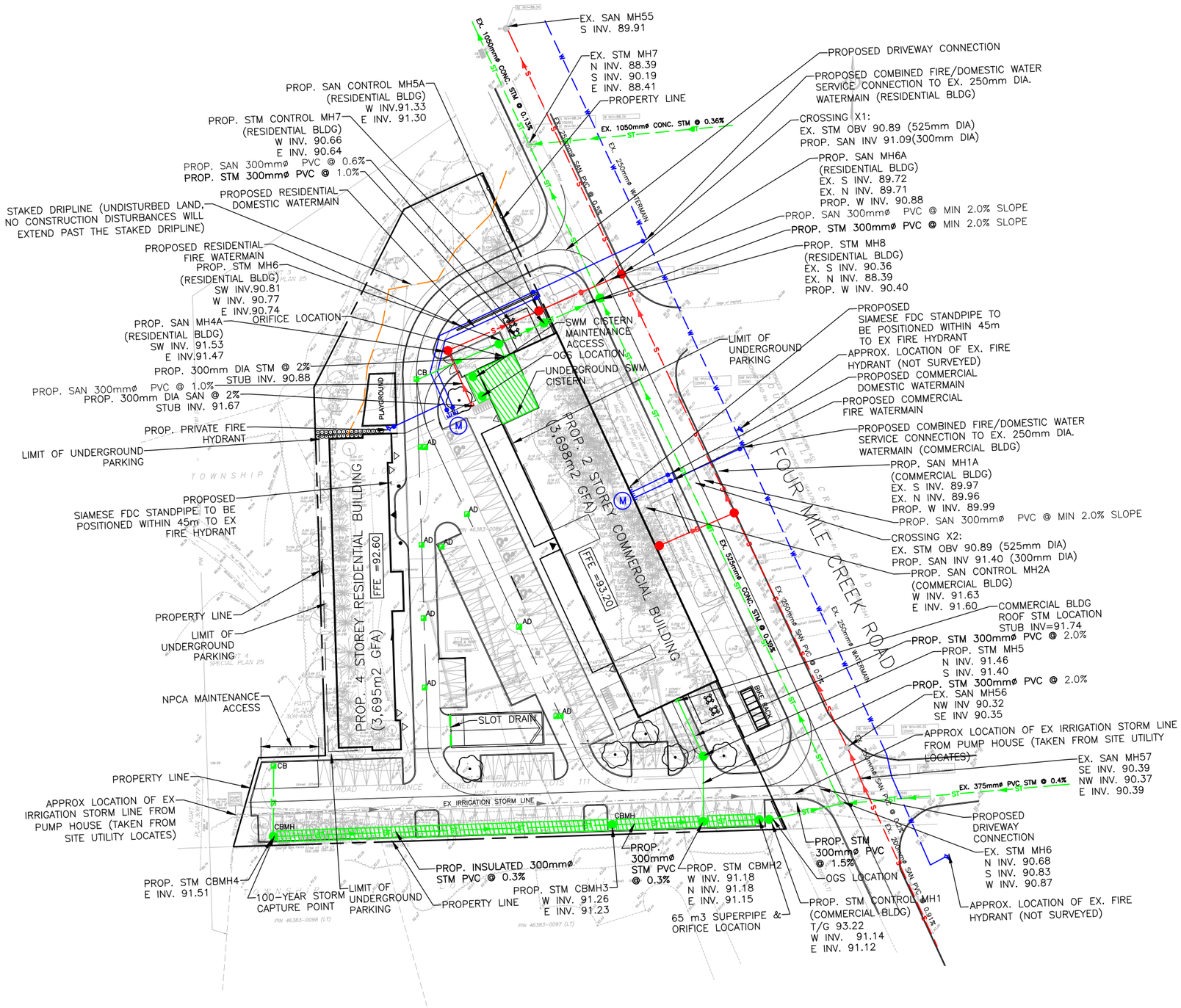
JANUARY 26, 2024

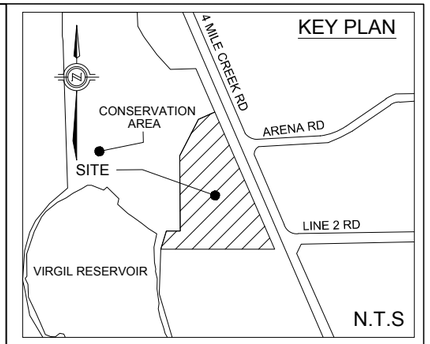
ERIC G. SALZER
O.L.S., O.L.I.P

Barich Grenkie Surveying Ltd.
301 HWY No. 8 (2ND FLOOR) - STONEY CREEK, ON L8G 1E5 (905) 662-6767
A DIVISION OF GEOMAPLE

DWN BY: EGS
CHK BY: EWA
JOB No. 23–3200

Z:\PROJECTS\Jobs 2023\23-3200 - 1544 & 1546 Four Mile Creek Rd, Virgil\Surveying\23-3200 TOPO_UPDATED_FEB18_2025.dwg





LEGEND:

- PROPERTY LINE
- NEW / EXISTING WATER VALVE AND BOX
- EXISTING HYDRANT
- 109.42 PROPOSED ELEVATION
- 109.42 EXISTING ELEVATION
- DRAINAGE ARROW / SLOPE (MAX 3:1)
- MAJOR INTERNAL OVERLAND FLOW
- MAJOR EXTERNAL OVERLAND FLOW
- EX. STORM/SANITARY M.H.
- EX. CATCH BASIN
- PROP. CATCHBASIN
- PROP. STORM M.H.
- PROP. SANITARY M.H.
- EX. STORM SEWER
- PROP. STORM SEWER
- EX. SAN SEWER
- PROP. SANITARY SEWER
- EX. WATERMAIN
- PROP. WATERMAIN
- PROP. SWM QUANTITY STORAGE FACILITY
- WATER METER LOCATION
- EXISTING IRRIGATION LINE

NOTES

- TOPOGRAPHIC SURVEY PROVIDED BY BARICH GRENKIE SURVEYING LTD. COMPLETED ON JANUARY 25, 2024.
- SITE PLAN PROVIDED BY ICKE BROCHU ARCHITECTS INC

SCALE: 1:1000

	DRAWN BY	CHECKED BY
exp.	R.N	S.P.

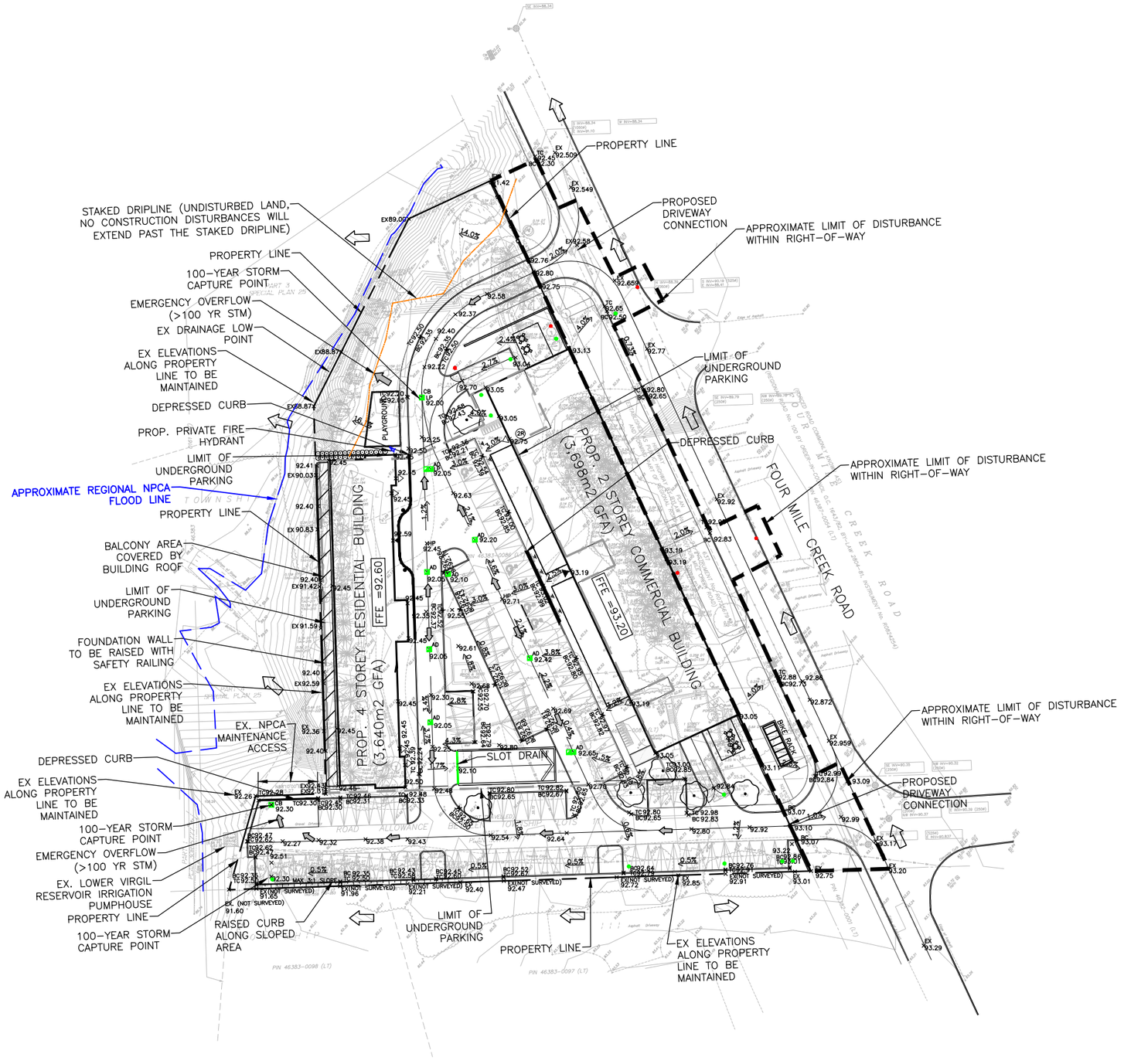
PRELIMINARY SITE SERVICING PLAN

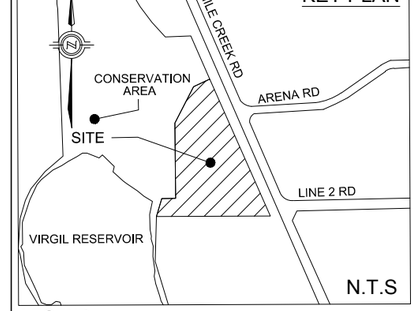
FIGURE 3

1544 & 1546 FOUR MILE CREEK RD
NIAGARA ON THE LAKE, ONTARIO

PROJECT NUMBER: ALL-24011473-A0

DATE: APRIL 2025





LEGEND:

- PROPERTY LINE
- NEW / EXISTING WATER VALVE AND BOX
- EXISTING HYDRANT
- PROPOSED ELEVATION
- EXISTING ELEVATION
- DRAINAGE ARROW / SLOPE (MAX 3:1)
- MAJOR EXTERNAL OVERLAND FLOW
- MAJOR INTERNAL OVERLAND FLOW
- APPROXIMATE LIMIT OF DISTURBED AREA WITHIN CITY RIGHT-OF-WAY
- HEAVY DUTY PAVEMENT AREA FOR FIRE TRUCK ACCESS
- EX. STORM/SANITARY M.H.
- EX. CATCH BASIN
- LIMIT OF UNDERGROUND PARKING
- AD PROP. AREA DRAIN
- CB PROP. CATCHBASIN
- PROP. STORM ACCESS LID
- PROP. SANITARY ACCESS LID

NOTES

- TOPOGRAPHIC SURVEY PROVIDED BY BARICH GRENKIE SURVEYING LTD. COMPLETED ON JANUARY 25, 2024.
- SITE PLAN PROVIDED BY ICKE BROCHU ARCHITECTS INC

SCALE: 1:1000

	DRAWN BY	CHECKED BY
exp.	R.N	S.P.

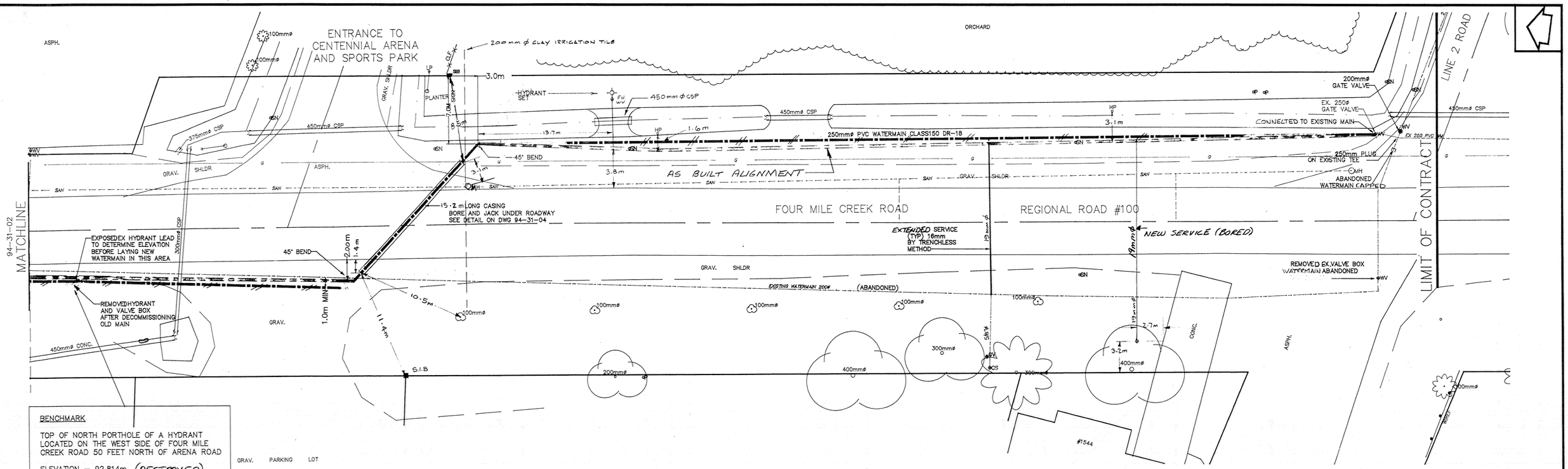
PRELIMINARY SITE GRADING PLAN

FIGURE 2

1544 & 1546 FOUR MILE CREEK RD
NIAGARA ON THE LAKE, ONTARIO

PROJECT NUMBER: ALL-24011473-A0

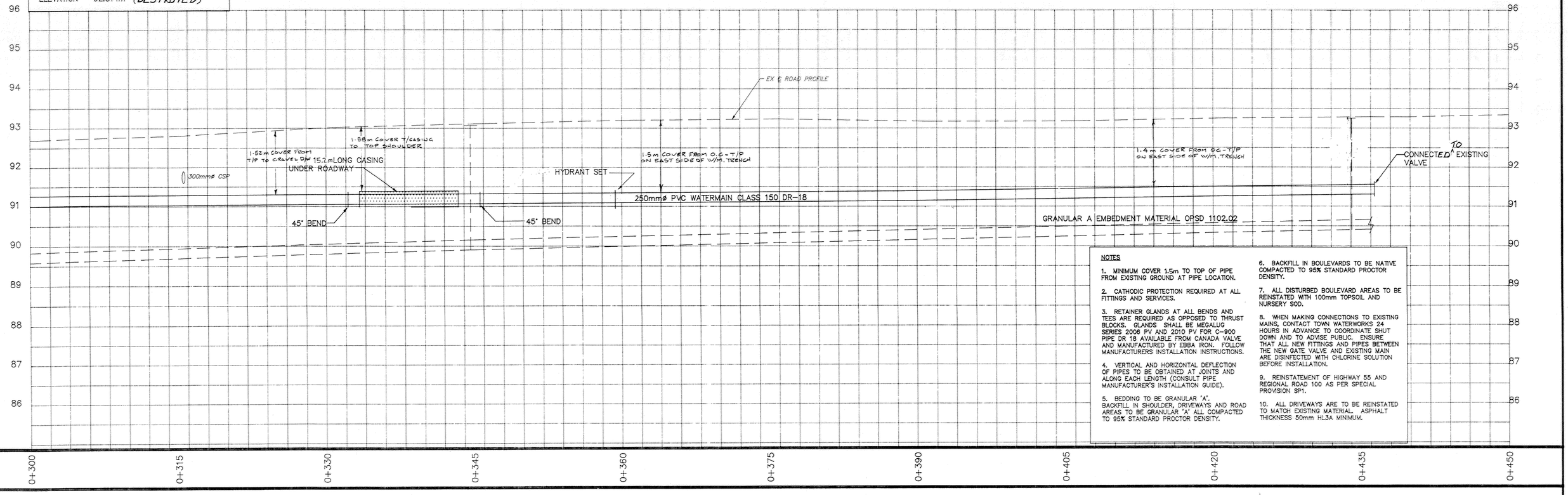
DATE: APRIL 2025



BENCHMARK

TOP OF NORTH PORTHOLE OF A HYDRANT LOCATED ON THE WEST SIDE OF FOUR MILE CREEK ROAD 50 FEET NORTH OF ARENA ROAD

ELEVATION – 92.814m (DESTROYED)



NOTES

1. MINIMUM COVER 1.5m TO TOP OF PIPE FROM EXISTING GROUND AT PIPE LOCATION.
2. CATHODIC PROTECTION REQUIRED AT ALL FITTINGS AND SERVICES.
3. RETAINER GLANDS AT ALL BENDS AND TEES ARE REQUIRED AS OPPOSED TO THRUST BLOCKS. GLANDS SHALL BE MEGALUG SERIES 2006 PV AND 2010 PV FOR C-900 PIPE DR 18 AVAILABLE FROM CANADA VALVE AND MANUFACTURED BY EBBA IRON. FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS.
4. VERTICAL AND HORIZONTAL DEFLECTION OF PIPES TO BE OBTAINED AT JOINTS AND ALONG EACH LENGTH (CONSULT PIPE MANUFACTURER'S INSTALLATION GUIDE).
5. BEDDING TO BE GRANULAR 'A'. BACKFILL IN SHOULDER, DRIVEWAYS AND ROAD AREAS TO BE GRANULAR 'A' ALL COMPACTED TO 95% STANDARD PROCTOR DENSITY.
6. BACKFILL IN BOULEVARDS TO BE NATIVE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
7. ALL DISTURBED BOULEVARD AREAS TO BE REINSTATED WITH 100mm TOPSOIL AND NURSERY SOD.
8. WHEN MAKING CONNECTIONS TO EXISTING MAINS, CONTACT TOWN WATERWORKS 24 HOURS IN ADVANCE TO COORDINATE SHUT DOWN AND TO ADVISE PUBLIC. ENSURE THAT ALL NEW FITTINGS AND PIPES BETWEEN THE NEW GATE VALVE AND EXISTING MAIN ARE DISINFECTED WITH CHLORINE SOLUTION BEFORE INSTALLATION.
9. REINSTATEMENT OF HIGHWAY 55 AND REGIONAL ROAD 100 AS PER SPECIAL PROVISION SP1.
10. ALL DRIVEWAYS ARE TO BE REINSTATED TO MATCH EXISTING MATERIAL. ASPHALT THICKNESS 50mm HL3A MINIMUM.

No.	REVISION	DATE	INIT.
1	CONSTRUCTION RECORD	JAN 11/96	G.R.

GENERAL NOTES:

1) THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVE-GROUND 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, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME LIABILITY FOR DAMAGE TO THEM.
2) CHECK ALL DIMENSIONS AND REPORT ANY INCONSISTENCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK – DO NOT SCALE DRAWINGS.
3) THIS DRAWING IS AN INSTRUMENT OF PROFESSIONAL SERVICE AND IS INTENDED FOR USE ONLY IN CONNECTION WITH THE PROJECT COVERED BY THE ENGINEERING AGREEMENT.
4) ROBERT M. MARTIN ENGINEERING & PROJECT MANAGEMENT INC. DOES NOT ASSUME ANY RESPONSIBILITY FOR LOSSES, DAMAGES AND COSTS ARISING FROM USE OR REUSE OF THIS DRAWING BY PERSONS, FIRMS OR CORPORATIONS WITHOUT PRIOR WRITTEN CONSENT OF ROBERT M. MARTIN ENGINEERING INC.
5) COPYRIGHT © ROBERT M. MARTIN ENGINEERING & PROJECT MANAGEMENT INC., 1995. ALL RIGHTS RESERVED. NO PART OF THIS DRAWING MAY BE REPRODUCED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF ROBERT M. MARTIN ENGINEERING INC.
6) BOREHOLE DATA SHOWN ON THE DRAWINGS IS TAKEN FROM THE GEOTECHNICAL REPORT PREPARED BY THE GEOTECHNICAL ENGINEERING CONSULTANTS. ROBERT M. MARTIN ENGINEERING INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION.

DRAFTING AK
DESIGN TW
CHECKED BY TW

LICENSED PROFESSIONAL ENGINEER J. T. WINSTONE PROVINCE OF ONTARIO

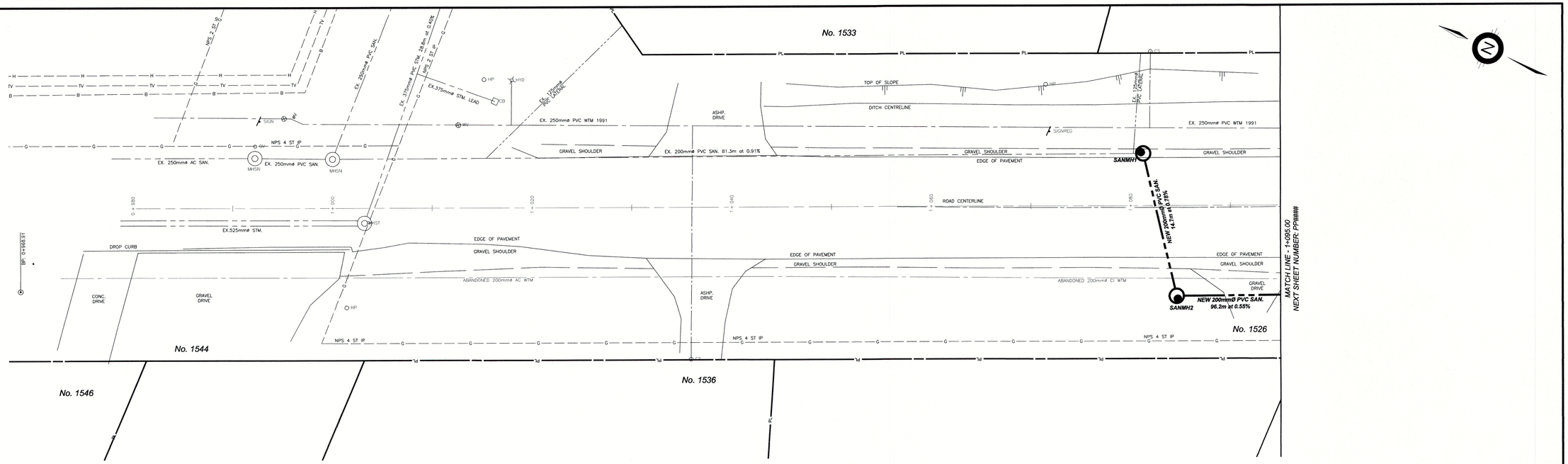
Robert M. Martin Engineering & Project Management Inc.
8 Centre Street, St. Catharines
Ontario. L2R 3A7
Phone (905) 687-4020
Fax (905) 687-4164

TOWN OF NIAGARA ON THE LAKE

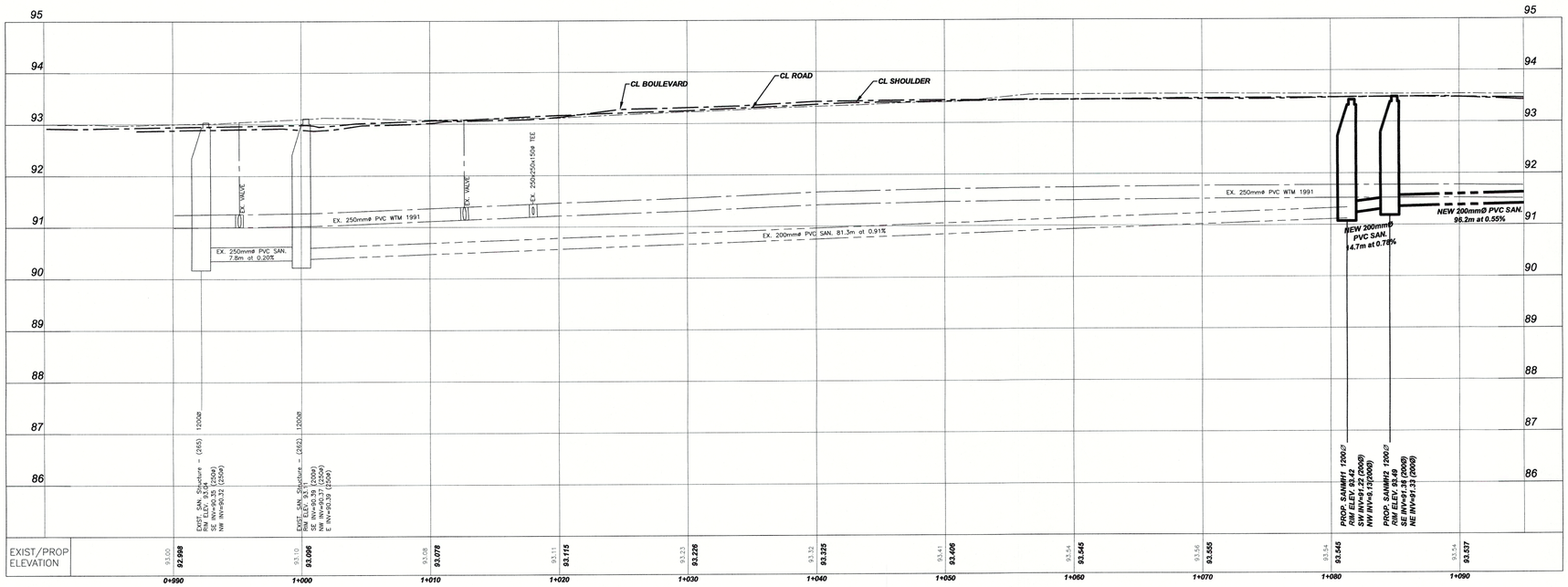
FOUR MILE CREEK ROAD WATERMAIN REPLACEMENT

VIRGIL

FILENAME	94-31\NOTL-3
DATE	JUNE 1995
SCALE	1:200 1:50
DWG. No.	94-31-03
MUN. REF. No.	
REV.	1



FOUR MILE CREEK ROAD (RR NO. 100)



NO.	REVISION	DATE	INIT.
---	-----	-----	---
---	-----	-----	---
6	RECORD OF CONSTRUCTION	JULY/15	LB
5	ISSUED FOR TENDER	APR/15	LB
4	REISSUED FOR MOE	MAR/15	JH
3	REISSUED FOR MOE	MAR/15	LB
2	ISSUED FOR MOE	JAN/15	LB
1	ISSUED FOR REVIEW	NOV/14	LB

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER 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, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

BENCHMARK

VERTICAL MONUMENT: ----- ELEV. -----
DATUM: ---- ELEV. ----
GEOGRAPHIC PROJECTION: U.T.M. NAD 83 ZONE 17

DRAFTING	LB/JH
DESIGN	KH
CHECKED BY	SK
APPROVED BY	KH

LICENSED PROFESSIONAL ENGINEER
K. T. S. HOWE
100139269
PROVINCE OF ONTARIO

KERRY T. HOWE ENGINEERING LTD.
CONSULTING ENGINEERS
88 Church Street St.
Catharines, Ontario
(905) 688-5550

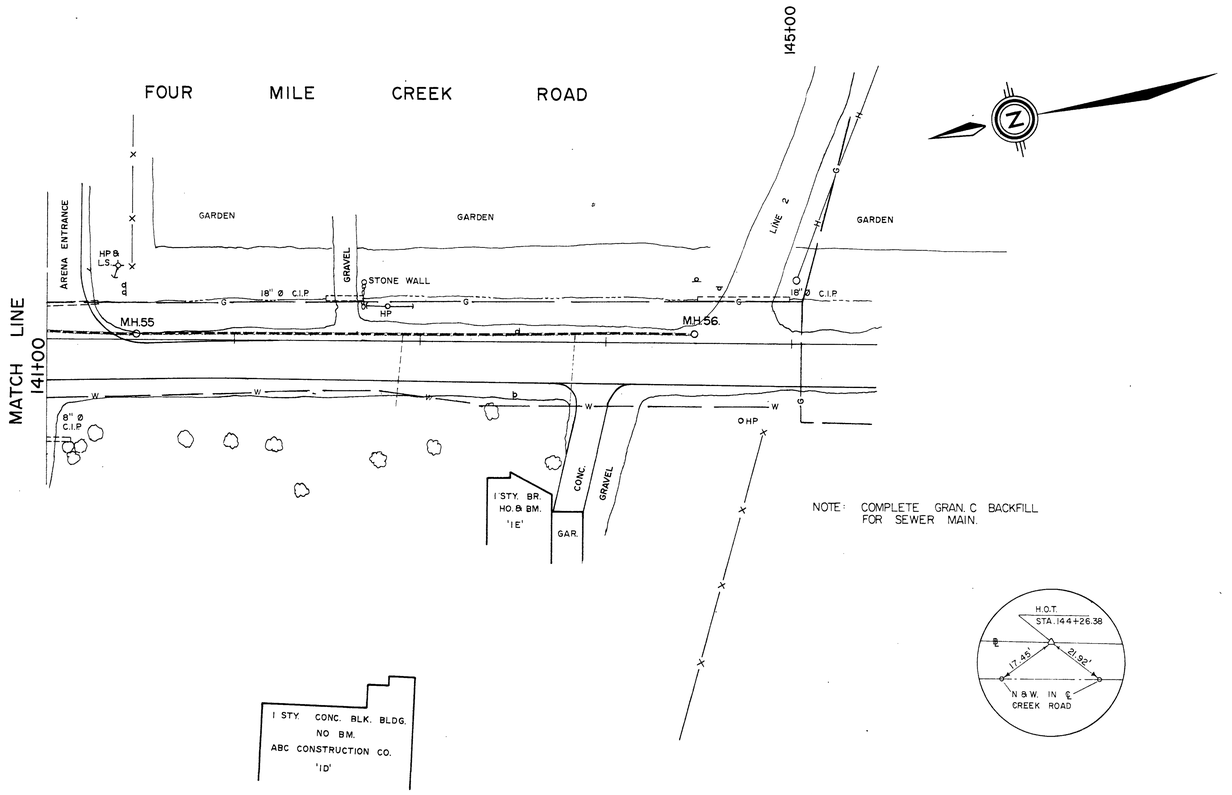
NIAGARA-ON-THE-LAKE

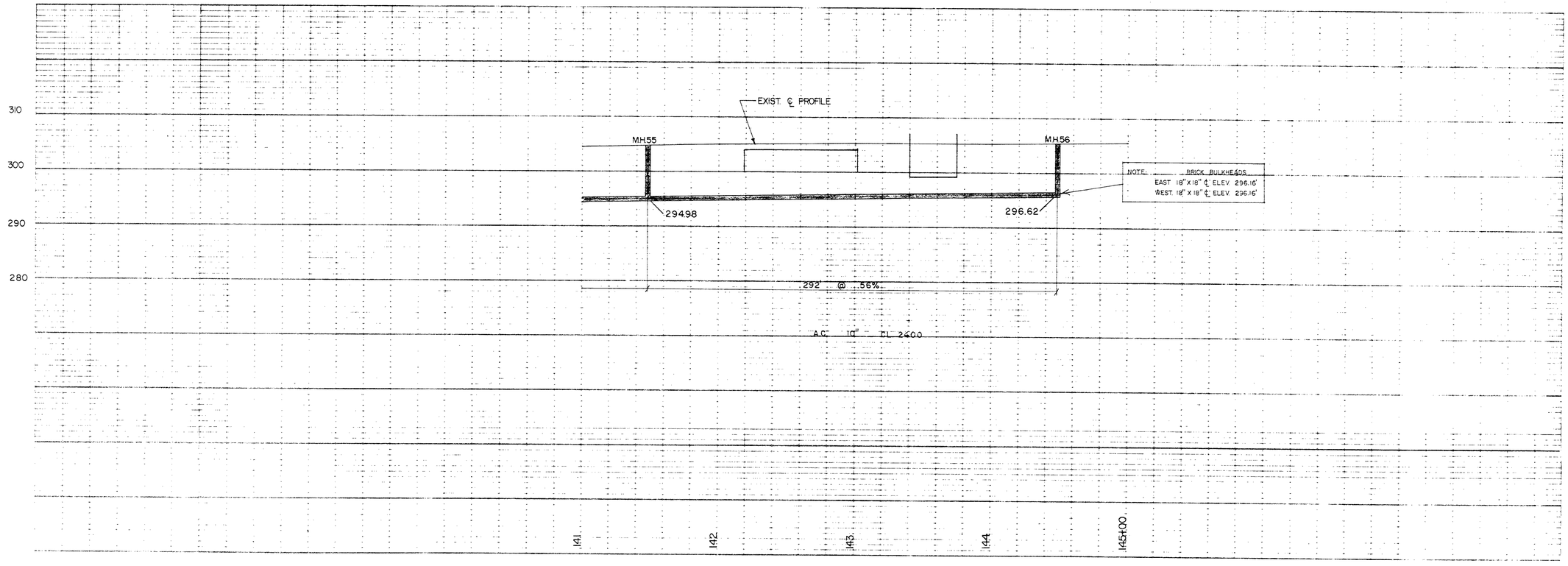
FOUR MILE CREEK ROAD (RR NO. 100)

SANITARY SEWER EXTENSION
TOWN OF NIAGARA-ON-THE-LAKE
PLAN AND PROFILE

CONSULTANT FILE No.	14-030
DATE	JULY 24, 2015
SCALE	HOR 1:200 VER: 1:50
REF. No.	---
DWG No.	14-030-PP1
REV.	6

DRAWING FILE: W:\2014\14-030 1512 Four mile Creek Rd\dwg\\...Record of Construction\1512 – ROC.dwg PLOTTED: Jul 24, 2015 – 11:51am PLOTTED BY: lbeaudoin





M.H.№	BASELINE CHAINAGE	OFFSET
55	141+51	3'S
56	144+47	5'S

No.	REVISIONS TO DRAWING	BY	DATE	APPR.
1	AS CONSTRUCTED	D.H.	AUG., 1978	
	APPROVED FOR CONSTRUCTION		Dec 8, 1978 W.J.F	

CLIENT
MINISTRY OF THE ENVIRONMENT

MUNICIPALITY
NIAGARA-ON-THE-LAKE

PROJECT
PROVINCIAL SEWAGE WORKS PROGRAMME

SHEET TITLE
FOUR MILE CREEK ROAD
STA. 141+00 — STA. 145+00

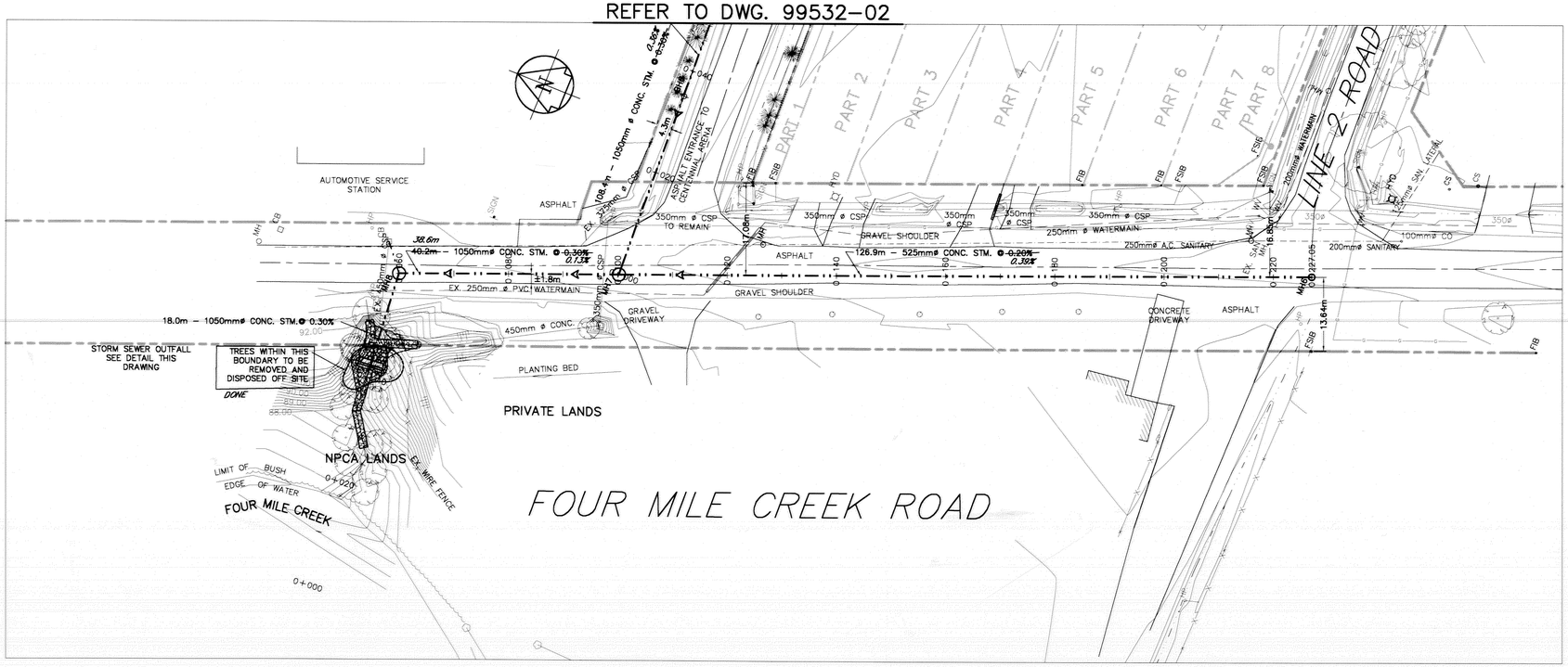
WILLIAM L. SEARS
AND ASSOCIATES LIMITED
CONSULTING PROFESSIONAL ENGINEERS
STONEY CREEK ONT.

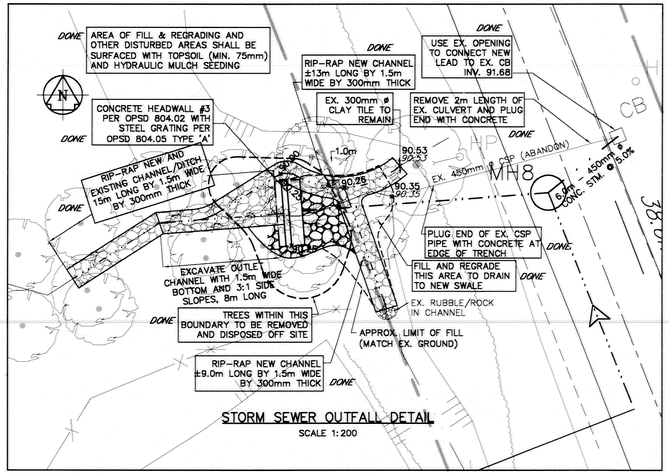
DESIGNED BY	DRAWN BY	CHECKED BY
W.J.F.		DAY

SCALE HOR. 1"=40' VER. 1"=10' | DATE NOV. 1974

PROJECT No.	JOB No.	SHEET
1-0265/71	7411	7

REFER TO DWG. 99532-02





STORM SEWER OUTFALL DETAIL

SCALE 1:200

LEGEND

- PROJECT BASELINE
- PROPERTY LINE
- PROPOSED STORM SEWER
- PROPOSED GRANULAR BACKFILL
- PROPOSED RIP-RAP
- EXISTING ROAD CENTRELINE
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING DITCH/SWALE
- EXISTING STORM SEWER
- EXISTING CULVERT
- EXISTING U/G BELL LINE
- EXISTING U/G HYDRO LINE
- EXISTING U/G CABLE TV
- EXISTING U/G GAS
- EXISTING FENCE
- EXISTING GAS VALVE
- EXISTING HYDRO POLE
- EXISTING LIGHT POLE
- EXISTING CURB STOP
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED DITCH INLET CATCHBASIN
- EX. STREET SIGN
- EX. BELL PEDESTAL
- EX. BELL MANHOLE
- EX. DECIDUOUS TREE
- EX. BUSH/HEDGE
- FOUND IRON BAR
- FOUND STANDARD IRON BAR
- FOUND CONCRETE MONUMENT
- HORIZONTAL CONTROL POINT
- BENCHMARK
- BOREHOLE
- PROPOSED ELEVATION
- EXISTING ELEVATION

GENERAL NOTES:

1) THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN AND WHERE SHOWN, THE ACCURACY OF THE LOCATION SHOWN OF SUCH UTILITIES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONTACT ALL SUCH UTILITIES INVOLVED AND INFORM HIMSELF AS TO THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME LIABILITY FOR DAMAGE TO THEM.

2) ALL MEASUREMENTS ARE IN METRES UNLESS OTHERWISE NOTED.

3) ALL WORK SHALL BE IN ACCORDANCE WITH THE RELEVANT SECTIONS OF THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND DRAWINGS AND THE NIAGARA PENINSULA STANDARD CONTRACT DOCUMENT UNLESS OTHERWISE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS.

4) COMPUTER DRAWING FILE CO-ORDINATES FOR THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION LAYOUT.

5) ALL GRANULAR MATERIAL SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY (SPD) AND ALL NATIVE BACKFILL SHALL BE COMPACTED TO 95% SPD UNLESS OTHERWISE NOTED.

6) ALL CONSTRUCTION SHALL BE CARRIED OUT IN SUCH A WAY THAT SILTATION OR OTHER DAMAGE TO WATERCOURSES DOES NOT OCCUR. THE REQUIREMENTS, REGULATIONS AND GUIDELINES OF THE MINISTRY OF NATURAL RESOURCES ARE TO BE ADHERED TO IN THIS RESPECT.

7) CONTRACTOR SHALL EXPOSE EXISTING WATERMAIN AND SANITARY SEWER IN VICINITY OF PROPOSED STORM SEWER CROSSING AND VERIFY EXACT LOCATION AND ELEVATION PRIOR TO CONSTRUCTION.

8) ALL TRENCHES, EXCEPT IN DRIVEWAYS, ROADWAYS OR PARKING AREAS, SHALL BE BACKFILLED WITH SELECT NATIVE MATERIAL UNLESS OTHERWISE NOTED. ALL TRENCHES IN DRIVEWAYS, ROADWAYS AND PARKING AREAS SHALL BE BACKFILLED WITH GRANULAR 'A'.

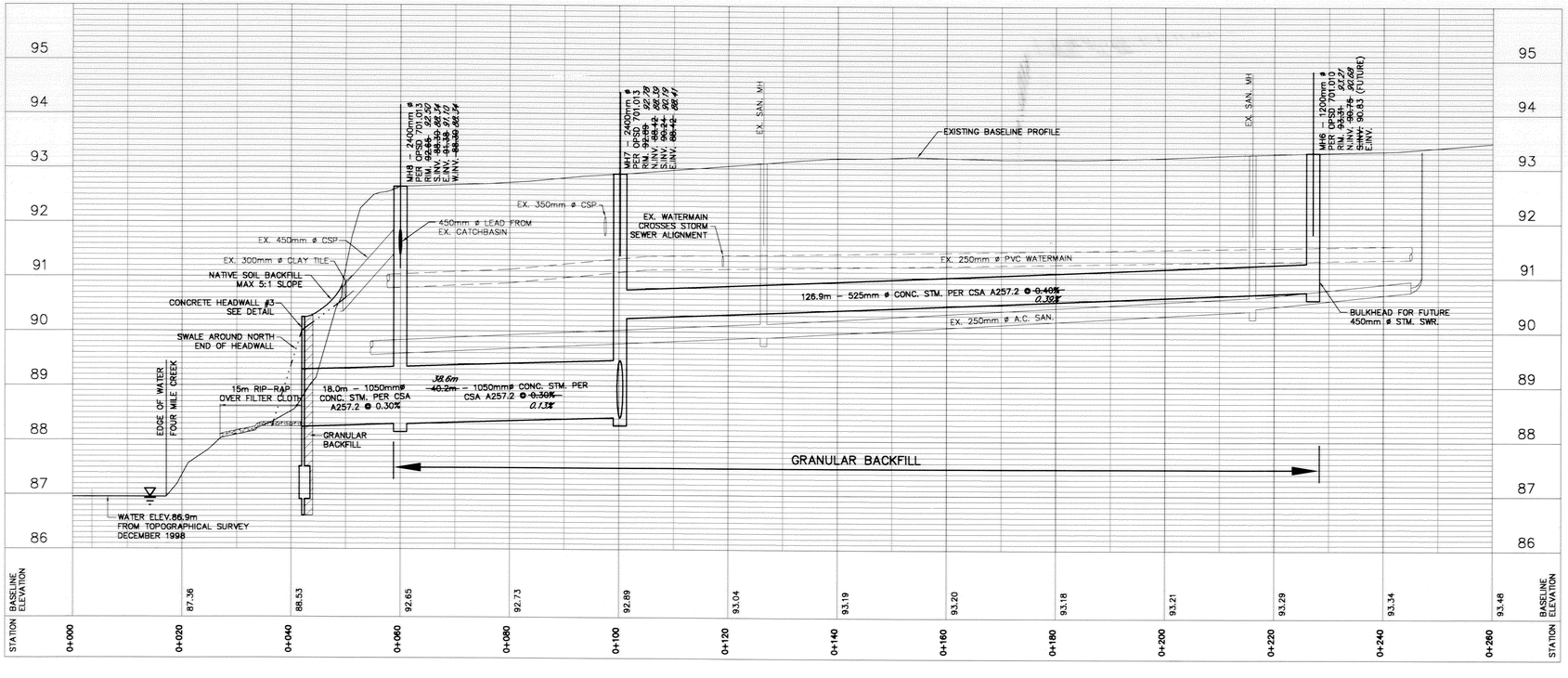
9) A MINIMUM CLEAR VERTICAL SEPARATION OF 0.5m SHALL BE MAINTAINED AT CROSSINGS OF THE STORM SEWER OVER WATERMAINS

10) REMOVE AND REINSTATE STREET FURNITURE, SIGNS, MAIL BOXES, GUIDE RAILS, CULVERTS, HEADWALLS ETC. AS NECESSARY. REINSTATEMENT TO BE TO EXISTING CONDITION OR BETTER, AND TO THE SATISFACTION OF THE ENGINEER AND THE PROPERTY OWNER.

11) PIPE BEDDING FOR ALL CONCRETE PIPE SHALL BE GRANULAR 'A', CLASS 'B' PER OPSD 802.030. PIPE BEDDING AND COVER FOR ALL PVC PIPE SHALL BE GRANULAR 'A' PER OPSD 802.010.

12) ALL MAINTENANCE HOLES SHALL BE BENCHED PER OPSD 701.021 UNLESS OTHERWISE NOTED. CATCHBASIN MAINTENANCE HOLE #4 SHALL HAVE 300mm DEEP SUMP PER OPSD 701.01.

13) ALL MAINTENANCE HOLES SHALL HAVE FRAME & COVER PER OPSD-401.01 TYPE 'A' UNLESS OTHERWISE NOTED.



NO.	REVISION	DATE	INIT.
1	ISSUED FOR CONSTRUCTION RECORD	14 MAR 01	APM
0	ISSUED FOR CONSTRUCTION	07 MAR 00	SEN
C	ISSUED FOR TENDER	27 JAN 00	HEK
B	ISSUED FOR APPROVAL	14 JAN 00	SEN
A	ISSUED FOR TOWN REVIEW	10 JAN 00	SEN

cad file: 99532-AB

plot scale: 1:0.001

NOTE:
FOR STORMWATER MANAGEMENT POND DETAILS REFER TO DWG. 99532-01.

FOR PARK/POND/PRIVATE LAND STORM SEWER ALIGNMENT INFORMATION REFER TO DRAWING 99532-02

drawn by: S.E.N.
design by: S.E.N./D.K.P.
approved by: D.K.P.
date: 10 JAN 00

MPS REINDERS
MPS Reinders Niagara Inc.
Engineers, Architect, & Planners
phone: (905) 984-8676
fax: (905) 682-5896

drawing title: OUTLET STORM SEWER FOUR MILE CREEK ROAD STA 0+000 TO STA 0+240

project title: LINE 2 / CONCESSION 4 DEVELOPMENT AREA STORMWATER MANAGEMENT
VIRGIL, ONTARIO

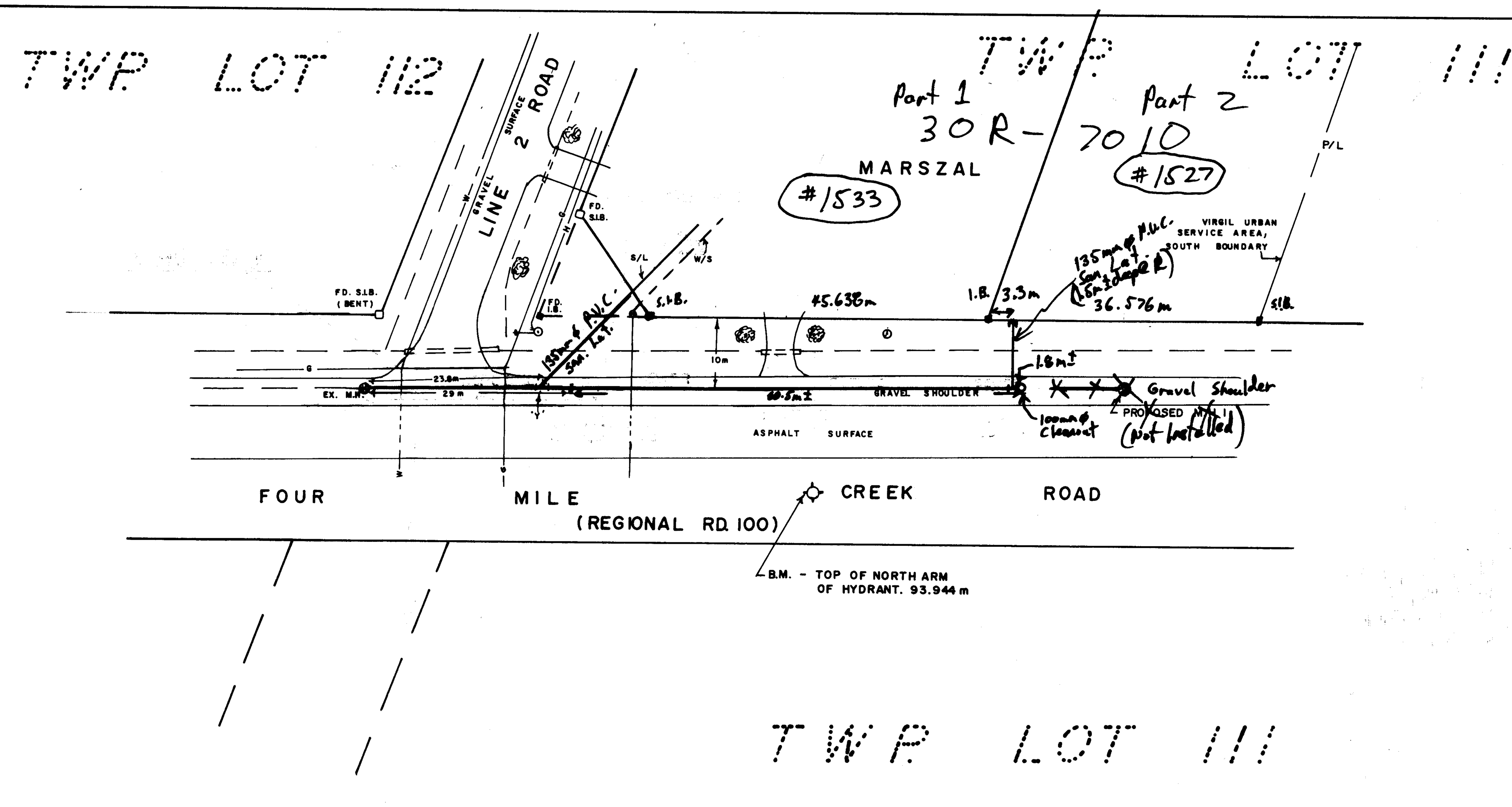
scale: 1:500 1:50

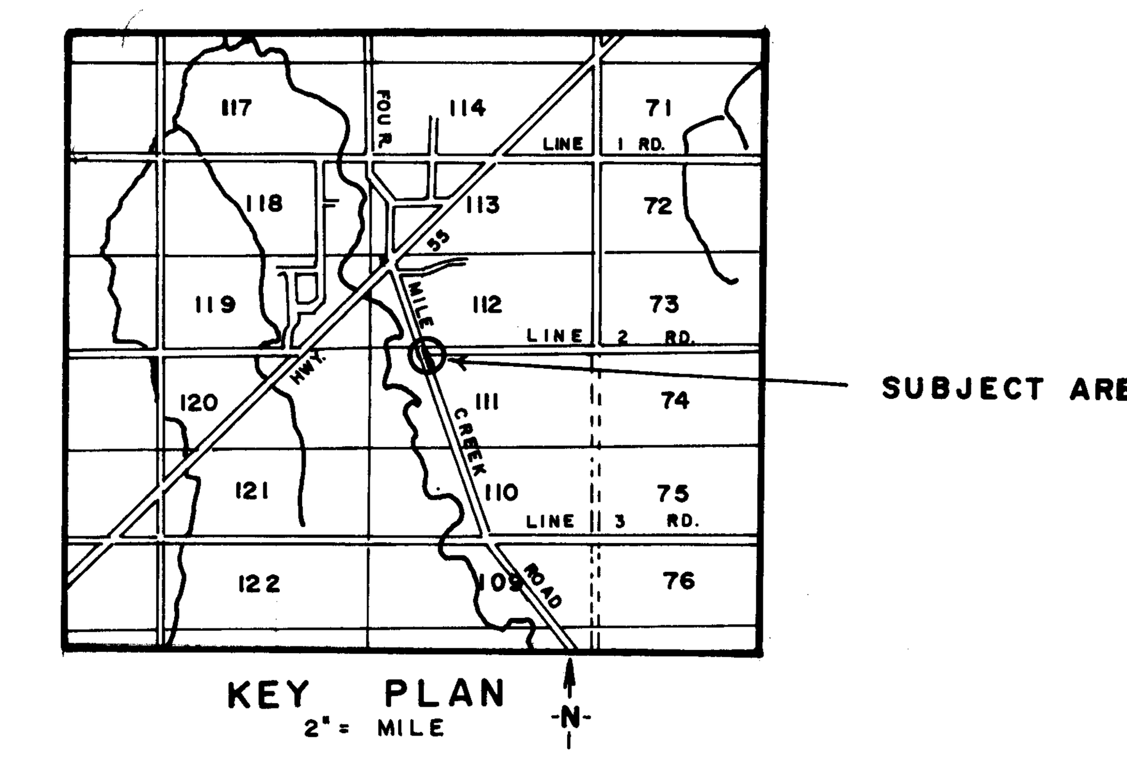
job #: 99532

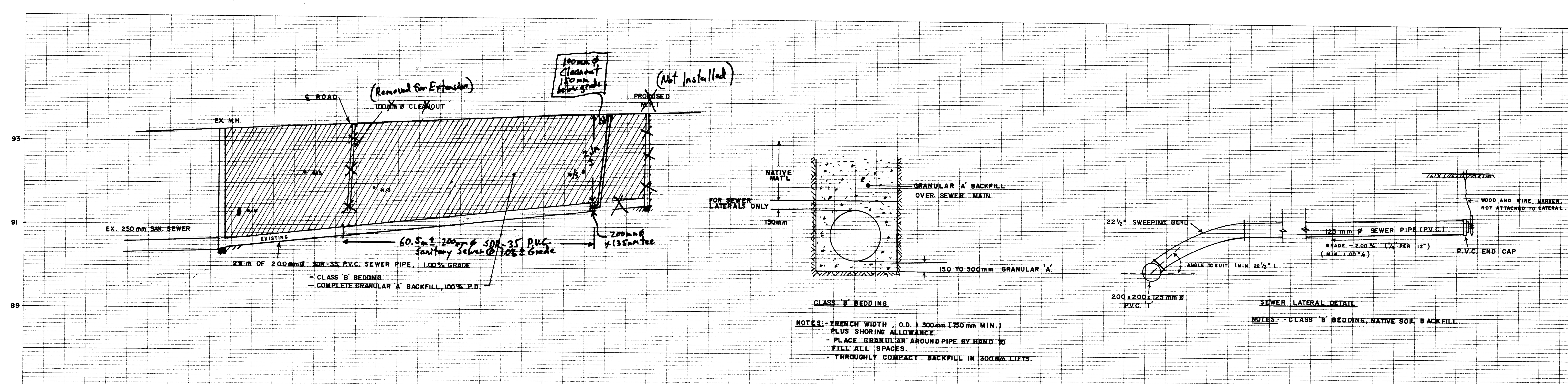
revision #: 1

drawing number: 99532-01

7a. + 7b.







SANITARY INVERT	S. 90.39 / N. 90.42		90.76	91.06	91.36	91.46
℄ ROAD	93.32			93.56		
STATION	0+010	0+000	0+030	0+060	0+090	0+100

NO.	REVISION	DATE	INIT.
2	As constructed, 60.5m Ext. + Cleanout (7b.)	1992 06 22	L.H.
1	AS CONSTRUCTED, 29m EXT. & CLEANOUT (7a.)	1983 10 21	R.B.

NOTES

DRAFTING R.B.
DESIGN R. B.
CHECKED BY N.A.

REGISTERED PROFESSIONAL ENGINEER
D. L. PATAKY
PROVINCE OF ONTARIO
PROCTOR & REDFERN LTD.

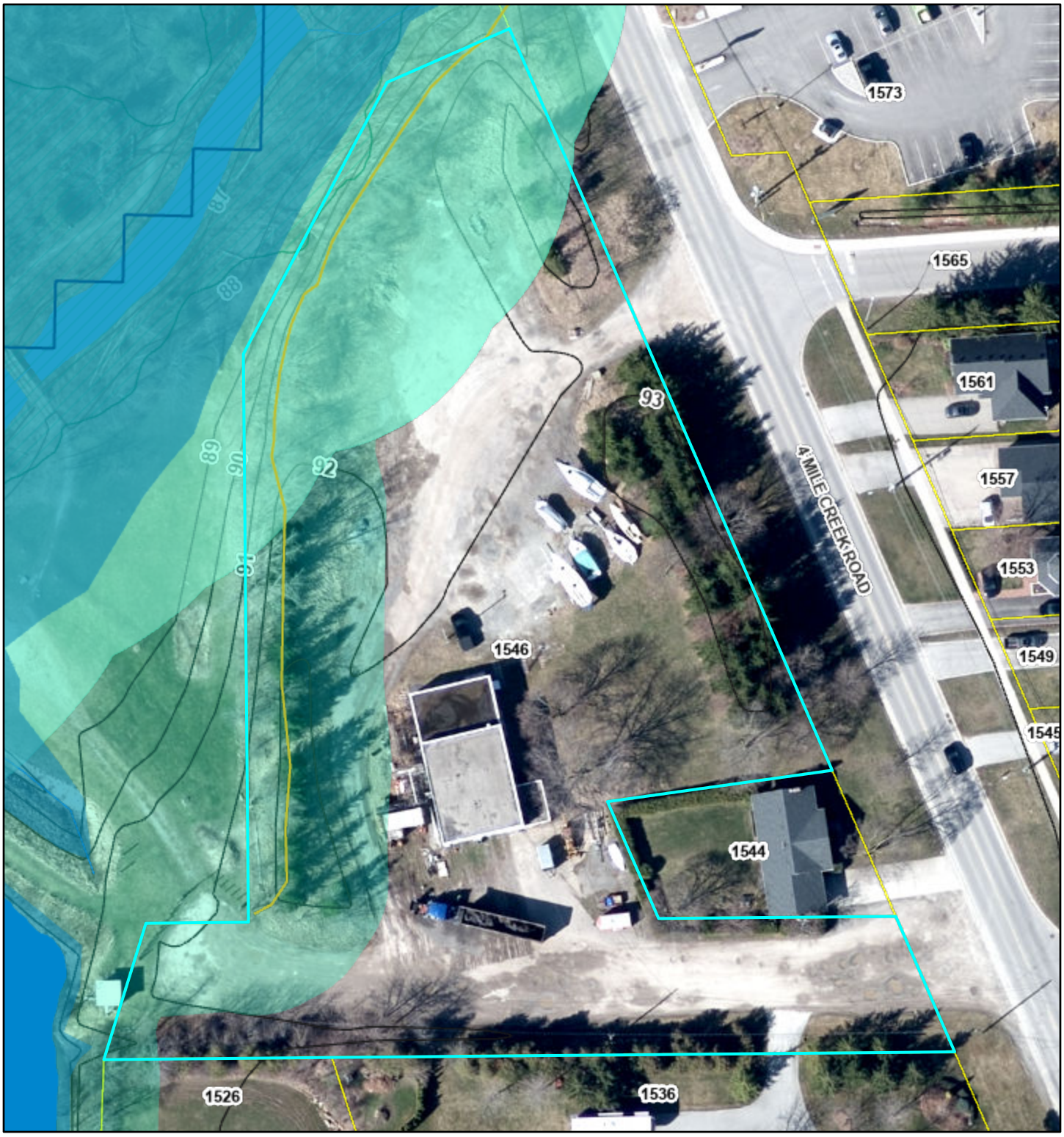
TOWN OF NIAGARA-ON-THE-LAKE
TOWN OF
NIAGARA-ON-THE-LAKE
ENGINEERING DEPARTMENT

SANITARY SEWER EXTENSION
FOUR MILE CREEK RD. AT LINE 2 RD.

IN THE
REGIONAL MUNICIPALITY OF NIAGARA

FIELD NOTES	R.B.
DATE	1983 08 04
SCALE	HOR. 1 = 500 VER. 1 = 50
DWG. No.	1 OF 1
MUN. REF. No.	L - 2 - 67
REV.	0

1544 & 1546 Four Mile Creek Road - Regulated Features Map



12/15/2023, 11:23:02 AM

1:1,128

0 0.01 0.01 0.02 mi

0 0.01 0.02 0.04 km

SWOOP 2020 NPCA

Red: Band_1

Green: Band_2

Blue: Band_3

Roads

NPCA APPROXIMATE REGULATION LANDS

Top of Slope Features

Unstable

Regulated Floodplain Extent

Regulated

NPCA, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

From: Nicholas Bradley <nbradley@npca.ca>
Sent: Thursday, October 17, 2024 12:04 PM
To: Roshawn Nunes
Subject: 1544 & 1546 Four Mile Creek Road
Attachments: 1544 & 1546 Four Mile Creek Road - Regulated Features Map.pdf

Good afternoon,

Thank you for reaching out. The mapping of the two subject properties has been attached to this email. Please note that 1544 Four Mile Creek Road is not impacted by any NPCA regulated features. The information provided below only pertains to 1546 Four Mile Creek Road.

With reference to the attached mapping, part of 1546 Four Mile Creek Road is impacted by a Non-Provincially Significant Wetland Complex known as the Virgil Conservation Area Wetland Complex (seen in light green in the attached map). As such, new development and/or site alterations on 1546 Four Mile Creek Road would be subject to the policies under **Ontario Regulation 41/24**. Wetlands provide for natural flood attenuation during storm events and, as such, it is important to maintain the hydrologic function of wetlands to assist in minimizing flooding impacts downstream. In accordance with NPCA policies and regulations, no new development or site alterations are permitted within a wetland. Also, the NPCA uses a 30-meter buffer in which new development and site alterations may be permitted in accordance with NPCA Policies on development within the wetland buffer.

Additionally, given the topography of 1546 Four Mile Creek Road, the west side of the property would be subject to the NPCA's Valleyland Policies. The NPCA regulates all development and site alterations within 15 meters of a steep riverine valley for slope stability purposes. In accordance with current NPCA policies, new buildings and structures, accessory buildings and additions to existing buildings and structures shall provide an appropriate setback from the stable top of slope to ensure the long-term stability of the valley slope and safety of buildings or structures. This setback shall be based on a geotechnical study, approved by the NPCA. In no case shall any portion of a building or structure extend beyond the physical or stable top of slope (whichever is more restrictive).

Further, the Four Mile Creek flows adjacent to 1546 Four Mile Creek Road. This creek has an associated 1-in-100-year floodplain (seen in blue in the attached map). Current NPCA policies prohibit the placement of new structural development or fill within riverine floodplain areas. The regulatory floodplain elevation for this section of the creek is 88.78m CGVD28:78 on the north side of the property and 90.22m CGVD28:78 on the south side of the subject property. All new structures and site alterations must take place above these respective elevations to be located outside of the riverine flood hazard.

Finally, any work that encroaches on the areas of the properties that have regulated features, would fall within the jurisdiction of the NPCA and be subject to the policies under O. Reg. 41/24. Following the permitting process, applicable policies and fees would apply. Please note that depending on the scope, nature, and location of any proposed works, further supporting studies and/or plans may be required.

Thank you,
Nick

Nicholas Bradley
Planning Technician
Niagara Peninsula Conservation Authority (NPCA)
3350 Merrittville Highway, Unit 9, Thorold, Ontario L2V 4Y6

905.788.3135 ext. 279
www.npca.ca
nbradley@npca.ca

Appendix B – Existing Conditions Calculations

PROJECT: **1544 & 1546 Four Mile Creek Road**
PROJECT No: **ALL-24011473-A0**
CREATED: **26-Feb-25**
PRINTED: **26-Feb-25**

Pre-Development Runoff Coefficients and Peak Flows
Town of Niagara on the Lake

Contributing Area	ID#	Runoff Coefficient	AREA (ha)
Cathcment 1	101	0.43	0.65
Cathcment 2	102	0.25	0.07
Cathcment 3	103	0.55	0.35
TOTAL		0.46	1.07

Pre-Development Flows Catchment 101

Time of Concentration	10	minutes		
2 Year Intensity	74.46	mm/hr	$Q_{(2Year)}$ = C*I*A/360	57.8 l/s
5 Year Intensity	89.88	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	69.8 l/s
100 Year Intensity	144.26	mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	112.0 l/s

Pre-Development Flows Catchment 102

Time of Concentration	10	minutes		
2 Year Intensity	74.46	mm/hr	$Q_{(2Year)}$ = C*I*A/360	3.6 l/s
5 Year Intensity	89.88	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	4.4 l/s
100 Year Intensity	144.26	mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	7.0 l/s

Pre-Development Flows Catchment 103

Time of Concentration	10	minutes		
2 Year Intensity	74.46	mm/hr	$Q_{(2Year)}$ = C*I*A/360	39.8 l/s
5 Year Intensity	89.88	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	48.1 l/s
100 Year Intensity	144.26	mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	77.1 l/s

Appendix C – Proposed Conditions Calculations

PROJECT: **1544 & 1546 Four Mile Creek Road**
PROJECT No: **ALL-24011473-A0**
CREATED: **26-Feb-25**
PRINTED: **26-Feb-25**

Post-Development Runoff Coefficients and Peak Flows
Town of Niagara on the Lake

Contributing Area	ID#	Runoff Coefficient	AREA (ha)
Catchment 1	201	0.82	0.53
Catchment 2	202	0.95	0.17
Catchment 3	203	0.80	0.26
Catchment 4	204	0.25	0.11
TOTAL		0.78	1.07

Post-Development Flows Catchment 201

Time of Concentration	10 minutes		
2 Year Intensity	74.46 mm/hr	$Q_{(2Year)}$ = C*I*A/360	89.9 l/s
5 Year Intensity	89.88 mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	108.5 l/s
10 Year Intensity	101.38 mm/hr	$Q_{(10Year)}$ = C*I*A/360	122.4 l/s
100 Year Intensity	144.26 mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	174.2 l/s

Post-Development Flows Catchment 202

Time of Concentration	10 minutes		
2 Year Intensity	74.46 mm/hr	$Q_{(2Year)}$ = C*I*A/360	33.4 l/s
5 Year Intensity	89.88 mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	40.3 l/s
10 Year Intensity	101.38 mm/hr	$Q_{(10Year)}$ = C*I*A/360	45.5 l/s
100 Year Intensity	144.26 mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	64.7 l/s

Post-Development Flows Catchment 203

Time of Concentration	10 minutes		
2 Year Intensity	74.46 mm/hr	$Q_{(2Year)}$ = C*I*A/360	43.0 l/s
5 Year Intensity	89.88 mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	51.9 l/s
10 Year Intensity	101.38 mm/hr	$Q_{(10Year)}$ = C*I*A/360	58.6 l/s
100 Year Intensity	144.26 mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	83.4 l/s

Post-Development Flows Catchment 204

Time of Concentration	10 minutes		
2 Year Intensity	74.46 mm/hr	$Q_{(2Year)}$ = C*I*A/360	5.7 l/s
5 Year Intensity	89.88 mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	6.9 l/s
10 Year Intensity	101.38 mm/hr	$Q_{(10Year)}$ = C*I*A/360	7.7 l/s
100 Year Intensity	144.26 mm/hr	$Q_{(100\ Year)}$ = C*I*A/360	11.0 l/s

PROJECT: **1544 & 1546 Four Mile Creek Road**
PROJECT No: **ALL-24011473-A0**
CREATED: **26-Feb-25**

Catchment Area 201

Required Storage Volume

Town of Niagara on the Lake

Control 100 year Post Development to 5 Year Pre Development

Controlled Site Area	5300	m^2
Allowable Release From Site	42.22	l/s
Orifice Control	41.4	l/s
Composite Runoff Coefficient (Controlled Area)	0.82	
Time of Concentration	10	minutes

100 Year Storm I = 980/(t+3.7)^0.732

Storm Duration (minutes)	Rainfall Intensity (mm/hr)	Total Runoff Q (l/s)	Required Storage Volume (m^3)
2	274.111	330.9	34.7
4	219.945	265.5	53.8
6	185.742	224.2	65.8
8	161.925	195.5	74.0
10	144.260	174.2	79.7
12	130.565	157.6	83.7
14	119.594	144.4	86.5
16	110.580	133.5	88.4
18	103.024	124.4	89.6
20	96.585	116.6	90.2
22	91.024	109.9	**90.4**
24	86.165	104.0	90.2
26	81.878	98.8	89.6
28	78.064	94.2	88.8
30	74.645	90.1	87.7
32	71.560	86.4	86.4
34	68.761	83.0	84.9
36	66.208	79.9	83.2
38	63.868	77.1	81.4
40	61.715	74.5	79.5
90 m^3 of Storage is required			

PROJECT: **1544 & 1546 Four Mile Creek Road**

100 YEAR STORM EVENT- SWM Controls

PROJECT No: **ALL-24011473-A0**

CREATED: **26-Feb-25**

PRINTED: **26-Feb-25**

INPUT

Net Required Discharge (l/s) =	**174.20**
Max. Water Surface Elev. (m) =	**92.80**
Discharge Pipe Invert (m) =	**90.64**
Discharge Pipe Diameter (mm) =	**300**
Orifice Diameter (mm) =	**100**
Orifice Flow Loss (C) =	**0.82**

OUTPUT

H =	**2.11**	**m**
g =	**9.806**	
V = (2*g*H)^0.5 =	**6.433**	**m/s**
A = X-section Area =	**0.0079**	**m2**

Orifice Flow = Q = C * A * V * 1000 =	**41.4**	**l/s**

PROJECT: **1544 & 1546 Four Mile Creek Road**
PROJECT No: **ALL-24011473-A0**
CREATED: **26-Feb-25**

Cathment Area 202 + 203

Required Storage Volume

Town of Niagara on the Lake

Control 100 year Post Development to 5 Year Pre Development

Controlled Site Area	4300	m^2
Allowable Release From Site	22.73	l/s
Orifice Control	22	l/s
Composite Runoff Coefficient (Controlled Area)	0.65	
Time of Concentration	10	minutes

100 Year Storm I = 980/(t+3.7)^0.732

Storm Duration (minutes)	Rainfall Intensity (mm/hr)	Total Runoff Q (l/s)	Required Storage Volume (m^3)
2	274.111	212.8	22.9
4	219.945	170.8	35.7
6	185.742	144.2	44.0
8	161.925	125.7	49.8
10	144.260	112.0	54.0
12	130.565	101.4	57.1
14	119.594	92.9	59.5
16	110.580	85.9	61.3
18	103.024	80.0	62.6
20	96.585	75.0	63.6
22	91.024	70.7	64.2
24	86.165	66.9	64.7
26	81.878	63.6	64.8
28	78.064	60.6	**64.9**
30	74.645	58.0	64.7
32	71.560	55.6	64.4
34	68.761	53.4	64.0
36	66.208	51.4	63.5
38	63.868	49.6	62.9
40	61.715	47.9	62.2
65 m^3 of Storage is required			

100 YEAR STORM EVENT- SWM Controls

PROJECT: **1544 & 1546 Four Mile Creek Road**
PROJECT No: **ALL-24011473-A0**
CREATED: **26-Feb-25**
PRINTED: **26-Feb-25**

INPUT

Net Required Discharge (l/s) =	**148.10**
Max. Water Surface Elev. (m) =	**92.30**
Discharge Pipe Invert (m) =	**91.12**
Discharge Pipe Diameter (mm) =	**300**
Orifice Diameter (mm) =	**85**
Orifice Flow Loss (C) =	**0.82**

OUTPUT

H =	**1.1375**	**m**
g =	**9.806**	
V = (2*g*H)^0.5 =	**4.723**	**m/s**
A = X-section Area =	**0.0057**	**m2**

Orifice Flow = Q = C * A * V * 1000 =	**22.0**	**l/s**

End of Document