PROPOSED DEVELOPMENT OF
AGRICULTURAL STORAGE FACILITY
AT
263 CONCESSION 6 ROAD,
NIAGARA-ON-THE-LAKE, ON

SERVICING BRIEF

November 18, 2024

Prepared by:

Jain Infrastructure Consultants Ltd.
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1.0 INTRODUCTION

The purpose of the report is to describe the proposed servicing arrangement i.e sanitary, water and stormwater for the proposed development. The project site is located at the intersection of York Road and Concession 6 Road in Niagara On The Lake, as shown in Figure 1 below.

Figure 1 - Site Location Plan

2.0 EXISTING SITE CONDITIONS

The total unsevered site has an area of 10.13 ha. consisting of a single dwelling unit, open area and woodland. The owner intends to sever the southern part of the land ("severed lands"), approximately 1.81 ha. as an agricultural storage facility. A consent and rezoning application is required for the severance and proposed agricultural-related uses on the severed lands with an area of 1.81 ha.

3.0 EXISTING SERVICES & CONNECTIONS

Existing record drawings obtained from Niagara Region show that 400mm dia. watermain is available along York Road (Refer drawing T27B-3-107, Appendix "A"). However, the Region does not allow services from transmission mains (refer email by Town of NOTL, Appendix "A"). There are no existing municipal sanitary or stormwater services near the project location. For storm drainage, an open ditch is running along the southern and western property line of the lot.

4.0 PROPOSED DEVELOPMENT

The area under development (approx. 1.81 ha) is highlighted in yellow in Figure 1. The following facilities are proposed to be constructed on the site: The facilities are shown on Drawing C101, Appendix D.

Table-1: Proposed Facilities

Facility	**Area (m^2)**
Agri Farm Office Building	561
Farm Stands (Agri Market)	187
Agri Farm Temperature Controlled Storage Facility	1850
Agri Farm Equipment Storage Facility	1850
Seasonal Farming Area/ Market Facility	1394
Parking & driveway	5836

5.0 WATERMAIN SERVICING

The region does not permit service connections to t heir transmission mains, therefore a water well is proposed to be installed on the site. The proposed location of the water well is shown on drawing # C101, Appendix "D".

5.1 WATER DEMAND CALCULATIONS

The proposed development contains four building as listed below:

a. Agri Farm Office Building
b. Farm Stands (Agri Market)
c. Agri Farm Temperature Controlled Storage Facility
d. Agri Farm Equipment Storage Facility

Table 8.3.1.B of Ontario Building Code describes the water demand for the buildings as under:

For Agri Farm Office Building (each 9.3m^2 demand) = 75 lpd

For Farm Stands (Agri Market) for each m^2 of floor demand = 5 lpd
For Farm Temperature Controlled Storage Facility demand = 150 lpd per loading bay

For Agri Farm Equipment Storage demand = 150 lpd per loading bay

Water Closet for Warehouse = 950 lpd

Max. Daily Demand = Avg. Daily Demand x 1.4

Peak Demand = Avg. Daily Demand x 3

The total water demand for the proposed buildings is calculated as follows.

Table-2: Water Demand Calculations

Building	Loading Bay	Water Closet	Gross Floor Area (m^2)	Criteria	Avg. Demand l/day	Avg. Demand l/sec	Max. Day Demand l/sec	Peak Demand l/sec
Agri Farm Office Building			560.7	75 lpd /9.3m^2	4522.10	0.052	0.073	0.157
Farm Stands (Agri Market)			186.9	5 lpd /m^2	934.70	0.011	0.015	0.032
Agri Farm Temperature Controlled Storage Facility	2	1		150 lpd/bay + 950 lpd/w.c.	1250.00	0.014	0.020	0.043
Agri Farm Equipment Storage Facility	2	1		150 lpd/bay + 950 lpd/w.c.	1250.00	0.014	0.020	0.043
					7956.80	**0.092**	**0.129**	**0.276**

The maximum daily demand is calculated as Maximum daily demand = **0.129 l/sec**.
A water well is proposed on the location shown in drawing C101, Appendix "D". The water shall be supplied to the Agri Farm Office Building via 25mm dia. copper watermain and remaining buildings shall be served from the office building.

6.0 SANITARY SERVICING

In the existing conditions, municipal sanitary network is not available around the lot. Ontario Building Code Criteria has been adopted for the calculations of the sanitary flow. Detailed calculations by septic system designer (O'Hara Services) are attached as Appendix "C". An area is also allocated for alternative/standby arrangement proposed as "Secondary Septic System" with equal capacity as of the primary septic system. The sewage from the buildings will be collected into SAN-MH1 and then directed towards the Septic Tank. The Septic Tank Shall be connected with the proposed Septic bed as shown in drawing C101, Appendix "D".

7.0 STORM SERVICING

Currently the project site is vacant land. The rainwater runoff is flowing from west to east side as sheet flow in present conditions. The following SWM criteria are assumed to be applicable for the site.

Quantity Control

The post development runoff from the site will be controlled for all return periods i.e 2, 5, 10, 25, 50 &100 year to pre-development conditions.

Quality Control

Low impact development techniques will be used to improve water quality

Erosion and Sediment Control

Adequate measures are to be implemented to minimize the transportation of sediments out of the construction area.

7.1 STORMWATER RUNOFF COEFFICIENTS

Pre and post development Drainage area plans are attached in Appendix "A" as DR01 & DR02 respectively. Pre and post-development imperviousness are summarized in Table B1 and Table B2 Appendix "B".

Table 3 – Runoff Coefficients

Area	Drainage Area (Hectare)	Runoff coefficient 'C' (Pre-Development)	Runoff coefficient 'C' (Post-development)
A1	1.81	0.25	0.65

7.2 PRE & POST DEVELOPMENT FLOW CALCULATIONS & ONSITE STORAGE

The Rainfall intensities shall be calculated in accordance with the City of St. Catharine's IDF Parameters defined by the following equation and values.

Table 3 – IDF Parameters

Return Period (Years)	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years
A	567	664	724	821	900	980
B	0.746	0.744	0.739	0.735	0.734	0.732
C	5.2	4.7	4.3	4.0	3.8	3.7

$$I = \frac{A}{(T+C)^{B}} \text{ mm/min} \qquad \text{where T = duration (min)}$$

Where: A ,B ,C = above
i = intensity (mm/hr or in/hr)
t = storm duration (min) and Ratio of time to peak = 0.375

The discharges have been calculated using the formula.

$$Q = 0.00278CIA$$

Where Q = Flow (m3/sec)
C = Coefficient of Imperviousness
I = Rainfall Intensity (mm/hr)
A = Drainage Area (ha)

The pre and post development flows are calculated in Table B3 & B4, Appendix B.
The pre and post development flows with onsite storage requirements for 2–100-year storms are summarized in Table 4 below.

Table 4 – Pre & Post Development Peak Flows

Storm	Pre-Development Peak Flow (l/sec)	Post-Development Peak Flow (l/sec)	Onsite Storage Required (m^3)
2 -Years	75.8	195.8	108.71
5-Years	90.9	235.0	130.12
10 -Years	102.2	264.1	145.98
25 -Years	118.6	306.5	169.26
50 -Years	131.4	339.6	187.13
100-Years	144.5	373.4	**205.76***

*Max. storage required.

The site storm runoff will be allowed to flow towards the east over parking as sheet flow . The required on site detention storage is provided by the proposed gravel trench in the south-east corner of the project as shown in drawing C101, Appendix "D". Capacity of the gravel infiltration trench is calculated below:

Length of Trench = 80m
Width of Trench = 7.6m
Depth of Trench = 0.85m
Porosity = 40%
Volume = 80x7.6x0.85x0.4 = 206.72m^3 (storage volume is more than the required volume of 205.76m^3)

8.0 EROSION AND SEDIMENT CONTROL

An erosion and sediment control strategy will be implemented during the construction to mitigate the transportation of silt from the site. To prevent construction-generated sediments from entering the storm sewer or leaving the site by overland flow, the following measures should be implemented with regular inspection and maintenance.

- Management of construction activities in a manner to minimize disturbed area and duration of soil disturbance.
- Provision of a mud mat construction access to minimize sediment on adjacent municipal road.
- Installation of drain inlet protection at each catch basin and storm manhole cover within the construction site and downstream of the construction access on the adjacent municipal road.
- Installation and maintenance of silt fences (OPSD 219.130 or equivalent) around the perimeter of any construction/disturbed areas.
- Periodically removal of sediments accumulated behind silt fences or sediment protection when 50% of its individual design capacity has been reached
- Dust control measures should be followed during construction.
- Erosion and sediment control practices to be decommissioned after paving, landscaping or other stabilization measures and restoration of disturbed areas have been completed.

9.0 CONCLUSIONS

- A water well shall be installed on site to serve the new development ensuring a flow of 0.129 l/s.
- On-site septic bed system shall be provided with a capacity of 8000 lpd.
- Post-development to pre-development flows are controlled through 2-100 years and the excess volume is stored in the infiltration trench provided in the south-east corner of the property.
- Sediment and erosion control mitigation plan shall be implemented, such as the installation of mud mat, temporary silt fence and dust control measures.

We trust you will find this submission complete and in order. Should you have any questions, please contact the undersigned.

Respectfully Submitted,
Jain Infrastructure Consultants Ltd.

Yasar Ayub, P. Eng.
November 18, 2024

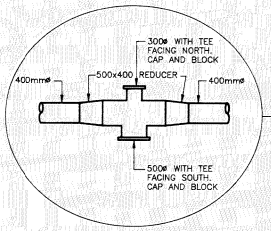
Appendix A

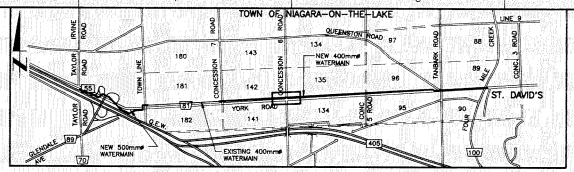
Existing Services (drawing # T27B-3-107)
Email from the City of NOTL.

116 (P7)

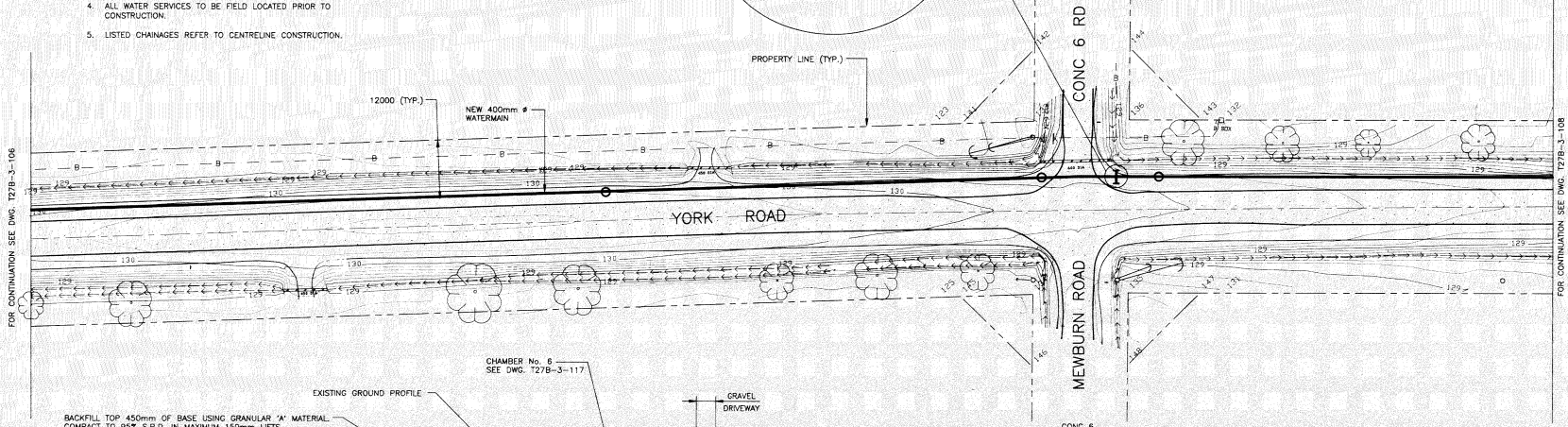
GENERAL NOTES:

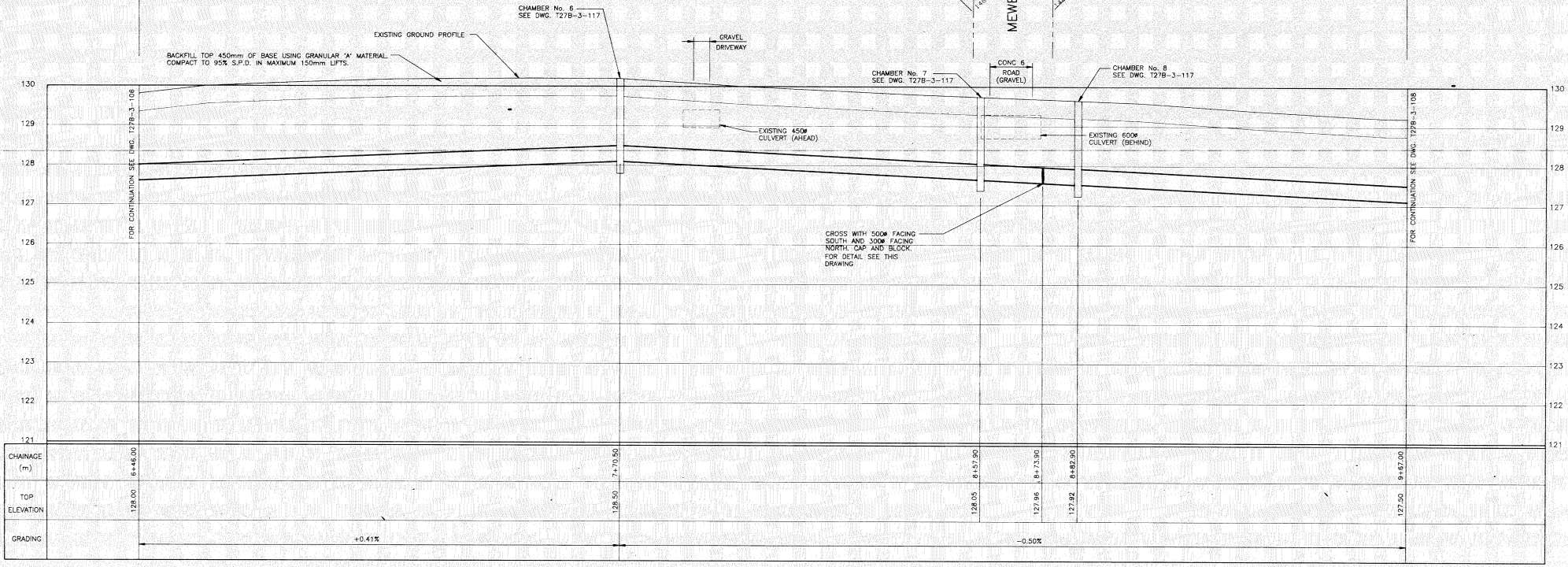
1. THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION SHOWN OF SUCH UTILITIES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONTACT ALL SUCH UTILITIES INVOLVED AND INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. REMOVE AND REINSTATE STREET FURNITURE, SIGNS, MAIL BOXES, GUIDE RAILS, CULVERTS, HEADWALLS, ETC., AS NECESSARY. REINSTATEMENT TO BE TO EXISTING CONDITION OR BETTER, AND AS SPECIFIED IN THE SPECIAL PROVISIONS.
3. CULVERTS, POLES, ETC., NOT REMOVED TO BE PROTECTED. SHORE OR BRACE TO PREVENT DAMAGE OR MOVEMENT.
4. ALL WATER SERVICES TO BE FIELD LOCATED PRIOR TO CONSTRUCTION.
5. LISTED CHAINAGES REFER TO CENTRELINE CONSTRUCTION.





LOCATION PLAN
N.T.S.





CHAINAGE (m)	6+46.00	7+70.50	8+57.90	8+73.90	8+82.90	9+67.00
TOP ELEVATION	128.00	128.50	128.05	127.96	127.92	127.50
GRADING	+0.41%		-0.50%			

DUCTILE IRON CLASS 250 HYPROTEC EXTERIOR COATING

NO	REVISION	DATE	INIT
1	RECORD DRAWINGS	NOV. /93	J.R.
0	ISSUED FOR TENDER		J.R.
A	ISSUED FOR REVIEW	OCT. 30/92	J.R.

NOTES

ASSOCIATED ENGINEERING

DRAFTING: J. TAYLOR
DESIGN: D. CAMPBELL
CHECKED BY: J. RADLEY

REGISTERED PROFESSIONAL ENGINEER J. E. RADLEY PROVINCE OF ONTARIO

Niagara Region

THE REGIONAL MUNICIPALITY OF NIAGARA
TOWN OF NIAGARA-ON-THE-LAKE
YORK ROAD WATERMAIN

400mm DIA. WATERMAIN

PLAN/PROFILE STA. 6+46.00 TO STA. 9+67.00

FIELD NOTES
DATE: SEPTEMBER 1992
SCALE: H 1:500 V 1:50
DWG No.: T27B-3-107
MUN REF No.: RN 92-30
REV: 1

AutoCAD File: T27B3DWG
Last Edit Date: 93/10/28

Rasheed Ahmad

From: Darrin Wills, C.Tech., rcji, mii <Darrin.Wills@notl.com>
Sent: October 30, 2024 1:05 PM
To: Yasar Ayub; Rasheed Ahmad
Subject: RE: 263 Concession 6 Road, Niagara on the Lake.

Hi Yasar,

The Region does not permit services connected to their transmission mains, therefore either a well or cistern would be recommended.

Regards,

Darrin Wills, C.Tech., rcji, mii
(A) Manager of Public Works
Darrin.Wills@notl.com

Town of Niagara-on-the-Lake
1593 Four Mile Creek Road
P.O. Box 100, Virgil, ON L0S 1T0
Telephone: (905) 468-3266
Website: www.notl.com

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: Wednesday, October 30, 2024 1:01 PM
To: Darrin Wills, C.Tech., rcji, mii <Darrin.Wills@notl.com>; Rasheed Ahmad <rasheed@jainconsultants.com>
Subject: RE: 263 Concession 6 Road, Niagara on the Lake.

Hi Darrin,

Thanks for providing the watermain info. Our client is proposing a farm produce storage and retail development at the north east corner of Concession 6 and York Road. Would they be getting a water service from the 400mm watermain or they need to consider a well supply.

Regards,

Yasar Ayub, P.Eng., PMP
Jain Infrastructure Consultants Ltd.
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Appendix B

Design Calculations:

Table B1 – Pre Development Runoff Coefficient Calculations

Table B2 – Post Development Runoff Coefficient Calculations

Table B3 – Pre Development Runoff Flow Calculations

Table B4 – Pre Development Runoff Flow Calculations

Table B5 – On-Site Storage Calculations

Table B1 - Pre Development Runoff Coefficients

263 Concession 6 Road, Niagara On The Lake, ON

Site Area = 18101.61 m^2

A1			
LANDUSE	AREA	R	AxR
Concrete	0.00	0.90	0.00
Landscape	18101.61	0.25	4525.40
Asphalt	0.00	0.90	0.00
	18101.61		4525.40

AREA (Ha)	***1.81***
"c"	***0.25***

Table B2 - Post Development Runoff Coefficients

263 Concession 6 Road, Niagara On The Lake, ON

Site Area = 18101.61 m^2

A1			
LANDUSE	AREA	R	AxR
Asphalt	5836	0.9	5252.27
Proposed Buildings	4351	0.9	3915.56
Septic System	841	0.9	757.17
Landscape	7074	0.25	1768.46
	18101.61		11693.45

AREA (Ha)	***1.81***
"c"	***0.65***

Calculation Sheet: B3
PRE DEVELOPMENT FLOW (Area: A1)

Project:	**263 Concession 6 Road, Niagara On The Lake, ON**
Project No.	**2024-111**
Date:	**2024-11-14**

PRE DEVELOPMENT RUNOFF COFFICENT

A1			
LANDUSE	AREA	R	AxR
Concrete	0.00	0.90	0.00
Landscape	18101.61	0.25	4525.40
Asphalt	0.00	0.90	0.00
	18101.61		4525.40

AREA (Ha,	***1.81***
"c"	***0.25***

Rational Method

$Q=0.00278CIA(m^3/sec)$

Where:

Q= Design Flow (m^3/sec)

C = Site specific runoff coefficient

A = Contributing draingae Area (ha)

I = Rainfall intensity (mm/hr) = $A/(T+C)^{\wedge B}$

Return Period (Years)	**2 -Years**	**5-Years**	**10 -Years**	**25 -Years**	**50 -Years**	**100-Years**
A	567	664	724	821	900	980
B	0.746	0.744	0.739	0.735	0.734	0.732
C	5.2	4.7	4.3	4.0	3.8	3.7
T (mins)	15	15	15	15	15	15
I (mm/hr)	60.23	72.29	81.23	94.29	104.47	114.88
Q (m^3/sec)	0.076	0.091	0.102	0.119	0.131	0.145
Q (l/sec)	**75.8**	**90.9**	**102.2**	**118.6**	**131.4**	**144.5**

Calculation Sheet: B4
POST DEVELOPMENT FLOW (Area A1)

Project:	**263 Concession 6 Road, Niagara On The Lake, ON**
Project No.	**2024-111**
Date:	**2024-11-14**

POST DEVELOPMENT RUNOFF COFFICENTS

A1			
LANDUSE	AREA	R	AxR
Asphalt	5836	0.9	5252.27
Proposed Buildings	4351	0.9	3915.56
Septic System	841	0.9	757.17
Landscape	7074	0.25	1768.46
	18101.61		11693.45

AREA (Ha)	***1.81***
"c"	***0.65***

Rational Method

$Q=0.00278CIA(m^3/sec)$

Where:

Q= Design Flow (m^3/sec)

C = Site specific runoff coefficient

A = Contributing draingae Area (ha)

I = Rainfall intensity (mm/hr) = $A/(T+C)^{\wedge B}$

Return Period (Years)	**2 -Years**	**5-Years**	**10 -Years**	**25 -Years**	**50 -Years**	**100-Years**
A	567	664	724	821	900	980
B	0.746	0.744	0.739	0.735	0.734	0.732
C	5.2	4.7	4.3	4.0	3.8	3.7
T (mins)	15	15	15	15	15	15
I (mm/hr)	60.23	72.29	81.23	94.29	104.47	114.88
Q (m^3/sec)	0.196	0.235	0.264	0.307	0.340	0.373
Q (l/sec)	**195.8**	**235.0**	**264.1**	**306.5**	**339.6**	**373.4**

On-Site Storage Calculator

Niagara On The Lake

Table B5 - Area A2

Project: 263 Concession 6 Rd.
Project No.: 2024-111
By: RA
Date: 14-Nov-24

R = 0.65
A = 1.81 ha
$Q_{release}$ = 0.145 m^3/s
144.52 L/s

100 Year

t_c (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	144.26	0.47	0.32	194.44	
15	114.88	0.37	0.23	205.76	***
20	96.59	0.31	0.17	203.04	
25	83.96	0.27	0.13	192.27	
30	74.65	0.24	0.10	176.29	
35	67.46	0.22	0.07	156.63	
40	61.72	0.20	0.06	134.25	
45	57.01	0.19	0.04	109.77	
46	56.17	0.18	0.04	104.66	
47	55.36	0.18	0.04	99.49	
48	54.57	0.18	0.03	94.26	
49	53.81	0.17	0.03	88.96	
50	53.07	0.17	0.03	83.61	
51	52.36	0.17	0.03	78.21	
52	51.67	0.17	0.02	72.75	
53	51.00	0.17	0.02	67.24	
63	45.29	0.15	0.00	9.73	
73	40.88	0.13	-	-	
83	37.38	0.12	-	-	
93	34.51	0.11	-	-	
103	32.11	0.10	-	-	
113	30.07	0.10	-	-	
123	28.31	0.09	-	-	
133	26.78	0.09	-	-	
143	25.43	0.08	-	-	
153	24.23	0.08	-	-	
163	23.16	0.08	-	-	
173	22.19	0.07	-	-	
193	20.52	0.07	-	-	
213	19.12	0.06	-	-	
233	17.92	0.06	-	-	
253	16.89	0.05	-	-	
273	15.98	0.05	-	-	
293	15.19	0.05	-	-	

Appendix C

Septic System Sizing Calculations

O'Hara Services
(O/B 2454646 Ontario Ltd)
1933 Haldimand Road 17
Cayuga, ON. N0A 1E0
905-774-1669
B.C.I.N. 102265
Roger OHara BCIN 11846
Michael OHara BCIN 11847

Specializing in: On Site Sewage Systems
Evaluations
Consulting
Designs
Installations
Repairs

Proposed Onsite Sewage System Design
263 Concession Rd 6 Niagara on the Lake

May 5 2024

Details of the proposed Farm/Market facility have been provided by Jain Infrastructure Consultants and the owner. All the facilities on the property are for private farm use except the retail sales area.

We done preliminary investigation of the site on May 22 2024 for the purpose of establishing the soil type and ground water table in order to calculate the size of area required for an Onsite Sewage System. The soil in the top .3 M would be best described as CC type compared to the Unified Soil Classification System as described in the Supplementary Standard SB-6, Chart 7. Table 2 Unified Soil Classification shows CC to have a T-Time of 12 to 50 minutes per centimeter. The bottom .3 M in depth would best be described as M H type compared to the Unified Soil Classification having a T Time of over 50 minutes per centimeter.

Design Flow Calculations:

The proposed facility has an office, sales area, farm equipment storage facility and a temperature controlled storage area.

1: Office 560.7 M Sq. 560.7/9.3 = 60.29 x 75 L/D = 4,521.75 L/D			4522 L/D
2 Sales Area 186.9 M Sq = 186.9 x 5 L/D = 934.5			935 L/D
3 Temperature Controlled Storage Facility: 2 loading bays	2 x 150 L/D =		150 L/D
	1 washroom	1 x 950 L/D =	950 L/D
4: Implement storage / repair facility	1 loading bay	1 x 150 L/D =	150 L/D
	1 Washroom	1 X 950 L/D =	950 L/D

Total 7,657 L/ D
Design for 7,700 L/D

A System such as a System O Nested Pipe Configuration Good for soil up to T Time of 150 minutes would work in this project

Required pipe 7,700 /30 = 256.6 M
Rows can be installed in a bent configuration
4 Rows of pipes on 2 meter centers, 65 M long = 260 M
Pipes will site in an area of 6 M x 65 M
Pipes to be minimum of 3 M from property Line and 5 M from Buildings

Prepared by Roger O'Hara

Appendix D

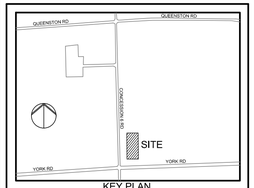
C101 - Site Servicing & Grading Concept

LEGEND:

PROPERTY LIMIT	PROPOSED SWALE
EXISTING WATERMAIN	+128.24 EXISTING ELEVATIONS FROM SURVEY
PROPOSED SANITARY	128.3 EXISTING CONTOUR
PROPOSED WATERMAIN	+ 128.00 (Ex.) EXISTING ELEVATIONS TO REMAIN
PROPOSED SANITARY MANHOLE	+128.37 PROPOSED ELEVATION
PROPOSED WATER WELL	+Sw. 127.63 PROPOSED SWALE ELEVATION
EXISTING VALVE CHAMBER	PROPOSED FLOW DIRECTION

PROJECT NORTH

TRUE NORTH

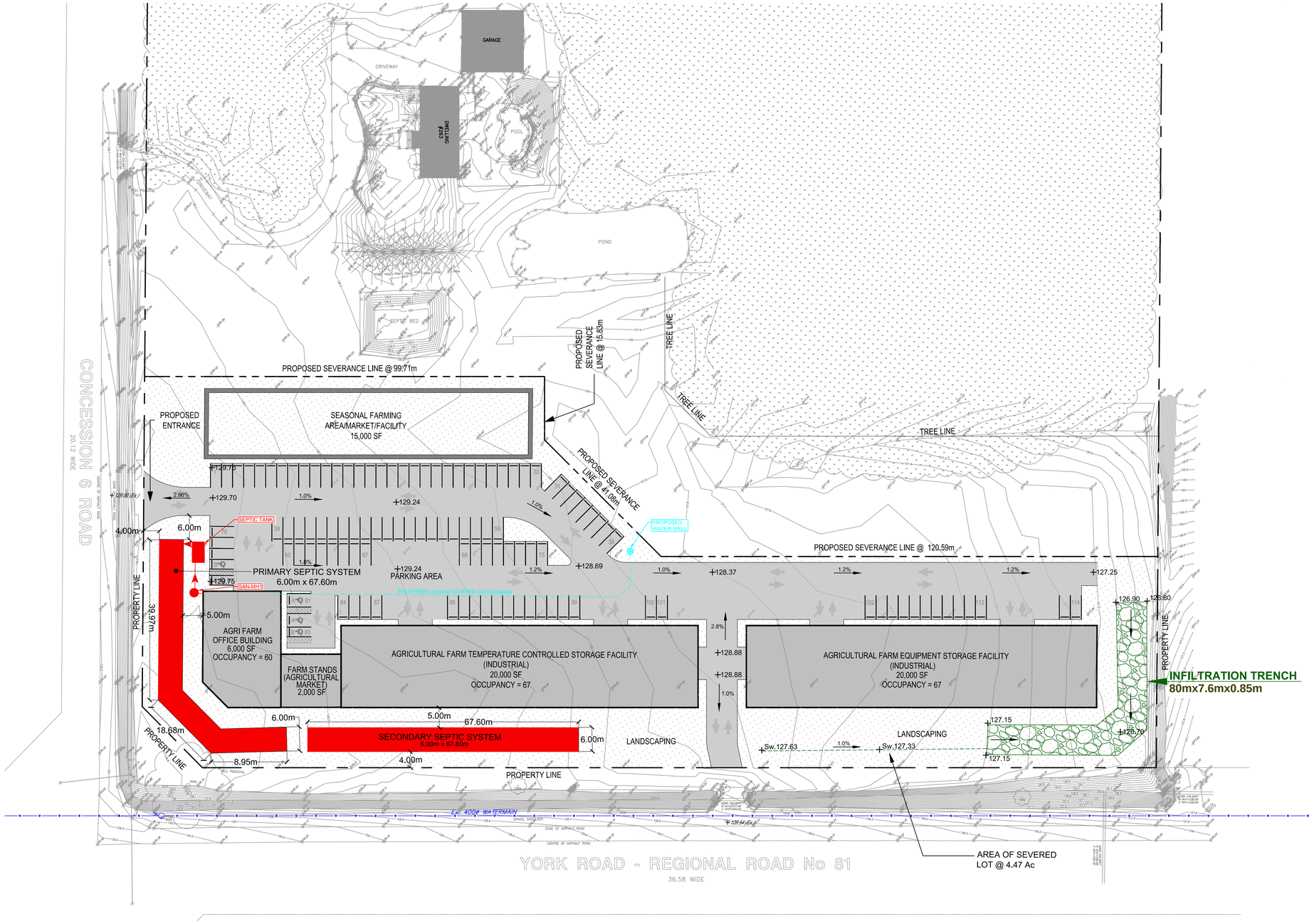


KEY PLAN
(N.T.S)

BENCHMARK:

ELEVATIONS HEREON ARE GEODETIC AND WERE DERIVED FROM THE TOPNET RKT NETWORK, NAD83 CSRS, VERSION 3, EPOC 2010.

LICENSED PROFESSIONAL ENGINEER
Y.AYUB
NOV 04,24
PROVINCE OF ONTARIO
2024-111



	REVISION	
4	ISSUED FOR APPROVAL	NOV 04/24
3	ISSUED FOR APPROVAL	SEP 11/24
2	ISSUED FOR APPROVAL	JUN 11/24
1	ISSUED FOR APPROVAL	MAY 24/24
No.	DESCRIPTION	DATE

JAIN
Jain Infrastructure Consultants Ltd.
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MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
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CLIENT

PROJECT

236 CONCESSION 6 ROAD
NIAGARA-ON-THE-LAKE, ONTARIO

DRAWING TITLE

SERVICING & GRADING CONCEPT

SCALE: (ARCH 36"x24")	1:500
DATE:	Nov. 4, 24
DRAWN BY:	AT
CHECKED BY:	YA

DWG No.
C101