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

SERVICING BRIEF

Rev-01

February 20, 2025

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 their 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 a septic tank (24,000 litre capacity) and then directed towards the pump chamber. The pump chamber shall be connected with the proposed septic bed that is designed as O-Nested Tertiary Sewage Treatment system. The arrangement is shown in drawing C101, Appendix "D". The system is designed in accordance with BMEC, the authorization number is "BMEC Authorization:23-06-408" for Nested Pipe Configuration. A copy of BMEC authorization is attached as Appendix "E". An introduction brief of the System O)) is also attached in Appendix "E".

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

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

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)
A retaining wall along the eastern property limit is provided to direct the flow into the infiltration trench and to avoid to flow into the neighbouring lot. The stormwater runoff shall be ultimately discharge to the existing ditch (along York Road) in the south-east corner the property.

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.
February 20, 2025

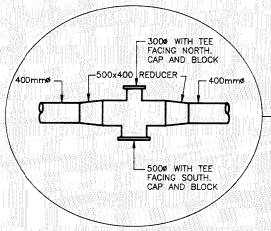
Appendix A

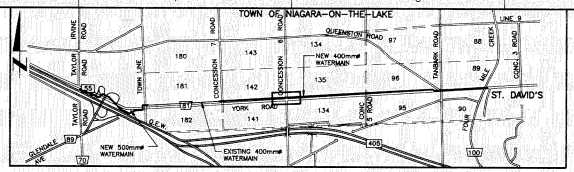
Existing Services (drawing # T27B-3-107)
Email from the City of NOTL.

116 (P7)

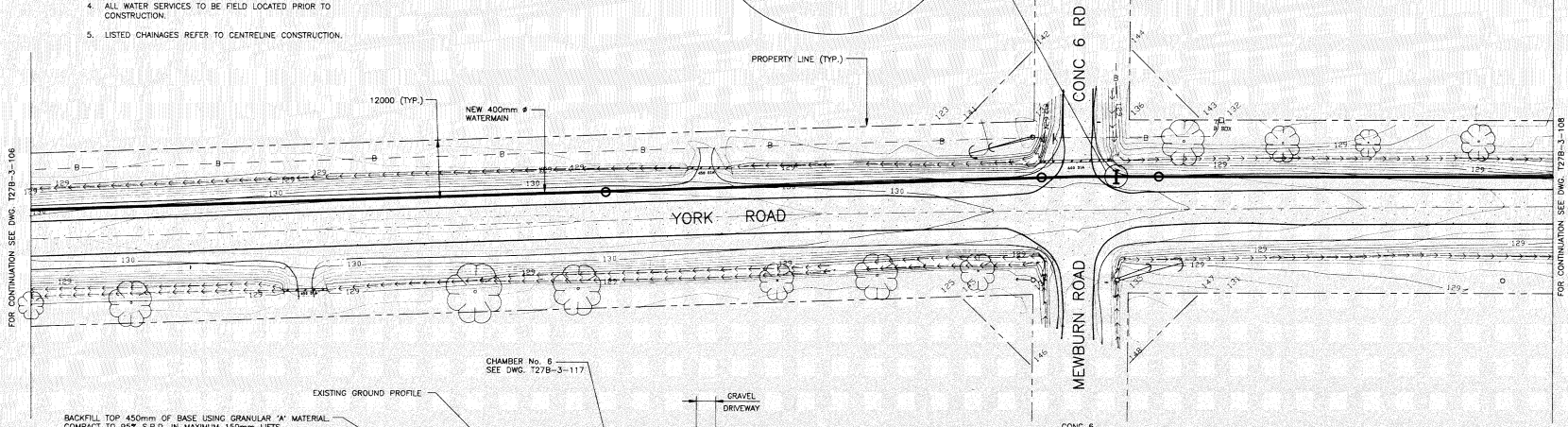
GENERAL NOTES:

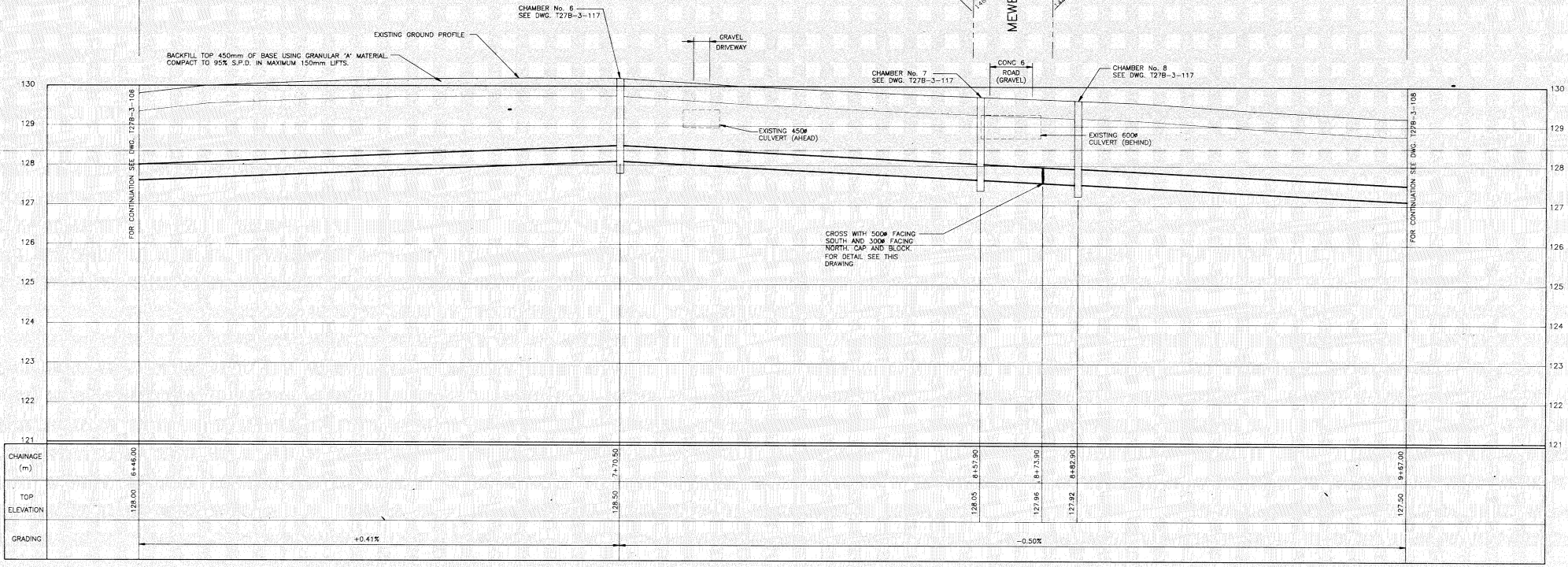
1. THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION SHOWN OF SUCH UTILITIES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONTACT ALL SUCH 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.
7405 East Danbro Crescent, 2nd FLoor
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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. NOA lE0
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
Revised June 10 2024
Revised February 20 2025

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 April 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. Below.3M 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 Farm facility has an office, sales area, farm equipment storage facility and a temperature controlled storage area.

1: Agri/Farm Office 560.7 M Sq. 560.7/9.3 = 60.29 x 75 L/D= 4,521.75 L/D 4522 L/D

2: Farm sales stand area 186.9 M Sq= 186.9 x 5 L/D= 934.5 935 L/D

3: Temperature Controlled Farm Storage Facility: 2 loading bays 2 x 150 L/D= 300 L/D
1 washroom 1 x 950 L/D = 950 L/D

4: Farm implement storage /repair: 2 loading bays 2 x 150 L/D= 300 L/D
1 washroom 1 x 950 L/D = 950 L/D

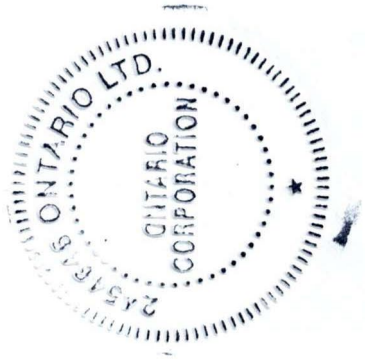
Total 7,957 L/D

Design for 8,000 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 8,000/30 = 266.6 M
Rows can be installed in a bent configuration
3 Rows of pipes on 2 meter centers, 90M long = 270M
Pipes will site in an area of 4M x 90M
Pipes to be minimum of 3M from the property line and 5M from Buildings.

Prepared by Roger O'Hara



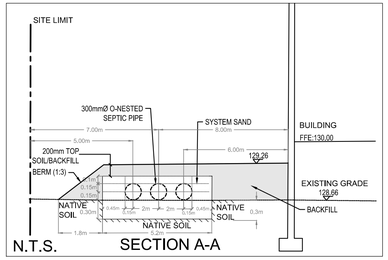
The stamp of approval is for the septic system design calculations by Roger O'Hara.

Appendix D

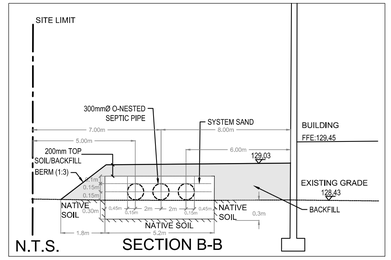
C101 - Site Servicing & Grading Concept

LEGEND:

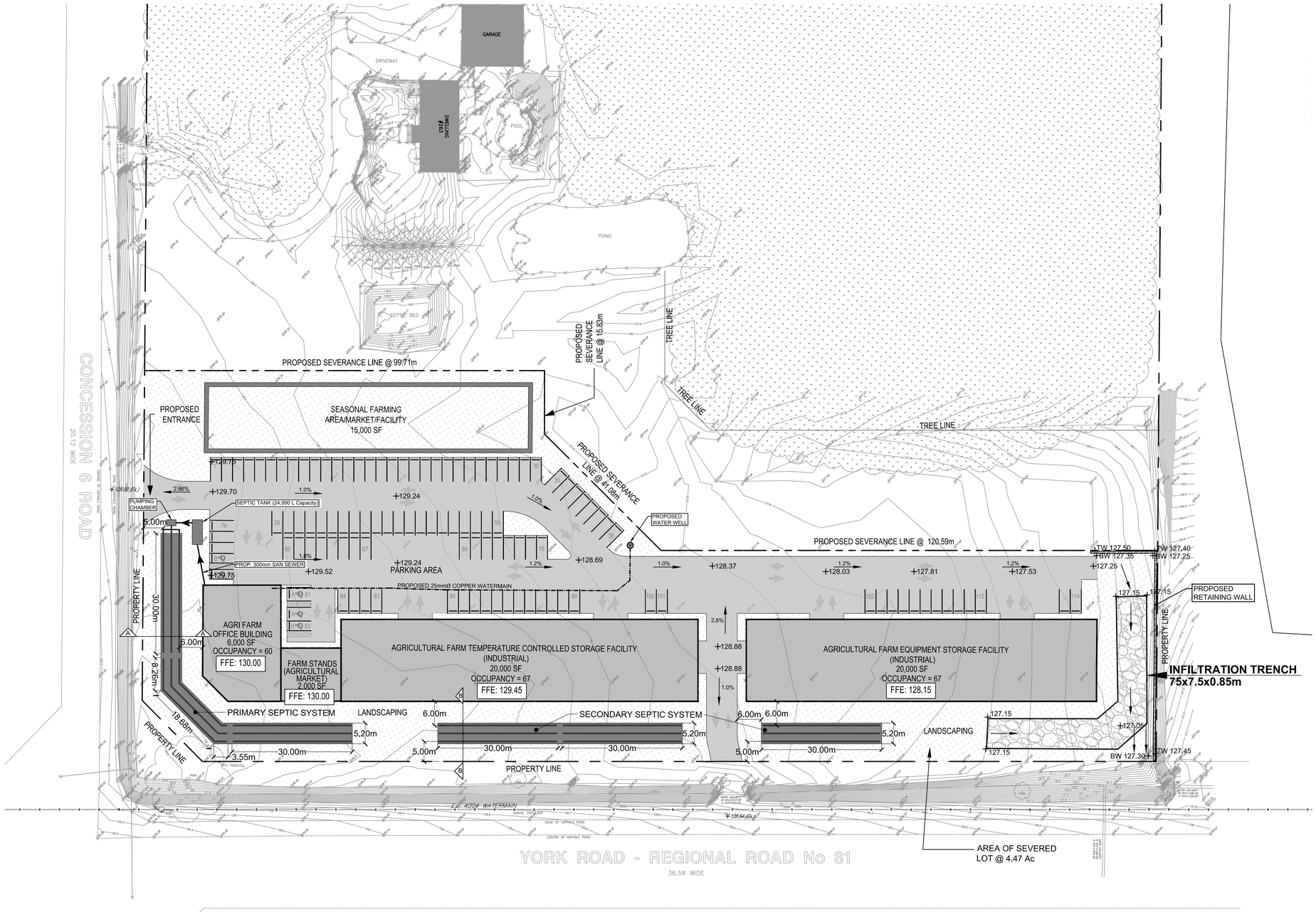
PROPERTY LIMIT	+128.24 EXISTING ELEVATIONS FROM SURVEY
EXISTING WATERMAIN	128.3 EXISTING CONTOUR
PROPOSED SANITARY	+ (129.00) (Ex.) EXISTING ELEVATIONS TO REMAIN
PROPOSED WATERMAIN	+128.37 PROPOSED ELEVATION
PROPOSED SANITARY MANHOLE	+BW 127.25 PROPOSED ELEVATION (BOTTOM OF WALL)
PROPOSED WATER WELL	+TW 127.25 PROPOSED ELEVATION (TOP OF WALL)
EXISTING VALVE CHAMBER	PROPOSED FLOW DIRECTION



N.T.S. SECTION A-A

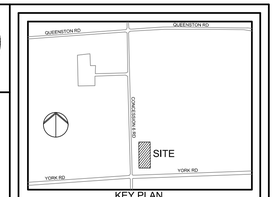


N.T.S. SECTION B-B



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
FEB 19,25
PROVINCE OF ONTARIO
2024-111

REVISION

No.	DESCRIPTION	DATE
5	REVISED AS PER COMMENTS	FEB 19/25
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

JAIN
Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

CLIENT

PROJECT

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

DRAWING TITLE

SITE SERVICING & GRADING PLAN

SCALE: (ARCH 36"x24")	1:500
DATE:	Feb. 20, 25
DRAWN BY:	AT
CHECKED BY:	YA

DWG No.

C101

Appendix E

BMEC Authorization: 23-06-408" for Nested Pipe Configuration
Brochure System O))

777 Bay Street, 12th Floor
Toronto, Ontario, M5G 2E5

T: 416 585 4234
W: ontario.ca/buildingcode/

777, rue Bay, 12e étage
Toronto, Ontario, M5G 2E5

T: 416 585 4234
W: ontario.ca/buildingcode/

Ontario
Building Materials Evaluation Commission
Commission d'évaluation des matériaux de construction

BMEC AUTHORIZATION: 23-06-408
System O)) – Nested Pipe Configuration

Date of Authorization: **July 26, 2023**
Date of Expiry[1]: **July 26, 2028**

1. Applicant

DBO Expert Inc.

501, Chemin Giroux
Sherbrooke, Québec,
J1C 0J8, Canada

Tel: 866 440-4975
Web: www.dboexpert.com

2. Manufacturing Facility

Pipes
Presby Environmental Inc.
143 Airport Road, Whitefield, NH
USA, 03598

Engineering and Design
Make-Way Environmental Technologies Inc.
PO Box 1869 Exeter, ON, N0M 1S7

Tel: 866 625-3929
Web: www.makeway.ca

Manufacturing, Engineering, Design, and Distribution
DBO Expert Inc.
501, Chemin Giroux
Sherbrooke, Québec,
J1C 0J8, Canada

Tel: 866 440-4975
Web: www.dboexpert.com

1 This Authorization expires on the date shown. It is the responsibility of Authorization holders to make a complete application considering the time for review and complexity of the new application.

3. Authorization

System O)) – Nested Pipe Configuration is a combined treatment and dispersal system comprised of a septic tank, an effluent filter, pump chamber and pump, Nested Pipe distribution system, consisting of a 38 mm diameter pressurized distribution pipe, that is contained within the Advanced Enviro-Septic® pipe, sampling device, and System O)) Specified System Sand. System O)) – Nested Pipe Configuration can be installed in-ground, partially raised, or fully raised.

Additional descriptive information is provided in documents supplied by the Applicant which are listed in Appendix A.

Reports and assessments provided by the Applicant demonstrate that if System O)) – Nested Pipe Configuration is manufactured, designed, constructed, installed, operated and maintained in accordance with the manufacturer's instructions and limitations, and the specific terms and conditions stated in this authorization, the use of the innovative system "System O)) – Nested Pipe Configuration " shall be deemed to not be a contravention of Division B, Section 8.6. “Class 4 Sewage System” and Section 8.7.3 “Absorption Trench Construction” and 8.7.6. “Shallow Buried Trench” of Division B of the Building Code.

All other requirements pertaining to the manufacture, design, construction, testing, and installation are subject to the requirements of the Building Code, and subject to the following terms and conditions contained below.

4. Specific Terms and Conditions

4.1. General

4.1.1. This Authorization is valid only for DBO Expert Inc.’s System O)) – Nested Pipe Configuration;

4.1.2. This Authorization is contingent on maintenance of the CAN/BNQ 3680-600 certification, including annual CAN/BNQ certification audits.

4.2. Definitions

4.2.1. Raised or Partially Raised means a sewage system in which any part of the system is above the natural ground elevation;

4.2.2. Vertical Separation means the depth of unsaturated soil below the system, as measured from the bottom of the System O)) Specified System Sand at 300 mm below the Advanced Enviro-Septic® pipes, to a limiting layer such as high groundwater table, bedrock, or soil with a percolation time (T) less than 1 min/cm; and,

4.2.3. System O)) – Nested Pipe Configuration “System O)) Specified System Sand” is defined in Section 4.4.7 of this Authorization.

4.3. Installation Requirements

4.3.1. System O)) – Nested Pipe Configuration shall be installed as per the manufacturer's installation instructions found in the "System O)) Design and Installation Manual – Province of Ontario", Version 5.1 dated June 2023";

4.3.2. No person shall operate System O)) – Nested Pipe Configuration unless the person has entered into an agreement whereby the servicing and maintenance of the System O)) – Nested Pipe Configuration and its related components will be carried out by a person who is authorized by the manufacturer to service and maintain System O)) – Nested Pipe Configuration.

4.4. System Requirements

4.4.1. There are six (6) main components to System O)) – Nested Pipe Configuration:

1. Primary/Septic tank;
2. Effluent filter;
3. Distribution Device;
4. Advanced Enviro-Septic® pipe;
5. The System O)) Specified System Sand; and
6. Sampling device.

4.4.2. The Septic Tank – System O)) – Nested Pipe Configuration is designed to receive septic tank effluent for treatment and dispersal. All raw sewage will enter into a septic tank sized in accordance with Article 8.2.2.3. of Division B of the Building Code;

4.4.3. The Effluent Filter – An effluent filter, meeting the requirements of Article 8.6.2.1. of Division B of the Building Code, shall be connected to the outlet of the septic tank;

4.4.4. The Distribution Device – A time-dosed Nested Pipe Distribution System that may also include a distribution valve;

4.4.5. The Advanced Enviro-Septic® pipe consists of

4.4.5.1. A 300 mm diameter, high-density plastic pipe, which is corrugated and perforated; skimmer tabs extend into the pipe at the point of each perforation;

4.4.5.2. A dense mat of coarse, randomly oriented plastic fibres surrounding the outside of the pipe;

4.4.5.3. A bio-accelerator geo-textile fabric layer, which partially covers the fibres on the lower half of the pipes, located between the pipe and the plastic fibres, and

4.4.5.4. The outer layer of non-woven geo-textile fabric that holds the other components in place and provides a protected surface on which the

biomat develops;

4.4.6. A row of Advanced Enviro-Septic® pipe is a combination of an adaptor, Advanced Enviro-Septic® pipes, couplings and piezovent;

4.4.6.1. Each row of Advanced Enviro-Septic® pipe is fed with a perforated PVC pipe (38 mm diameter) through the small bottom opening of a double offset adaptor, while the top opening serves as an air circuit;

4.4.6.2. Each row of the Advanced Enviro-Septic® pipe is completed with a piezometer through the top opening of a piezovent;

4.4.6.3. Each row of Advanced Enviro-Septic® pipe is completed with a vent or an aeration pipe leading to a vent through the side openings of a piezovent; and

4.4.6.4. The minimum equivalent length of any row of Advanced Enviro-Septic® pipe is 3.05 m and the maximum length is 30.5 m;

4.4.7. The System O)) Specified System Sand and Imported Sand

4.4.7.1. System O)) – Nested Pipe Configuration requires System O)) Specified System Sand to surround the Advanced Enviro-Septic® pipe and shall be a minimum of:

(a) 300 mm under the Advanced Enviro-Septic® pipes;
(b) 150 mm beside each of the Advanced Enviro-Septic® pipes;
(c) 300 mm from the ends of the Advanced Enviro-Septic® pipes; and
(d) 100 mm above the Advanced Enviro-Septic® pipe;

4.4.7.2. System O)) Specified System Sand must meet all the following requirements:

(a) Effective diameter of between 0.20 and 0.50 mm;
(b) Uniformity coefficient (C_u) less than or equal to 4.5;
(c) Less than 3% of the material smaller than 80 µm; and
(d) Less than 20% of the material larger than 2.5 mm;

4.4.7.3. Imported sand must meet all the following requirements:

(a) A percolation time of between 6 and 10 min/cm; and
(b) Not more than 5% of fines passing through a 0.074 mm (No. 200) sieve;

4.4.7.4. For each System O)) – Nested Pipe Configuration project, the system installer is to receive a copy of both the sieve analysis and System O)) Specified System Sand analyzer results, and these results are to be available upon request to the Principal Authority and the operator (homeowner);

4.4.8. The sampling device includes the following:

(a) A collector that consists of a thermoformed trough in which a collector pipe is installed; and

(b) A sample port that is used to take the treated effluent samples for analysis.

4.5. Design Requirements

4.5.1. System O)) – Nested Pipe Configuration shall meet the minimum spacing requirements of 4.5.6.2. below;

4.5.2. System O)) – Nested Pipe Configuration shall be designed, installed, operated and maintained using these criteria:

4.5.2.1. For systems on ground sloping greater than 10%, the System O)) Specified System Sand shall extend a minimum of 300 mm on three (3) sides and 1200 mm beyond the Advanced Enviro-Septic® pipe on the down-slope side;

4.5.2.2. No system shall be installed in an area where the original ground has a slope in excess of 25%;

4.5.2.3. The rows of Advanced Enviro-Septic® pipe shall be of approximately equal lengths, shall be laid level within each row, and the length shall not be greater than 30.5 m in any one row;

4.5.2.4. The system shall use differential venting or a shunt pipe (air bypass pipe);

4.5.2.5. System O)) – Nested Pipe Configuration shall have a venting system including a manifold that connects to each row of Advanced Enviro-Septic® pipe, and:

(a) The entry vent must be at least 3 m lower than the exit vent;
(b) The entry vent must be a minimum of 100 mm above ground and high enough to rise above snow during winter;
(c) A minimum of one (1) vent is required for every 300 m of Advanced Enviro-Septic® pipe;

4.5.2.6. For the purpose of sampling the treated effluent, System O)) – Nested Pipe Configuration shall have a sampling device installed at the bottom of the System O)) Specified System Sand and directly below the first length of Advanced Enviro-Septic pipe on an outside row;

4.5.2.7. The site shall be protected from erosion by proper grading, mulching, seeding and runoff control;

4.5.2.8. The Advanced Enviro-Septic® pipes, measured from the centre of the pipes, shall meet the clearance distance requirements outlined in Article 8.2.1.4. of Division B of the Building Code;

4.5.2.9. No reduction in size of the System O)) – Nested Pipe Configuration system is permitted with the use of a treatment device beyond that of a septic tank;

4.5.2.10. System O)) – Nested Pipe Configuration shall comply with the requirements of Article 8.7.2.2. of Division B of Ontario's Building Code;

4.5.3. Except as otherwise described in section 4.5.7, following installation of the System O)) Specified System Sand for each row of Advanced Enviro-Septic® pipe, imported sand or system sand must be used to fill in the area between the rows of advanced Enviro-Septic pipe (complete with system sand as per 4.4.7.2), to cover the complete dispersal surface/ contact area. The thickness of imported sand/System O)) Specified System Sand between the rows of Advanced Enviro-Septic® pipes/System O)) Specified System Sand shall be a minimum of 700 mm.

4.5.4. Vertical Separation

4.5.4.1. The vertical separation distance from the bottom of the System O)) Specified System Sand to high groundwater table, bedrock or soil with a T (percolation time) less than or equal to 1 min/cm shall be at least 600 mm;

4.5.5. Number of Advanced Enviro-Septic® Pipes Required

4.5.5.1. The total length (in metres) of Advanced Enviro-Septic® pipe is determined by the greater of either:

(a) 30 metres;

(b) NAES = Q/126 X LAES (where NAES is the Number of Enviro-Septic pipes and LAES is 3.05, which is the length of an Enviro-Septic pipe), or

(c) Based on the table below:

Percolation Time of Natural Soil (min/cm)	Total Length of Enviro-Septic Piping (m)
$1 < T \leq 20$	Q/75
$20 < T \leq 50$	Q/50
$50 < T \leq 125$	Q/30

4.5.6. Pipe Spacing Requirements

4.5.6.1. The Advanced Enviro-Septic® pipes shall be placed level within each row;

4.5.6.2. When multiple rows are used, Advanced Enviro-Septic® pipes shall be spaced using the following criteria:

(a) Centre-to-centre spacing is the horizontal distance from the centre of one row of Enviro-Septic® pipes to the centre of the adjacent row. The minimum center-to-centre spacing is 2.0 m;

(b) Lateral extension distance is the distance extending from the centre of the last lateral row to the side of the System O)) Specified System Sand. The minimum lateral extension is 300 mm; and

(c) End extension distance is the distance extended from the end of a row to the end of the System O)) Specified System Sand. The minimum end extension distance is 300 mm;

4.5.7. System O)) Specified System Sand and Dispersal Requirements

System O)) – Nested Pipe Configuration shall be constructed with a layer of System O)) Specified System Sand meeting all the requirements of Section 4.4.7, beneath the Advanced Enviro-Septic® pipes;

4.5.7.1. Where the T-time of the underlying soil is less than or equal to 20 min/cm, the System O)) Specified System Sand shall have a minimum thickness of 300 mm below the Advanced Enviro-Septic® pipes, and shall extend 150 mm beyond the sides of the pipes, and a minimum of 100 mm over the top of the pipes;

4.5.7.2. Where the T-time of the underlying soil is greater than 20 min/cm, the System O)) Specified System Sand shall be placed in a continuous layer of at least 300 mm thickness, beneath the entire area covered by the Advanced Enviro-Septic® pipes, and shall extend at least 150 mm beyond the sides of the outermost pipes, and 100 mm over the top of the pipes;

4.5.7.3. The total depth of cover over the Advanced Enviro-Septic® pipes, including the combined thickness of the specified System O)) Specified System Sand and topsoil, shall not exceed 300 mm;

4.5.8. Pump Chamber

4.5.8.1. The pump chamber shall be sized to provide sufficient storage volume so that the effluent is evenly dosed on an hourly basis over a 24-hour period;

4.5.8.2. Where more than one pump is employed within a pump chamber, the pumps shall alternate dosing, and dosing shall continue in the event that one pump fails;

4.5.8.3. The pump shall be equipped with an audible and visual alarm signal to indicate a high water level in the pump chamber; and

4.5.8.4. The pump shall be sized to provide a minimum pressure head of not less than 600 mm when measured to the most distant point of the Enviro-Septic piping from the pump.

4.6. Maintenance Requirements

4.6.1. Conduct and record at least once during every twelve (12) month period, an inspection and servicing, as specified by the Applicant, DBO Expert Inc. in the "System O)) Design and Installation Manual – Province of Ontario", Version 5.1 dated June 2023";

4.6.2. Every person operating a System O)) – Nested Pipe Configuration that is designed and constructed to produce effluent, as described in Table 4.6.2. below, shall take a sample of the effluent to determine whether it complies with maximum levels contained in Table 4.6.2. below:

Table 4.6.2. – Effluent concentration of parameters

Parameter	Effluent quality maximum concentration based on a 30 day averages	Effluent quality compliance with a single grab sample
cBOD5 (mg/L)	10	20
Suspended Solids (mg/L)	10	20
Colum n 1	*Colum n 2*	*Colum n 3*

4.6.2.1. If a single grab sample is taken to demonstrate compliance with the values in Table 4.6.2. above, the results from a single grab sample shall not exceed the maximum concentrations listed in Column 3, above;

4.6.2.2. If the results of a sample do not comply with Table 4.6.2., then the Principal Authority shall be informed by the operator (homeowner), and the course of action to remedy the problem shall be identified;

4.6.2.3. Subsequent sampling results, submitted to the Principal Authority, within six (6) months of the first non-compliant sample, must demonstrate the problem has been rectified;

4.6.3. Effluent sampling shall be performed in accordance with the requirements of Sentence 8.9.2.4.(1) of Division B of the Ontario Building Code, as follows:

(a) initially, once during the first 12 months after the sewage system was put into use, and
(b) thereafter, once during every 12 month period, at least 10 months and not more than 18 months after the previous sampling has been completed;

4.6.4. DBO Expert Inc. or their Authorized Agents shall retain records of the sampling test results for each System O)) – Nested Pipe Configuration received pursuant to the terms and conditions set out in 4.3.2 above, for a period of ten (10) years and shall promptly forward copies of those records to the Principal Authority, when requested.

5. General Conditions

5.1. The use of the System O)) – Nested Pipe Configuration as described in Section 3. and the Specific Terms and Conditions set out in Section 4. must comply with:

(a) the *Building Code Act, 1992,* (the "Act") as amended or re-enacted,
(b) except as specifically authorized herein, the Building Code as amended or remade, and
(c) all other applicable legislation.

5.2. A copy of this Authorization shall accompany each application for a building permit and shall be maintained on the site of the construction with the building permit.

5.3. The Applicant specified in Section 1. shall promptly notify the BMEC of:

(a) the failure of the Applicant to comply with any of the Specific Terms and Conditions set out in Section 4.,
(b) the failure of the material, system or building design that is the subject matter of this Authorization to
    i. comply with any of the Specific Terms and Conditions set out in Section 4., or
    ii. provide a satisfactory level of performance in situ, or
(c) the occurrence of any of the events described in General Conditions 5.4.(a), (b), or (e).

5.4. The BMEC may amend or revoke this Authorization at any time on its own initiative, or at the request of the Applicant specified in Section 1. Without restricting the foregoing, the BMEC may amend or revoke this Authorization where it determines that:

(a) any change has been made to:
    (i) the name of the Applicant specified in Section 1.,
    (ii) the address or other contact name information of the Applicant specified in Section 1.,
    (iii) the ownership of the Applicant specified in Section 2.,
    (iv) the manufacturing facilities specified in Section 2,
    (v) the material, system, or building design that is the subject matter of this Authorization, or
    (vi) a test method relevant to this Authorization,

(b) the Applicant has failed to comply with any of the terms and conditions set out in this Authorization,
(c) in the opinion of the BMEC, the use of the material, system or building design authorized herein provides an unsatisfactory level of performance in situ,
(d) in the opinion of the BMEC, amendment or revocation of the Authorization is appropriate on the basis of potential danger to public health and safety,
(e) the *Act* or Building Code has been amended, re-enacted or remade in a manner relevant to this Authorization,
(f) this Authorization was issued on mistaken, false or incorrect information, or
(g) a revision of an editorial nature is appropriate.

Dated at Toronto this July 26, 2023

BUILDING MATERIALS EVALUATION COMMISSION

_____

CHAIR, BUILDING MATERIALS EVALUATION COMMISSION

attached – “Appendix A – Supporting Information”

Appendix A – Supporting Information

The following is a list of the documents that were submitted and reviewed, but were not limited to:

1. Application, DBO Expert Inc., “System O)) BMEC Application” as amended;
2. Certification, Bureau de normalisation du Québec, “Performance Report in accordance with Annex A, Class B-IV, D-I” dated July 2018;
3. Certification, Bureau de normalisation du Québec, “Performance Report in accordance with Annex A, Class B-IV” dated June 2019;
4. Certification, Bureau de normalisation du Québec, “Seasonal Reliability Report in accordance with Annex B, Class B-IV, D-I” dated May 2019;
5. Certification, Bureau de normalisation du Québec, “Seasonal Reliability Report in accordance with Annex B, Class B-IV” dated June 2019;
6. Description, DBO Expert Inc. “Nested pipe configuration”; dated February 3, 2023
7. Design and Installation Guide, DBO Expert Inc., “System O)): Design and Installation Manual Province of Ontario”, as amended;
8. Engineer’s Report, R.J. Burnside & Associates Limited, “Application for Renewal of BMEC Authorization No. 18-05-386 System O)) – Enviro-Septic® System”, dated February 3, 2023;
9. Letter, DBO Expert Inc., “Response to BMEC Follow up questions” dated April 14, 2023;
10. Letter, DBO Expert Inc., “Response to letter 1” dated June 1, 2023;
11. Maintenance Manual, DBO Expert Inc., “Ontario Maintenance Guide System O))”, as amended;
12. Results, MakeWay Environmental Technologies Inc., “Enviro-Septic System Sampling Results Percentage Summary”, 2010-2022;
13. Support document, DBO Expert Inc. “Infiltration area”, dated January 2023;
14. Support document, DBO Expert Inc. “Nested area”, dated January 2023;
15. User Guide, DBO Expert Inc., “Ontario User Guide System O))”, as amended.

System O®

NEXT GENERATION ADVANCED ENVIROSEPTIC®

Biological and **ecological** treatment system

- **No moving parts**
- **No electricity**
- **No mantle**

The simplest, most cost efficient and versatile sewage system producing Level IV quality effluent

On the market Today!

www.makeway.ca

Distributor of DBO EXPERT

BNQ 3680-600 2978

Tested from the EN12566-3 standart protocol

BMEC 23-05-407 23-06-408

APPROVED AS AN ALTERNATIVE TO A CLASS 4 SYSTEM PRODUCING LEVEL IV QUALITY EFFLUENT

The **System O))** is easy to install, does not require a stone layer, does not require a mantle, does not require hydro if gravity flow is achieved, no moving parts, no media to replace, and now is priced similarly to that of a conventional pipe and stone system.

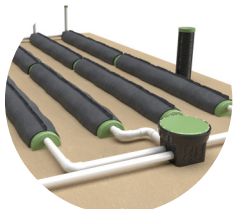
The system requires system sand, which is readily available at most sand and gravel suppliers across Ontario. In some cases, System Sand is priced below filter sand or septic sand.

Looking for a cost-effective and efficient system that produces Level IV quality effluent?

CAN/BNQ, BMEC Authorization & Design Information Available.

THE ADVANCED ENVIRO-SEPTIC® PIPES ARE A PATENTED PRODUCT COMPOSED OF FOUR COMPONENTS:

- A high-density polyethylene pipe with corrugated walls for enhanced heat transfer and perforations for effluent release. Each corrugation features a unique notched design promoting airflow, vital for bacteria involved in wastewater treatment.
- The Bio-Accelerator™ allows for a fast ramp-up time.
- A randomly oriented fiber mesh covers the pipe, facilitating the supply of oxygen and acting as a support structure for the biomass.
- A non-woven geotextile membrane is sewn around the pipe to prevent sand from entering the pipe.

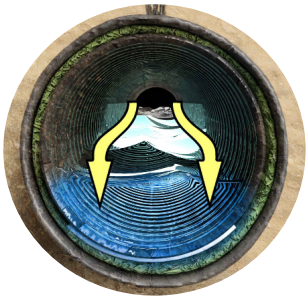


THE 4 STAGES OF WASTEWATER TREATMENT

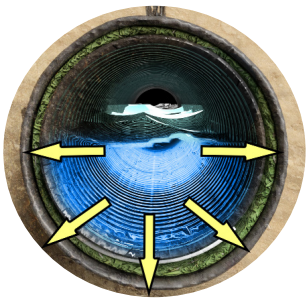
1. The wastewater leaving the house goes into the septic tank where the solids are separated from the liquid.
2. The septic tank effluent then flows by gravity into the distribution box where it is evenly distributed into the rows of Advanced Enviro-Septic® pipes.
3.

THE SYSTEM O)) PROCESS

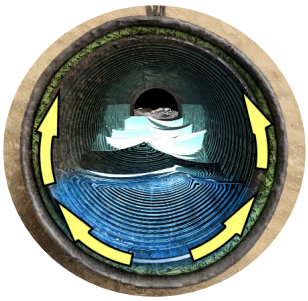
The wastewater from the septic tank flows into a distribution box equipped with equalizers, then evenly into rows of **Advanced Enviro-Septic®** pipes, which cool the effluent to ground temperature due to their corrugations.



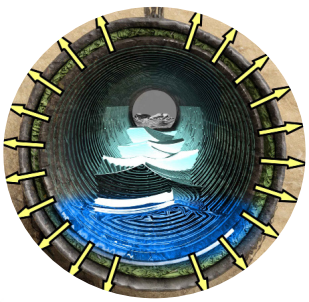
Effluent exits the pipe through perforations, passes through a mat of plastic fibers housing bacteria to treat suspended solids. Liquid level fluctuations in the pipe, caused by household water usage, create an aerobic/anaerobic environment, fostering bacterial treatment similar to wood deterioration at ground level.



The effluent continues through a geo-textile, where more bacteria develop, and capillary action distributes it around the pipe's circumference, aiding water evacuation to the surrounding ground, similar to a wick in an oil lamp.

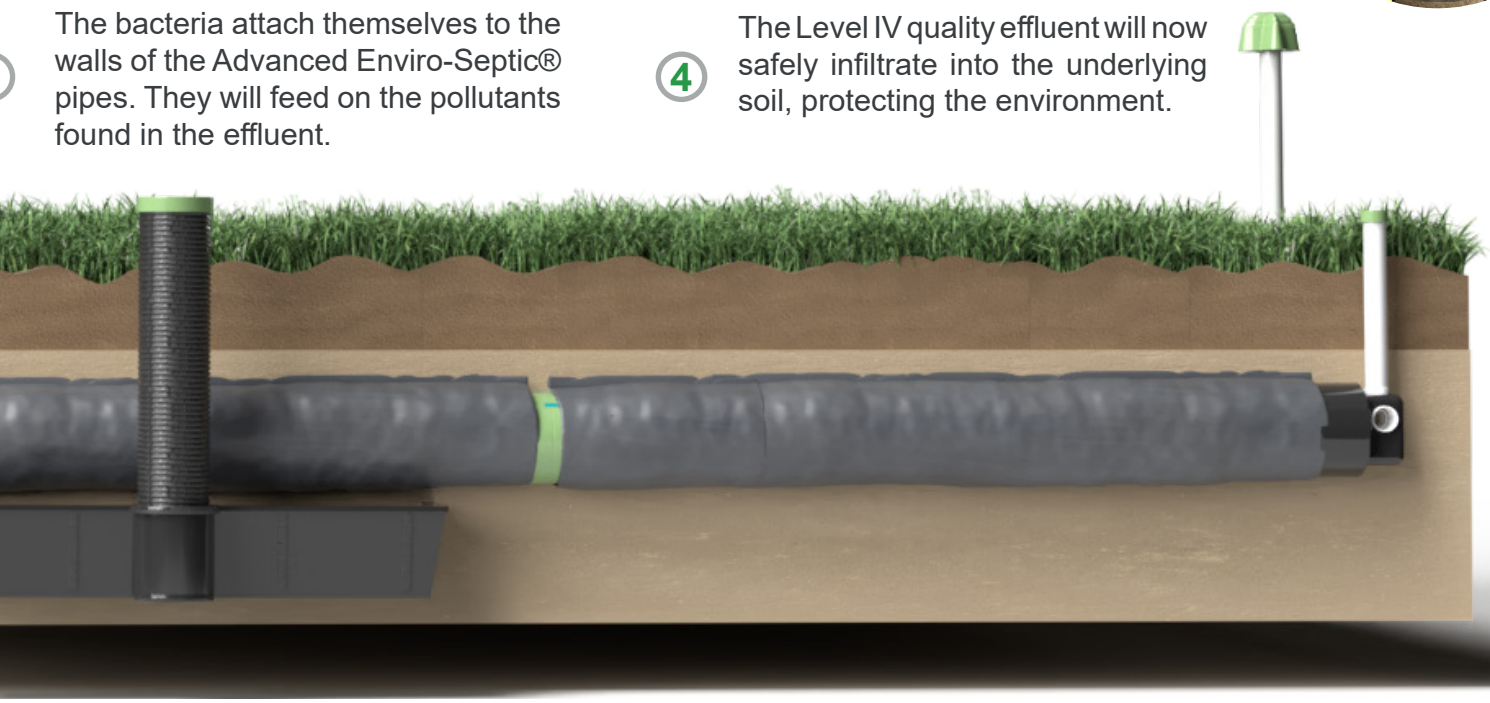


Finally, the treated effluent passes through system sand surrounding the pipes before infiltrating into the receiving soil, removing almost all contaminants for easier ground infiltration and site evacuation.



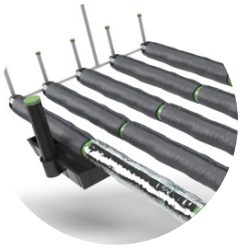
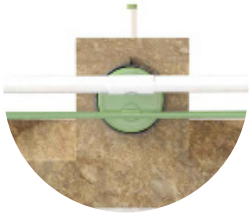
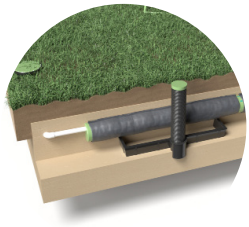
The bacteria attach themselves to the walls of the Advanced Enviro-Septic® pipes. They will feed on the pollutants found in the effluent.

4 The Level IV quality effluent will now safely infiltrate into the underlying soil, protecting the environment.



SYSTEM O)) ADVANTAGES

- ***Easy to Install***
- ***Very versatile and flexible***
- ***One length Enviro-Septic Pipe can be cut into sections or bent 90 degrees***
- ***Can be installed in a slope up to 25%***
- ***Smallest footprint***
- ***Does not require a stone layer***
- ***No media to replace - EVER !***

MAKEWAY

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