APPENDIX 3

MEMO

Attema Consulting Services Inc

To: Township of Wainfleet Planning Department

From: Attema Consulting Services Inc.

CC: Dan Bunz
Michael Sullivan, RPP, MCIP, EP

Date: February 15, 2021

Re: Wills Road Lot Servicing

PROPERTY INFORMATION			
Property Address:	Roll Number:	Legal Description:	Lot Area:
Vacant Lot – Wills Road	271400000909002	CON 4 PT LOT 30	3.75 ha

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The purpose of this report is to provide background and design specifications for the proposed cistern water supply and sewage systems for the proposed development at the Wills Road property. The proposed location of the residences, driveway, cisterns and sewage systems have been coordinated with the Functional Servicing & Preliminary Stormwater Management Report (February 2021) prepared by C.F. Crozier & Associates and can be found in Appendix 1.

A hydrogeological study was completed in October 2020 by Terra-Dynamics Consulting. This report builds on the two of the recommendations found in the Report (Appendix 2).

a) It is recommended that a development agreement be provided that will indicate water supply by cisterns only.
b) Lots with private sewage systems and cisterns may be sustainably created on as small as 0.4 ha as long as Ontario Building Code setbacks are met. Future sewage system effluent disposal locations (e.g. raised leaching or filter bed) are constrained by a series of Part 8 Ontario Building Code set-backs including at least 15 metres from (i) a cistern (ii) a minimum of 5 m from the property line.

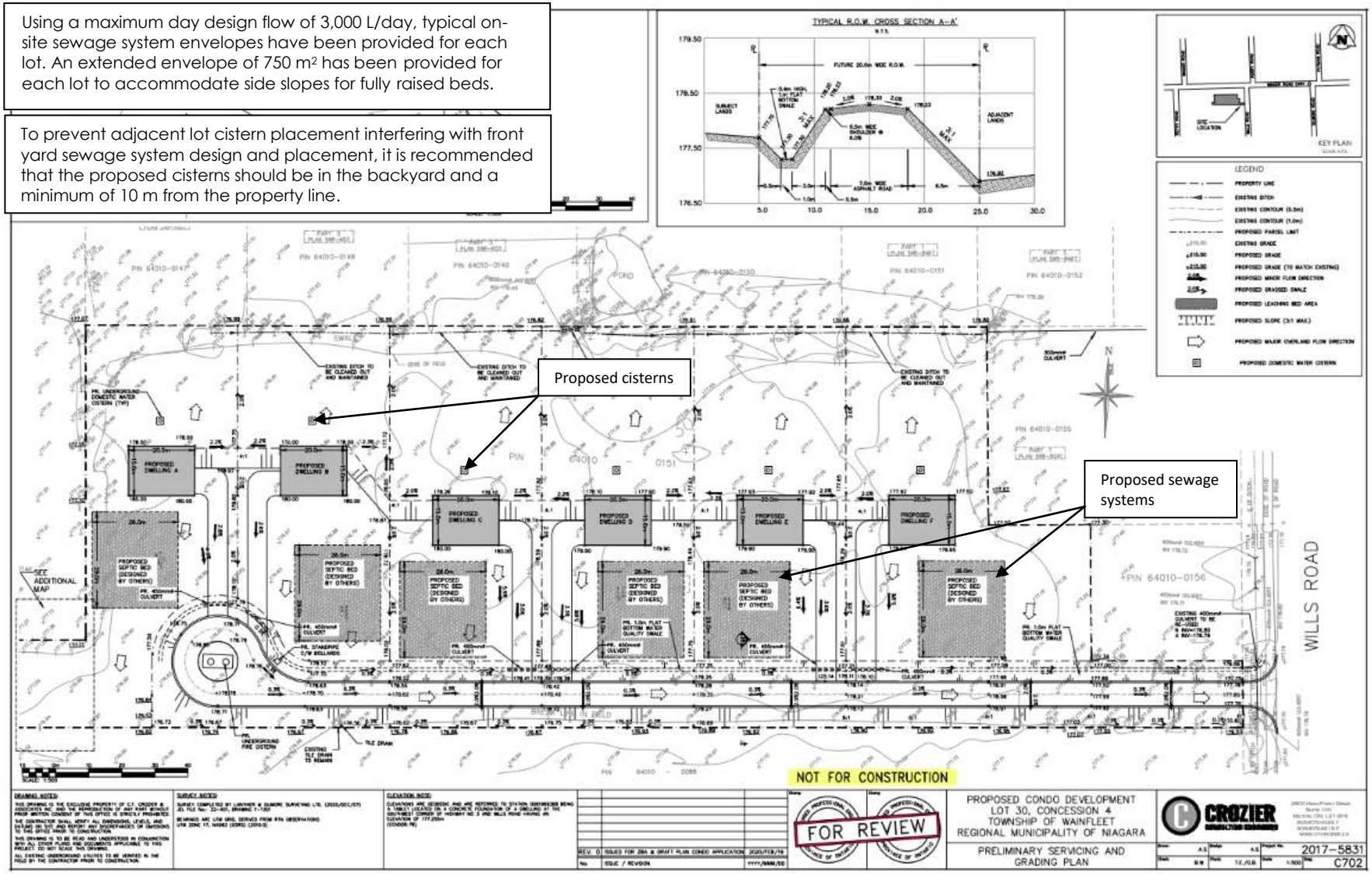
Based on the lot layout and final grades proposed in the Functional Servicing & Preliminary Stormwater Management Report (February 2021) it will be possible to construct conventional sewage system filter bed with a contact area of 750 m^2 in the front yard. To further demonstrate the design specifications and a proposed detailed site plan with the proposed final grade elevations for one of the proposed building lots (Lot D) are included in Appendix 3. The proposed sewage system final grade elevations are aligned with the proposed grades required for storm water management.

To prevent adjacent lot cistern placement interfering with front yard sewage system design and placement it is recommended that the proposed cisterns should be in the backyard and a minimum of 10 m from the property line.

APPENDIX 1

Using a maximum day design flow of 3,000 L/day, typical on-site sewage system envelopes have been provided for each lot. An extended envelope of 750 m^2 has been provided for each lot to accommodate side slopes for fully raised beds.

To prevent adjacent lot cistern placement interfering with front yard sewage system design and placement, it is recommended that the proposed cisterns should be in the backyard and a minimum of 10 m from the property line.



APPENDIX 2

Terra-Dynamics Consulting Inc.

404 Queenston Street, St. Catharines, ON L2P 2Y2

October 29, 2020

Mr. Dan Bunz
53214 Winger Road
Wainfleet, ON L0S 1V0

Re: Hydrogeological Assessment, Winger Subdivision, Wainfleet, ON

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As the new lots will be provided potable water via cisterns, this report does not include a water supply assessment (MECP, 1996b), but it is recommended that a development agreement be provided that will indicate water supply by cisterns only.

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1. Lots on private sewage systems and cisterns may be sustainability created as small as 0.4 hectares (1 acre) as long as Ontario Building Code and NPCA set-backs are met, including a recommended 15 m set-back from the external subdivision property boundary.

2. The design of the Site layout can be completed during the Building Permit stage.

3. A development agreement should be completed with the Township indicating water supply by cisterns.

4. If any tile drains are located during site development they should be closed off and removed.

APPENDIX 3

(Page 1)

The purpose of Appendix 3 is to provide the detailed sewage system design specifications with the proposed final grade elevations for one of building lots. For the purpose of this assessment this evaluation is limited to one of the proposed building lots (Lot D). As illustrated the proposed sewage system final grade elevations are aligned with the proposed grades required for storm water management.

Proposed final grade at the residence for storm water management purposes = 179.9 m
Proposed final grade at the top of the proposed fully raised filter bed = 179.2 m

The design specifications and contact area for a sewage system depends on a) the soil conditions on the site and b) the sewage system design flow (Q).

The site is mapped as a poorly drained, hydrologic soil group C soil. Based on the attached soil map data and follow up on-site evaluation it is appropriate to assume a soil T-time of greater than 50 min/cm for the sewage system design. For T-time > 50 min/cm soil the Ontario Building Code standard is a fully raised filter bed with a minimum of 90 cm separation between the underlying soil and the bottom of the filter bed stone load area. The overall height of the raised mound at the filter bed stone loading area will be a minimum of 1.5 m.

For T-time > 50 min/cm soils the imported septic sand contact area including the mantle is based on the formula of design flow (litres) divided by four (Q/4).

As shown in the attached calculations and based on the methodology prescribed in the Ontario Building Code the sewage system design flow is determined by the number of bedrooms, the number of bathrooms and the square footage of finished living area. The calculations and specifications found in Appendix 3 are based on the assumption of a maximum 3000 litre/day sewage system design flow suitable for up to a 4 bedroom, 4-full bathroom residence with 3200 ft^2 finished living area. For the purpose of this report front yard conventional raised mound filter beds meeting Ontario Building Code specifications are proposed.

Note that the actual sewage system designs for the properties will be completed at the building permit stage and will be based on the sewage system design flow of the proposed residence. The future owner(s) of the properties may also prefer a smaller contact area footprint and lower overall height tertiary sewage system Type A Area Bed. A tertiary sewage system Type A Area Bed requires a minimum of 60 cm separation between the underlying soil and the bottom of the filter bed stone load area. The overall height of the raised mound at the filter bed stone loading area will be a minimum of 1.2 m. For T-time > 50 min/cm soils the imported septic sand contact area including the mantle is based on the formula of design flow (litres) divided by eight (Q/8).

APPENDIX 3
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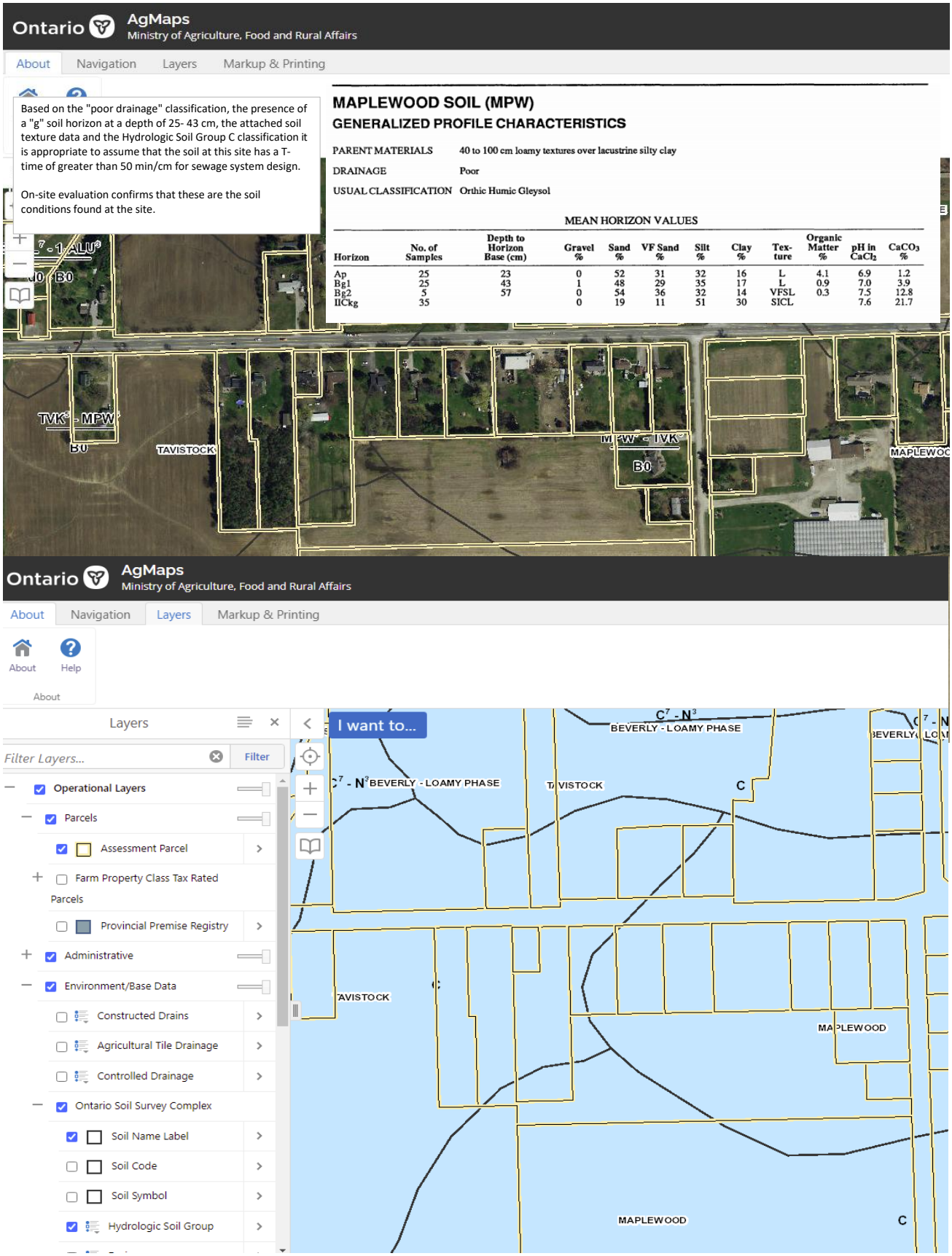

DESIGN FLOW CALCULATION

Owner Contact

Dan Bunz

Cell: 1 905 380 8348
danb_88@hotmail.com

Property Location

Assessment Parcels
Roll No: 271400000909002

Township Lots and Concesssions
Township: Wainfleet
Lot: Lot 30
Concession: Con 4

Total Design Daily Sanitary Sewage Flow: **3000.0 L/day**

Total Daily Design Sanitary Sewage (TDDSS) Flow

Item Contributing to the TDDSS Flow	Quantity	Sewage Flow (L/day)
Base Flow for Dwelling		
Bedroom Units (Q_B)	4	2000.0
Additional Flow Modifiers		
Fixture units (Q_F)	30.0	500.0
Floor Area m^2 (Q_A)	300	1000.0

Unit Flow Calculation	TDDSS Flow
TDDSS Flow (Q_B+Q_F) =	2500.0 L/day
TDDSS Flow (Q_B+Q_A) =	3000.0 L/day

Based on the Criteria of Section 8.2.1.3 of the OBC, the higher flow is chosen for design:

Total Design Daily Sanitary Sewage Flow: **3000.0 L/day**

Fixture Units Calculation*

	Number	Fixture Units	Total
Bathroom Group (with flush tank)	4	6.0	24.0
Additional Toilets*	0	4.0	0.0
Additional bathtub or shower	0	1.5	0.0
Additional bathroom sink	0	1.5	0.0
Kitchen sink	1	1.5	1.5
Dishwasher	1	1.5	1.5
Clothes washer	1	1.5	1.5
Laundry Tub	1	1.5	1.5
			30.0

3200	ft^2	10.76426265	ft^2/m^2

APPENDIX 3: SEWAGE SYSTEM DESIGN CALCULATIONS & SPECIFICATIONS

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RAISED FILTER BED INSTALLATION SPECIFICATIONS

Owner Contact	Property Location
Dan Bunz	Assessment Parcels Roll No: 271400000909002
	Township Lots and Concesssions Township: Wainfleet Lot: Lot 30 Concession: Con 4
Cell: 1 905 380 8348	
danb_88@hotmail.com	

T underlying soil = > 50

Application Rate (L/m2)	Q (L/day)	Required Filter bed area (m^2)
75	3000.0	40.0

Area Bed Installation Summary:

	Stone Loading Area	40.0 m^2	
	Number of runs:	6	
	Length of run (m):	6.1	20.0 ft
	Total length of pipes (m):	36.6	120.1 ft
	Length of header/footer (m)	3.8	12.5 ft
	Stone Load Area length (m):	6.5	21.3 ft
	Stone Load Area Width (m):	6.2	20.3 ft
	Stone Loading Area	**40.30 m^2**	433.6 ft^2

Filter Bed Summary:

A	**Underlying filter media contact area (QT/850) =**	176.47 m^2	1898.8 ft^2
	Filter Media Length (m) =	15.00 m	49.2 ft
	Filter Media Width (m) =	12.00 m	39.4 ft
	Each Filter Media Contact Area =	**180.00 m^2**	1936.8 ft^2
B	**Mantle Contact Area (Q/4) =**	750.00 m^2	
	Square Mantle in direction of flow		
	Mantle Length (m) =	30.00 m	98.4 ft
	Trapezoid Mantle Start Width =	25.00 m	82.0 ft
	Trapezoid Mantle Finish Width =	25.00	82.0 ft
	Expanded Mantle Average Width (m) =	25.00 m	82.0 ft
	Mantle Contact Area Provided	**750.00 m^2**	8070.0 ft^2
	Filter sand volume (cubic meters)	117.27 m^3	
	Filter sand weight (tonnes)	225.16 tonnes	
	Septic sand volume (cubic meters)	360.00 m^3	
	Septic sand weight (tonnes)	748.80 tonnes	

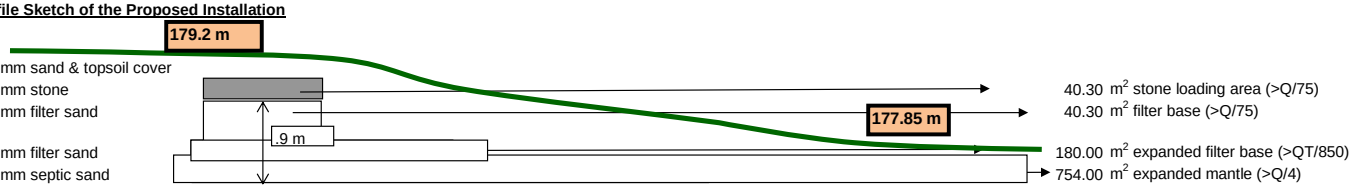
Septic Tank Summary:

Minimum Septic Tank Size (2 x Q)	6000 litres	
Septic tank provided	**6750 litres**	

PROFILE SKETCH

Owner Contact	Property Location
Dan Bunz	**Assessment Parcels** Roll No: 271400000909002
	Township Lots and Concesssions Township: Wainfleet Lot: Lot 30 Concession: Con 4
Cell: 1 905 380 8348	
danb_88@hotmail.com	

Profile Sketch of the Proposed Installation

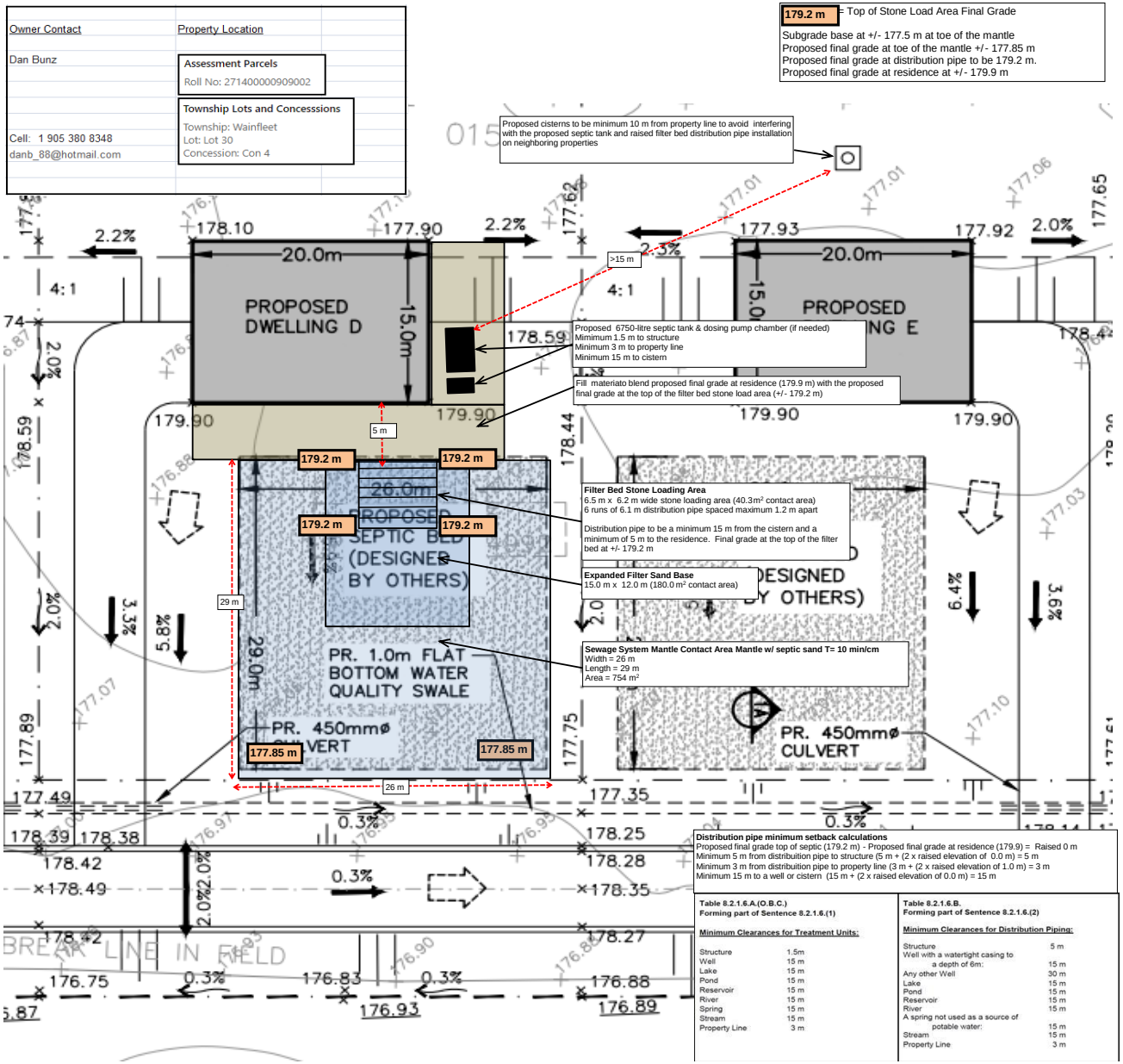


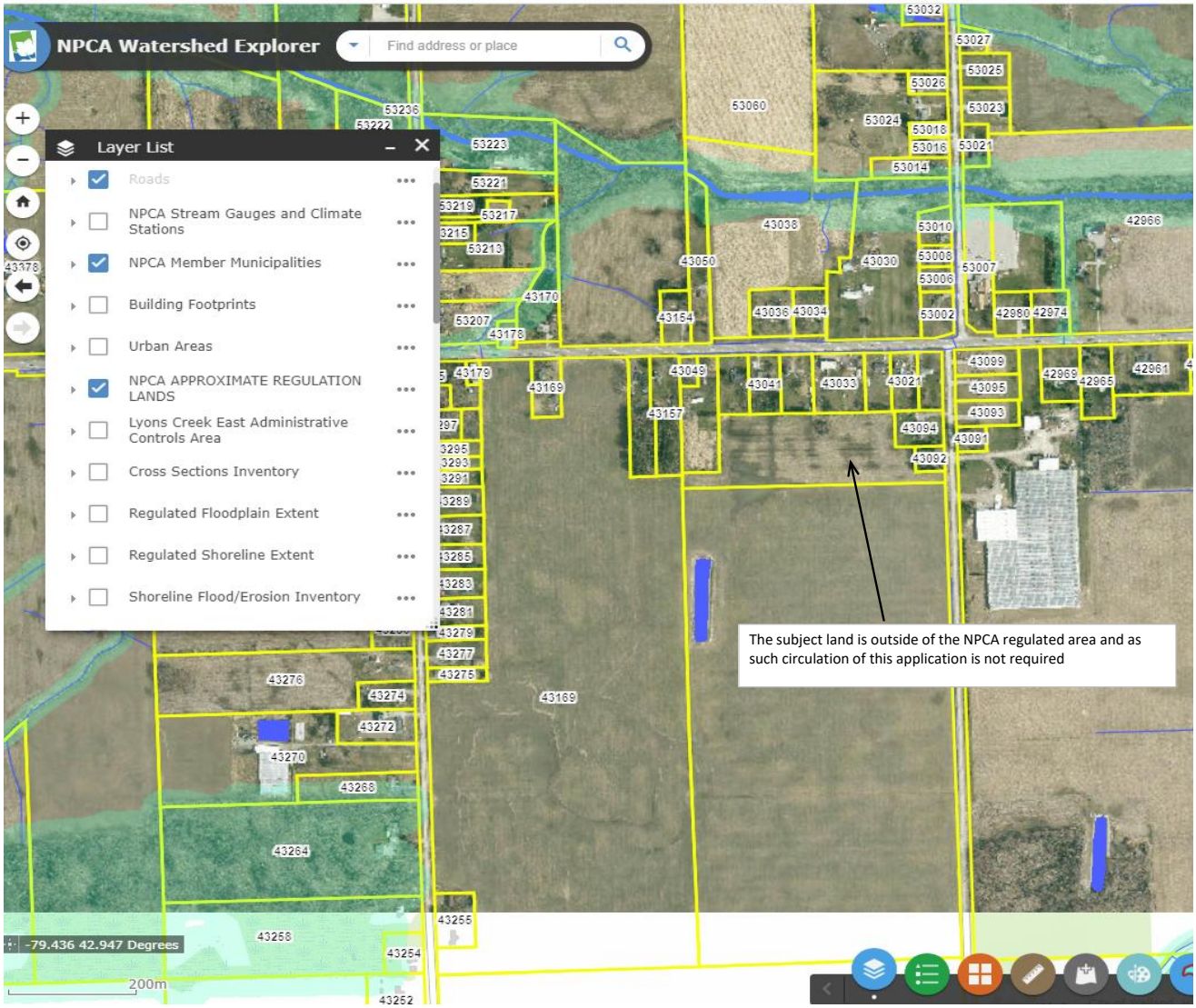
	inches	Elevation m	
Final Grade Elevation	65	179.20	300 mm sand & topsoil cover
Top of stone load area	50	178.90	300 mm stone
Top of filter sand	40	178.60	500 mm filter sand
Top of expanded filter base		178.10	
Top of septic sand	20	177.85	250 mm filter sand
Top of mantle subgrade	10	177.70	250 mm septic sand
Toe subgrade	0	177.50	

40.30 m^2 stone loading area (>Q/75)
40.30 m^2 filter base (>Q/75)
180.00 m^2 expanded filter base (>QT/850)
754.00 m^2 expanded mantle (>Q/4)

Subgrade area regraded to establish the subgrade base at +/- 177.5 m. A minimum of 20 cm subgrade fall in the direction of flow.

LOT D DETAILED SEWAGE SYSTEM SITE PLAN AND PROPOSED FINAL GRADES



APPENDIX 3: NPCA MAP

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