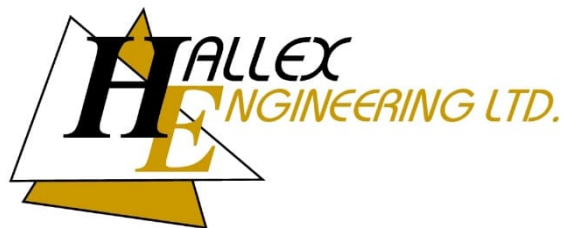

PROPOSED VINELAND GROWERS ADDITION
795 EAST & WEST LINE, NIAGARA-ON-THE-LAKE

FUNCTIONAL SERVICING DESIGN BRIEF
EXISTING / NEW STORM AND WATER SERVICES

REV 1 – December 17, 2024

PREPARED BY:



HALLEX PROJECT #240609

HALLEX NIAGARA
4999 VICTORIA AVENUE
NIAGARA FALLS, ON L2E 4C9

HALLEX HAMILTON
745 SOUTH SERVICE ROAD, UNIT 205
STONEY CREEK, ON L8E 5Z2

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1. INTRODUCTION

The proposed Vineland Growers' Co-operative Ltd. development consists of the demolition of the existing single-family dwelling complete with asphalt driveways, concrete patios, gravel laneways and parking areas, and grass areas and the construction of a building addition, gravel laneway & parking areas, concrete loading docks and grass areas. This development is located at 747 & 795 East & West Line, which is at the southwest corner of the East & West Line and Concession 4 Road intersection in the Town of Niagara-on-the-Lake, ON.

The purpose of the service assessment is to determine the functional sizing of the proposed storm and water services in addition to the post-development flows from the site to determine the impact on the existing municipal infrastructure.

2. EXISTING MUNICIPAL INFRASTRUCTURE

2.1 EXISTING SITE DRAINAGE

The existing Vineland Growers' Co-operative Ltd. currently drains to an existing stormwater management dry pond which discharges to the existing roadside ditch at East & West Line as per the Vineland Growers Warehouse Expansion Stormwater Management Report, by Quartek Group Inc., dated October 23, 2015. Given the SWM dry pond will be demolished as part of the new development, the pre-development site condition will consider the pre-2015 site condition. This site condition had drained uncontrolled from the southeast to the northwest side of the property via overland flow and sewers to the existing roadside ditch at East & West Line as shown in Figure 1 – NPCA Watershed Map – Existing Site Contours



Figure 1 – NPCA Watershed Map – Existing Site Contours

2.2 ROADSIDE DITCH

The existing site is currently serviced with a 75mm poly storm forcemain and a storm sewer outfall draining to the existing roadside ditch at East & West Line as it consists of the existing Vineland Growers' Co-operative Ltd., however the size of the existing storm sewer outfall is unknown. The existing drainage infrastructure at East & West Line consists of a roadside ditch which drains to the existing 600mm CSP culvert adjacent the Vineland Growers' Co-operative Ltd. Property. This culvert crosses East & West Line and drains to the north of the street.

2.3 SEPTIC SYSTEM

The existing Vineland Growers' Co-operative Ltd. building is currently serviced with an existing septic system to manage wastewater and the existing single-family dwelling is currently serviced with a second septic system on the property. A new septic system shall be designed by others to accommodate wastewater flows from the proposed building addition including the decommissioning of the existing septic systems. There is no existing sanitary infrastructure at East & West Line or Concession 4 Road fronting the existing site.

2.4 WATERMAIN

The existing Vineland Growers' Co-operative Ltd. building is currently serviced with a 38mm water service and the existing single-family dwelling is currently serviced with a 16mm water service. Both water services connect to the existing watermain infrastructure at East & West Line consisting of a 200mm PVC municipal watermain.

3. STORM DRAINAGE SYSTEM

3.1 PRE-DEVELOPMENT SITE FLOW

The total drainage for the site is 3.114 hectares with an allowable runoff coefficient of 0.45 based on the roof, asphalt, gravel and grass surfaces that existed prior to flow controls being implemented in 2015. The catchment area plan for the pre-development site condition is provided on Hallex Sketch CSK1, attached.

Utilizing the rationale method ($Q = CiA/360$) and the minimum recommended time of concentration of 10 minutes, the allowable peak flow for the pre-development site is as follows:

<u>Storm Event</u>	<u>Pre-Development Storm Flow</u>
5-year Storm	347.4 L/s
100-year Storm	557.6 L/s

These flows are calculated using the Town of Niagara-on-the-Lake intensity-duration-frequency curves. The pre-development flows for the proposed development are provided in Exhibit #1 for the five-year storm and Exhibit #2 for the one-hundred-year storm at the end of the design brief.

3.2 POST-DEVELOPMENT SITE FLOW

The proposed development includes the building addition, gravel laneway & parking areas, concrete loading docks and grass areas. The grading for the site will ensure drainage through the proposed storm drainage system for storm water quantity and quality controls. The total drainage for the site consists of 3.114 hectares with a calculated runoff coefficient of 0.68 based on the existing and proposed roof, asphalt, gravel and grass surfaces. The proposed storm drainage system for the site will then discharge to the existing roadside ditch at East & West Line. The catchment area plan for the post-development site condition is provided on Hallex Sketch CSK2, attached.

Utilizing the rationale method ($Q = CiA/360$) and the minimum recommended time of concentration of 10 minutes, the calculated peak flow for the post-development site is as follows:

<u>Storm Event</u>	<u>Post-Development Storm Flow</u>
5-year Storm	527.5 L/s
100-year Storm	846.7 L/s

These flows are calculated using the Town of Niagara-on-the-Lake intensity-duration-frequency curves. The post-development flows for the proposed development are provided in Exhibit #3 for the five-year storm and Exhibit #4 for the one-hundred-year storm at the end of the design brief.

3.3 STORMWATER QUANTITY CONTROL

The post-development storm water runoff for the subject site will increase by 180.1 L/s for the five-year storm and 289.1 L/s for the one-hundred-year storm from the maximum allowable flow from the site. As such, storm water detention will be required for the proposed development.

Similar to the current stormwater management design as further described in the Vineland Growers Warehouse Expansion Stormwater Management Report, by Quartek Group Inc., dated October 23, 2015, stormwater quantity controls for the site can be achieved by utilizing stormwater management dry pond and then pumped to the existing roadside ditch at East & West Line.

The pump chamber will ensure the post development runoff is controlled to the pre-development runoff rate for the five-year and one-hundred-year storm events. The resulting 185.0 m³ volume generated for the five-year storm event and 283.0 m³ volume generated for the one-hundred-year storm event would then be stored within the stormwater management dry pond. The pond shall be designed to ensure an active storage capacity of at least 283.0m³ with a 300mm freeboard for the one-hundred-year storm event.

3.4 STORMWATER QUALITY CONTROL

Stormwater quality controls for the site can be achieved by utilizing a Hydroguard HG8 prior to draining to the existing roadside ditch at East & West Line. This will achieve a total suspended solids removal of at least 75% based on the above post-development site conditions. This value is greater than the required 'Normal' treatment of 70% as indicated in the MOE Stormwater Management Planning and Design Manual, dated March 2003 (refer to Chapter 3: Environmental Design Criteria, Section 3.3.1.1. Level of Protection).

4. WATER DISTRIBUTION SYSTEM

The proposed Vineland Growers' Co-operative Ltd. development intends to reuse the existing 38mm water service connection to the existing 200mm PVC municipal watermain at East & West Line.

The building development is currently in the concept phase; therefore, the following assumptions based on the architectural drawings are made in carrying out the calculations:

- The plumbing fixtures and the number of plumbing fixtures indicated in Exhibit #5 are existing and no additional plumbing fixtures are proposed for this development.
- The building is assumed to be of non-combustible construction and will not have sprinklers installed throughout the building.

The domestic water demand for the Vineland Growers' Co-operative Ltd. building is determined to be 178.9 L/min based on the fixtures and fixture units shown in Exhibit #5 attached. Table 7.4.10.5 in the Ontario Building Code is used to determine water demands for the total fixture units.

Using the calculations provided in the Fire Underwriters Survey – 2020 Water Supply for Public Fire Protection, the minimum water supply flow rate for fire protection is determined to be 17,000 L/min for the building based on the above assumptions as shown in Exhibit #6, attached. There are three existing municipal fire hydrants located near the site. The first is located immediately adjacent to the north property line on the south side of East & West Line. The second is approximately 56.2m west of the existing west property line on the south side of East & West Line. The third is approximately 30.5m east of the property on the northeast corner of the East & West Line and Concession 4 Road intersection.

Based on the above, the existing 38mm water service from the building to the existing 200mm PVC municipal watermain at East & West Line is sufficiently sized to continue servicing the existing domestic water demands for the Vineland Growers' Co-operative Ltd. building.

5. CONCLUSION

The aforementioned calculations and recommendations for the storm and water services are based on the current design for the site as of writing this report. A final sealed report, complete with updates to the recommendations made in this report, may be required based on the final site design.

We trust this report meets your approval. Please contact the undersigned should you have any questions or comments.

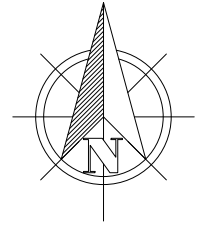
Yours truly,
HALLEX ENGINEERING LTD



Jim Halucha P.Eng
Civil/Structural Engineer

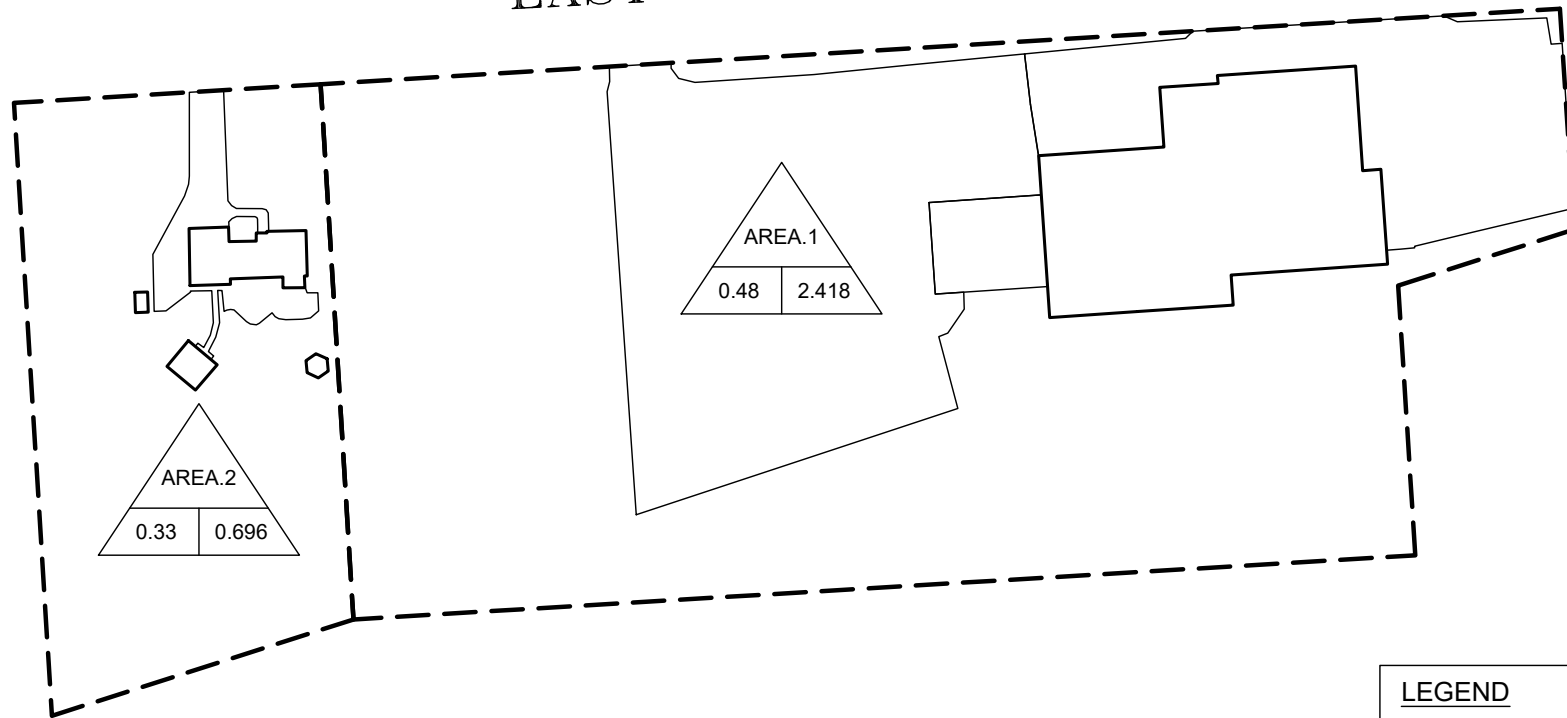
A handwritten signature in black ink, appearing to read "Jonathan Skinner".

Jonathan Skinner, C.E.T., B.Tech
Civil Technologist



EAST & WEST LINE

CONCESSION 4 ROAD



LEGEND

● — CATCHMENT AREA
 —●— AREA (HECTARES)
 — AVERAGE RUNOFF COEFFICIENT



4999 Victoria Avenue
 Niagara Falls, ON L2E 4C9
 Tel: 905-357-4015 Fax: 905-353-1105

Do not scale drawings. Report any discrepancies to Hallex Civil Engineering Ltd. before proceeding. This drawing must be signed and sealed by the Engineer prior to use in construction or submission for building permit. All construction shall be in accordance with latest edition of the Ontario Building Code and all applicable Ontario regulations. No part of this drawing including details, calculations or schedules may be reproduced in any form, either in part or whole, without the prior written consent of Hallex Civil Engineering Ltd.

PROJECT:
 VINELAND GROWERS NOTL ADDITION
 795 EAST & WEST LINE, NOTL

SHEET TITLE:
 PRE-DEVELOPMENT
 CATCHMENT AREA PLAN

SCALE: 1:1500

DATE: 2024/12/17

DRAWN BY: JS

DESIGNED BY: JS

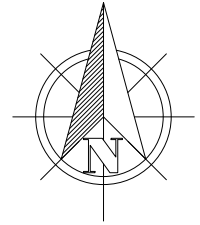
CHECKED BY: JH

JOB NUMBER: 240609

ISSUED FOR: ZONING BYLAW AMENDMENT

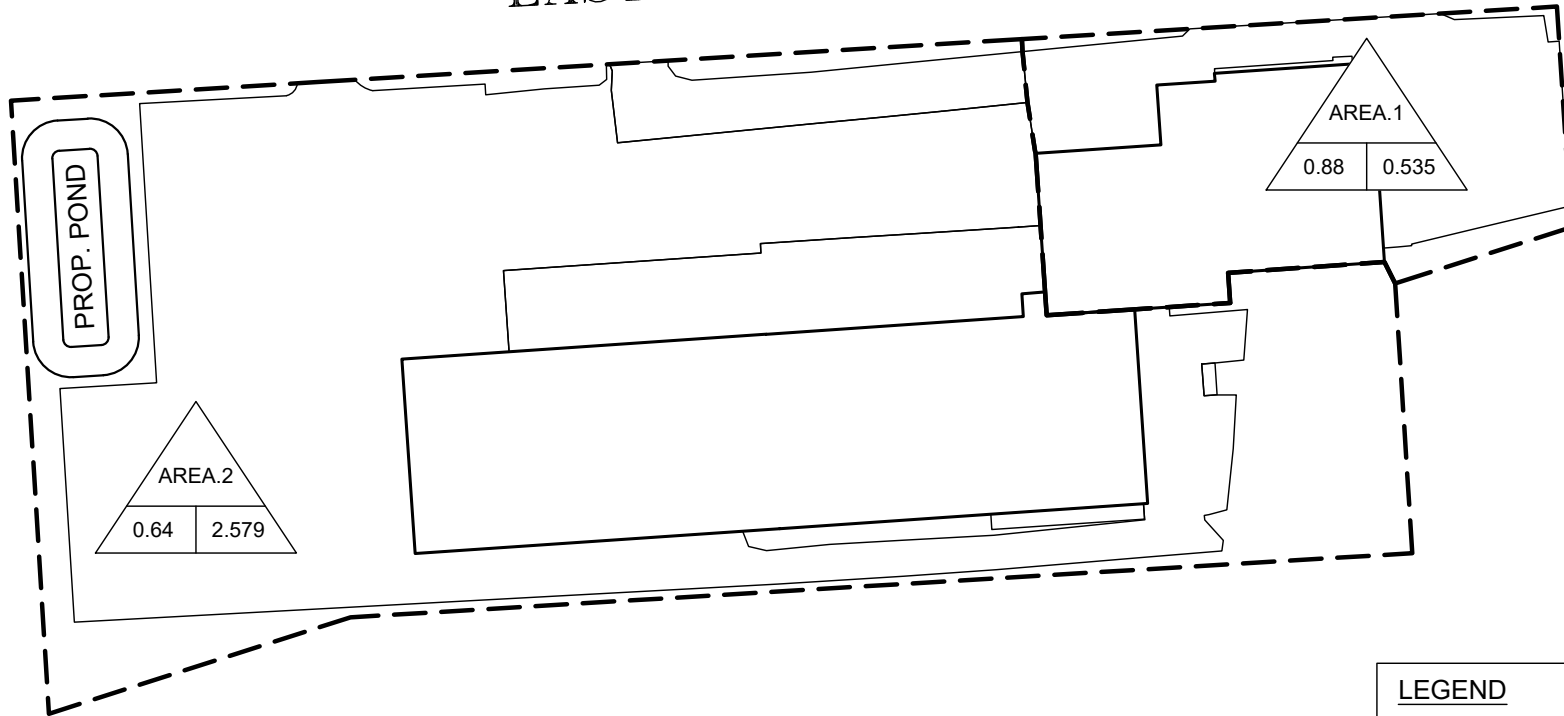
DWG **REV.**

CSK1 **1**



EAST & WEST LINE

CONCESSION 4 ROAD



LEGEND

● — CATCHMENT AREA
 ● — AREA (HECTARES)
 — AVERAGE RUNOFF COEFFICIENT



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PROJECT:
 VINELAND GROWERS NOTL ADDITION
 795 EAST & WEST LINE, NOTL

SHEET TITLE:
 POST-DEVELOPMENT
 CATCHMENT AREA PLAN

SCALE: 1:1500

DATE: 2024/12/17

DRAWN BY: JS

DESIGNED BY: JS

CHECKED BY: JH

JOB NUMBER: 240609

ISSUED FOR: ZONING BYLAW AMENDMENT

DWG **REV.**

CSK2 **1**



Vineland Growers NOTL Addition Exhibit #2 - 100 Year Pre - Development Calculations

2024-12-17
Job: 240609

MUNICIPALITY: **NOTL**

manning's n = 0.013 Conc Pipe
0.013 PVC Pipe
0.024 Corr. Stl Pipe

Rainfall Intensity Values = A= 980.000
B= 3.700
C= 0.732

Pipe	Location		Length of Pipe (m)	Area		Flow Time		Rainfall Intensity mm/hr	Unit rate of Runoff m ³ /ha*day	Design Flows	
	From Node	To Node		Incre-ment (ha)	Cum Total (ha)	To Upper (min)	In Sectio (min)			Cum Flow (m ³ /d)	Cum Flow (m ³ /s)
1	Area.1	Street	N/A	2.418	2.418	10.00	N/A	144	103867	40298.8	0.4664
Roof	-	-	-	0.247	-	-	-	-	32891.3	8124.2	-
Paved	-	-	-	0.298	-	-	-	-	31160.2	9285.7	-
Gravel	-	-	-	0.551	-	-	-	-	20773.5	11446.2	-
Grass	-	-	-	1.322	-	-	-	-	8655.6	11442.7	-
2	Area.2	Street	N/A	0.696	0.696	10.00	N/A	144	103867	7876.6	0.0912
Roof	-	-	-	0.030	-	-	-	-	32891.3	986.7	-
Paved	-	-	-	0.050	-	-	-	-	31160.2	1558.0	-
Grass	-	-	-	0.616	-	-	-	-	8655.6	5331.9	-

Run-off Coefficients Used:

Velocity Range:

Roof Structure	C =	0.95	Minimum Velocity =	0.75 m/s
Paved Surface	C =	0.90	Maximum Velocity =	6.00 m/s
Gravel Surface	C =	0.60		
Grass Surface	C =	0.25	<u>Time of Concentration =</u>	10 min



MUNICIPALITY: NOTL

Vineland Growers NOTL Addition Exhibit #4 - 100 Year Post - Development Calculations

2024-12-17
Job: 240609

Rainfall Intensity Values =
 A= 980.000
 B= 3.700
 C= 0.732

Location			Length of Pipe	Area		Flow Time		Rainfall Intensity	Unit rate of Runoff	Design Flows	
Pipe	From Node	To Node		Increment	Cum Total	To Upper	In Section			Cum Flow	Cum Flow
			(m)	(ha)	(ha)	(min)	(min)	mm/hr	m ³ /ha*day	(m ³ /d)	(m ³ /s)
1	Area 1	Street	N/A	0.535	0.535	10.00	N/A	144	72707	16333.1	0.1890
Roof	-	-	-	0.247	-	-	-	-	32891.3	8124.2	-
Paved	-	-	-	0.254	-	-	-	-	31160.2	7914.7	-
Grass	-	-	-	0.034	-	-	-	-	8655.6	294.3	-
2	Area 2	Street	N/A	2.579	2.579	10.00	N/A	144	93481	56818.9	0.6576
Roof	-	-	-	0.565	-	-	-	-	32891.3	18583.6	-
Paved	-	-	-	0.282	-	-	-	-	31160.2	8787.2	-
Gravel	-	-	-	1.193	-	-	-	-	20773.5	24782.8	-
Grass	-	-	-	0.539	-	-	-	-	8655.6	4665.4	-

Run-off Coefficients Used:

Roof Structure C = 0.95
 Paved Surface C = 0.90
 Gravel Surface C = 0.60
 Grass Surface C = 0.25

Velocity Range:

Minimum Velocity = 0.75 m/s
 Maximum Velocity = 6.00 m/s

Time of Concentration:

Time of Concentration = 10 min



**Vineland Growers NOTL Addition
Exhibit #5 - Water Demand**

2024-12-17
Job: 240609

DOMESTIC WATER SUPPLY

Fixture	# of Plumbing Fixtures	Fixture Units (Table 7.6.3.2.A.)	Total Water Fixture Units	
Existing Plumbing Fixtures				
Sink (domestic)	2 fixtures	2 FUs	4 FUs	- Kitchen Sinks
Dishwasher (domestic)	1 fixture	1.4 FUs	1.4 FUs	
Sink (domestic)	5 fixtures	2 FUs	10 FUs	- Bathroom Sinks
Water closet w/ flush tank (private)	5 fixtures	3 FUs	15 FUs	
Urinal (private, stall, washout)	1 fixture	3 FUs	3 FUs	
Shower drain (private, 1 head)	1 fixture	2 FUs	2 FUs	
Sink (service or mop basin)	3 fixtures	3 FUs	9 FUs	
Total =			44.4 FUs	
Total Flow =			178.9 L/min	

Therefore the maximum domestic water demand is determined to be 178.9 L/min.



Vineland Growers NOTL Addition
Exhibit #6 - Fire Water Demand

2024-12-17
Job: 240609

FIRE WATER SUPPLY

Building Type: No Fire Protection

<u>Floor Area</u>		<u>Reduct.</u>	
First Floor	6963.69 m ²	1.00	<u>6963.69 m²</u>
			6963.69 m ²

Construction Type: Non-Combustible Const. Construction Coefficient:

1st Preliminary Fire Flow = 15000 L/min

Fire Hazard: Combustible Fire Hazard Factor:
No Change = 0 L/min

2nd Preliminary Fire Flow = 15000 L/min

Sprinkler System: No System Sprinkler System Factor:
No Change = 0 L/min

Separation Factor

North	45+ m	0.00
South	45+ m	0.00
West	45+ m	0.00
East	25.0 m	<u>0.10</u>
		0.10

Net Increase = 1500 L/min

FINAL FIRE FLOW = 17000.0 L/min

Minimum Water Supply Flow Rate for Fire Protection as determined by the Water Supply For Public Fire Protection, dated 2020, by the Fire Underwriter's Survey