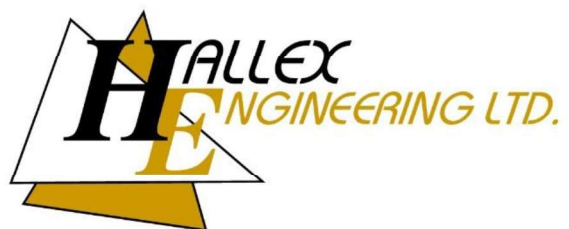

**PROPOSED VOLTA ESTATE WINERY
17945 LOYALIST PARKWAY, ROSEHALL,
PRINCE EDWARD COUNTY, ON**

FUNCTIONAL WATER SERVICING DESIGN BRIEF

REV 5 – November 29, 2024

PREPARED BY:



HALLEX PROJECT #220526

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1. INTRODUCTION

The proposed Volta Estate Winery development consists of the construction of two new buildings, gravel laneway & parking areas and grass areas. This development is located at 17945 Loyalist Parkway, Rosehall, which is south of the Greer Road and Loyalist Parkway intersection in the County of Prince Edward, ON.

The purpose of the service assessment is to determine the required domestic water supply flows to ensure it meets the recommended recommended pumping rates for Well #1, Well #2, Well #4 and Well #5 from the ground water aquifer as recommended in the Hydrogeological Assessment Report by Cambium Inc., reference #15435-002, dated November 08, 2023.

2. WATER DISTRIBUTION SYSTEM

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 agricultural complex and residential building plumbing fixtures and the number of plumbing fixtures indicated in Exhibit #1 are assumed and may not represent the final building plumbing design.
- The winery production flow rate assumes 9,000 cases of wine produced per year. Each case is assumed to contain 12-750mL bottles and requires 10L of water to produce a litre of wine. Assuming production is to occur 8 hours per day, 5 days per week, 26 weeks per year with a 50% safety factor, the peak flow rate required for production is 19.5 L/min. The winery production process will only occur at a time when the restaurant is not operational. Given the restaurant water demand of 121.2 L/min is higher than the water demand of the winery production process, the highest value has been taken to calculate the maximum water demand of the agricultural complex.
- The total daily wastewater usage rate, also being representative of the total daily water consumption rate, is taken from the Septic System Design Brief by Hallex Engineering (Project #220526, Revision #4, dated August 26, 2024) as follows:
 - Agricultural complex – 21,171 L
 - Residential building – 2,320 L

The peak probable domestic water demand for the proposed development is determined to be 270.0 L/min for the agricultural complex and 125.6 L/min for the residential building. These calculations are based on the above assumptions and fixtures and fixture units shown in Exhibit #1 attached. Table 7.4.10.5 in the Ontario Building Code is used to determine water demands for the total fixture units.

The average domestic water demand for the proposed development, assuming the total daily water consumption rate is used over a 4-hour period, is determined to be 88.2 L/min for the agricultural complex and 9.7 L/min for the residential building.

The hydraulic analysis conclusions from Hydrogeological Assessment Report by Cambium Inc. state *“Based on hydraulic testing results, recommended pumping rates for the test wells are 90 L/min for TW1, 23 L/min for TW2, 10 L/min for TW4, and 14 L/min for TW5.”* Well 1 and Well 2 could cumulatively provide the daily water consumption rate of 21,171 L for the agricultural complex in 3.2 hours and Well 5 could provide the daily water consumption rate of 2,320 L for the residential building in 2.8 hours.

Given all the above peak flows exceed the well supply rate for each development area, a minimum cistern size would be required to ensure sufficient water supply for the development. A single 15-minute peak period would result in a required volume of 4,050 L for the agricultural complex and 1,884 L for the residential building. If four peak periods were to occur daily, a required volume would be 16,200 L for the agricultural complex and 7,536 L for the residential building.

Additional hydraulic testing was completed on test wells TW1 and TW3 as summarized in the Additional Hydraulic Testing Report by Cambium Inc., reference #15435-002, dated November 08, 2023. This report concludes that *“Test well TW1 can conservatively be pumped at a rate of 365L/min to meet and enhance the peak demand of the proposed development.”* The report further utilizes the above water demand calculations for the development and concludes the *“Water Supply network and peak demand calculations indicate there is a shortage of about 9,3000 L to meet the peak demand conditions. Therefore, one Water Storage Reservoir with a minimal capacity of 9,300 L is recommended to meet the peak demand conditions.”*

As such, domestic water supply using the wells for the development could be utilized provided a minimum 9,300 L Water Storage Reservoir complete with any required water treatment system(s) are constructed as part of the development. That said, Hallex Engineering recommends two Water Storage Reservoirs to be installed on site: a minimum of 22,700 L for the agricultural complex and a minimum of 13,700 L for the residential building to ensure sufficient storage capacity at all times.

3. CONCLUSION

The aforementioned calculations and recommendations for domestic water servicing 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 "Mustafa Abdullaiev".

Mustafa Abdullaiev, B.Eng
Civil Designer



Volta Estate Winery
17945 Loyalist Parkway, Rosehall,
Prince Edward County, ON
Exhibit #1 - Water Demand

2024-11-29
 Job: 220526

DOMESTIC WATER SUPPLY

Fixture	# of Plumbing Fixtures	Fixture Units (Table 7.6.3.2.A.)	Total Water Fixture Units
Retail / Office / Wine Tasting / Warehouse			
Water closet w/ flush tank (public)	5 fixtures	5 FUs	25 FUs
Water closet w/ flush tank (private)	1 fixture	3 FUs	3 FUs
Sink (domestic)	6 fixtures	2 FUs	12 FUs
Restaurant			
Water closet w/ flush tank (private)	2 fixtures	3 FUs	6 FUs
Sink (domestic)	2 fixtures	2 FUs	4 FUs
Sink (commercial, kitchen)	2 fixtures	4 FUs	8 FUs
Dishwasher (domestic)	1 fixture	1.4 FUs	1.4 FUs
Winery			
Water closet w/ flush tank (private)	4 fixtures	3 FUs	12 FUs
Sink (domestic)	6 fixtures	2 FUs	12 FUs
Sink (commercial, kitchen)	4 fixtures	4 FUs	16 FUs
Sink (service or mop basin)	2 fixtures	3 FUs	6 FUs
Hose bibb (public, 19mm)	2 fixtures	6 FUs	12 FUs
Dishwasher (commercial)	2 fixtures	8 FUs	16 FUs
Total =			133.4 FUs
Total Flow =			270.0 L/min

Therefore the maximum domestic water demand is determined to be 270 L/min for the agricultural complex.

Residence			
Bathroom group with flush tank	2 fixtures	3.6 FUs	7.2 FUs
Sink (domestic)	2 fixtures	2 FUs	4 FUs
Water closet w/ flush tank (private)	1 fixture	3 FUs	3 FUs
Shower drain (private, 1 head)	2 fixtures	2 FUs	4 FUs
Dishwasher (domestic)	1 fixture	1.4 FUs	1.4 FUs
Clothes washer (private, domestic)	1 fixture	1.4 FUs	1.4 FUs
Total =			21.0 FUs
Total Flow =			125.6 L/min

Therefore the maximum domestic water demand is determined to be 125.6 L/min for the residential building.