

April 8, 2023

City of Ottawa
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

To Whom it May Concern:

RE: Water retention storage design
Reference to Grading and Drainage plan (Shade Group Mar 8th, 2023)
Reference to Fire Flow Calculation (TTF Engineering Feb 27th, 2023)
8005 Jock Trail
Part Lot 9, Concession 3
Geographic Township of Goulbourn
City of Ottawa
Owner / Designer (s): Tom and Janet Moul

This design describes the 'pond', hereinafter also referred to as a body of water, as a water retention area for storm water management (please see Grading and Drainage Plan – Shade Group Mar 8th, 2023) as well as a facility for the storage of water for fire fighting.

Notwithstanding that the building has an FRR (fire resistance rating) of 45 minutes, and therefore do not require sprinklers, the city insists that we provide access to a certain volume of water for firefighters to use.

2012 Building Code Compendium Div B A 3.2.5.7 – Table 2

The code refers to buildings (Part 3) under the building code where a one-story building with building area not exceeding 600m² requires a minimum water supply flow rate of 1800L/min. Please refer to TTF engineering letter Feb 7th, 2023 and TTF engineering letter dated Apr 25th 2023, where the fire flow calculation water supply is 1800 L / min for 30 minutes. This equates to a water storage requirement of 54 000 Litres (1800L x 30 minutes = 54 000 Litres).

However, even if the building area is defined as the 'roof footprint' instead of the OBC definition of building area i.e. 'the greatest horizontal area of a building above grade within the outside surface of exterior walls or within the outside surface of exterior walls', and the area was greater than 600m², the 2012 Building Code Compendium Div B A 3.2.5.7 – Table 2 prescribes 2700 L/min for 30 minutes. This equates to a water storage requirement of 81 000 Litres (2700L x 30 minutes = 81 000 Litres).

Reference is made to the Grading and Drainage plan which indicates that the available storage in the body of water has an available capacity estimated to be 661 m³ which equates to 661 000 Litres. This is 8 times the water required by code.

Fire Retention Storage Design

The existing body of water, located to the west of the winery building as detailed in Grading and Drainage plan (Shade Group Mar 8th, 2023), has sufficient water to meet the requirements as set out in the code.

The bottom of this water storage area is bed rock and has not permitted water to leak through the bottom since 2007.

The walls of the water storage area are semi permeable and can lose some water to the surrounding ground and the body of water is subject to evaporation. It is proposed that a layer of sodium bentonite is distributed on the walls of the water retention area to minimise water loss. See fig 1.

Sodium Bentonite swells 15-18 times its dry size when wetted by water. Sodium Bentonite is a natural sealant and is used for sealing stock and recreational ponds, dairy and sewage lagoons. Sodium bentonite is one of the most effective ways of treating porous soils. It is environmentally safe because it contains no chemicals, no additives, and no toxins.

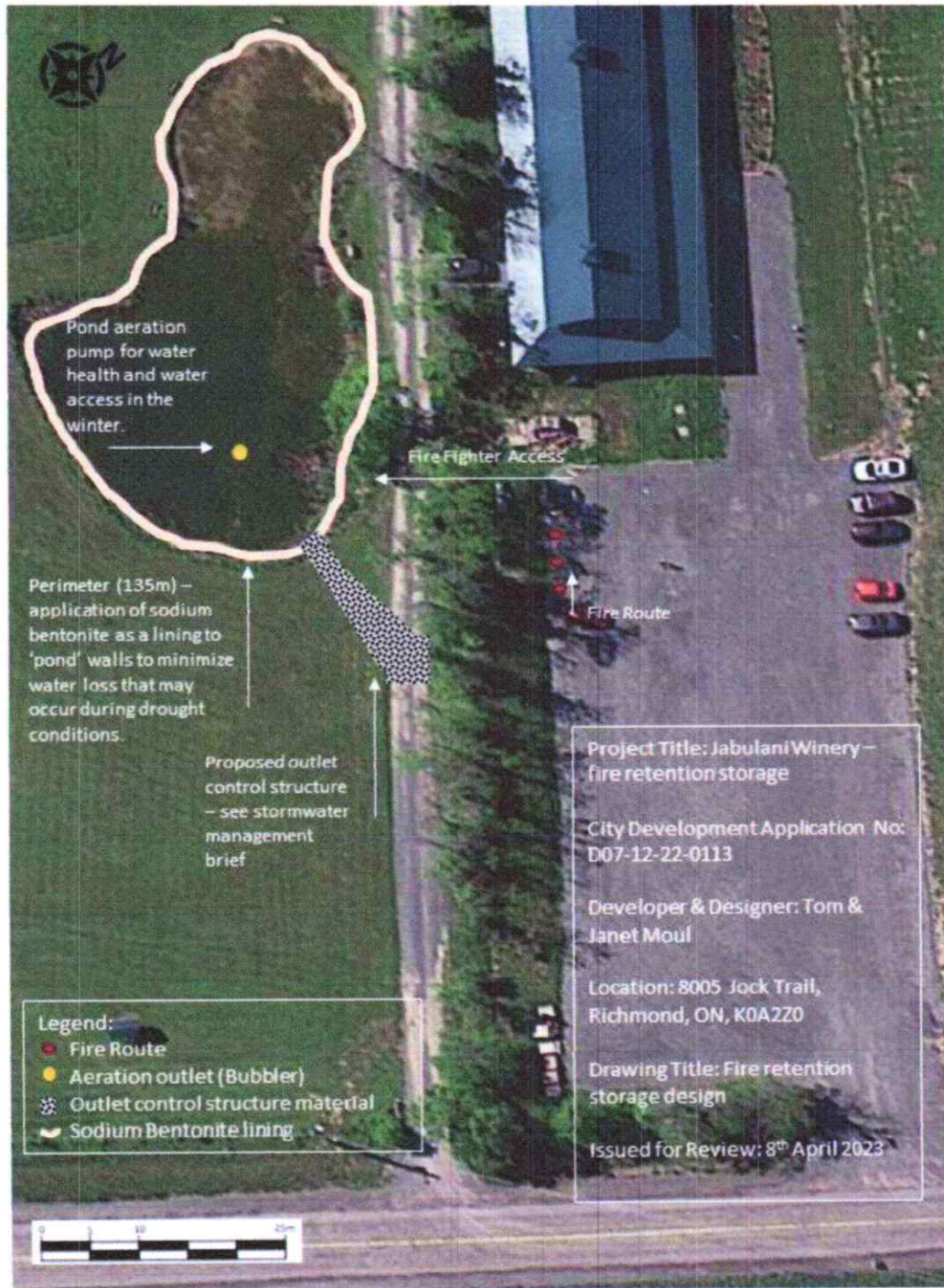
Pond aeration is proposed (see fig 1) to fulfil two requirements:

1. Healthy water should generally have dissolved oxygen concentrations above 6.5-8 mg/L. Water needs to have oxygen to promote a beneficial natural environment for organisms, turtles and wild birds that may want to visit the farm.
2. An aerator works under the understanding that moving water resists freezing. Aeration systems won't keep an entire water body ice free; they can help create an opening in the ice which allows oxygen and sunlight to enter the water body and gases to escape. This also permits access to the water for fire fighting purposes. A dry fire hydrant may be installed to facilitate access to the water.

Provision can be made to top up the body of water loss through evaporation via a permanent hose connected from the well adjacent to the body of water.

Access to the water storage area is across the farm laneway next to the fire route as indicated in the design drawing fig.1.

Proposed / Existing fire retention storage.



Summary

Applying our past experience^{1 2 3} of building and managing ponds or water retention resources, we consider this body of water to be a stable and reliable environment to meet the needs of fire water retention storage as well as fulfilling the design of the storm water management of the grading and drainage plan.

Should you have any questions or concerns, please do hesitate to contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom & Janet Moul". The signature is fluid and cursive, with a large loop at the beginning and a long, sweeping tail.

Tom & Janet Moul – for Jabulani Vineyard and Winery Ltd.

¹ Clean Water Pro document review on Water retention storage design.

² Developed a 'pond' to manage the flow of a geothermal system at the original winery and homestead at 8005 Jock Trail in 2006. (110 m perimeter and 2 936 000L volume).

³ Assisted with the development of ponds at a trout farm in Rusape Zimbabwe and Designed and built a pond and waterfall feature in Harare Zimbabwe (30 m perimeter and 294 000 L volume)

DOCUMENT REVIEW

Clean Water Pro

Box 1948

Carman, MB

ROG OJO



Reviewed For:

April 20, 2023

RE: Water retention storage design

Reference to Grading and Drainage plan (Shade Group Mar 8th, 2023)

Reference to Fire Flow Calculation (TTF Engineering Feb 27th, 2023)

8005 Jock Trail

Part Lot 9, Concession 3

Geographic Township of Goulbourn

City of Ottawa

Owner / Designer (s): Tom and Janet Moul

Reviewed by: Lynne Melvin, President of Clean Water Pro

About Clean Water Pro

Clean Water Pro has extensive knowledge and experience treating storm retention ponds, lakes, swimming holes, dugouts and lakeshores, including beaches for cities and municipalities. We have successfully assessed, and recommended solutions for many different types of water bodies and have developed a strong strategy to achieve the desired outcomes for our stakeholders. We have consulted with several engineering companies regarding storm retention pond design to ensure success. We hold full environmental insurance to work with water and we are a Safe Work Certified company.

In reviewing the document we believe the proposed plan is adequate. We would like to highlight the following:

- Bentonite is a good choice to seal the water body
- The owner has access to water to top up the water body during periods of evaporation to maintain an adequate level.

- Note: the retention pond should be topped up to the maximum amount of water prior to freeze up in the fall.
- Good access is planned for fire fighter's access.
- Aeration system recommendations:
 - 4 diffuser plate shallow water system to ensure adequate turn over and dissolved oxygen
 - Diffuser plates are to be distributed across the water body in deepest spots possible
- Water should stay open during the winter months where the aeration plates are situated.
 - Note: In winter, flow to the plate(s) should be slowed to reduce risk of turning water too quickly due to the shallow nature of the water body
 - To keep the water healthy, we suggest a shallow water aeration system with 4 diffuser plates spread out across the water body.
- Aeration will promote healthy water with increased dissolved oxygen with will promote digestion of organics and nutrients such as ammonia and nitrogen.
- If algae becomes a problem, beneficial bacteria CWP Pond Cleaner and CWP Phosphate binder are recommended to reduce the organics and nutrients in the water to starve the algae. The products are found naturally in the environment and are not harmful to fish, pets or humans. SDS sheets can be provided.

The views expressed in this document are based on our professional opinion and experience and we can not be held liable. Please let us know if you have any questions or require further clarification.

Kindest regards,

