

WESTBROOK Consulting Ltd.

July 1, 2020

3487-02

Cowichan Valley Regional District
175 Ingram Street
Duncan, BC V9L 1N8

Attn: Devin Warwick, Bylaw Enforcement Officer

Re: Site Remediation Plan – Saanichton Developments Sooke Lake Road Quarry

Dear Sir:

Westbrook Consulting has been engaged by Saanichton Developments Ltd. to apply for the *Type "C" Soil Deposit Permit* as per Cowichan Valley Regional District (CVRD) Bylaw 4236.

Saanichton Developments Ltd. owns and operates the quarry and soil deposit site at Sooke Lake Road in the CVRD.

The site is located within the Shawnigan Lake aquifer and contains an active quarry in the northeast corner of the site, and a soil deposit area in located between two existing unnamed streams that flow into Shawnigan Creek.

The site slopes from the west to the east property line, and the area of the soil deposit site is approximately 2.1 ha.

Reclamation Measures

Upon completion of the soil deposit activity on the south side of the site, Saanichton Developments Ltd. plans to start Phase 2 of the quarry remediation with soil deposit activity on the north side of the site.

The measures to be taken for the soil deposit reclamation is as follows:

- Evenly grade the finished ground of the deposited soil to ensure a slow and even storm water runoff from soil deposit area.
- Cultivate the finished ground with a grass mixture.
- Monitor progress of revegetated areas following initial planting until vegetation is successfully established.
- Conduct monthly visual inspection of the finished ground for potential problems of erosion and repair as required.
- In the event of an extreme rainfall, inspect the soil deposit area immediately after the event for signs of soil erosion and scouring, and repair, as required.
- Take corrective action in areas showing evidence of erosion, sedimentation or slope failure, as necessary.
- Qualified Environmental Professional to monitor and inspect the condition of the existing streams.

Permanent Drainage and Storm Water Management

There are no plans for a permanent drainage and storm water management on the soil deposit area of the site.

Once the vegetation of the finished ground is established, the storm water ditch and sediment settling pond at the toe of the soil deposit area can be backfilled and vegetated.

Noxious Weeds and Invasive Species Control

Upon completion of the soil deposit activity on the south side of the site, Saanichton Developments Ltd. will grade and cultivate the finished ground surface with a grass mixture. This will help curb the appearance of noxious weeds and invasive species in the area.

The project Qualified Environmental Professional will monitor the area monthly, as required, to ensure any occurrence of invasive and noxious species is eradicated on site and removed from the area. The collected material will be transported to a mulching area or an area off site to be disposed of. Refer to the Environmental Protection Plan (EPP) for detailed set of measures.

CONCLUSION

Saanichton Developments Ltd. shall be responsible for implementing and inspecting the measures outlined in this plan. The measures shall be maintained and altered as necessary should deficiencies be noted upon inspection.

In addition to the *Type "C" application form* and the enclosed attachments, we trust that the above information is adequate to satisfy the *Type "C" Soil Deposit Permit Application Requirements*. If you have any questions, please contact the undersigned.

Yours truly,

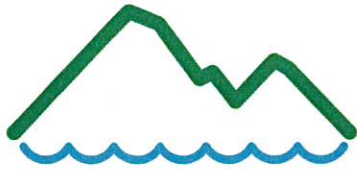
WESTBROOK CONSULTING LTD.



Ivana Kvartuc, B.Eng.
Engineering Assistant

IK





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Re: Storm Water Management Plan – Saanichton Developments Sooke Lake Road Quarry

Dear Sir:

Westbrook Consulting has been engaged by Saanichton Developments Ltd. to apply for the *Type "C" Soil Deposit Permit* as per Cowichan Valley Regional District (CVRD) Bylaw 4236.

Storm Water Management Plan During Soil Deposit

During the soil deposit activity, any storm water will be infiltrated in the deposited soil and it will not impact the existing stream close to the site. In the event of a major rainfall, once the soil is saturated, the storm water runoff will flow overland down the soil deposit slope to the north.

The proposed storm water management system to be used during the soil deposit operations will consist of a perimeter ditch located at the toe of the soil deposit fill and a settling pond. The storm water runoff from the soil deposit area will flow into the perimeter ditch and into the settling pond.

In addition to the silt fencing described in the Environmental Protection Plan (EPP), the perimeter ditch will intercept the storm water runoff and the runoff particles, effectively preventing the particles from entering the stream.

The function of the settling pond is to provide storage capacity to storm water runoff volume and to slow the flow velocity of storm water runoff to allow for the sedimentation of suspended soil particles, prior to the storm water being discharged into the stream. Refer to the attached drawings for the details of the storm water management system.

During the soil deposit activity on the site, the owner shall inspect, monitor, and maintain the perimeter ditch and settling pond, and make repairs, as necessary.

When the soil deposit activity is completed, the stormwater ditch and settling pond can be removed.

Assumptions

The settling pond has been sized based on the following assumption:

- Particle type for sedimentation is chose as medium silt particle.
- Medium silt particle density is 2633 kg/m³.
- Medium silt particle sedimentation velocity is 0.00029 m/s.
- Medium silt sedimentation time is 57 min.
- Medium silt entrainment velocity is 0.07 m/s.

Calculations

Minimum Water Area in Basin

$$A_s = \frac{\theta \times Q}{v_p}$$

where,

A_s = Minimum water area in basin (m^2)

Q = Discharge rate corresponding to 5% of the 10 – year peak flow ($0.006m^3/s$)

θ = adjustment factor related to turbulence

(1, 1.2 or 1.5 depending on the degree of turbulence in the basin)

v_p = sedimentation velocity (m/s)

$$A_s = \frac{\theta \times Q}{v_p} = \frac{1.5 \times 0.006m^3/s}{0.00029m/s} = 31.03m^2$$

Width of The Water Surface and Minimum Length of Basin

$$W = L + 2 \times P \times z = 3.0 + 2 \times 1 \times 1 = 5.0m$$

$$l = \frac{A_s}{W} = \frac{31.03}{5.0} = 6.21m$$

where,

W = Width of water surface (m)

L = Width at floor of basin ($3.0m$)

P = Water depth in basin during operation ($1.0m$)

z = Slope of sides (1)

l = Minimum length of basin (m)

A_s = Minimum water area in basin (m^2)

The minimum required settling pond width is 5.0m and the length is 6.21m. Refer to the enclosed tables for results.

Dust Control and Offsite Road Siltation Control

During the warm, dry summer months, dust can be problematic. Saanichton Developments Ltd. shall use available water or alternate methods to moisten fine material to prevent it from blowing away, as required. Dust control measures shall remain in place until the site is fully remediated. Saanichton Developments Ltd. shall monitor and maintain the measures and make alterations or repairs, as necessary.

To prevent mud and other debris from being deposited on the surface of Sooke Lake Road, a wheel wash has been constructed on site to ensure that no rocks or debris have been picked up in the tires of the trucks that may become a danger to others.

Construction access road is maintained with a 200mm minimum thickness of 75mm rock such that mud and other debris will not leave the site. Any trucks that are being loaded or unloaded onsite are to remain on the rock roads whenever possible. Sooke Lake Road is regularly monitored and swept clean of any mud or debris.

Yours truly,

WESTBROOK CONSULTING LTD.



Ivana Kvartuc, B.Eng.
Engineering Assistant

IK

Enclosures:



Reviewed by,

Mike Wignall, P. Eng., LEED AP
Project Manager

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