Reference: 307354

January 27, 2017

South Island Resource Management Ltd.
2158 Millstream Road
Victoria BC V9B 6H4
Email: Raymond@allterraconstruction.ca
Email: Todd@allterraconstruction.ca

South Island Aggregates Ltd.
Herald Street Law
101-536 Herald Street
Victoria BC V8W 1S6
Email: info@heraldstreetlaw.com

Martin Uwe Block
A-693 Stebbings Road
Shawnigan Lake BC V0R 2W3
Email: marty.sia@shaw.ca

Michael Kelly
A-693 Stebbings Road
Shawnigan Lake BC V0R 2W3
Email: mike.sia@shaw.ca

Brian Martin
A-693 Stebbings Road
Shawnigan Lake BC V0R 2W3

Cobble Hill Holdings Ltd.
Herald Street Law
101-536 Herald Street
Victoria BC V8W 1S6
Email: info@heraldstreetlaw.com

Enclosed is Order MO1701 issued under Section 79 of the *Environmental Management Act*. Your attention is respectfully directed to the requirements outlined in the Order.

Failure to comply with the requirements of this Order is a contravention of the *Environmental Management Act* and may result in legal action. I direct your attention to Section 120(10) of the *Environmental Management Act*, which reads:

> (10) A person who contravenes an order...that is given, made or imposed under this Act by ...the minister...commits an offence and is liable on conviction to a fine not exceeding $300 000 or imprisonment for not more than 6 months, or both.

Failure to comply with the requirements of this Order may also result in an administrative penalty under the Administrative Penalties Regulation (*Environmental Management Act*) (B.C. Reg 133/2014) (Regulation). I direct your attention to Section 12(4) of the Regulation, which reads:

> (4) A person who fails to comply with an order under the [Environmental Management] Act is liable to an administrative penalty not exceeding $40 000.

I also draw your attention to the Spill Reporting Regulation (B.C. Reg 263/90) and the reporting requirement in section 79(5) of the *Environmental Management Act* which provides that:

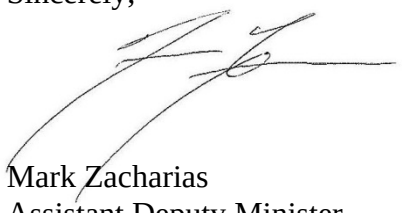
> (5) If a polluting substance escapes or is spilled or waste is introduced into the environment other than as allowed or authorized by… the person who had possession, charge or control of the substance or waste immediately before the escape, spill or introduction must, immediately after he or she learns of the escape, spill or introduction, report the escape, spill or introduction in accordance with the regulations.

This Order does not authorize entry upon, crossing over, or use for any purpose of private or crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with you. It is also your responsibility to ensure that all activities are carried out with due regard for the rights of third parties, and comply with other applicable legislation that may be in force, including applicable local government bylaws.

The Parties are notified that the Province intends to publish on the Ministry of Environment website the entirety of any Regulatory Document provided that:

> (a) the Province will provide written notice to the parties of its intent to publish the Regulatory Documents at least [14] days prior to publication,
> (b) the Province will not publish any information what could not, if it were subject to a request under section 5 of FOIPPA, be disclosed under the *Freedom of Information and Protection of Privacy Act*, R.S.B.C. 1996, c. 165 as amended from time to time.

Sincerely,



Mark Zacharias
Assistant Deputy Minister
Environmental Protection Division

Enclosure

Reference: 307354 File: PR105809

January 27, 2017

Cobble Hill Holdings Ltd.
Herald Street Law
101-536 Herald Street
Victoria BC V8W 1S6

Email: info@heraldstreetlaw.com; mike.sia@shaw.ca; marty.sia@shaw.ca

Dear Mr. Martin Block and Mr. Michael Kelly:

Re: Suspension of Permit and Spill Prevention Order

Take notice that waste discharge permit 105809, originally issued on August 21, 2013, in the name of Cobble Hill Holdings Ltd. (BC0754588) ("CHH"), is suspended effective immediately upon the service of this notice on CHH, pursuant to Section 18 (3) of the *Environmental Management Act*.

This suspension is effective immediately and remains in effect until such time as the Director confirms in writing to CHH that:

- The Director has approved a closure plan for the site and a cost estimate for such closure;
- CHH has provided the Provincial Government with an adjusted financial security, in the form of an irrevocable letter of credit, and in an amount consistent with the approved cost estimate; and
- The Director has approved a final contact water management review report and a final non-contact water management review report (the "Reports").

I have briefly summarized the reasons for my decision in the attached document (Reasons for Decision).

…2

Ministry of Environment
Office of the Minister
Mailing Address: Parliament Buildings Victoria BC V8V 1X4
Telephone: 250 387-1187
Facsimile: 250 387-1356

Furthermore, I hereby give notice of my intention to cancel the Permit if the Director does not receive all of the following, within fifteen business days of the service of this decision on CHH:

1. An updated cost estimate for closure that is prepared and signed by a qualified professional and is fully consistent with the attached Landfill Criteria for Municipal Solid Waste – June 2016 (the "2016 Criteria"), in particular sections 7.0, 8.0 and 9.0 of the 2016 Criteria. Without limitation:
    a. the cost estimate must clearly demonstrate that all the steps and requirements set out in the 2016 Criteria for completing a cost estimate have been completed;
    b. the cost estimate must include all costs identified for inclusion in section 8.2 of the 2016 Criteria, including a contingency of 20 percent;
    c. the cost estimate should cover any expansion of the facility over the next five years;
    d. the cost estimate must assume a contaminating lifespan consistent with section 8.3 of the 2016 Criteria and provide a technical analysis supporting the lifespan which may, on no account, be less than 30 years.
2. Security, in the form of an irrevocable letter of credit, consistent with the requirements of section 8.6 of the 2016 Criteria, in a form acceptable to the Director, and in an amount consistent with the approved cost estimate, less the current financial security of $220,000.00 which is already held by the Province.
3. A draft non-contact and contact water management review report (or reports) that corrects all the deficiencies identified in the attached Ministry Review dated January 19, 2017, and includes a work plan and schedule for completion of all recommendations in the report(s) within 90 days of the approval of the report(s). The reports or reports must be prepared and certified by a qualified, independent professional.

I note that CHH has yet to implement any of the requirements set by the Director in the June 29, 2016 letter. At this time, this failure to implement the recommendations of the final non-contact water management review report and the final contact water management review report is considered a non-compliance. It is my expectation that once final plans are submitted and approved, CHH will take immediate action to implement the approved plans together with any additional specifications or requirements imposed by the Director. My intention is to either re-suspend or cancel the permit if I find that the report(s), once approved, are not being implemented in accordance with the schedule and workplan in the approved final report(s).

I have provided multiple opportunities for CHH to respond to the outstanding non-compliances as evidenced in my letters of October 11, 2016, and November 4, 2016. However, I note that in deciding to suspend the permit I have taken into consideration several factors, such as CHH past non-compliances, including non-payment of permit fees. Thus, I will consider any submissions CHH wishes to make in relation to the lifting of this suspension, or the cancellation of the permit that I receive within ten business days of service of this notice on CHH.

…3

All submissions to satisfy the requirements for lifting the suspension or not having the permit cancelled must be submitted to Executive Director of Regional Operations, Ministry of Environment (currently, Ms. Jennifer McGuire at Jennifer.McGuire@gov.bc.ca) for consideration.

This suspension does not remove the responsibilities of CHH to maintain monitoring requirements and ensure that pollution does not occur. The permit suspension suspends the authorization to discharge waste under section 6(5) of the *Environmental Management Act.* CHH is therefore no longer permitted to discharge contaminated soil to the environment or discharge contact water. All other applicable permit conditions must be abided by.

Please also note that section 55 of the *Environmental Management Act* also prohibits relocation of contaminated soil from a contaminated site, without a permit, contaminated soil relocation agreement or other applicable authorization. This prohibition applies regardless of whether there is a discharge to the environment.

With the permit suspended, I am also issuing a Spill Prevention Order to ensure that measures are taken to lessen the risk of an escape of leachate from the contaminated soil management facilities at 460 Stebbings Road into the environment. I have not previously given notice of the Spill Prevention Order to you and I will consider any submissions regarding rescinding or amending the order that I receive within ten business days of this letter being served on you.

Please note that non-compliance with the Spill Prevention Order is an offence.

Sincerely,

Mary Polak,
Minister

Enclosures:

Landfill Criteria for Municipal Solid Waste – June 2016 (section 8)
Report from Staff
Reasons for Decision

ORDER OF THE MINISTER OF ENVIRONMENT

***ENVIRONMENTAL MANAGEMENT ACT* SECTION 79**

SPILL PREVENTION ORDER : MO1701

WHEREAS Cobble Hill Holdings Ltd., Inc. No. BC0754588 ("**Cobble Hill Holdings**") is the owner of land legally described as Lot 23 Blocks 156, 201 and 323 Malahat District Plan VIP78459 (the "**Land**") located at 460 Stebbings Road near Shawnigan Lake, British Columbia, which is used as a landfill facility for contaminated soil (the "**Facility**") as part of a reclamation plan for a quarry site;

AND WHEREAS Permit PR-105809 issued to Cobble Hill Holdings under the *Environmental Management Act* authorizing the discharge of refuse and effluent in connection with the Facility has been suspended for non-compliance;

AND WHEREAS the contaminated soil at the Facility generates and may be expected to continue to generate leachate, which is a liquid that, in the course of passing through matter, extracts soluble or suspended solids, or any other component of the material through which it has passed ("**Leachate**");

AND WHEREAS the Leachate is a polluting substance that, in my opinion, is capable of causing pollution if it were to be spilled or escape onto any land or into any body of water, as it contains contaminants that are capable of substantially altering or impairing the usefulness of the environment;

AND WHEREAS I consider that the following persons (together, the "**Named Parties**") have possession, charge or control of the polluting substance:

- **Cobble Hill Holdings Ltd.**, owner of the Land and Facility;
- **Martin Uwe Block**, **Michael Kelly** and **Brian Martin**, directors of Cobble Hill Holdings Ltd.;
- **South Island Resource Management Ltd.**, operator of the Facility; and
- **South Island Aggregates Ltd.**, operator of the quarry reclamation program on the Land;

AND WHEREAS I consider it reasonable and necessary to lessen the risk of an escape or spill of the polluting substance (Leachate) to make the following Order;

NOW THEREFORE pursuant to Section 79 of the *Environmental Management Act*, I, Mary Polak, Minister of Environment, order as follows:

1. The Named Parties must ensure that all Leachate generated at the Facility, including from the landfill, soil management area and wheel wash area, is collected, stored temporarily pending removal from the Facility, and transported from the Facility to an off-site facility that is authorized to treat and/or dispose of the Leachate. The collection and temporary storage of Leachate at the Facility must be carried out so as to prevent an escape or spill of Leachate into the environment.

2. The Named Parties must ensure that all works for the collection and temporary storage of Leachate generated at the Facility are inspected regularly and maintained in good working order, and that records of the volumes of Leachate collected, stored and transported, including the location of the authorized facility(ies) receiving the Leachate, are maintained and submitted to the director on or immediately before the 1st and 15th day of each month. Submissions must be made electronically to the following email inbox: EnvironmentalCompliance@gov.bc.ca.

3. This Order shall take effect immediately.

4. In the event of a conflict between the provisions of this Order and the Pollution Prevent Order issued to Cobble Hill Holdings Ltd. on October 12, 2016, the provisions of this Order will prevail.

5. The Named Parties are jointly and severally responsible for fulfilling all requirements of this Order.

6. Nothing in this Order prevents the Ministry of Environment from taking any other action that may be taken under the *Environmental Management Act*.

Minister of Environment

January 27, 2017
Date

(This part is for administrative purposes only and is not part of the Order)

Authority under which Order is made:

Act and Section: *Environmental Management Act*, Section 79

Other (specify): _____

Reasons for Minister's Decision
Suspension of Permit 105809 (Cobble Hill Holdings) for Non-Compliance

Background

Authority

The *Environmental Management Act* (EMA) and Waste Discharge Regulation (WDR) stipulate that permits or other authorizations are required in order to discharge waste from prescribed industries, trades, businesses, operations and activities. The contaminated soil treatment facility and landfill operated by Cobble Hill Holdings Ltd. (CHH) at 460 Stebbings Road requires an EMA permit because it falls in the WDR Schedule 1 industry of "commercial waste management or waste disposal industry."

It is the ministry's expectation that in order to exercise the rights granted by permits issued under Section 14 of EMA, full compliance with all requirements is achieved at all times; Non-compliance with permit conditions compromises the ability of the authorization as a whole to protect the environment.

Authorizations issued under EMA are not static. Under Section 16 of EMA, permits and other authorizations can be amended for environmental protection by a Statutory Decision Maker (SDM) at any time to address issues such as changing circumstances, new information, or request of the permittee.

The Minister has authorities under Section 18 (3) of EMA to cancel or suspend a permit for numerous reasons, including for a permittee's failure to comply with the terms of a permit.

Permit & Compliance History

Permit 105809 was issued to CHH on August 21, 2013. The decision was appealed and in March 2015 the Environmental Appeal Board (EAB) upheld the permit. The permit was amended by the Director on June 4, 2015 in accordance with directions given by the EAB, and additional permit requirements were set on June 21, 2016 and on June 29, 2016.

In October 2016, staff identified to me a number of outstanding non-compliances that were not being resolved by CHH. These included:

- Failure to provide an updated closure plan, cost estimate and financial security.
- Failure to submit water management review reports for both non-contact and contact water, in accordance with a series of deadlines that included submission of interim and final deliverables for approval by the Director over the course of the summer and fall.
- Failure to meet specific water quality permit limits on certain occasions.

On October 11, 2016 I issued a letter to CHH identifying I was considering suspending or cancelling the Permit for failure to comply with the terms of the Permit. Specifically, the letter noted the non-compliances listed above.

On October 13, 2016 CHH provided a short 3 page letter suggesting that cancellation or suspension is not warranted. Upon review of the submission, I determined that the response did not adequately clarify how the specific non-compliances would be rectified in an appropriate and timely manner. I issued a follow-up letter on November 4 affording CHH the opportunity to submit information by December 20 which specifically address the non-compliant requirements identified.

As of October 31, 2016, CHH was also in non-compliance with requirements to implement report recommendations contained in approved reports. This was a direct result of not having the reports and interim deliverables submitted on time. I am not basing my decision on this non-compliance, other than to note that it relates directly to the significance on the non-compliances set out in by October 11, letter.

On December 19, the Director received two submissions from independent Qualified Professionals (QPs) engaged by CHH to undertake studies and prepare reports to address the non-compliances:

- WSP Canada Inc. (WSP) submitted a review of contact and non-contact water management systems. The report included some limited comments about the specific non-compliances with respect to water quality permit limits for the effluent discharge.
- Sperling Hansen Associates Inc. (SHA) submitted a closure plan report with cost estimates included.

No submissions were received from CHH directly.

Considerations

I have received a report from staff summarizing the permit and compliance history. Based on this I conclude as follows:

Permit requirements imposed on June 21, 2016, required an updated closure plan, including an updated cost estimate for closure and updated security for costs. This was required by July 29, 2016. Nothing in furtherance of this requirement was submitted to the Director until December 19, 2016. This was a clear violation of permit requirements.

The Closure Plan and cost estimate that was submitted was clearly deficient. The permit requirements specified that the Closure Plan, the cost estimate included in it, and the financial security, use the ministry's Landfill Criteria for Municipal Solid Waste second edition (the "2016 Criteria") for guidance. The plan including cost estimate failed to follow the 2016 Criteria on numerous key issues:

- The Closure Plan assumed a 25 year contaminating lifespan (below the minimum 30 year lifespan set by the 2016 Criteria), and did not include the necessary technical justification for a lifespan less than the defaults set by the Criteria.

- The Closure Plan proposed works (landfill base liners and water diversion that) that did not follow the 2016 Criteria, and did not provide justification for variances.
- The cost estimates failed to include numerous closure related costs, including post closure activities and contingencies.

While a requirement to use a document for guidance is not necessarily breached by some minor divergence from that document, I have concluded that ignoring numerous directives in the Criteria without any justification is contrary to permit requirements. Furthermore, cost estimates and the Closure Plan did not address several issues which were specifically required to be addressed by the permit such as post closure operation and maintenance of facilities and works, management of contact water, etc.

CHH has failed to provide an adjusted security consistent that used the 2016 Criteria and which addresses the issues identified in the June 21, 2016 letter.

Under the terms of the June 29, 2016 permit amendments, CHH was required by July 31, 2016, to submit a draft non-contact water management review report including workplan and schedule for carrying out the report's requirements, for approval and specification of any additional requirements. A final non-contact water management report was to be submitted by August 31, for approval, and the recommendations of the final non-contact water management review report were to be implemented by October 31, 2016. Also under the terms of the June 29, 2016, permit amendments, CHH was required to submit by July 31, 2016, proposed terms of reference for a contact water management review for approval, with a draft contract water management review report, including a work plan and schedule for carrying out recommendations, to be submitted by August 31. A final contact water management report was to be submitted by September 30, 2016 and the final report recommendations were to be implemented by October 31, 2016.

Despite the requirements to submit a series of terms of reference, draft reports and final reports by various dates, nothing was received until December 19, 2016. This was a clear violation of permit requirements.

The reports that have been submitted are deficient. The June 29, 2016, permit amendments provided some guidance on the contents of the non-contact review report and the contact water management review, requiring that they be "generally consistent" or "consider" certain terms of reference and information. While the use of this terminology may have resulted in some uncertainty as to what was expected or required, no effort was made by CHH or its qualified professional to make further inquiries, and the reports that were submitted by WSP on December 19, 2016 did not address a number of issues which the Director had intended to be covered. I am satisfied that even giving CHH the benefit of the doubt, the totality of deficiencies is such that the reports cannot be considered to have been compliant with the June 29, 2016 letter.

The consequence of this non-compliance is that the Director is not in a position where the reports can be approved with the Director remedying any minor deficiencies by imposing additional requirements.

The WSP report identified deficiencies and provided recommendations, but it did not include required workplans and schedules for carrying out the report's recommendations in relation to contact water and non-contact water. This was a clear breach of permit requirements. Although nothing in the permit required the permittee to do so, I note nothing was received from the permittee in the way of an acknowledgement of the conclusions and recommendations. Thus, there no indication of commitment to carry out the recommendations of the WSP report.

If a draft non-contact water review report and other documents had been submitted by the July 31 deadline, those issues could have been addressed by now. And if the reports had been submitted late but fully addressed all the issues of concern, it would be possible to approve the reports so that CHH could implement the approved reports' recommendations. Instead, we are in a situation where inadequacies in the work leave it uncertain what steps are necessary to adequately protect the environment and there is no workplan or schedule to implement the recommendations that have been made.

Finally, non-compliances with water quality permit limits (Section 1.5.3) continue. While I understand CHH may assert that the water quality permit limits are more stringent than what would normally be required, staff have confirmed that the limits were agreed to during the permitting process and were rigorously reviewed by the Environmental Appeal Board which ultimately upheld the conditions of the permit and directed the SDM to set additional requirements. A change in the permit limits would require a permit amendment with the associated technical assessments, and while CHH was advised that an application could be submitted, nothing was received.

In determining my response to the issues described above, I have further considered two factors which form the basis of the Ministry of Environment's Compliance and Enforcement Matrix that guides decision-making about non-compliance.

Considerations Relating to Risks to the Environment

While a failure to provide adequate plans and reports (such as those required by the June 2016 letters) might appear to be an administrative non-compliance, compliance with all authorization requirements is necessary to ensure protection of the environment. Conducting careful planning and engineering is foundational to the ministry's approach to protecting the environment. Impacts are to be avoided not rectified after they occur, and careful planning is paramount to achieving this. Furthermore, calculation and provision of adequate security is not a trivial matter and is a necessary contingency to ensure that environmental protection can be achieved into the future, and not at the expense of the taxpayer.

Failure to maintain compliance has resulted in significant public concern, public health concerns, and potential environmental impacts. Furthermore, incidents in the fall of both 2015 and 2016 have raised questions about the ability of the site to operate in a manner that is protective of the environment and human health. In addition to the Director needing to step in and issue a Pollution Prevention Order in October 2016, Vancouver Island Health Authority determined it was necessary to take a precautionary approach after a November 2016 incident to issue a "Do Not Use Water Advisory" on November 13, 2015.

Considerations Relating to Willingness to Comply

In the past, the permittee has not been adequately responsive (either by timely or complete responses) to the ministry, despite significant efforts on behalf of ministry staff to ensure environmental protection measures are in place and compliance is achieved. For example, the water management requirements that were set in June 2016 followed more than 6 months of efforts on behalf of staff to obtain the review reports without needing to amend the permit.

A total of 14 inspections were conducted on various aspects of the permit between April 2015 and December 31, 2016: 6 resulted in a notice of compliance and 8 resulted in non-compliance responses ranging from Advisory Letters to issuance of an Order. The number and variety of enforcement actions demonstrates a history and pattern of non-compliance at the site.

While I understand CHH may assert that during the March to November period there were times when their business was limited or suspended by the courts and that they were not in a financial position to complete the required studies. However, the EMA permit remained in effect during the court process and there was a need to ensure measures were in place to protect the environment on an ongoing basis from the waste that had been received at the site. CHH was advised that their obligations under the permit remained in effect, and that should they wish to reduce the permit fees or change their obligations during times when there was no discharge of soil to the landfill, a permit amendment would be needed and an application could be submitted.

The permittee has also been late to pay ongoing permit fees every year, further demonstrating a reluctance to follow the regulatory requirements that come with the rights granted in the permit.

Conclusions

Given the significance of the non-compliances and the permittee's lack of response to the ministry's efforts to obtain compliance, I have determined that as Minister, I am justified in exercising cancellation or suspension authorities enabled though Section 18 (3) (c) of EMA and I have made a decision to suspend the permit for failure to comply with the terms of the permit, based on the following non-compliances:

- Failure to submit the various documents referred to in the June 29, 2016 letter by the time required;
- Failure of the Closure plan and included cost estimate that were submitted on December 19, 2016 to fully satisfy permit requirements including the requirement to use the Landfill Criteria for Municipal Solid Waste for guidance;
- Updated security consistent with permit requirements was not provided;
- The WSP report did not adequately address scope issues, nor did it contain key clearly identified deliverables such as workplans and schedule for carrying out recommendations; and
- Water quality permit limits specified in Section 1.5.3 of the permit continue to be exceeded on an ongoing basis.

MINISTRY REVIEW

To: A.J. Downie, Director, Authorizations-South **Date: January 19, 2017**

From: A. Leuschen, Senior Environmental Protection Officer, Authorizations-South **File: 105809**

1. Request

Review the submitted reports:

- WSP Review of Contact and Non-Contact Water Management Systems, dated December 19, 2016, and,
- Sperling Hansen Associates (SHA), Cobble Hill Landfill Closure Plan Report, dated December 20, 2016

Provide comments and conclusions with regard to whether the submitted reports satisfy permit requirements and/or Ministry of Environment (MOE) guidance, and should be approved/accepted by the Director.

2. Background

August 21, 2013: Permit 105809 was issued.

June 4, 2015: Permit was amended.

June 21, 2016: MOE Director to permittee.

> Pursuant to sections 4.1 and 4.2 of the permit, I hereby require review, reassessment and submission of an updated closure plan certified by a qualified professional, an updated cost estimate prepared or reviewed by a suitably qualified independent third party, and updated adjusted security in the form of an ILOC, **by July 29, 2016**.
>
> The updated closure plan, cost estimate and security must satisfy the permit sections 4.1 & 4.2, including the requirements with regard to investigations, identification and assessment of any residual contamination, maintenance, monitoring, remediation and closure, including any necessary removal of contact water for off-site treatment/disposal, use the latest second edition Landfill Criteria for Municipal Solid Waste (LCMSW) for guidance, and address the preceding bullets (in the letter). Guidance regarding the irrevocable letter of credit (ILOC) was attached.

June 29, 2016: MOE Director to permittee.

Pursuant to Permit 105809 Section 2.20 Amended or Additional Requirements, I hereby require the permittee to:

1. **By July 31, 2016**, submit a draft non-contact water management review report including work plan and schedule for carrying out the report's recommendations, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements. The draft non-contact water management review and report shall be generally consistent with the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, and address the previous Stantec reports and relevant information in the MOE letters of January 22, 2016 and May 26, 2016 (page 2, MOE observations and concerns, first bullet, much higher precipitation at the on-site weather station reported in the SIRM 2015 annual and 2016 1st quarter environmental reports).
2. **By July 31, 2016**, submit a proposed terms of reference, scope, workplan and schedule for a contact water management review, and table of contents for a contact water management review report, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements. This submission shall consider the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, Contact Water - high level scope for contact water management review (page 5), and relevant information in the MOE letters of January 22, 2016 and May 26, 2016 (page 2, MOE observations and concerns, bullets).
3. **By August 31, 2016**, submit the final non-contact water management review report including work plan and schedule for carrying out the report's recommendations, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements.
4. **By August 31, 2016**, submit a draft contact water management review report including work plan and schedule for carrying out the report's recommendations, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements.
5. **By September 30, 2016**, submit the final contact water management review report including work plan and schedule for carrying out the report's recommendations, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements.
6. **By October 31, 2016**, carry out the recommendations of the final non-contact water management review report and the final contact water management review report, in accordance with the Director's approvals and any additional specified requirements.

The permit as amended June 4, 2015, and the June 21, 2016 (closure plan, cost estimate, and security) and June 29, 2016 (contact and non-contact water management review reports) letters, specify the current permit requirements.

As per the permit, the contact and non-contact water management review report, closure plan, cost estimate and security, are subject to Director approval/acceptance and specification of any additional requirements.

3. Review

The reports were reviewed within the available time period and the attached Table was prepared summarizing permit requirements and/or ministry guidance, report comments, MOE comments, and whether the permit requirement and/or MOE guidance were satisfied.

4. Results

A brief summary of the results from the attached Table follows:

WSP NON-CONTACT AND CONTACT WATER MANAGEMENT REVIEW REPORT

- The draft and final non-contact and contact water management review report(s) were not received by the required due dates specified in the MOE Director's letter dated June 29, 2016.
- The recommendations of the WSP non-contact and contact water management review report were not carried out as required by October 31, 2016.
- The WSP report did not include a required workplan and schedule for carrying out the report's recommendations.
- The permittee did not submit a commitment to carry out the recommendations of the WSP report.

NON-CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 3)

- The WSP non-contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016. The scope and content of the WSP non-contact water management review report was not fully consistent with the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, and did not fully address the previous Stantec reports and relevant information in the MOE letter of January 22, 2016.
- Recent settling pond discharge effluent sampling data as a result of Pollution Prevention Order 108608 shows permit section 1.5.3 (effluent quality limits) is not fully satisfied.
- The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. Prior technical information used the North Cowichan climate station (annual precipitation 1170 mm) IDF curve for design. This affects the design of the required non-contact water management works including the settling pond.
- The WSP report (Figure 1) shows a settling pond catchment area of 4.5 ha. This is less than the area used in prior technical information (10.4 ha), and less than the landfill area on the permit site plan. The WSP report indicates that settling pond capacity should be reviewed prior to future increases in catchment area. The catchment area affects the design of the required non-contact water management works including the settling pond.

- The WSP report indicates that (with recommended improvement to increase storage volume) the settling pond is estimated to have the capacity to settle a 19 µm sized particle and should be capable of providing approximately 16 hours of residence time. This appears inconsistent with MOE Technical Guidance 7 Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining, December 2015, initial recommended maximum 10 µm design particle size, and minimum 20 hour retention time (Method A Simplistic Design Approach).
- The WSP report identified deficiencies with the settling pond spillway chute slope, rock size, and riprap thickness, recommended improvements to increase effective pond volume, indicated additional review will be required to confirm the settling pond design meets permit requirements, and that following review, the settling pond capacity may need to be increased.
- Additional review and improvements to the settling pond will be necessary to satisfy permit requirements.

CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 4)

- The WSP contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016. The WSP report did not fully review all aspects of the contact water management system including all facilities, works, design, construction, operation, functioning and performance, systems and procedures, and its ability to treat the contact water to permit effluent quality requirements.
- Contact water effluent quality has been in non-compliance with permit requirements. The MOE Inspection record 29727, issued November 16, 2016, for 2016 2nd Quarter report, determined the permittee was in non-compliance with the contact water quality requirements (section 1.4.4): Chloride and Sulfate levels within the WTS effluent were above applicable guidelines between June 11, 2016 and June 16, 2016.
- The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. Prior technical information used the North Cowichan climate station (annual precipitation 1170 mm) IDF curve for design. This affects the design of the required contact water management works including the contact water holding pond and water treatment system.
- The WSP report proposes contact water design criteria of a 25 and/or 50 year return period rainfall event. This is inconsistent with prior technical information, including plans and specifications, that indicated the contact water management system was designed for a 200 year 24 h storm event plus snowmelt.
- The WSP report indicates the contact water holding pond has a total volume of 320 m^3 and a volume below the high water level of approximately 206 m^3. This is inconsistent with prior technical information, including plans and specifications, that indicated the volume of the contact water holding pond is approximately 1100 m^3.

- The WSP report (section 4.2) assumes a catchment area of 0.2 ha from the wheelwash and contact water containment pond (i.e. no catchment area from landfill or soil management area (gutters being installed)) and indicates that the contact water holding pond storage volume, with freeboard included, is adequate to contain runoff from the existing contact water catchment for a design event.
- The WSP report indicates that additional contact water storage will be required for future landfill encapsulation cell construction.
- The WSP report indicated the permitted annual average rate of discharge (12.1 m^3/day) is not sufficient, and the permitted maximum rate of discharge (274 m^3/day) may have to be increased if future landfill encapsulation cell areas will exceed an additional 0.20 ha.
- Additional review and improvements to the contact water management works will be necessary to satisfy permit requirements.

SHA CLOSURE PLAN, COST ESTIMATE AND SECURITY

- The updated closure plan, cost estimate, and updated adjusted security in the form of an irrevocable letter of credit (ILOC), were not submitted by July 29, 2016, as required by the MOE Director's letter dated June 21, 2016.
- The SHA report, including cost estimates, did not fully address the bullets in the MOE Director's letter dated June 21, 2016, including:
    - post-closure inspections, operation and maintenance of facilities and works, including the final cover, water treatment system, surface water management works and settling pond
    - relocation of Cell 1 to ultimate pit bottom
    - revisions and improvements to facilities and works (e.g. settling pond)
    - actual design, construction, operating, maintenance and monitoring costs; Inflation and cost increases since October 2013
    - use of the LCMSW Second Edition June 2016 for guidance (see also following bullets)
- The SHA report did not include a technical analysis of the contaminating lifespan and assumed a post-closure period of 25 years. The LCMSW Second Edition, June 2016, (section 8.3) indicates that in no case shall the post-closure period be less than 30 years and that in the absence of technical rationale to determine the contaminating lifespan of the landfill:
    - The current post closure period would be 50 years
    - For the next landfill cell, the post-closure period would be 100 years
    - At landfill closure, the post-closure period would be 200 years
- The SHA report assumed a post-closure period of 25 years that did not fully satisfy the LCMSW Second Edition June 2016.
- The SHA report cost estimates did not specifically include:
    - operation and maintenance of any on-site or off-site leachate management facilities (e.g. water treatment system)
    - operation and maintenance of site infrastructure including surface water control works, roads, fences, etc. (e.g. settling pond)
    - construction or replacement of any monitoring or control works as required
    - post-closure period in accordance with LCMSW Second Edition June 2016 (e.g. 30, 50, 100 and 200 years)
    - cost estimates presented in net present values and adjusted for inflation and discount rates
    - contingency of 20% be added to the total estimated costs

- The SHA report cost estimates, including the post-closure period, did not fully satisfy the LCMSW Second Edition June 2016.
- Additional review and discussion will also be required regarding the SHA report including:
    - Reference to the Shawnigan Lake climate station with annual precipitation approximately 1250 mm (section 2.2.5). The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site.
    - An additional settling pond located immediately North of the existing settling pond (shown on Figures).
    - Given the tight discharge constraints, SHA recommends that each cell be constructed with a base footprint of approximately 5,000 m^2 (section 6.1.1). However, an operational landfill cell area of 2,000 m^2 is used for cost estimate and security calculations (section 12).
    - Section 5, Landfill Phasing Plan, indicates that once filling has been completed on the western slopes of Phase 1, progressive final closure of the slopes is recommended (section 5.2.1). The progressive closure areas shown on Figures 5-2 to 5-6 appear larger than 0.2 or 0.5 ha.
- The SHA report proposed landfill base liner did not fully satisfy the LCMSW Second Edition, June 2016, and technical justification for a site-specific exception was not provided.
- The SHA report proposed surface/storm/non-contact water conduit pipe beneath the landfill footprint did not satisfy the LCMSW Second Edition, June 2016, and technical justification for a site-specific exception was not provided.

5. Conclusions

As indicated, the submitted reports do not fully satisfy permit requirements and/or MOE guidance.

WSP NON-CONTACT AND CONTACT WATER MANAGEMENT REVIEW REPORT

- The WSP report did not include a required workplan and schedule for carrying out the report's recommendations.
- The permittee did not submit a commitment to carry out the recommendations of the WSP report.

NON-CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 3)

- The scope and content of the WSP non-contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016 (e.g. did not address the hydrogeological investigation of shallow sub-surface flow (inter-flow), infiltration into the settling pond, and the installation and sampling of 2-3 shallow monitoring wells within the layer of blast rock (on the western property line)).

- The WSP report identified deficiencies with the settling pond overflow spillway, recommended improvements to increase effective pond volume, indicated additional review will be required to confirm the settling pond design meets permit requirements, and that following review, the settling pond capacity may need to be increased.
- The WSP report indicates that settling pond capacity should be reviewed prior to future increases in catchment area.
- In summary, additional review and improvements to the settling pond will be necessary to satisfy permit requirements.

CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 4)

- The WSP report focussed on hydrologic modelling to estimate the quantity of contact water, and assessment of the adequacy of the contact water containment pond volume, and the permitted water treatment system discharge rates, to manage the estimated quantity of contact water. However, the WSP contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016, as it did not fully review all aspects of the contact water management system including all facilities, works, design, construction, operation, functioning and performance, systems and procedures, and its ability to treat the contact water to permit effluent quality requirements.
- The WSP report indicates that additional contact water storage will be required for future landfill encapsulation cell construction.
- The WSP report indicated the permitted annual average rate of discharge is not sufficient, and the permitted maximum rate of discharge may have to be increased if future landfill encapsulation cell areas will exceed an additional 0.20 ha.
- In summary, additional review and improvements to the contact water management works will be necessary to satisfy permit requirements.

SHA CLOSURE PLAN, COST ESTIMATE AND SECURITY

- Updated adjusted security in the form of an irrevocable letter of credit (ILOC), was not submitted as required by the MOE Director's letter dated June 21, 2016.
- The SHA report, including cost estimates, did not fully address the bullets in the MOE Director's letter dated June 21, 2016.
- The SHA report cost estimates, including the post-closure period, did not fully satisfy the LCMSW Second Edition June 2016. The SHA report assumed a post-closure period of 25 years which is less than the post-closure period specified by the LCMSW. The SHA cost estimates did not include all the items specified in the LCMSW (e.g. operation and maintenance of facilities, construction or replacement of any monitoring or control works as required, post-closure period in accordance with LCMSW, cost estimates presented in net present values and adjusted for inflation and discount rates, contingency of 20% be added to the total estimated costs).

It is not recommended that the Director approve/accept the submitted reports.

To fully satisfy the permit requirements and MOE guidance, the reports would require further discussions with the permittee and their Qualified Professionals, and revisions including:

- To address the results and conclusions identified in this review.

- To fully satisfy permit requirements including the June 21, 2016 (closure plan, cost estimate, and security) and June 29, 2016 (contact and non-contact water management review reports) letters.
- To address/satisfy MOE guidance including the Landfill Criteria for Municipal Solid Waste (LCMSW) Second Edition June 2016.
- To address and confirm technical design criteria and details (e.g. climate station used for design, contact and non-contact water design storm event(s), contact and non-contact water catchment areas, active landfill areas, contact water holding pond volume, settling pond design criteria and volume, contact water maximum and annual average discharge rates, contaminating lifespan and post-closure period, post-closure cost estimates, etc.)
- To address additional review and improvements to the works, particularly the non-contact and contact water management works, to satisfy permit requirements.
- To address a workplan and schedule to carry out the recommendations of the reports, and to satisfy permit requirements.

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
WSP NON-CONTACT AND CONTACT WATER MANAGEMENT REVIEW REPORT			
The MOE Director's letter dated June 29, 2016, required the submission of proposed terms of reference, scope, workplan and schedule for a contact water management review, and draft and final non-contact and contact water management review reports, including workplan and schedule, to the Director for approval and specification of any additional requirements, and carrying out the recommendations of the reports, in accordance with the Director's approvals and any additional specified requirements, by the dates specified in the letter.	The WSP report did not include a workplan and schedule for carrying out the report's recommendations.	The draft and final non-contact and contact water management review report(s) were not received by the required due dates specified in the MOE Director's letter dated June 29, 2016. The recommendations of the WSP non-contact and contact water management review report were not carried out as required by October 31, 2016. The WSP report did not include a required workplan and schedule for carrying out the report's recommendations. The permittee did not submit a commitment to carry out the recommendations of the WSP report.	Permit requirements not satisfied
NON-CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 3)			
The MOE Director's letter dated June 29, 2016 stated: "The draft non-contact water management review and report shall be generally consistent with the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, and address the previous Stantec reports and relevant information in the MOE letters of January 22, 2016…" The MOE letter of January 22, 2016, referred to the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, and indicated: • A comprehensive review of all non-contact water management on-site is proposed including surface stormwater management and shallow sub-surface flow of water which infiltrates into the ground. (sections 1 & 2) • A primary objective of this investigation is to better define the nature of this sub-surface drainage path and this will be achieved by conducting a hydrogeological site investigation and a review of the "seepage blanket" design. Deep groundwater flow will not be included in this review. This review will focus on the shallow sub-surface flow (referred to as "inter-flow"). (section 2.1) • The first phase will focus on the hydrogeology of the immediate area around the settling pond on the western perimeter including a percolation test for the settling pond and the installation of 2-3 shallow monitoring wells within the layer of blast rock (on the western property line) to better characterize inter-flows. Depending on the results of the first phase, additional shallow wells may be required. (section 2.1) • Expansion of the monitoring program to include regular sampling from the shallow wells to be installed on the western property line. Recommendations for improving sub-surface water quality (if required). (section 2.3)	The WSP report did not address hydrogeological investigation of shallow sub-surface flow (inter-flow), infiltration into the settling pond, and the installation and sampling of 2-3 shallow monitoring wells within the layer of blast rock (on the western property line). The WSP report (section 3.1.3) did indicate that permeability tests could estimate the location and rate of infiltration but did not recommend or carry out these tests.	The WSP non-contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016. The scope and content of the WSP non-contact water management review report was not fully consistent with the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, and did not fully address the previous Stantec reports and relevant information in the MOE letter of January 22, 2016.	Permit requirements not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
The MOE letter dated January 22, 2016 further stated: For the Stantec non-contact water management review, it will be important to review available information, and address stormwater infiltration into the shallow sub-surface ("inter-flow") and west settling pond infiltration, and related flow directions, quantities and qualities, on-property, at property line(s), and off-property; please also address treated contact water inflow into the west settling pond.			
Permit section 1.5.3 (characteristics of settling pond discharge effluent). Prior technical information indicated that the non-contact water management system was designed for a 200 year 24 h storm event plus snowmelt, and the settling pond was designed to satisfy the permit section 1.5.3. Examples include: • Active Earth Engineering Ltd. Technical Assessment dated August 2012: ○ Section 2.5 Table A Shawnigan Lake climate data indicated annual precipitation of 1248 mm ○ Flow pathways will be constructed with sufficient capacity to handle a 200-year storm event including snowmelt. (section 6.1) ○ Site area is 10.4 ha (section 6.4) ○ used the 200-year 24 h storm event from the North Cowichan weather station (annual precipitation 1170 mm) IDF curve with snowmelt. The resulting rainfall/melt depth is 181.4 mm (section 6.5) ○ The storm event used for design of the stormwater management system components is based on a 200-year, 24-hour storm plus snowmelt as described in Section 6.5. (section 8.4) • MOE assessment dated August 20, 2013 section 3.7.1.7: "The proposed erosion controls and stormwater management infrastructures, including the proposed settling pond were designed to accommodate 1 in 200 year 24-hours storm events. In addition, the settling pond was designed to remove solids for 1 in 10 year 24-hour storm events as it is typically required. The calculated 1 in 200 year 24-hour storm event corresponds to 181.4 mm rain/equivalent snow melt." • Environmental Appeal Board ruling March 20, 2015: ○ "Flow pathways will be constructed with sufficient capacity to handle the "worst case scenario" of a 1-in-200 year, 24-hour storm, plus melting snowpack." (para 87) ○ "The settling pond is designed to accommodate a 1-in-200 year, 24-hour, storm event. It is also designed to remove solids for a 1-in-10 year, 24-hour, storm event." (para 110) MOE Landfill Criteria for Municipal Solid Waste Second Edition June 2016 (section 5.6 Surface Water Management Works) include: • All components of a surface water management system, including stormwater retention ponds, are to be designed to promote settling of sediment and infiltration of	The WSP report indicates the Lake Cowichan Station was selected since the recorded annual rainfall volumes were a conservative representation of those recorded at the site. Annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. WSP also indicated the hydrologic model was calibrated and validated using the available local hydrometric and meteorological data. (section 3.1.1) The WSP report (page iv) identified deficiencies and made conclusions and recommendations with regard to the settling pond: • The settling pond is estimated to have the capacity to settle a 19 µm sized particle provided that the outlet engages sufficient storage, based on Stokes' Law calculations, with a 1.5 safety factor and flow measurements from the pond outlet. The existing settling pond should be capable of providing approximately 16 hours of residence time as long as the outfall orifices are sized appropriately and located higher to provide a deep retention volume. The following additional items were noted with respect to settling pond operation: ○ A review of the typical sediment particle size distribution observed during a large rainfall event will be required to confirm if the settling pond design meets the permitted requirement of TSS concentrations not exceeding 25 mg/l for a design event. ○ Conversations with the site operations personnel indicate that a portion of the water in the settling pond infiltrates. The measured pond discharge rate will increase with time (per unit catchment size) if the infiltration rate decreases as a result of the soil and rock pore spaces	Recent settling pond discharge effluent sampling data as a result of Pollution Prevention Order 108608 shows permit section 1.5.3 (effluent quality limits) is not fully satisfied. The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. Prior technical information used the North Cowichan climate station (annual precipitation 1170 mm) IDF curve for design. This affects the design of the required non-contact water management works including the settling pond. The WSP report (Figure 1 & section 3.1.1) shows a settling pond catchment area of 4.5 ha. This is less than the area used in prior technical information (10.4 ha), and less than the landfill area on the permit site plan. The WSP report indicates that settling pond capacity should be reviewed prior to future increases in catchment area. The catchment area affects the design of the required non-contact water management works including the settling pond. The WSP report indicates that (with recommended improvement to increase storage volume) the settling pond is estimated to have the capacity to settle a 19 µm sized particle and should be capable of providing approximately 16 hours of residence time. This appears inconsistent with MOE Technical Guidance 7 Assessing the Design, Size, and Operation of	Permit requirements not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
retained storm water for groundwater recharge where possible. • Ponds are to be designed with low flow control structures and high flow overflow spillways. • Surface water ditches and retention ponds shall be designed for the control and retention of a 1:100-year, 24-hour storm event. • The design shall make allowances for additional water that may result from snow melt and from prolonged multi-day precipitation events. MOE Technical Guidance 7, Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining, December 2015 includes: • MoE recommends that sediment ponds be designed to capture at least a 10 micron soil particle for the 10-year, 24-hour runoff event. However, it must be recognized that such a design may not on its own achieve the discharge quality required by MoE permits. (section 5.1) • In the absence of any mitigating factors, the pond should be sized to provide not less than a 20 hour retention time for a 1 in 10 year runoff flow, and longer if the calculations above indicate it is necessary. (section 6.1 Method A Simplistic Design Approach)	filling with sediment. This change will reduce the effectiveness of the pond; the impact should be considered in future design changes. ○ Settling pond capacity should be reviewed prior to future increases in catchment area. ○ The settling pond spillway chute slope, rock size, and riprap thickness were observed to be deficient during a site visit. The spillway design and armouring is recommended to be reviewed and redesigned as soon as possible to provide adequate erosion protection. ○ The effectiveness of the settling pond is impacted by the location of the outlet orifices, which are near the bottom of the pond. As a result, the pond provides a small volume of detention storage and most likely discharges partially settled sediment. The outlet water quality can be improved if the orifices are raised. The WSP report identified corrective action to address permit exceedances (sections 5.2 & 5.3): • Corrective Action Taken To Address Turbidity Exceedances: The first step was to evaluate the adequacy of the current settling pond. Section 3.1.3 of this report provides estimates of the current settling pond capacity. Moving forward, the next step will be to determine the actual particle size distribution in runoff from the site during a heavy rainfall event. With the particle size distribution it will be possible to provide a better estimate for a suitable settling pond size. This may result in a need to increase the capacity of the settling pond. • Corrective Action Taken To Address Total Iron Exceedances: Elevated levels of iron are believed to be naturally occurring from the mine pit. Thus the heavy turbidity loading from the non-contact mine water likely contains suspended iron particles. Analysis to verify the proportion of dissolved and suspended iron will confirm if a reduction in the TSS and turbidity will be sufficient to keep total iron levels below the 1 mg/L guideline.	Sediment Ponds Used in Mining, December 2015, initial recommended maximum 10 µm design particle size, and minimum 20 hour retention time (Method A Simplistic Design Approach). The WSP report identified deficiencies with the settling pond spillway chute slope, rock size, and riprap thickness, recommended improvements to increase effective pond volume, indicated additional review will be required to confirm the settling pond design meets permit requirements, and that following review, the settling pond capacity may need to be increased. Additional review and improvements to the settling pond will be necessary to satisfy permit requirements.	

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
	The WSP report also identified actions with regard to the east-west ditch (section 3.2.1): The riprap armouring in the lower portions of the ditch where flow is concentrated could be supplemented to increase the thickness and should extend to the full height of the ditch. The ditch should be monitored for erosion concerns following major rainfall events. Additional rock could be added if the existing riprap appears to be impacted by the flow.		
CONTACT WATER MANAGEMENT (WSP REPORT – MAINLY SECTION 4)			
The MOE Director's letter dated June 29, 2016, required that the permittee submit a proposed terms of reference, scope, workplan and schedule for a contact water management review, and table of contents for a contact water management review report, prepared and certified by an independent qualified professional, to the Director for approval and specification of any additional requirements. This submission shall consider the Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, Contact Water - high level scope for contact water management review (page 5), and relevant information in the MOE letters of January 22, 2016 and May 26, 2016 (page 2, MOE observations and concerns, bullets). The Stantec Terms of Reference Water Management Assessment, dated January 15, 2016, Contact Water - high level scope for contact water management review (page 5) included: • Stantec will conduct a peer review of all available design criteria, as-built drawings, operational records, test data that pertain to the on-site Water Treatment System, designed to treat contact water to be in compliance with the most stringent of either BC Surface Water Quality Guidelines for Drinking Water or the protection of Aquatic Life. Stantec will assess the suitability of the treatment system to meet the permit requirements, and make recommendations for upgrades if required. • A detailed review of all available information pertaining to the other aspects of the contact water management system, including the contact pond, soil management area, permanent encapsulation cells, and piping between these locations, will be reviewed to ensure ongoing compliance with the MOE permit. The MOE Director's letter of January 22, 2016, also included: • A review of contact water management will be addressed in a separate document (scope, terms of reference, description and schedule) and report. A high level scope includes review of all available information pertaining to the water treatment system, assessment of the suitability of the water treatment system to meet permit requirements and recommendations for upgrades if required. Review of all available information pertaining to other aspects of the contact water management system including the contact pond, soil management area, permanent encapsulation cells, and piping. (sections 1, 2, 2.3 & 2.4)	The WSP report focussed on hydrologic modelling to estimate the quantity of contact water, and assessment of the adequacy of the contact water containment pond volume, and the permitted water treatment system discharge rates, to manage the estimated quantity of contact water.	The WSP contact water management review report did not fully satisfy the MOE Director's letter dated June 29, 2016. The WSP report did not fully review all aspects of the contact water management system including all facilities, works, design, construction, operation, functioning and performance, systems and procedures, and its ability to treat the contact water to permit effluent quality requirements. Contact water effluent quality has been in non-compliance with permit requirements. The MOE Inspection record 29727, issued November 16, 2016, for 2016 2nd Quarter report, determined the permittee was in non-compliance with the contact water quality requirements (section 1.4.4): Chloride and Sulfate levels within the WTS effluent were above applicable guidelines between June 11, 2016 and June 16, 2016.	Permit requirements not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
• As indicated in prior ministry correspondence, the ministry expects the independent site engineering consultant (Stantec) to conduct full reviews and assessments of non-contact water management and contact water management, for Lot 23, including facilities, works, design, construction, operation, functioning and performance, systems and procedures, and to prepare reports including conclusions and recommendations.			

Prior technical information indicated that the contact water management system was designed for a 200 year 24 h storm event plus snowmelt. Examples include:
• Active Earth Engineering Ltd. Technical Assessment dated August 2012:
  • Section 2.5 Table A Shawnigan Lake climate data indicated annual precipitation of 1248 mm
  • Flow pathways will be constructed with sufficient capacity to handle a 200-year storm event including snowmelt. (section 6.1)
  • used the 200 year 24 h storm event from the North Cowichan weather station (annual precipitation 1170 mm) IDF curve with snowmelt. The resulting rainfall/melt depth is 181.4 mm (section 6.5)
  • used a 200 year storm event and a 24 hour duration storm for calculation of the contact water flows from the soil management area (1800 m^2) and the permanent encapsulation area (1800 m^2) (section 6.7)
• MOE Assessment dated August 20, 2013, page 43 states: "…the water treatment system was designed to treat all incoming flows up to a 1 in 200 year 24-hour flood event." The total area used to calculate the design peak flow include an area of 1800 m^2 for the soil management and treatment facility (Subsection 1.2 of the draft permit) and area of 1800 m^2 for any active portions of the landfill (Subsection 1.3). The peak flow associated to the water treatment is estimated at 274 m3/d"
• Active Earth Engineering Ltd., As-Built Summary – Soil Management Area dated October 29, 2013, states: "This holding pond is sized to handle a 200 year storm plus snowmelt assuming the entire SMA is uncovered. The holding pond is 25 m by 25 m for a surface area of 625 m^2. The pond is 4 m deep with side slopes of 2:1 (H:V), which gives it a capacity of approximately 1,100 m^3."
• Active Earth Engineering Ltd., As-Built Summary – Water Management System, dated December 6, 2013 states: "The Containment Reservoir is 25m by 25m for a surface area of 625m^2. The pond is lined with a 30 mil LLDPE synthetic liner and is 4m deep with side slopes of 2:1 (H:V), which gives it a capacity of approximately 1,100m^3."
• Environmental Appeal Board decision dated March 20, 2015, paragraph 266, states the delegate "..required that the water treatment facility be designed to treat a 1-in-200 year flood event;
• The SIRM Environmental Procedures Manual/Operation, Maintenance and Surveillance Manual, dated March 31, 2016 indicates:
  ○ The "worst case scenario" that was used to design the components of the
	The WSP report indicates the Lake Cowichan Station was selected since the recorded annual rainfall volumes were a conservative representation of those recorded at the site. Annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. WSP also indicated the hydrologic model was calibrated and validated using the available local hydrometric and meteorological data. (section 3.1.1)
	
	The WSP Report states:
	• Contact stormwater and primary and secondary containment effluent infrastructure should be designed, at a minimum, to convey the 25-year return period rainfall event, based on best management practice;
	  • Containment systems, including ponds and tanks, should have capacity for the entire storm event runoff volume, as a contingency in the event of a WTS failure.
	  • Containment storage facilities (ponds and tanks) should be drawn down within 48 hours, based on best management practice as outlined in (Fisheries and Oceans Canada, 1993). (section 2.1)
	• Calculations are based on the projected runoff from a 25-year return period rainfall event, as a minimum requirement based on best management practice. The results are compared against runoff volumes from a 50-year return period rainfall event to assess the impact of a more severe event. (section 4)
	
	The WSP report (section 4.2) assumes a catchment area of 0.2 ha from the wheelwash and contact water containment pond (i.e. no catchment area from landfill or soil management area (gutters being installed)) and
		The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. Prior technical information used the North Cowichan climate station (annual precipitation 1170 mm) IDF curve for design. This affects the design of the required contact water management works including the contact water holding pond and water treatment system.
		
		The WSP report proposes contact water design criteria of a 25 and/or 50 year return period rainfall event. This is inconsistent with prior technical information, including plans and specifications, that indicated the contact water management system was designed for a 200 year 24 h storm event plus snowmelt.
		
		The WSP report indicates the contact water holding pond has a total volume of 320 m^3 and a volume below the high water level of approximately 206 m^3. This is inconsistent with prior technical information, including plans and specifications, that indicated the volume of the contact water holding pond is approximately 1100 m^3.
		
		The WSP report (section 4.2) assumes a catchment area of 0.2 ha from the wheelwash and contact water containment pond (i.e. no catchment area from landfill or soil management area (gutters being installed)) and indicates that the contact water holding pond storage volume, with freeboard included, is adequate to contain runoff from the existing contact water catchment for a design event.
			Permit requirements not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
water management system, included a melting snowpack during a 1/200 year rainfall event. The 200-year storm event from the North Cowichan Rainfall Intensity Duration Frequency (IDF) curve was used... The values for additional rainfall from snowmelt were added to the 200 year rainfall depths to provide a "worst case scenario" event which conservatively models complete melting of a 300 mm snow pack concurrently with a 24 hour 200 year rainfall event (SNOWPACK + 200). The resulting rainfall/melt depth is 181.4 mm... (section 7.1) ○ 7.3 Contact Water: Soil Management Area Run-off - Any water incident to the SMA is collected within a catch basin via gravity flow across the paved asphalt surface. The catch basin water is piped to a Containment Pond capable of storing up to 326.6 m^3 of water. The volume was set based on the size of the uncovered, paved surface of the Soil Management Area (1,800 m^2) and the design 1-in-200 year storm event (181.4 mm). (section 7.3) MOE Landfill Criteria for Municipal Solid Waste Second Edition June 2016, state – "The leachate quantity assessment shall identify the expected leachate quantities that will be generated by the facility on a phase by phase basis, both under average and extreme conditions." Typically, on-site treatment will require flow equalization.. (section 10.3.3) and, for surface water management, "The design shall make allowances for additional water that may result from snow melt and from prolonged multi-day precipitation events." (section 5.6)	indicates that the contact water holding pond storage volume, with freeboard included, is adequate to contain runoff from the existing contact water catchment for a design event. The WSP report indicates that additional contact water storage will be required for future landfill encapsulation cell construction. The WSP report (section 4.2) states: The existing containment pond is estimated to have a total volume of 320 m^3, based on survey data provided by the client. Approximately 206 m^3 of storage is available below the HWL. The WSP report (page iv) identified deficiencies and made conclusions and recommendations with regard to contact water: • The design runoff depth for contact water catchment is estimated to be 136 mm, based on a 25-year 24-hour design event. Storage should be provided for 100 % of the runoff volume. • The existing containment pond storage volume, with freeboard included, is adequate to contain runoff from the existing contact water catchment for a design event. Additional storage will be required for future encapsulation cell construction. • The permitted Maximum Rate of Discharge should be increased if future encapsulation areas will exceed an additional 0.20 ha, based on a 48-hour drawdown of the stored contact water. This constraint is dependent on sufficient containment storage volume being available. (The SHA report (section 6.1.1) states: Given the tight discharge constraints, SHA recommends that each cell be constructed with a base footprint of approximately 5,000 m^2 ...(i.e. 0.5 ha)) • The permitted Annual Average Rate of Discharge, 12.1 m^3/day, is not sufficient for the existing contact water catchment, based on calculations using measured rainfall volumes for the year 1997 (peak recorded rainfall year) at Lake Cowichan. These calculations show that the permitted annual average discharge rate is not sufficient for an extreme rainfall year. The permitted discharge rate should be	The WSP report indicates that additional contact water storage will be required for future landfill encapsulation cell construction. The WSP report indicated the permitted annual average rate of discharge (12.1 m^3/day) is not sufficient, and the permitted maximum rate of discharge (274 m^3/day) may have to be increased if future landfill encapsulation cell areas will exceed an additional 0.20 ha. Additional review and improvements to the contact water management works will be necessary to satisfy permit requirements.	

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
	increased to 14.8 m^3/day to cover the existing drainage area, with consideration given to the footprint of future encapsulation cells (additional discharge rate equivalent to 74.3 m^3/ha-day). • The WTS discharge rate should be limited to not exceed the Maximum Rate of Discharge unless runoff is approaching the storage capacity of the containment system. The intent is to have "checks" on the system to ensure the Maximum Rate of Discharge is exceeded only when absolutely necessary. Corrective Action Taken To Address Flow Exceedances (section 5.1): A review of the flows to the WTS indicated that water other than contact water had been entering the WTS resulting in flows exceeding the capacity of the system. SIRM has already constructed a roof over the soil area and is in the process of attaching a gutter system to direct this source of noncontact away from the WTS.		
SHA CLOSURE PLAN, COST ESTIMATE AND SECURITY			
MOE Director's letter dated June 21, 2016 required submission of an updated closure plan, cost estimate, and updated adjusted security in the form of an irrevocable letter of credit (ILOC), by July 29, 2016. MOE Director's letter dated June 21, 2016 also required: The updated closure plan, cost estimate and security must satisfy the permit sections 4.1 & 4.2, including the requirements with regard to investigations, identification and assessment of any residual contamination, maintenance, monitoring, remediation and closure, including any necessary removal of contact water for off-site treatment/disposal, use the latest second edition Landfill Criteria for Municipal Solid Waste (LCMSW) for guidance, and address the bullets in the letter. Guidance regarding the irrevocable letter of credit (ILOC) was attached. Bullets in the letter to be addressed included: The October 2013 closure plan and cost estimate included: • Monitoring for 25 years but not including post-closure inspections, operation and maintenance of facilities and works, including the final cover, water treatment system, surface water management works and settling pond. Circumstances and items that have arisen since October 2013 include: • The Ministry of Environment (MOE) developed the second edition of the LCMSW available on the ministry website at:	The SHA report indicated: • Given the current conditions at the site, where one fully encapsulated contaminated soil cell exists and has been completely lined and closed off, as well as the fact that Cobble Hill Landfill (CHL) does not plan to manage contaminated soil onsite until further quarrying takes place to make room for further landfilling, SHA believes that the current bonding is adequate to address current liabilities; however, additional bonding should be posted prior to commencing the development of a new contaminated soil cell. (section 12) • Long term monitoring of surface water, groundwater and ambient air is required for up to 25 years. (section 12.1.1 & 12.1.2) • The total cost of the current security posting totals approximately $220,000. (section 12.1.1) • The total cost of the updated security posting totals approximately $331,000. (section 12.1.2) • SHA report Figures 3-1 & 4-2, appear to imply that the existing Cell 1 will be relocated to the ultimate	The updated closure plan, cost estimate, and updated adjusted security in the form of an irrevocable letter of credit (ILOC), were not submitted by July 29, 2016, as required by the MOE Director's letter dated June 21, 2016. The SHA report, including cost estimates, did not fully address the bullets in the MOE Director's letter dated June 21, 2016, including: • post-closure inspections, operation and maintenance of facilities and works, including the final cover, water treatment system, surface water management works and settling pond • relocation of Cell 1 to ultimate pit bottom • revisions and improvements to facilities and works (e.g. settling pond) • actual design, construction, operating, maintenance and monitoring costs; Inflation and cost increases since October 2013 • use of the LCMSW Second Edition June 2016 for guidance (see also following rows)	Permit requirements not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
http://www2.gov.bc.ca/gov/content/environment/waste-management/garbage/landfills/landfill-criteria-for-municipal-solid-waste. The second edition LCMSW includes updated design criteria for final cover design (s. 5.8), final contours (s. 5.9), closure and post-closure criteria (s. 7), financial security (s. 8) and closure plan (s. 10.3.4), and should be reviewed and used for guidance. • The Active Earth Engineering Ltd. Bedrock Integrity Inspection and Risk Assessment, dated October 10, 2013, indicates that Cell 1 was constructed approximately 15 metres above the ultimate pit bottom and will be relocated in the future and the underlying bedrock will ultimately be mined. If relocation of Cell 1 to the ultimate pit bottom is still planned, the closure plan, cost estimate and security must address this. • Revisions to facilities and works. In June 2015, the permit was amended to specify additional requirements, works and receiving environment monitoring. In late 2015/early 2016, an independent site engineering consultant (Stantec) prepared reports and recommendations for revisions to facilities and works that have been partially implemented. In May 2016, the MOE requested a proposed updated workplan and schedule, including for the non-contact and contact water management reviews by the independent site engineering consultant, that may result in additional revisions to facilities, works and monitoring. SIRM also recently indicated in its letter of June 09, 2016, that a second lined contact water retention pond will be constructed. • Actual design, construction, operating, maintenance and monitoring costs for the facilities and works, including the water treatment system and settling pond, and removal of contact water for off-site treatment/disposal, should be available. • Inflation and cost increases since October 2013.	pit bottom but this is not explicitly stated. • There should be a monitoring program put in place to test any groundwater seepage draining from under the landfill to ensure no leakage of the basal liner system is occurring. (section 7.3) • It is anticipated that the existing Water Treatment System (WTS) will remain in operation until leachate generation is no longer a significant concern. (section 11.1) • SHA proposes to establish two more monitoring wells at least 1 km away from the site to safely account for any groundwater mixing between the rock fractures (section 11.3)		
The Permit section 4.2 specifies a minimum 25 year post-closure period. The MOE Director's letter of June 21, 2016, required use of the LCMSW Second Edition, June 2016, for guidance. The LCMSW specify: The post-closure period for which post-closure care will be required shall be determined based on the contaminating lifespan of the landfill. When determining the necessary funding level for post-closure care (a closure fund for public landfills and financial security for private landfills), a technical analysis of the expected contaminating lifespan shall be undertaken by a Qualified Professional. In the absence of technical rationale to determine the contaminating lifespan of the landfill, a lifespan of 50 years shall be used for landfills with less than 100,000 tonnes of MSW in place, 100 years shall be used for landfills with less than 1,000,000 tonnes of MSW in place and 200 years shall be used as the default for landfills with more than 1,000,000 tonnes of MSW in place. In no case shall the post-closure period be less than 30 years. (section 8.3)	The SHA report did not include a technical analysis of the contaminating lifespan and assumed a post-closure period of 25 years. The SHA report (section 4.2) indicates that final landfill volume would be approximately 1,230,000 m^3 of airspace (i.e. more than 1 million tonnes).	The current landfill tonnage is estimated as 44,722 (from 2015 annual report) + 49,513.36 tonnes (2016 Q3 report) = 94,235 tonnes (i.e. slightly less than 100,000 tonnes). The SHA report did not include a technical analysis of the contaminating lifespan and assumed a post-closure period of 25 years. The LCMSW Second Edition, June 2016, (section 8.3) indicates that in no case shall the post-closure period be less than 30 years and that in the absence of technical rationale to determine the contaminating lifespan of the landfill: • The current post closure period would be 50 years • For the next landfill cell, the post-closure period would be 100 years	MOE guidance not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
As a minimum, the contaminating lifespan of a landfill shall not be assumed to be less than 30 years when determining the requirements for post-closure operation and maintenance and the amount of financial security required for the landfill site. (section 7.4)		• At landfill closure, the post-closure period would be 200 years The SHA report assumed a post-closure period of 25 years that did not fully satisfy the LCMSW Second Edition June 2016.	
The MOE Director's letter of June 21, 2016, required use of the LCMSW Second Edition, June 2016, for guidance. The LCMSW specify: • Financial security for private landfills and a closure fund for publicly-owned landfills shall match liabilities throughout the life of the site. The amount shall be adequate to close the site at any point in its operational life and continue with post-closure care (section 8.1) • post-closure cost estimate should consider operation and maintenance of any on-site or off-site leachate management facilities, Operation and maintenance of site infrastructure including surface water control works, roads, fences, etc., Construction or replacement of any monitoring or control works as required. (section 8.2) • A contingency of 20% shall be added to the total estimated costs. All cost estimates should be presented in net present values and adjusted for inflation and discount rates. (section 8.4).	The SHA report included cost estimates for current and future site conditions (section 12). The SHA report also includes: • Reference to the Shawnigan Lake climate station with annual precipitation approximately 1250 mm (section 2.2.5). The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site. • An additional settling pond located immediately North of the existing settling pond (shown on Figures). • Given the tight discharge constraints, SHA recommends that each cell be constructed with a base footprint of approximately 5,000 m^2 (section 6.1.1). However, an operational landfill cell area of 2,000 m^2 is used for cost estimate and security calculations (section 12). • Section 5, Landfill Phasing Plan, indicates that once filling has been completed on the western slopes of Phase 1, progressive final closure of the slopes is recommended (section 5.2.1). The progressive closure areas shown on Figures 5-2 to 5-6 appear larger than 0.2 or 0.5 ha.	The SHA report cost estimates did not specifically include: • operation and maintenance of any on-site or off-site leachate management facilities (e.g. water treatment system) • operation and maintenance of site infrastructure including surface water control works, roads, fences, etc. (e.g. settling pond) • construction or replacement of any monitoring or control works as required • post-closure period in accordance with LCMSW Second Edition June 2016 (e.g. 30, 50, 100 and 200 years) • cost estimates presented in net present values and adjusted for inflation and discount rates • contingency of 20% be added to the total estimated costs The SHA report cost estimates, including the post-closure period, did not fully satisfy the LCMSW Second Edition June 2016. Additional review and discussion will also be required regarding the SHA report including: • Reference to the to the Shawnigan Lake climate station with annual precipitation approximately 1250 mm (section 2.2.5). The WSP report used the Lake Cowichan climate station (annual precipitation 2047.5 mm), calibrated and validated using the available local hydrometric and meteorological data, for design. The WSP report indicated that annual rainfall volumes at other local meteorological stations with IDF curves (North Cowichan and Victoria International Airport) are significantly less than that observed at the Site.	MOE guidance not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
		• An additional settling pond located immediately North of the existing settling pond (shown on Figures). • Given the tight discharge constraints, SHA recommends that each cell be constructed with a base footprint of approximately 5,000 m^2 (section 6.1.1). However, an operational landfill cell area of 2,000 m^2 is used for cost estimate and security calculations (section 12). • Section 5, Landfill Phasing Plan, indicates that Once filling has been completed on the western slopes of Phase 1, progressive final closure of the slopes is recommended (section 5.2.1). The progressive closure areas shown on Figures 5-2 to 5-6 appear larger than 0.2 or 0.5 ha.	
The existing Cell 1 includes 1 m compacted clay and a 40 mil LLDPE landfill base liner. The Environmental Appeal Board decision dated March 20, 2015, referred to a 40 mil LLDPE landfill base liner. The MOE Director's letter of June 21, 2016, required use of the LCMSW Second Edition, June 2016, for guidance. The LCMSW (section 5.4) specify: The landfill base liner (illustrated on Figure 5.3) shall be comprised of a primary High Density Polyethylene (HDPE) geomembrane liner and a secondary compacted clay liner or Geosynthetic Clay Liner (GCL). HDPE geomembrane thickness of 1.5 mm (60 mil).	The SHA report (section 6.1) indicates: The engineered basal liner system recommended by SHA includes a double lined system composed of a geosynthetic clay liner (GCL) overlain by a 40mil HPDE geomembrane liner.	The SHA report proposed landfill base liner did not fully satisfy the LCMSW Second Edition, June 2016, and technical justification for a site-specific exception was not provided.	MOE guidance not satisfied
The LCMSW (section 3.6) specifies: Diversion of water through culverts beneath the landfill footprint is not allowed.	The SHA report (section 5.2 & Figures 5-1 to 5-6) shows a surface/storm/non-contact water conduit pipe beneath the landfill footprint. The SHA report includes: • Three conduit pipes are proposed to convey water from the east side of the Phase 1 reclamation fill to the treatment ponds: one pipe for contact water, a second for clean run-off from closed cells and a third for groundwater captured in the leak detection system. A fourth large diameter pipe may be added to manage storm water from within the active quarry area, if there is a need to keep this water separate from clean run-off. (section 5.2.1)	The SHA report proposed surface/storm/non-contact water conduit pipe beneath the landfill footprint did not satisfy the LCMSW Second Edition, June 2016, and technical justification for a site-specific exception was not provided.	MOE guidance not satisfied

Permit Requirement and/or Ministry Guidance	Report Comments	MOE Comments	Permit Requirement and/or MOE Guidance Satisfied?
	• The three storm water, contact water and leak detection conduits will get extended under the base of Phase 2 and daylight on the central eastern slopes of the phase. (section 5.2.2)		

LANDFILL CRITERIA FOR MUNICIPAL SOLID WASTE

Second Edition

BRITISH COLUMBIA

BC Ministry of Environment

JUNE 2016

8.5 REVIEW PERIOD

Cost estimates should be reviewed at the commencement of a new landfill phase or where there has been a significant design revision. Regardless, the period for review should not exceed 5 years.

8.6 TYPES OF FINANCIAL SECURITY

An irrevocable letter of credit (ILOC) and a Surety Bond are the acceptable forms of financial security.

An ILOC is a promise from a financial institution to the province that at the request of the province funds up to the agreed sum of money will be paid to the province. It can't be cancelled or amended and must automatically renew on expiry unless advance notice is provided to the province. It is an assured method of securing payment because the promise to pay is directly from the financial institution to the Ministry. In addition, an Irrevocable Letter of Credit allows for incremental additions each year should that be desired.

An ILOC should only be accepted if it is issued by a financial institution which meets all of the following qualifying criteria:

a. Canadian Chartered Schedule 1, 2, or 3 Banks or Canadian Credit Unions;
b. Senior unsecured long term credit rating of Standard and Poor's A+, Moody's A1, or Dominion Bond Rating Service A (high), (determined by the lowest rating); and,
c. An office in Canada.

A Surety Bond is a three-party agreement where the surety company promises to perform obligations of the bonded party or pay up to an agreed sum of money to the beneficiary if the bonded party fails to perform those obligations.

Surety Bonds are suited to short-term projects where contract performance specifications are measurable and/or the length of time to completion is readily determinable and an appropriate bond is available. Depending on the obligations to be bonded, a renewable or longer term surety may be available. Like the Irrevocable Letter of Credit, a Surety Bond is irrevocable.

- Operation and maintenance of site infrastructure including surface water control works, roads, fences, etc.
- Construction or replacement of any monitoring or control works as required.
- Annual environmental monitoring and reporting.

Contingency Measures Cost

Activities to be included are the costs of implementing and maintaining the contingency measures included in the DOCP.

8.3 POST-CLOSURE PERIOD

The post-closure period for which post-closure care will be required shall be determined based on the contaminating lifespan of the landfill. When determining the necessary funding level for post-closure care (a closure fund for public landfills and financial security for private landfills), a technical analysis of the expected contaminating lifespan shall be undertaken by a Qualified Professional. In the absence of technical rationale to determine the contaminating lifespan of the landfill, a lifespan of 50 years shall be used for landfills with less than 100,000 tonnes of MSW in place, 100 years shall be used for landfills with less than 1,000,000 tonnes of MSW in place and 200 years shall be used as the default for landfills with more than 1,000,000 tonnes of MSW in place. In no case shall the post-closure period be less than 30 years.

8.4 COST TO BE PRESENTED IN CURRENT DOLLARS

All cost estimates should be presented in net present values and adjusted for inflation and discount rates. Inflation rates shall be based on the *British Columbia Consumer Price Index* averaged over the preceding 10 year period or as recommended by a Qualified Professional. Discount rates shall be based on the current *Government of Canada Long Term Bond Yield* or as recommended by a Qualified Professional.

The default for the real rate of return (i.e. the difference between the discount rate and inflation rate) shall be 2% unless otherwise determined by a member of *Canadian Institute of Actuaries* or other Qualified Professional with comparable expertise.

8.2 CALCULATING FINANCIAL SECURITY

The amount of financial security shall be calculated as the sum of the following costs:

- Cost of emergency closure or planned closure, whichever cost is greater.
- Cost of post-closure operation, maintenance, monitoring and reporting for the contaminating lifespan.
- Cost of implementing contingency measures.

Each task or activity associated with closure and post-closure care shall be detailed and estimated in performing financial security calculations. Costs for each task or activity should be determined by multiplying the unit cost by the number of units (e.g. cost to develop a well X number of wells). All costs shall be identified individually and tabulated for each phase of landfill development. Estimates shall include costs associated with administration, engineering assessment and construction oversight.

The estimated costs shall not be reduced by the value of any assets. A contingency of 20% shall be added to the total estimated costs.

Closure Costs

Activities to be considered in the closure costs include:

- Compaction, grading of the landfill surface area.
- Final cover placement and the establishment of vegetation.
- Installation of fences, gates, surface water control works, passive landfill gas venting system and construction of any other monitoring and control works that may be required for the post-closure period.

Post-Closure Costs

Activities to be considered in the post-closure cost estimate are:

- Management and maintenance of the landfill final cover including fertilizing, irrigating and re-seeding of the vegetative cover as anticipated.
- Operation and maintenance of any on-site or off-site leachate management facilities.
- Operation and maintenance of landfill gas management facilities.

8.0 FINANCIAL SECURITY

Financial security is required for all privately-owned landfills.

Public landfill owners including Regional Districts and municipalities are required to follow the Public Sector Accounting Board's (PSAB) financial reporting model for annual financial reporting purposes. Section PS 3270 requires that financial liability for closure and post-closure monitoring costs of municipal solid waste landfills is properly recognized and adequately funded. A dedicated closure fund should be established to promote local government accounting and ensure that taxpayers are appropriately funding the future liability associated with the landfills, including progressive closure and post-closure care and monitoring. This is not considered financial security.

8.1 AMOUNT OF FINANCIAL SECURITY

Financial security for private landfills and a closure fund for publicly-owned landfills shall match liabilities throughout the life of the site. The amount shall be adequate to close the site at any point in its operational life and continue with post-closure care which includes leachate and landfill gas management, maintenance, monitoring and other environmental protection measures as necessary. Liabilities should be estimated for each phase of development such as:

1. Maximum land disturbance as a result of site development before any waste is placed in the landfill.
2. Nearing completion of each phase of the landfill development and including post-closure care costs.
3. Just prior to final closure of the landfill and including post-closure care costs. This will typically be the point of maximum liability.
4. Post-closure care.

The initial financial security deposit will, at minimum, match the estimate determined by number (1). Increasing financial security shall match costs projected and the timeline for each phase of development (2). At the time of site closure, the financial security shall be adequate to offset final closure (3) and post-closure care costs (4).