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Yukon Energy, Mines and Resources
Assessment and Abandoned Mines
PO Box 2703 (K-419)
Whitehorse, YT
Y1A 2C6 Canada

Attention: Ms. Josée Perron and Mr. Wade McMillan

Dear Ms. Perron and Mr. McMillan:

**RE: CLINTON CREEK REMEDIATION OPTIONS - PUBLIC ACCESS
ASSESSMENT**

WorleyParsons Canada Services Ltd. (WorleyParsons) has been retained by Assessment and Abandoned Mines (AAM) to present the anticipated public access approach that will be associated with each of the remediation options assessed as part of the Clinton Creek Site Closure Options - Life Cycle Cost Analysis (LCCA) project, including alternatives.

This letter summarizes the anticipated approach, and will become an addendum to the life cycle cost analysis project report (Reference No. 307071-00895-00-WW-REP-0001).

1. METHOD OF ASSESSMENT

The Clinton Creek site includes both Clinton Creek and Wolverine Creek. Each of the remediation options has been evaluated to determine whether safe public access to the site:

- May be achieved;
- Would not be anticipated; or
- May be achieved with additional option-specific risk mitigation measures in place.

This assessment considers the safety aspects to typical public access, and not unusual or excessive loads.

The following general philosophies have been considered in the assessment.

- Where the waste rock (in the case of the Clinton Creek options) is to be stabilized, public access may be achieved.
- Where the tailings pile (in the case of the Wolverine Creek options) is to be stabilized, public access may be achieved.



- Where no channel armouring is proposed for Clinton Creek, the existing access road in this area is at risk of failure during peak flow events. Public access may be achieved with these options; however, a regular safety inspection of the access road (after peak flow events) is recommended.
- Where implementation of an option results in increasing impounded water levels in Wolverine Pond (upstream of the tailings pile), an assessment of whether a Dam Safety Review (DSR) (under the Canadian Dam Safety Regulations) is required. If the DSR results in the site being classified as a dam, additional safety aspects will need to be addressed, and a regular inspection and monitoring program implemented.

2. REMEDIATION OPTIONS PUBLIC ACCESS ASSESSMENT

2.1 General

This assessment is based on information available at the time of issuance of this letter and the assumptions in the LCCA report. Should some of the information or assumptions be modified during the detailed design stage, the recommendations put forward in this letter may no longer be valid.

The ultimately selected remediation option will need to address access and monitoring (particularly slope stability) requirements, and a site wide risk assessment should be completed.

This letter does not explicitly consider the potential human safety implications of exposure to asbestos fibres, from either the tailings pile or waste rock piles. All options noted below leave some possibility for human exposure to airborne asbestos fibres. The risks of this exposure and potential mitigative measures are outside the scope of this letter and should be considered through a formal Human Health Risk Assessment (HHRA) before allowing public access to the site.

Table A and Table B provide a summary of the public access approaches for the Clinton Creek and Wolverine Creek remediation options.

It is noted that the future slope stability assessments to be carried out by a registered geotechnical engineer (as recommended above), DSRs (if required), and/or HHRA may alter the approaches outlined in this letter.

2.2 Clinton Creek Public Access Summary

Table A Clinton Creek Public Access Summary

Option	Description	Public Access Approach	Option Specific Risk Mitigation Measures
A	<u>CC-1 / WR-1 / HL-1</u> <ul style="list-style-type: none"> • Maintaining status quo. 	Not anticipated.	---
B	<u>CC-2 / WR-3 / HL-1</u> <ul style="list-style-type: none"> • Excavating and armouring a new channel (with gabion drop-structures). • Stabilizing the waste rock dump. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> • Ongoing stability monitoring. • Installation of a flow gauging station. • Inspections after peak flow events. • Posting signs noting known hazards (flash floods, asbestos, etc.).



Option	Description	Public Access Approach	Option Specific Risk Mitigation Measures
B2	<u>CC-2 / WR-3 / HL-1 (Alternative)</u> <ul style="list-style-type: none"> Excavating and armouring a new channel (with riprap). Stabilizing the waste rock dump. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
C	<u>CC-4 / WR-1 / HL-1</u> <ul style="list-style-type: none"> Armouring existing channel with gabion drop structures. 	Not anticipated.	---
C2	<u>CC-4 / WR-1 / HL-1 (Alternative)</u> <ul style="list-style-type: none"> Armouring existing channel with riprap. 	Not anticipated.	---
C3	<u>CC-4 / WR-1 / HL-1 (Alternative)</u> <ul style="list-style-type: none"> Armouring existing channel with riprap. Extending rip rap lined channel upstream to replace existing gabion drop structures. 	Not anticipated.	---
D	<u>CC-4 / WR-3 / HL-1</u> <ul style="list-style-type: none"> Armouring existing channel with gabion drop structures. Stabilizing the waste rock dump. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
D2	<u>CC-4 / WR-3 / HL-1 (Alternative)</u> <ul style="list-style-type: none"> Armouring existing channel with riprap. Stabilizing the waste rock dump. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
D3	<u>CC-4 / WR-3 / HL-1 (Alternative)</u> <ul style="list-style-type: none"> Armouring existing channel with riprap. Stabilizing the waste rock dump. Extending rip rap lined channel upstream to replace existing gabion drop structures. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
E	<u>CC-5 / WR-3 / HL-3</u> <ul style="list-style-type: none"> Lowering the existing channel to the bedrock lining. Stabilizing the waste rock dump. Lowering the lake level. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events, particularly for road condition. Posting signs noting known hazards (flash floods, asbestos, etc.).
E2	<u>CC-5 / WR-3 / HL-3</u> <ul style="list-style-type: none"> Lowering the existing channel to the bedrock lining. Modifying channel alignment. Stabilizing the waste rock dump. Lowering the lake level. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events, particularly for road condition. Posting signs noting known hazards (flash floods, asbestos, etc.).



Option	Description	Public Access Approach	Option Specific Risk Mitigation Measures
E3	<u>CC-5 / WR-3 / HL-3</u> <ul style="list-style-type: none"> Lowering the existing channel to the bedrock lining. Modifying channel alignment and lining with riprap. Stabilizing the waste rock dump. Lowering the lake level. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events, particularly for road condition. Posting signs noting known hazards (flash floods, asbestos, etc.).
F	<u>CC-6 / WR-2 / HL-2</u> <ul style="list-style-type: none"> Restoring Clinton Creek to the original valley bottom. Stabilizing the waste rock dump by removing waste rock to valley bottom. Fully drain lake. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Water and soil quality assessment to determine initial (and potential ongoing) effects of disturbing the bottom layers of the lake. Posting signs noting known hazards (flash floods, asbestos, etc.).
G	<u>CC-10 / WR-1 / HL-1</u> <ul style="list-style-type: none"> Armouring existing channel with gabion baskets (gabion chute). 	Not anticipated.	---
H	<u>CC-10 / WR-3 / HL-1</u> <ul style="list-style-type: none"> Armouring existing channel with gabion baskets (gabion chute). Stabilizing the waste rock dump. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).

2.3 Wolverine Creek Public Access Summary

Table B Wolverine Creek Public Access Summary

Option	Description	Public Access Recommendation	Option Specific Risk Mitigation Measures
A	<u>WC-2 / T-1</u> <ul style="list-style-type: none"> Maintaining status quo. 	Not anticipated.	---
B	<u>WC-3 / T-1</u> <ul style="list-style-type: none"> Installing a rock drain along the toe of the tailings lobes. 	Not anticipated.	---
C	<u>WC-7 / T-5</u> <ul style="list-style-type: none"> Providing a cover over the tailings pile base. Constructing an armoured channel (riprap) through the cover. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Preparation of a dam safety inspection and monitoring program (under the Canadian Dam Safety Regulations as part of a DSR) due to increased water levels. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).



Option	Description	Public Access Recommendation	Option Specific Risk Mitigation Measures
D	<u>WC-3 and WC-7 / T-5</u> <ul style="list-style-type: none"> Installing a rock drain along the toe of the tailings lobe. Providing a cover over the tailings pile base. Constructing an armoured channel (riprap) through the cover. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
D2	<u>WC-3 and WC-7 / T-5</u> <ul style="list-style-type: none"> Providing a cover over the tailings pile base. Constructing an armoured channel (riprap) through the cover. Lowering the waste rock cover. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
E	<u>WC-3 and WC-7 / T-2 and T-3</u> <ul style="list-style-type: none"> Installing a rock drain along the toe of the tailings lobes. Stabilizing the tailings pile. Providing a cover over the tailings pile base. Constructing an armoured channel (riprap) through the cover. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).
E2	<u>WC-3 and WC-7 / T-2 and T-3</u> <ul style="list-style-type: none"> Stabilizing the tailings pile. Providing a cover over the tailings pile base. Constructing an armoured channel (riprap) through the cover. Lowering the waste rock cover. 	May be achieved with additional risk mitigation.	<ul style="list-style-type: none"> Ongoing stability monitoring. Installation of a flow gauging station. Inspections after peak flow events. Posting signs noting known hazards (flash floods, asbestos, etc.).



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We trust that this meets your requirements. Should you require further clarification, please do not hesitate to contact Alex Timmis at alex.timmis@worleyparsons.com or Project Manager Lee Martin at lee.martin@worleyparsons.com or by phone at 604-298-1616.

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