



**INTERNAL REPORT**

# Luscar Mine Tailings Storage Facility 2021 Annual Inspection

*Cardinal River Mine*

Submitted to:

**Teck Coal Limited**

Hao Wang, P.Geo.  
Senior Geologist

Submitted by:

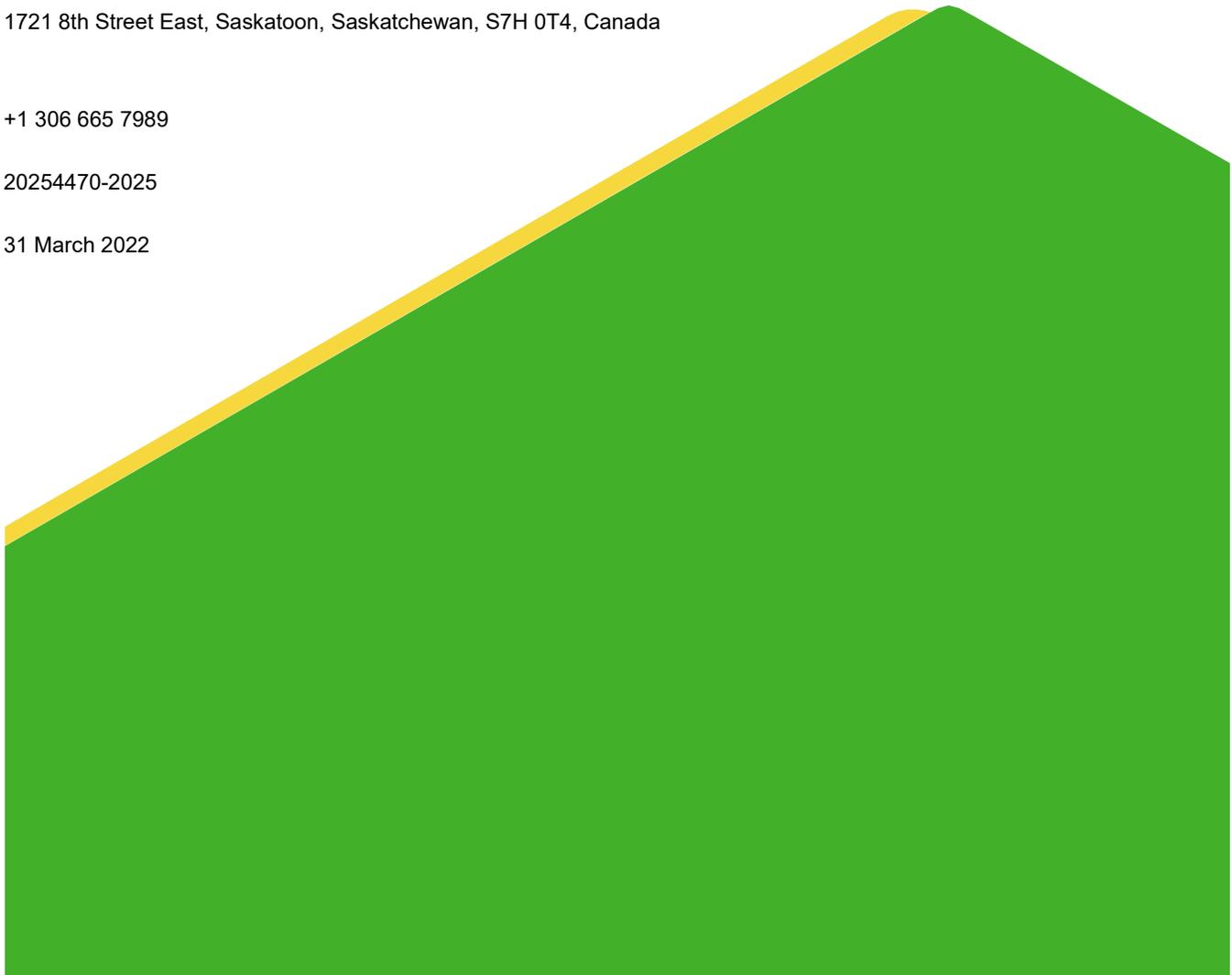
**Golder Associates Ltd.**

1721 8th Street East, Saskatoon, Saskatchewan, S7H 0T4, Canada

+1 306 665 7989

20254470-2025

31 March 2022



# Distribution List

Teck: 1 PDF

Golder: 1 PDF

## Executive Summary

Teck Coal Limited (Teck) contracted Golder Associates Ltd. (Golder) to carry out an inspection of the Luscar Mine tailings storage facilities (TSFs) at Teck's Cardinal River mine (CRm) located about 40 km south of Hinton Alberta. The objective of the site visit was to conduct a general inspection of the physical condition of 10 TSFs at the Luscar Mine (Figure 1) with the results of the site inspection documented in an internal factual memo to identify if there are any concerns and/or deficiencies compared to the regulations and Teck guidelines, and include recommendations as required. The inspection is the first of what is planned to become a regular inspection of TSF areas at Luscar Mine.

The inspection of the Luscar mine TSF areas was completed on October 21, 2021, by Golder's representative Jason Stianson, Ph.D., P.Eng with on site escort provided by Hao Wang, Senior Geologist from Teck. The weather was sunny and the temperature increased from about 5 to 10 degrees through the site visit. Site staff had mentioned that a about 30 cm of wet snow had fallen prior to the site inspection and had completely melted in the previous one to two weeks leading up to the site inspection. The ground and road conditions were generally dry with some runoff still occurring in shaded areas around the site

The following general conclusions and recommendations are provided as a result of the 2021 inspection and are supported by the photographic record provided in APPENDIX A.

### Conclusions:

- The TSFs appeared to be in suitable physical condition with no visual signs of distress or poor performance.
- The inspection did not identify any areas where it could be confirmed visually that tailings were contained by a dam or were above the surrounding grade. The tailings in 51-B2X remain exposed but were observed to be stored in a pit area and below grade (note: a small area of 50-B4 Phase 9 was noted to have exposed tailings that were also observed to be stored below the grade of surrounding ground and coarse coal reject [CCR]). Other TSFs noted as storing tailings were observed to be capped by CCR (and most of the CCR remained exposed), or significant thickness of overburden that appeared to be at various stages of final reclamation. It was not possible to confirm visually whether capped areas could encapsulate some of the tailings above ground, but it is expected that this could be confirmed through further document review and assessment.
- Three of the TSFs were observed to include exposed pit walls. The exposed pit walls appeared to be generally stable. The pit slope at one location in 50-B8 was observed experiencing some ravelling with some debris accumulated near the toe of the slope (Photo A-32). Some minor amounts of debris have accumulated at the base of the pit wall (east side) of 51-B2X (Photo A-56 or Photo A-57).

Recommendations: (note: all recommendations are related to TSF 51-B2X closure considerations. The site inspection did not result in recommendations for other TSFs.)

- Continue to record and observe the water level stored in 51-B2X.
- Non-performance related, but to assist future reclamation activities, Teck should consider developing a record of yearly tailings settlement as a means to estimate the degree of tailings consolidation and contribute to the timing of closure activities such as placement of cap material over the tailings.
- Also, for future reclamation purpose, Teck should consider conducting a field trial to determine the trafficability of the tailings that would be followed by a suitable investigation to conduct sampling and/or cone penetration testing (CPT) to a limited depth to characterize the tailings in support of closure cap placement considerations.

# Table of Contents

<b>LUSCAR MINE TAILINGS STORAGE FACILITY 2021 ANNUAL INSPECTION .....</b>	<b>1</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>II</b>
<b>TABLE OF CONTENTS .....</b>	<b>III</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 BACKGROUND .....</b>	<b>1</b>
<b>3.0 TSF INSPECTION OBSERVATIONS .....</b>	<b>3</b>
3.1 50-B1, 50-B2, and 50-B3 .....	3
3.2 50-B4 .....	3
3.3 50-B5 .....	4
3.4 50-B4 Phase 9 .....	5
3.5 50-B8 .....	5
3.6 51-B1 .....	6
3.7 51-B2 .....	6
3.8 51-B2X .....	7
3.9 General Site Discussion Topics .....	8
<b>4.0 CONCLUSIONS .....</b>	<b>8</b>
<b>5.0 REFERENCES .....</b>	<b>10</b>

## TABLES

Table 1: Summary of Tailings Storage Facilities at Luscar Mine (Modified from (Teck, 2020)).....	2
--	---

## FIGURES

Figure 1: Distribution of Pits that Received Tailings and Coarse Coal Reject at CRM (Teck, 2020).....	12
Figure 2: Site Inspection Plan.....	13

## APPENDICES

### APPENDIX A

Site Inspection Photographs

## 1.0 INTRODUCTION

Teck Coal Limited (Teck) contracted Golder Associates Ltd. (Golder) to carry out an inspection of the Luscar Mine tailings storage facilities (TSFs) at Teck's Cardinal River mine (CRm) located about 40 km south of Hinton Alberta. The inspection is the first of what is planned to become a regular inspection of TSF areas at Luscar Mine.

The objective of the site visit was to conduct a general inspection of the physical condition of the Luscar Mine TSFs.

The results of the site inspection were to be documented in a factual memo to identify if there are any concerns and/or deficiencies compared to the regulations and Teck guidelines, and include recommendations as required.

## 2.0 BACKGROUND

The location of 10 TSF pit areas near the Luscar mine processing plant are shown in Figure 1. Table 1 summarizes the TSFs. The details of the tailings disposal history are not repeated but were reviewed as part of the site inspection and served as a basis for adding information to the TSF summary (e.g., check list style information to summarize physical features and the status of regulatory considerations).

**Table 1: Summary of Tailings Storage Facilities at Luscar Mine (Modified from (Teck, 2020)).**

Disposal Location	Fines			Coarse coal rejects		Waste rock		Backfilled	Reclaimed	Exposed Pit Wall	Pit Wall Stability assessment	Dam Safety	Comment
	LCM x1000 @24%solids	LCM X1000 @85% solids	Years deposited	LCM x1000 @93% solids	Years deposited	BCM X1000	Years deposited						
Original tailings pond	16,544	4,671	1970-1986	-	-	170,447	1979-2003	Yes	Yes	No	-	No	Decommissioned (1986), all material disposed in 50B5 pit or dump and backfilled/reclaimed (1990+/-)
UG workings under shop	2,747	776	1987-1989	-	-			n/a	No	No	-	No	Inactive, no additional monitoring or data
50-B1, 50-B2	0	0	-	3,477	1970-1977			Yes	Yes	No	-	No	Fully backfilled, re-sloped, reclaimed. Some has been reclamation certified.
50-B4 pit	8,519	2,405	1994-2000	4,476	1995-2000			Yes	No	Yes	Complete	No	Completed backfilled, no reclamation work completed to date.
50-B4 Phase 9 pit	9,519	2,688	2001-2009	4,540	2001-2009			95% CCR	No	No	-	No	50-B9 pit 90-95% capped with CCR, active equipment workspace
50-B5 pit	8,822	2,491	1989-1994	5,077	1989-1994			Yes	Yes	No	-	No	Completely backfilled, capped with cover soil, revegetated and reclaimed since 2000+/-
50-B8(3)	245	69	2000	9,340	2009-2019			Mostly	No	Yes	Complete	No	50-B8 mostly backfilled with CCR, no final reclamation completed to date
51-B1, 50-B3	0	0	-	1,605	1978-1980	Yes	Most	no	-	No	Fully backfilled and re-sloped, most is fully reclaimed, Highway 40 crosses thru centre of 51B1.		
51-B2 pit	0	0	-	3,779	1981-1988	27,468	1970-1990	Yes	Most	No	-	No	Fully backfilled and re-sloped, most is fully reclaimed
51-B2X Pit	12,360	3,490	2009-2020	-	-	-	-	No	No	Yes	Complete	Unlikely	Exposed tailings surface, exposed pit wall
<b>TOTAL</b>	<b>46,396</b>	<b>13,100</b>	<b>1970-2019</b>	<b>32,294</b>	<b>1970-2020</b>								

Note: LCM-loose cubic metre.

### 3.0 TSF INSPECTION OBSERVATIONS

The inspection of the Luscar mine TSF areas was completed on October 21, 2021, by Golder's representative Jason Stianson, Ph.D., P.Eng. The site visit was conducted over about four hours from 09:00 to 13:00. Golder was escorted on site by Hao Wang, Senior Geologist from Teck for the duration of the site visit. The weather was sunny and the temperature increased from about 5 to 10 degrees through the site visit. Site staff had mentioned that a about 30 cm of wet snow had fallen prior to the site inspection and had completely melted in the previous one to two weeks leading up to the site inspection. The ground and road conditions were generally dry with some runoff still occurring in shaded areas around the site.

A photographic record of the site inspection is provided in APPENDIX A and the site inspection plan is shown in Figure 2. The inspection route approximately followed the waypoint number sequence provided on the inspection plan (Figure 2). The inspection observations for each TSF are provided in the following sections.

Mike Tremblay of Golder is the Engineer of Record for the TSFs. Femi Baiyewun is the Responsible Tailings Facility Engineers RTFE) for the TSFs.

#### 3.1 50-B1, 50-B2, and 50-B3

The 50-B1, 50-B2, and 50-B3 TSF areas are grouped together and located west of Hwy 40 ( Figure 1). All three TSFs have been fully backfilled, 50-B1 and 50-B2 have been fully reclaimed and 50-B3 is noted by Teck as being mostly reclaimed (Table 1). The site inspection observations are summarized below:

(Note: The observations of the three TSF areas were made from a distance. The site inspection route did not extend directly over the TSF areas and was prioritized by Teck to include areas that were not reclaimed)

- The overall condition of three TSFs is shown in Photo A-1 through Photo A-6. The three TSFs appeared to be in satisfactory physical condition. The backfilled and recontoured slopes appeared to be stable with no visual signs of distress, apparent settlement, or ground movement that would suggest potential instability or poor performance.
- No exposed pit slopes were observed.
- The reclamation appears to be well established across the majority of the filled areas. There are areas of underdeveloped vegetation in the slopes of 50-B1 (Photo A-2), and 50-B2/50-B3 (Photo A-6), but the slopes appeared to remain stable.
- The backfilled and contoured areas appeared to be well drained and no areas of ponded water were observed. It is not clear from the inspection whether water will pond in contoured depressions above 50-B3 (Photo A-6).
- The tailings in the TSFs were noted by Teck as being stored below grade and no dam containment features were observed to provide tailings containment.

Recommendations:

- No physical deficiencies were observed, and no recommendation required.

#### 3.2 50-B4

The 50-B4 TSF is south of Hwy 40 and mostly north west of the plant area ( Figure 1). The TSF has been mostly backfilled with CCR and has not yet been contoured or reclaimed (Table 1). The site inspection observations are summarized below:

- The overall condition of 50-B4 is shown in Photo A-7 through Photo A-18. The 50-B4 TSF appeared to be in satisfactory physical condition. The above grade CCR slopes appeared to be standing near the angle of repose. The slopes appeared to be stable with no visual signs of distress, or ground movement that would suggest potential instability or poor performance.
- The pit slopes along the north perimeter are exposed over limited heights and generally appeared to be stable (Photo A-10, Photo A-11, Photo A-14, and Photo A-15). A pit wall stability analysis was completed by Teck in 2021 and submitted to the regulator in 2021 (Teck, 2021a).
- The CCR material appeared to be well drained and is likely to have a low internal phreatic surface (not confirmed). Some areas of ponded water were observed in low lying areas near the toe of some slopes (Photo A-12) and some surface runoff was observed that was likely due to melting of the recent snow cover (Photo A-13).
- The surface of the CCR remains exposed and has not been reclaimed.
- No exposed tailings were observed.
- Some infrastructure extends along the north perimeter of 50-B4 including a railway, hwy 40, and a power line (Photo A-7 and Photo A-8).
- An area of seepage was observed to be reporting from the pit slope CCR contact near the west end of 50-B4 (Photo A-16 and Photo A-17). The source of the seepage is not confirmed but is thought by Teck to originate from 51-B4 to the north. The possibility that the seepage is sourced from 51-B2X has also been considered due to the orientation of faults mapped within the 51-B2X pit.
- The tailings in the 50-B4 TSF appeared to be stored below grade and no dam was observed to provide tailings containment.

#### Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.3 50-B5

The 50-B5 TSF is located east of the plant and south of Luscar Creek ( Figure 1). The TSF has been fully backfilled and reclaimed (Table 1). The site inspection observations are summarized below (Note: The observations of the area were made from a distance. The site inspection route did not extend directly over the 50-B5 area and was prioritized by Teck to include areas that were not reclaimed):

- The overall condition of the 50-B5 TSF is shown in Photo A-19 and Photo A-20. The TSF appeared to be in satisfactory physical condition. The backfilled and recontoured slopes appeared to be stable with no visual signs of distress, apparent settlement, or ground movement that would suggest potential instability or poor performance.
- No exposed pit slopes were observed.
- The reclamation appears to be well established across the majority of the filled areas.
- The backfilled and contoured areas appeared to be sloped and well drained with no areas of ponded water.

- The tailings in the TSFs appeared to be stored below grade and no dam were observed to provide tailings containment.

Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.4 50-B4 Phase 9

The 50-B4 Phase 9 (Ph9) TSF is located immediately south of the plant area ( Figure 1). The TSF has been mostly backfilled with CCR and has not yet been contoured or reclaimed (Table 1). The site inspection observations are summarized below:

- The overall condition of 50-B4 Ph9 is shown in Photo A-21 through Photo A-25. The 50-B4 Ph9 TSF appeared to be in satisfactory physical condition. The above grade CCR slopes appeared to be standing near the angle of repose. The slopes generally appeared to be stable with no visual signs of distress, or ground movement that would suggest potential instability or poor performance.
- No exposed pit slopes were observed.
- The exposed CCR surface appeared to be graded and was generally flat. No reclamation of the CCR surface has been conducted.
- A small pond of water is located in the south end of the TSF and was noted by Teck to be above an area with exposed tailings. The pond is maintained to control the flow of surface water that sheds from surrounding areas to avoid water flooding the refuse road and refuse loadout areas.
- The tailings in the 50-B4 Ph9 TSF appeared to be stored below grade and no dam was observed to provide tailings containment.

Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.5 50-B8

The 50-B8 TSF is south of Hwy 40 and immediately west of the main office areas ( Figure 1). The TSF has been mostly backfilled with coarse coal reject (CCR) and dumped in relatively thick lifts and track packed by dozers as material was leveled for subsequent lifts. The CCR surface has not yet been contoured or reclaimed (Table 1). The site inspection observations are summarized below:

- The overall condition of 51-B8 is shown in Photo A-26 through Photo A-39. The 51-B2 TSF appeared to be in satisfactory physical condition. The above grade slopes appeared to stand near the angle of repose and consisted of material placed in lifts, leveled with a dozer, and driven on with refuse trucks as the next lift was placed. The slopes generally appeared to be stable with no visual signs of distress, or ground movement that would suggest potential instability or poor performance.
- The exposed pit wall appears to be stable with some evidence of weathering, some surficial ravelling of the slopes and one area of seepage (Photo A-33). A pit wall stability analysis was completed by Teck in 2021 and submitted to the regulator in 2021 (Teck, 2021b).

- The CCR material appeared to be well drained and is likely to have a low internal phreatic surface given that no seepage or wet areas were observed around the perimeter of the stack (Note: the location of phreatic surface remains unknown as there are piezometers installed in the stack).
- The surface of the CCR remains exposed and has not been reclaimed.
- No exposed tailings were observed.
- A pond at the bottom of the pit exists at the southeast end of the facility and is contained below grade in the excavated pit (Photo A-32). The pond depth was not known at the time of the inspection.
- The tailings in the 50-B8 TSF appeared to be stored below grade and no dam was observed to provide tailings containment.

#### Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.6 51-B1

The 51-B1 TSF is adjacent to and west of the 51-B2 TSF and is divided by Hwy 40 which runs through the middle of the reclaimed area ( Figure 1). The TSF has been fully backfilled and is mostly reclaimed (Table 1). The site inspection observations are summarized below:

- The overall condition of 51-B1 is shown in Photo A-40 through Photo A-46. The 51-B1 TSF appeared to be in satisfactory physical condition. The backfilled and recontoured slopes appeared to be stable with no visual signs of distress, apparent settlement, or ground movement that would suggest potential instability or poor performance.
- No exposed pit slopes were observed.
- The reclamation appears to be well established across the majority of the filled areas (Photo A-40, Photo A-42, Photo A-43, and Photo A-44).
- The backfilled and contoured areas appeared to be well drained and no areas of ponded water were observed.
- The tailings in the 51-B1 TSF appeared to be stored below grade and no dam was observed to provide tailings containment.

#### Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.7 51-B2

The 51-B2 TSF is adjacent to 51-B1 and to the north of 51-B2X ( Figure 1). The TSF has been fully backfilled and is mostly reclaimed (Table 1). The site inspection observations are summarized below:

- The overall condition of 51-B2 is shown in Photo A-40 to Photo A-42 and Photo A-47 through Photo A-53. The 51-B2 TSF appeared to be in satisfactory physical condition. The backfilled and recontoured slopes appeared to be stable with no visual signs of distress, apparent settlement, or ground movement that would suggest potential instability or poor performance.

- The exposed pit slopes appear to be stable with no evidence of significant rock falls (Photo A-49, Photo A-50, and Photo A-51).
- The reclamation appears to be well established across the majority of the filled areas (Photo A-45, Photo A-46, Photo A-48). Some surficial erosion has occurred on some slopes with fewer micro-topography features and underdeveloped vegetation (Photo A-52).
- The backfilled and contoured areas appeared to be well drained. One minor area of ponding was observed and appeared to be the result of fill placement rather than underlying tailings settlement. A combination of the TSF geometry, underlying tailings thickness, historical LiDAR surveys, and fill placement records/closure surface design could be used to rule out tailings settlement as a source for the ponded water.
- The tailings in the 51-B2 TSF appeared to be stored below grade and no dam was observed to provide tailings containment.

#### Recommendations:

- No physical deficiencies were observed, and no recommendation required.

### 3.8 51-B2X

The 51-B2X TSF is north of Hwy 40 and immediately south of 51-B2 ( Figure 1). The TSF consists of an exposed pit wall, exposed tailings surface, and pond of water located in the south east (i.e., likely in the area above the thickest tailings profile that has experienced the most settlement). The tailings range from about 25 m to 80 m thick. The tailings elevation was estimated to be about 1655 m from the annual LiDAR survey conducted in 2021. The overall condition of 51-B2X is shown in Photo A-54 through Photo A-64. The site inspection observations are summarized below:

- The exposed pit slopes appear to be stable with no evidence of significant rock falls (Photo A-56, Photo A-57, Photo A-60, and Photo A-62). A pit wall stability analysis was completed by Teck in 2021 and submitted to the regulator in 2021 (Teck, 2021c).
- The exposed tailings surface generally slopes from the deposition point to the pond area above the thickest tailings (Photo A-63). The tailings surface appears to be developing some shear strength and a surficial crust as the tailings consolidate and are exposed to desiccation and freeze-thaw cycles (e.g., Photo A-57, Photo A-58, Photo A-59). The thickness of the crust is unknown and the shear strength likely varies across the tailings surface.
- The tailings surface is susceptible to erosion as shown by the erosion features extending toward the pond which appear (from a distance) to be in the order of 1 m deep (Photo A-61, Photo A-62, and Photo A-63). The erosion features were estimated to develop over a period of about 1.5 years since deposition ended in 2020 (e.g., from fall of 2020 to 2021).
- The pond above the tailings has been present since the end of deposition with some signs that it could be reducing in size given the previous higher water mark outline (Photo A-61)
- The contributing watershed area has not been delineated but could be defined from available LiDAR surveys. The watershed appeared to include areas in the north and north west (Photo A-54) and areas above the higher pit wall to the south east (Photo A-64).

- The tailings in 51-B2X are stored in the excavated pit to a maximum elevation near 1655 m. The tailings appear to be stored below the elevation of surrounding ground including hwy 40 which appears to be at El. 1670 m (i.e., about 25 m above the tailings surface). The tailings are fully contained in-pit with no portion of the pit presently acting as a dam to provide tailings containment.

The TSF has the ability to store water above the tailings and potentially to an elevation above downstream areas if runoff from the surrounding water shed is sufficient to fill the TSF (e.g., it appears that water could be stored near El. 1680 m and above the elevation of downstream areas such as Hwy 40 with an elevation near 1670 m). The resulting water level could be about 10 m above surrounding ground including highway 40 and is contained by an in situ pillar of rock. The in situ pillar appears to be about 100 m wide at where was estimated to be the maximum water level. It is our understanding that Teck is conducting a climate assessment for this facility to facilitate the assessment of this specific risk.

#### Recommendations:

- Continue to record and observe the water level stored in 51-B2X.
- For future reclamation works, Teck should consider developing a record of yearly tailings settlement as a means to estimate the degree of tailings consolidation and contribute to the timing of closure activities such as placement of cap material over the tailings.
- For future reclamation works, Teck should consider conducting a field trial to determine the trafficability of the tailings that would be followed by a suitable investigation to conduct sampling and/or cone penetration testing (CPT) to a limited depth to support closure cap placement considerations (e.g., tethered Argo with a modified sampling and/or CPT rig).

### 3.9 General Site Discussion Topics

The following are general discussion points relevant to the TSF areas.

- A pit slope stability analysis was conducted for TSFs having pit walls such as 50-B4, 50-B8, and 51-B2X and submitted to the Alberta Energy Regulator (AER) in 2021.
- There is an onsite weather station.
- There is no instrumentation installed at any of the TSFs.
- LiDAR surveys are conducted yearly and include the TSF areas.
- Fill material placed above tailings and used to contour the reclaimed slopes consists of waste rock from the pits.

### 4.0 CONCLUSIONS

The following general conclusions are provided as a result of the 2021 inspection of TSF facilities at Luscar Mine:

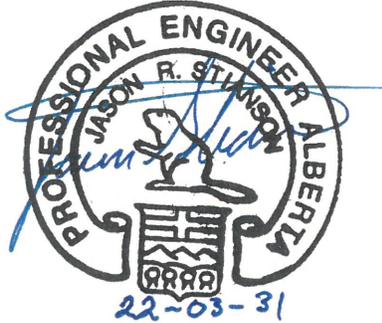
- The TSFs appeared to be in suitable physical condition with no visual signs of distress or poor performance.
- The inspection did not identify any areas where it could be confirmed visually that tailings were contained by a dam or were above the surrounding grade. The tailings in 51-B2X remain exposed but were observed to be stored in a pit area and below grade (note: a small area of 50-B4 Phase 9 was noted to have exposed tailings that were also observed to be stored below the grade of surrounding ground and CCR). Other TSFs noted as

storing tailings were observed to be capped by CCR (and most of the CCR remained exposed), or significant thickness of overburden that appeared to be at various stages of final reclamation. It was not possible to confirm visually whether capped areas could encapsulate some of the tailings above ground, but it is expected that this could be confirmed through further document review and assessment.

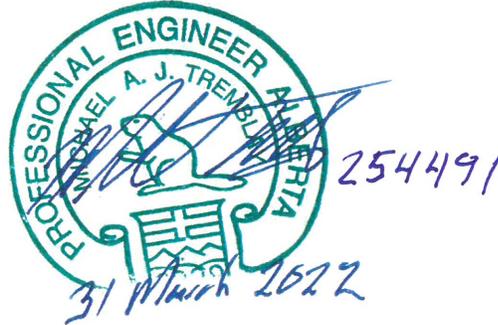
- Three of the TSFs were observed to include exposed pit walls (Table 1). The exposed pit walls appeared to be generally stable. The pit slope at one location in 50-B8 was observed experiencing some ravelling with some debris accumulated near the toe of the slope (Photo A-32). Some minor amounts of debris have accumulated at the base of the pit wall (east side) of 51-B2X (Photo A-56 or Photo A-57).

# Signature Page

Golder Associates Ltd.



Jason Stianson, Ph.D., P.Eng.  
Associate, Senior Geotechnical Engineer



Mike Tremblay, M.Sc., P.Eng.  
Principal, Senior Geotechnical Engineer

JRS/MT/rd

Golder and the G logo are trademarks of Golder Associates Corporation

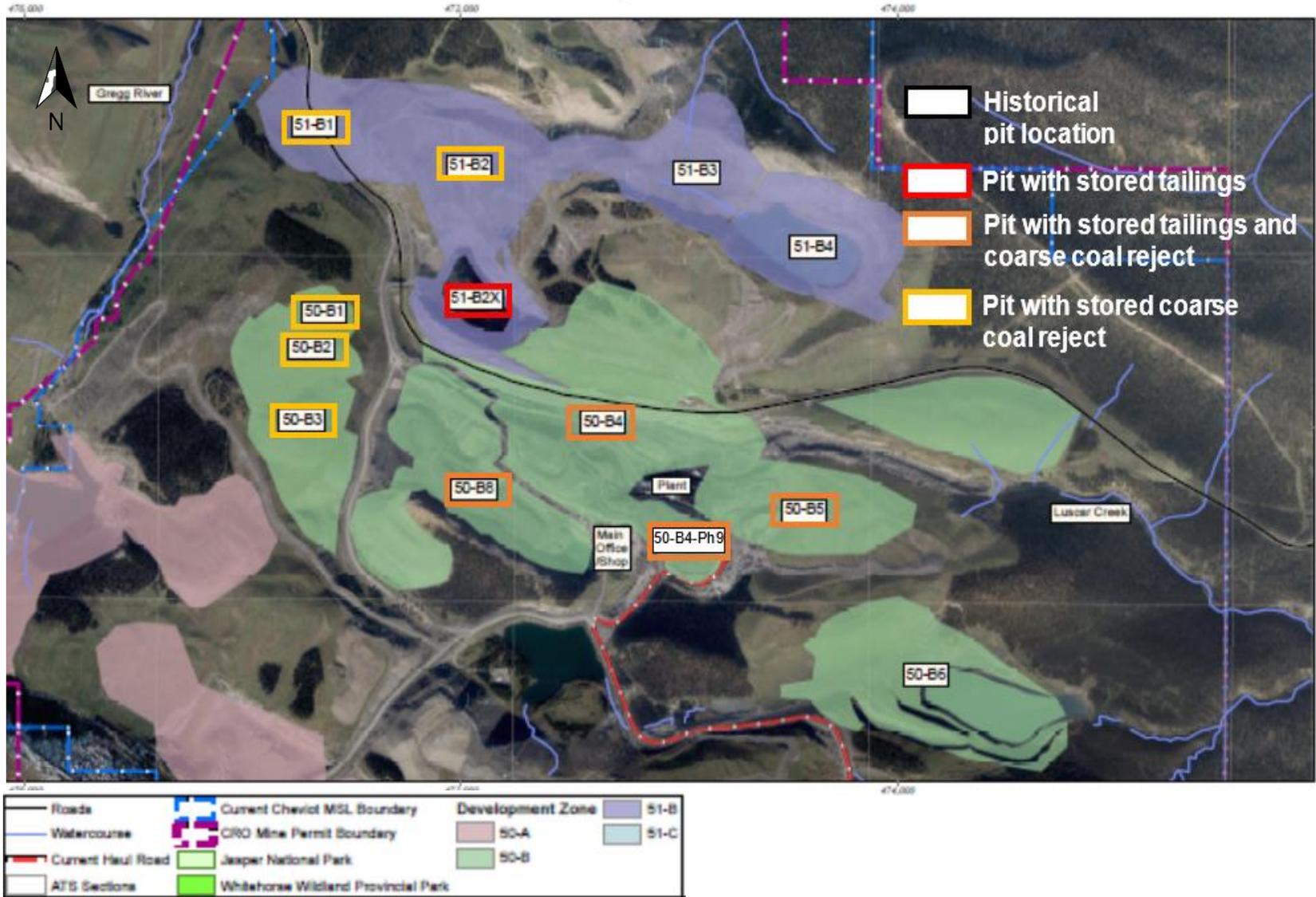
[https://golderassociates.sharepoint.com/sites/131611/project files/5 technical work/2025 fall 2021 site visit/report/rev 0/22-03-31 2021 luscar mine tsf site inspection rev 0 \(20254470\).docx](https://golderassociates.sharepoint.com/sites/131611/project%20files/5%20technical%20work/2025%20fall%202021%20site%20visit/report/rev%200/22-03-31%202021%20luscar%20mine%20tsf%20site%20inspection%20rev%200%20(20254470).docx)

## 5.0 REFERENCES

- AEP, 2018. Alberta Dam and Canal Safety Directive.
- AER, 2019. Coal Mine Pit Wall Abandonment. Alberta Energy Regulator.
- Teck, 2020. Tailings Disposal History at Luscar Mine - Internal Memo. Tech Coal Limited.
- Teck, 2021a. Application for Consent to Abandon Pits and Dumps 50-B4 and 50-B5 (Bundle D). Teck.
- Teck, 2021b. Application for Consent to Abandon Pits and Dumps 50-A4, 50-A5, 50-A6, 50-A7, 50-B8 (Bundle I). Teck.
- Teck, 2021c. Application for Consent to Abandon Pits and Dumps 51-B2 East, 51-B2, 51-B3, 51-B4 (Bundle E). Teck.

<b>PERMIT TO PRACTICE GOLDER ASSOCIATES LTD</b>	
RM SIGNATURE: _____	<i>R. Stianson</i>
RM APEGA ID #: _____	2022-03-31      M61240
DATE: _____	
<b>PERMIT NUMBER: P005122</b>	
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)	

## Figures



CLIENT

Teck Coal Limited

CONSULTANT



YYY/MM/DD	2022/03/31
PREPARED	JXS
DESIGN	
REVIEW	JRS
APPROVED	MT

PROJECT

Luscar Mine Tailings Storage Facility 2021 Annual Inspection - Cardinal River Mine

TITLE

**DISTRIBUTION OF PITS THAT RECEIVED TAILINGS AND COARSE COAL REJECT AT CRM (TECK, 2020)**

PROJECT No.	PHASE	Rev.	FIGURE
20254470	2025	0	1



- LEGEND**
- SITE INSPECTION LOCATION
  - PRIMARY HIGHWAY
  - SURFACE FLOW WATERCOURSE
  - LUSCAR MINERAL SURFACE LEASE BOUNDARY
  - WATERSHED BOUNDARY



**REFERENCE(S)**  
 BASE DATA OBTAINED FROM TECK COAL LIMITED AND FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. CANVEC, GEOBASE, IHS ENERGY INC. MINE LEASE BOUNDARY AND IMAGERY OBTAINED FROM TECK COAL LIMITED. DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT  
**TECK COAL LIMITED**

PROJECT  
**LUSCAR MINE TAILINGS STORAGE FACILITY 2021 ANNUAL INSPECTION - CARDINAL RIVER MINE**

TITLE  
**SITE INSPECTION PLAN**

CONSULTANT	DATE
DESIGNED	JRS
PREPARED	PS
REVIEWED	JRS
APPROVED	MT

PROJECT NO.	CONTROL	REV.	FIGURE
20254470	M_HYDRO_001	0	2



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (1189x841) TO A5 (841x594)

**APPENDIX A**

**Site Inspection Photographs**

**50-B1, 50-B2, and 50-B3**



**Photo A-1: Panoramic view looking north west near WP03 at the reclaimed 50-B1, 50-B2, and 50-B3 areas (WP03, IMG\_6945)**



**Photo A-2: Looking north west near WP03 at the reclaimed 50-B1 surface and slopes (WP03, IMG\_6944)**



Photo A-3: Looking west at the reclaimed 50-B1 slopes (IMG\_6971)



Photo A-4: Looking north west at the reclaimed 50-B1 slopes (IMG\_6972)



Photo A-5: Looking south west at the reclaimed 50-B1 and 50-B2 slopes (IMG\_6973)



Photo A-6: Looking west from WP03 at the reclaimed surface and slopes of 50-B3 (IMG\_6942)

**50-B4, 50-B5, and 50-B9**



**Photo A-7: Looking north near WP11 at the exposed CCR surfaces above 50-B4 (WP11, IMG\_6997)**



**Photo A-8: Looking south near WP11 at the exposed CCR surface and east pit wall associated with 50-B4 (WP11, IMG\_6995)**



**Photo A-9: Looking south west near WP11 at the exposed CCR surfaces and CCR stack above 50-B4 (WP11, IMG\_6999)**



**Photo A-10: Looking north west near WP11 at the east pit wall boundary of 50-B4 (WP11, IMG\_7001)**



**Photo A-11: Looking south west near WP11 at the east pit wall boundary of 50-B4 (WP11, IMG\_7002)**



**Photo A-12: Looking north west near WP12 at the CCR stack above 50-B4 (WP12, IMG\_7004)**



**Photo A-13: Looking north near WP12 at the CCR stack above 50-B4 (WP12, IMG\_7003)**



**Photo A-14: Looking west near WP13 at the west pit wall and exposed CCR above 50-B4 (WP13, IMG\_7012)**



**Photo A-15: Looking south near WP13 at the west pit wall and exposed CCR above 50-B4 (WP13, IMG\_7013)**



**Photo A-16: Looking south near WP15 at an area of seepage near the west pit wall of 50-B4 (WP15, IMG\_7029)**



**Photo A-17: Looking north east near WP15 at an area of seepage near the west pit wall of 50-B4 (WP15, IMG\_7031)**



**Photo A-18: Looking south near WP15 at surface runoff water discharge into conveyance ditch at the south end of 50-B4 (WP15, IMG\_7030)**



Photo A-19: Looking south east near WP08 across the reclaimed surface above 50-B5 (WP08, IMG\_6982)



Photo A-20: Looking east near WP08 across the surface CCR placed near 50-B5 (WP08,IMG\_6985)



Photo A-21: Pond above an isolated area of exposed tailings in 50-B9 (WP14, IMG\_7015)



Photo A-22: Looking west near WP14 at CCR surface placed above tailings in 50-B9 (WP14, IMG\_7016)



Photo A-23: Looking north west near WP14 at CCR surface placed above tailings in 50-B9 (WP14, 50-B9 IMG\_7021)



Photo A-24: Looking north near WP14 at CCR surface placed above tailings in 50-B9 (WP14, IMG\_7024)



**Photo A-25: Looking east near WP14 at CCR surface placed above tailings in 50-B9 (WP14, IMG\_7025)**

**50-B8**



Photo A-26: 50-B8 looking north toward 50-B8 IMG\_7014



Photo A-27: Looking west from WP03 at the exposed pit wall and CCR stack in 50-B8 (WP03, IMG\_6940)



Photo A-28: Looking west from WP03 at the CCR stack and slopes in 50-B8 (WP03, IMG\_6941)



Photo A-29: Looking north east near WP07 along the typical CCR slopes in 50-B8 (WP07, IMG\_6977).



**Photo A-30: Looking south west near WP07 at the typical CCR slopes (WP07, IMG\_6974)**



**Photo A-31: Looking north near WP09 along the interface with the west pit wall and CCR slopes in 50-B8 (WP09,IMG\_6981)**



Photo A-32: Panoramic view near WP09 of the CCR and pond contained at the south end of 50-B8 (WP09, IMG\_6990)



Photo A-33: View of the west pit wall of 50-B8 looking west near WP09 (WP09, IMG\_6988)



**Photo A-34: Looking north near WP09 pond below the toe of the CCR slopes in 50-B8 (WP09,IMG\_6986)**



**Photo A-35: Looking north east near WP09 along the interface with the west pit wall and CCR slopes in 50-B8 (WP09,IMG\_6987)**



**Photo A-36: Looking south west near WP10 at the CCR stack and east pit wall of 50-B8 (WP10, IMG\_6991)**



**Photo A-37: Looking west near WP10 at the CCR stack and east pit wall of 50-B8 (WP10, IMG\_6992)**



Photo A-38: Looking north west near WP10 at the CCR stack and east pit wall of 50-B8 (WP10, IMG\_6993)



Photo A-39: Looking south west north of WP10 at the CCR stack slopes in 50-B8 (WP10, IMG\_7033)

**51-B1 and 51-B2**



**Photo A-40: Looking north near WP01 at the material placed above 51-B2 (WP01, IMG\_6930)**



**Photo A-41: Looking north west across the reclaimed fill placed above 51-B1 and 51-B2. (WP04, IMG\_6950)**



Photo A-42: Looking west across the reclaimed fill placed above 51-B1 and 51-B2. (WP04, IMG\_6951)



Photo A-43: Looking north west near WP06 across the reclaimed fill placed above 51-B1. (WP04, IMG\_6967)



**Photo A-44: Looking east near WP06 across the reclaimed fill placed above 51-B1. (WP06, IMG\_6968)**



**Photo A-45: Looking south east near WP06 across the reclaimed fill placed above 51-B1 and 51-B2. (WP06, IMG\_6969)**



**Photo A-46: Looking south near WP06 across the reclaimed fill placed above 51-B1 and 51-B2. (WP06, IMG\_6970)**



**Photo A-47: Looking east near WP05.1 along the east boundary of 51-B2 (WP05.1, IMG\_6965)**



**Photo A-48: Looking north east near WP05 along the east boundary of 51-B2 (WP05, IMG\_6952).**



**Photo A-49: Looking north near WP05 along the exposed pit wall and east boundary of 51-B2 (WP05, IMG\_6953)**



**Photo A-50: Looking north east near WP05 along the east boundary of 51-B2 (WP05, IMG\_6954)**



**Photo A-51: Looking east near WP05 along the east boundary of 51-B2 and reclaimed fill placed above 51-B3 (WP05, IMG\_6956)**



**Photo A-52: Looking south west near WP05 at the condition of the reclaimed fill slopes placed above 51-B2 (WP05, IMG\_6960)**



**Photo A-53: Looking west near WP05 at the condition of the reclaimed fill slopes placed above 51-B2 (WP05, IMG\_6961)**

**51-B2X**



Photo A-54: Looking north east near WP01 at the pit wall slopes and tailings surface of 51-B2X (WP01, IMG\_6921)



Photo A-55: Looking north east near WP01 at the pit wall slopes and tailings surface of 51-B2X (WP01, IMG\_6931)



**Photo A-56: Looking east near WP01 at the pit wall slopes and tailings surface of 51-B2X (WP01, IMG\_6920)**



**Photo A-57: Looking south east near WP01 at the pit wall slopes and tailings surface of 51-B2X (WP01, IMG\_6926)**



**Photo A-58: Looking south east near WP02 along the dried tailings surface of 51-B2X (WP02, IMG\_6932)**



**Photo A-59: Looking south near WP02 along the dried tailings surface of 51-B2X (WP02, IMG\_6933)**



Photo A-60: Looking west near WP03 along the pit wall and area with ponded water in 51-B2X (WP02, IMG\_6934)



Photo A-61: Looking west near WP03 along the pit wall, area with ponded water, and eroded tailings surface (WP03, 51-B2X (WP03, IMG\_6935))



Photo A-62: Looking north west near WP03 along the pit wall, area with ponded water, and tailings surface (WP03, 51-B2X (WP03, IMG\_6936



Photo A-63: Looking north west near WP03 along the pit wall, area with ponded water, and eroded tailings surface of 51-B2X (WP03, IMG\_6937)



**Photo A-64: Panoramic view looking south near WP03 at a portion of the upstream area contributing runoff into 51-B2X (WP03, IMG\_6949)**



**[golder.com](http://golder.com)**