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REPORT

2021 Annual Facility Performance Report for the Coal Reject Spoils

Teck Coal Limited, Fording River Operations

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Reference No.: 21456080-2021-254-R-Rev0-600

30 March 2022

Distribution List

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Executive Summary

This report presents the 2021 annual facility performance report (AFPR) for the coal reject spoils at the Fording River Operations (FRO) mine site, located near Elkford, BC. The following coal reject spoils are included in this report:

- **A-Spoil**—dormant
- **Box Yard spoil**—dormant
- **Kilmarnock / Toe Berm spoil**—dormant
- **Impact Berm spoil**—dormant
- **Blake spoil**—dormant
- **Turnbull West spoil**—dormant
- **Taylor Rejects spoil**—dormant
- **Eagle 4 South Backfill spoil**—active

As coal rejects are a by-product of coal processing, they are considered “tailings” per the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (EMLI 2021) definition and are therefore subject to requirements for tailings storage facilities in the HSRC. Coal reject spoils at FRO, and within the scope of this report, are tailings storage facilities that cannot retain water or saturated tailings.

This report was prepared based on a site visit carried out by Golder Associates Ltd. (Golder) on 31 August and 1 September 2021, a review of site data provided by Teck, and discussions with Teck staff. Based on visual observations during the 2021 annual site visit the coal reject spoils appeared generally safe with minor maintenance issues that require action.

The reporting period for this AFPR is 1 September 2020 through 31 August 2021, unless otherwise noted.

Summary of Key Hazards

Potential failure modes associated with coal reject spoils include the following:

- **Instability—**Insufficient strength or excessive loading that could lead to failure of the spoil.
- **External Erosion of Slope Face or Toe—**External instability of the facility due to loss of materials from the slope face or toe as a result of rainfall, snowmelt, or surface water flows.

Not all failure modes are credible for each spoil.

Consequence of Failure

Teck has advised they will adopt design loading based on extreme events for any facility with a catastrophic credible flow-type failure mode. For facilities without catastrophic credible flow-type failure modes, Teck will reduce credible risks based on the As Low As Reasonably Practicable (ALARP) principle. Adopting this approach meets or exceeds regulatory requirements, aligns with Teck's goal to eliminate risk for loss of life, and is consistent with the Global Industry Standard on Tailings Management (GISTM; GTR 2020), which supports evolving beyond the conventional consequence classification system.

Summary of Key Changes and Changes to Instrumentation, Stability, and Surface Water Control

The following were identified as significant changes during the reporting period:

- The platform of the A-Spoil was developed for the storage of earthmoving equipment shovels.
- Approximately 830,000 m^3 (92%) of coarse rejects (CR) had been removed from the Box Yard spoil as of July 2021 and placed within the potentially acid generating area of the Swift North spoil.
- Approximately 1,200,000 m^3 of combined coarse and fine rejects (CCFR) was placed in the Eagle 4 South Backfill spoil from 26 July 2020 to 22 July 2021, based on Teck survey data.

There were no significant changes in the operation or performance of the coal reject spoils during the reporting period.

Review of Operational Documentation

Operation, maintenance, and surveillance (OMS) procedures for the coal reject spoils are documented in Teck's Standard Practices and Procedures (SP&P) EN.020.R6, Waste Dump Management (Teck 2020b).

This document is generally suitable, however a detailed review by the EoR should be completed and a specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.

Emergency response actions in the event of a failure or data indicating an impending failure of the coal reject spoils are documented in Teck's SP&P EN.020.R6, Waste Dump Management (Teck 2020b), including trigger action response plans (TARPs) and a roles and responsibilities matrix. It is recommended that these procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.

Emergency preparedness documentation is prepared on a site-wide basis (i.e., covers activities for emergency response at the mine site) and is documented in EP.001.R7, dated 14 October 2014 (Teck 2014).

Annual Facility Inspection

New erosion features were identified during the 2021 inspection, which require corrective actions, including:

- A new erosion gully at the south end of the Blake spoil along the western crest of the 1,780 m platform was observed. Additional erosion of this gully could lead to local bench instability and further mobilization of material downslope.

- Erosion was observed at the toe of the Kilmarnock / Toe Berm spoil due to water flowing out of the Old South spoil and along the road. Additional erosion of the toe could lead to spoil instability, which could impact the Kilmarnock Creek.

2021 Annual Facility Performance Priority Recommended Actions

This AFPR is the first AFPR completed for the coal reject spoils. Previously, major spoils were included in the FRO annual spoils report.

Table E-1 summarizes the priority 2 recommended actions from this 2021 AFPR. Additional lower priority recommendations are presented in the report body.

Table E-1: 2021 Priority 2 Recommended Actions for Fording River Operations Coal Reject Spoils

ID Number	Facility	Deficiency	Applicable Code / Guideline Reference / Potential Safety Hazard	Recommended Action	Priority	Deadline	Status
2021-12	Kilmarnock / Toe Berm	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	2	Q4 2022	New
2021-14		Erosion of toe of southeast extent of spoil	Potential for undermining spoil toe	Redirect water from exiting Old South spoil into Kilmarnock channel to prevent erosion of Kilmarnock / Toe Berm spoil toe.	2	Q2 2022	New
2021-17	Blake	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Determine the future for the North Blake spoil area and expected future geometry. Assess potential need for additional subsurface investigations.	2	Q4 2022	New

Priority	Description
1	A high probability or actual spoil safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
2	If not corrected, could likely result in spoil safety issues leading to injury, environmental impact, or significant regulatory enforcement; or a repetitive deficiency that demonstrates a systematic breakdown of procedures.
3	Single occurrences of deficiencies or non-conformances that alone would not be expected to result in spoil safety issues.
4	Best Management Practice – Further improvements are necessary to meet industry best practices or reduce potential risks.

Source: HSRC Guidance Document, Section 4.2 (Ministry of Energy and Mines 2016).

HSRC = Health, Safety and Reclamation Code.

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ABBREVIATIONS

Abbreviation	Definition
AFPR	annual facility performance report
CCFR	combined coarse and fine rejects
CDA	Canadian Dam Association
CR	coarse rejects
EoR	Engineer of Record
FoS	Factor of Safety
FRO	Fording River Operations
Golder	Golder Associates Ltd.
HSRC	Health, Safety and Reclamation Code for Mines in British Columbia
OMS	operation, maintenance, and surveillance
QPO	quantifiable performance objective
PAG	potentially acid generating
SP&P	Standard Practices and Procedures
TARP	Trigger Action Response Plan
Teck	Teck Coal Limited
TSF	tailings storage facility

1.0 INTRODUCTION

1.1 Purpose, Scope of Work, Method

At the request of Teck Coal Limited (Teck), Fording River Operations (FRO), Golder Associates Ltd. (Golder) has completed the 2021 annual facility performance report (AFPR) for the coal reject spoils at the FRO mine site, located near Elkford, BC.

This AFPR includes the following coal reject spoils (from oldest to youngest), shown in Figure 1:

- **A-Spoil**—dormant
- **Box Yard spoil**—dormant
- **Kilmarnock / Toe Berm spoil**—dormant
- **Impact Berm spoil**—dormant
- **Blake spoil**—dormant
- **Turnbull West spoil**—dormant
- **Taylor Rejects spoil**—dormant
- **Eagle 4 South Backfill spoil**—active

This AFPR report is based on a site visit conducted by the Engineer of Record (EoR) on 31 August and 1 September 2021. All coal reject spoils were inspected, with the exception of the Taylor Rejects spoil, in conjunction with Teck staff involved in the maintenance, operation, and surveillance of the facilities. Site data, including available instrumentation data, between 1 September 2020 and 31 August 2021 (the reporting period) were also reviewed. This AFPR report considers information previously reviewed by Golder as part of assuming the EoR role for the FRO coal reject spoils.

Photographs of the coal reject spoils from the annual site inspection are presented in Appendix A, and a summary of observations is included in the inspection reports in Appendix B.

All coordinates presented in this report are in Universal Transverse Mercator with elevations referenced to the Elk Valley Elevation Datum unless otherwise noted.

This report is to be read in conjunction with the Study Limitations provided at the end of the text.

1.2 Regulatory Requirements

1.2.1 BC Health, Safety and Reclamation Code

The coal reject spoils are subject to the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (EMLI 2021).

This report has also been prepared considering the Interim Guidelines of the British Columbia Mine Waste Rock Pile Research Committee (BCMWRPRC 1991), the Guidelines for Mine Waste Dump and Stockpile Design (Hawley and Cunning 2017), and the HSRC guidance document (Ministry of Energy and Mines 2016) and is intended to meet the requirement for an annual report as set out in Section 10 of the HSRC for Mines in British Columbia (EMLI 2021).

1.2.2 Permits and Licences

Coal rejects spoils at FRO are permitted under Teck's permit No. C-3, and associated amendments.

Permit amendments associated with the dormant coal reject spoils are available publicly via the Ministry of Energy, Mines, and Low Carbon Innovation website. The active Eagle 4 South Backfill spoil is permitted under a 2017 amendment to Teck's permit No. C-3 (MEMNG 2017) to a maximum elevation of 2,015 m.

2.0 BACKGROUND

2.1 Site History and Overview of Operations

The FRO site is an active open pit steelmaking coal mine.

As part of mining operations and coal processing, by-product materials known as coal rejects are produced. Coal rejects describes both historical coarse rejects (CR) and combined coarse and fine rejects (CCFR) that are currently produced at the plant. Characterization of the coal rejects is provided in Section 2.2.

The annual volume of coal rejects produced on site is approximately 3,500,000 m^3 (Gaebel 2021, pers. comm.).

The Eagle 4 South Backfill spoil is the only active coal rejects spoil at the FRO site at the time of this report, with material being placed since 19 January 2017 (MEMNG 2017).

2.2 Coal Rejects Process and Characterization

Raw coal delivered to the breaker at FRO contains high-ash material in the form of carbonaceous mineral rock. To meet product specifications, this high-ash rock is separated from the raw coal at the wash plant within the processing plant. The high-ash waste consists of a coarse fraction and a fine fraction. The coarse fraction, CR, consists of sand and gravel-sized fragments of washed, crushed rock ranging in size from approximately 1 to 100 mm. The fine fraction of the waste, comprising rock fragments smaller than approximately 1.0 mm, includes “coarse-fine” rejects (0.75 to 1.0 mm) and the flotation tailings (less than 0.75 mm).

Since 2005, the coarse-fine rejects and a portion of the flotation tailings have been separated from the remainder of the slurry floatation tailings at the wash plant and mixed with the CR to produce CCFR. CCFR is hauled by truck to a designated CCFR storage facility (i.e., spoil). The CCFR contains approximately 2% to 10% material finer than 0.075 mm.

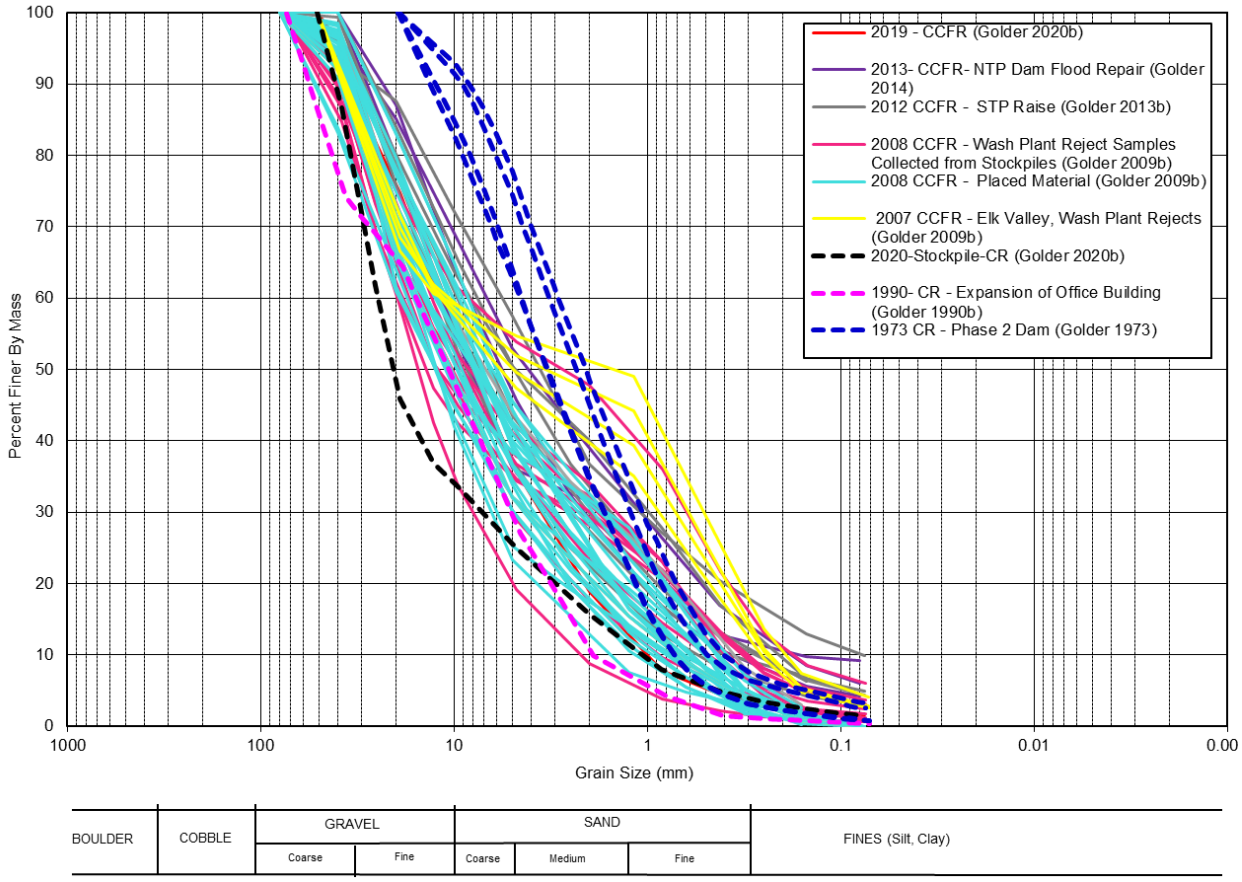
The properties of the CR and CCFR are summarized in Table 1.

Table 1: Coal Rejects Characterization

Characteristic	Value	Unit	Comment	Source
PSD – finer than 0.075 mm	<10	%	As shown in Chart 1.	Golder Brawner 1976; Golder 1990b, 2009, 2013b, 2014, 2020
PSD – D_{85}	6.5 to 49	mm		
PSD – D_{50}	1.5 to 20	mm		
PSD – D_{15}	0.2 to 3.5	mm		
Specific gravity	2.03 to 2.38	n/a	Range of values based on density testing conducted on CR and CCFR.	Golder Brawner 1976; Golder 2002, 2005b, 2008b
Friction angle	33.5 to 45.5	degrees	Triaxial and direct shear testing of CR and CCFR.	Golder Brawner 1976; Golder 1981, 1997a, 2005b, 2008b
In situ, uncompacted wet density	1,319 to 1,763	kg/m^3	Determined at Blake spoil by in situ PNG and sand cone replacement method.	Golder 2008b

PSD = particle size distribution; CR = coarse rejects, CCFR = combined coarse and fine rejects; PNG = portable nuclear gauge; n/a = not applicable.

Particle size distributions of historical CR and CCFR samples are shown in Chart 1.



CR = coarse rejects; CCFR = combined coarse and fine rejects; NTP = North Tailings Pond; STP = South Tailings Pond.

Chart 1: Coarse Rejects and Combined Coarse and Fine Rejects Particle Size Distribution Curves

The particle size difference between the CR and CCFR can be seen with the comparison between the bold dashed lines and the solid lines, representing CR and CCFR, respectively. Although the CR generally has less fines than the CCFR, the difference in gradations is not significant and some CCFR samples have similarly low fines as the CR.

Direct shear laboratory testing and in situ testing were conducted on the CR and CCFR material of the Blake spoil (Golder 2008b). The direct shear testing showed that when tested at field density levels, the material demonstrated dilatant behaviour under moderate loading (i.e., 200 and 400 kPa).

Teck (2016b) indicated that historical testing and monitoring data have shown that acid-consuming and acid-generating issues are not of significant concern for CCFR at FRO. The chemical nature of the rejects was detailed in a report by SRK Consulting (Canada) Ltd. (SRK) in 2017. Geochemical characterization of coal rejects indicated low potential for acid rock drainage and also considered the placed rejects to result in oxygen consumption or low gas permeabilities where oxygen concentrations decrease at depth, supporting conditions that result in nitrate and selenium microbial reduction (SRK 2017).

2.3 Site Seismicity

Golder developed a site-specific seismic hazard model for the FRO site based on historical seismicity and a review of geological and paleoseismological features (Golder 2016a). Golder's model includes four area sources from the 5th Generation Seismic Hazard Model and nine faults and fault segments mapped in northwest Montana. The 5th Generation Seismic Hazard Model was developed by Natural Resources Canada for use in the 2015 National Building Code of Canada.

Probabilistic analysis results from the site-specific hazard model are listed in Table 2. All site-specific peak ground acceleration values were evaluated for a soil Site Class C as described in the 2010 National Building Code of Canada (NRCC 2010) as this represents Golder's understanding of the general foundation conditions at the spoil locations. Note that the 2015 National Building Code of Canada description for Site Class was not published at the time of publication for Golder 2016a.

Table 2: Fording River Operations Site Seismic Hazard Values

Exceedance Probability	Return Period (years)	Peak Ground Acceleration (g)
40% in 50 years	100	0.020
10% in 50 years	475	0.063
5% in 50 years	1,000	0.097
2% in 50 years	2,475	0.158
1% in 50 years	5,000	0.222
½% in 50 years	10,000	0.300

Notes:

For firm ground site class "C," very dense soil and soft rock foundation, as defined by 2010 National Building Code of Canada (NRCC 2010).

Return periods are not exact representations of annual exceedance probabilities; rounding per CDA (2013) is shown.

FRO site coordinates: 50.202°N, -114.876°W.

2.4 A-Spoil

2.4.1 Description

A-Spoil is located south of Lake Mountain Creek, north of Swift Pit, and northwest of the site plant and offices. The A-Spoil is approximately 380 m wide, 440 m long, and 75 m high, based on a top elevation of 1,750 m and toe elevation of 1,675 m. The spoil has an overall area of approximately 140,000 m^2 and an estimated total volume of approximately 8,000,000 m^3. Based on LiDAR data from 2021, slope angles are up to approximately 38°. A-Spoil is the oldest coal reject spoil on site and is comprised of CR with a restoration soil stockpile on the top.

A-Spoil is no longer receiving CR material and is dormant.

2.4.2 Design and Development History

There is no information available on the initial design of A-Spoil. A cross-section of the facility is shown in Figure 5 based on the section location shown in Figure 2.

Golder (1981) provides a review of the spoil and reports that the permit allowed for a maximum elevation of 1,737.4 m (unknown datum), which defined the extents of the spoil. A permit amendment for the expansion of A-Spoil was granted (MEMPR 1981) subsequent to the Golder (1981) report and allowed for the expansion of A-Spoil to elevation 1,780 m (datum unknown).

Golder (1981) describes bottom-up development of A-Spoil with free-dumped material being spread by dozers in approximately 1 m thick lifts, followed by compaction by haul truck and dozer traffic.

Golder (2016c) included the proposed development of a restoration soil stockpile on top of the CR. The restoration soil stockpile was planned to be completed in six 5 m lifts using the bottom-up method with overall slopes of 5H:1V.

The Golder (2016c) report also notes that at the south and southwest sides of the spoil, it appears that CR had been tipped over the edge, resulting in slopes at angle of repose (approximately 38°).

2.4.3 Foundation Conditions

Golder (1981) describes the original A-Spoil as being constructed within a small topographic swale that drains to the south and that a minor pond is present between the southern limit of the spoil and Greenhills Road. Review of the 1968 survey information (Geoghegan 2015, pers. comm.) indicates that the site was placed on the western side of a topographical high point matching the elevation range defined by Teck (2017b). The base of the spoil is located on relatively gently sloping ground that was likely originally a minor water course.

Two known test pit investigations (Teck 2015b; AMECFW 2015) have been completed in the vicinity of A-Spoil. General conditions indicate the following:

- topsoil
- glaciofluvial deposits
- till deposits, which consisted of a mixture of sand and gravel within a clay matrix
- groundwater appeared within test pits close to the existing pond at an approximate depth of 3.0 m

Review of geological mapping (MEMPR 1987) indicates that the underlying bedrock formation is the Mist Mountain formation.

2.5 Box Yard Spoil

2.5.1 Description

The Box Yard spoil was located directly southeast of Shandley Pit (now drained) and west of the processing plant and site offices. Prior to the 2020/2021 monitoring period, the Box Yard spoil was approximately 310 m wide, 400 m long, and 85 m high, based on a top elevation of 1,700 m and toe elevation of 1,615 m. The spoil had an overall area of approximately 145,000 m^2 and stored an estimated total volume of CR of approximately 900,000 m^3. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be approximately 35° (Golder 2021).

In 2020/2021, Teck excavated CR material from the Box Yard spoil and placed the material within the potentially acid generating (PAG) designated section of the Swift North spoil. It was estimated by Teck that as of July 2021, approximately 830,000 m^3 (92%) of CR material had been removed, with 70,000 m^3 remaining. The rehandled coal rejects from Box Yard spoil which are now located in the Swift North spoil should be included in future annual reporting for coal reject spoils (Recommendation 2021-26).

2.5.2 Design and Development History

No design, analysis, or operational documentation is available for the Box Yard spoil. However, based on discussions with Teck, it was likely dumped in 15 m lifts and was potentially over-dumped so that lift set-backs were no longer visible at the time of the 2020 site inspection and the sides appeared to be at angle of repose.

A cross-section of the facility, at the time of the 2021 LiDAR survey, is shown in Figure 5 based on the section location shown in Figure 2.

2.5.3 Foundation Conditions

Limited data are available on the original conditions of the underlying foundation of the spoil and no known investigation information is available. The Box Yard spoil is located within the previous Shandley Pit and as such is expected to have been developed over mined-out waste rock. Review of the post-mined contours (Golder 2008d) indicates that the surface underlying the spoil was generally flat with a gentle rise. Review of geological mapping (MEMPR 1987) indicates that bedrock underlying the coal reject spoil is the Mist Mountain formation; however, the bedrock is likely an older formation at the base of the pit due to mining.

2.6 Kilmarnock / Toe Berm Spoil

2.6.1 Description

The Kilmarnock / Toe Berm spoil is located at the toe of the Old South spoil, approximately 15 m northwest of the Kilmarnock Creek. The spoil is approximately 450 m wide, 850 m long, and 130 m high, based on a top elevation of 1,770 m. The spoil stores an estimated total volume of CR of approximately 60,000,000 m^3. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be approximately 25° (Golder 2021).

The Kilmarnock / Toe Berm spoil is no longer receiving CR and has been dormant since 2002.

2.6.2 Design and Development History

Golder (1990b) indicates that the Kilmarnock / Toe Berm spoil was constructed to provide a protective barrier at the western limit of and to improve overall stability of the Old South spoil. Cross-sections for the facility are shown in Figure 6 based on section locations shown in Figure 3.

Golder (1994) indicates that the facility was designed to a maximum elevation of 1,730 m for the storage of up to 14,000,000 m^3 of CR near the toe of the Old South spoil Stage 3 development (elevation 2,045 m). The Kilmarnock / Toe Berm spoil is therefore assumed to be partially buried beneath two wrap-around, descending stages of the Old South spoil (Stages 4A West and 4B West; Golder 1994).

The Kilmarnock / Toe Berm spoil is understood to have been initially developed in the early 1990s using conveyor and spreader methods (Golder 1990b). The spoil continued to receive CR until approximately 2002; however, no known accurate development records are available.

In 2005, it was identified that the CR in the Kilmarnock / Toe Berm spoil was burning (Golder 2005a).

2.6.3 Foundation Conditions

Golder (1989) reported the results of four boreholes within the Kilmarnock Creek flood plain and in the outer limits of the Old South spoil footprint. The investigation identified the following soil deposits (bedrock depths were not reported) in the Kilmarnock Creek flood plain (top to bottom):

- **fluvial material**—between 3.4 and 4.8 m thick
- **glacial till**—between 1.8 and 4.3 m thick

Investigations completed by Golder (1994) indicated foundation soils consist of glacial till that varies from dense clayey silt with sand gravel and cobbles to dense mixtures of silt-sand-gravels with cobbles and boulders. Materials were noted as exhibiting high shear strength characteristics.

Review of the 1968 survey information (Geoghegan 2015, pers. comm.), surveyed prior to development of the facility, indicates that the original ground had a gentle profile with an approximate slope of 8°. The survey also indicates that the spoil is located partially on the Kilmarnock Creek flood plain, and Golder (1990b) indicated that the southern limit of the Kilmarnock / Toe Berm spoil would extend beyond the till bench that borders the northern extent of the Kilmarnock Creek flood plain. Lenses of organic and/or fine-grained and alluvial deposits can occur in flood plains and it is therefore possible that soft organic, fine-grained lenses and/or saturated sands and gravel may be present in the foundation beneath the spoil.

Based on review of geological mapping (MEMPR 1987), bedrock in the area is expected to be the Fernie Formation, which consists of shale, siltstone, sandstone, and some limestone.

2.7 Impact Berm Spoil

2.7.1 Description

The Impact Berm spoil is located 15 m to the southwest of the current Kilmarnock Creek. The spoil is approximately 325 m wide, 350 m long, and 35 m high, based on a top elevation of 1,660 m and a natural ground elevation of approximately 1,625 m. The spoil has a footprint area of approximately 50,000 m^2 and stores approximately 1,000,000 m^3 of CR material. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be near the angle of repose, at approximately 36° (Golder 2021).

The Impact Berm spoil is no longer receiving CR and is dormant.

2.7.2 Design and Development History

Golder (1990a) states that the Impact Berm spoil was constructed at the downstream side of the Old South spoil to provide protection from a potential runout failure from the Old South spoil facility. The Impact Berm spoil is believed to have been constructed in the early 1990s (Golder 1990a,c,1994) as the second phase of the Old South spoil barrier project. Golder (1990a) indicates that the Impact Berm spoil was to be constructed to an elevation of 1,660 m with the footprint extending over Kilmarnock Creek and Kilmarnock Creek diverted to the north of the Impact Berm spoil. Review of 2019 LiDAR survey information indicates that the diversion of Kilmarnock Creek was completed.

A cross-section of the facility is shown in Figure 7 based on the section location shown in Figure 3.

No information is available on the development of the Impact Berm spoil. Based on site inspection observations, the Impact Berm spoil appears to have been developed in a single lift by end tipping material.

2.7.3 Foundation Conditions

Review of survey information from 1968 (Geoghegan 2015, pers. comm.) indicates that the northwestern portion of the Impact Berm spoil is founded within the Kilmarnock creek flood plain and is therefore expected to be underlain by alluvial and/or saturated sand and gravel. This area may have glacial till underlying the Kilmarnock Creek alluvial deposits and is expected to have glacial till underlying the southeastern portion of the spoil, based on observations at the nearby Kilmarnock till borrow pit.

Golder (1989) reported the results of four boreholes within the Kilmarnock Creek flood plain and in the outer limits of the Old South spoil footprint. The investigation identified the following soil deposits (bedrock depths were not reported) in the Kilmarnock Creek flood plain (top to bottom):

- **fluvial material**—between 3.4 and 4.8 m thick
- **glacial till**—between 1.8 and 4.3 m thick

Golder (1990b) indicated that the foundations of the nearby Kilmarnock / Toe Berm spoil consist of till and surficial peat material, which, based on proximity, could also be present under the Impact Berm spoil.

Based on review of geological mapping (MEMPR 1987), bedrock in the area is expected to be the Fernie Formation, which consists of shale, siltstone, sandstone, and some limestone.

2.8 Blake Spoil

2.8.1 Description

The Blake spoil is located east of the South Tailings Pond and directly north of the Kilmarnock / Toe Berm spoil. The spoil is located topographically above site infrastructure and work areas, including the mine access road, gatehouse, railway, gas line, breaker area, and coal stockpile area.

The spoil is approximately 685 m wide, 670 m long, and 150 to 200 m high, based on a top elevation of 1,835 m. The spoil has a footprint area of approximately 260,000 m^2 and stores approximately 16,000,000 m^3 of coal rejects. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be approximately 23° (Golder 2021).

The Blake spoil has been dormant since 2014. However, freshly tipped CR was observed during the 2021 annual inspection (Section 5.0).

2.8.2 Design and Development History

The initial design of the Blake spoil is summarized in Golder (1997b), which indicates a geometry comprising two lifts, each between 30 and 35 m high, a 40 m wide bench between the lifts, and an elevation of 1,765 m.

In 2002, an expansion of the spoil to the south, over the existing Kilmarnock / Toe Berm spoil, and raise to elevation 1,810 m was designed. This expansion was referred to as the “Upper Blake reject spoil”. Golder (2002) indicates that this was developed over an area of previous waste rock failures. The design included a rock drain to convey Blake Creek (presumed to join Blackmore Creek) through the base of the facility.

A revised design configuration for the Upper Blake reject spoil was developed in 2004 (Golder 2004) including increasing the height of the spoil and changing to the storage of CCFR from CR. The spoil height was increased to elevation 1,820 m, additional benches were added, and the height of each bench reduced from 40 to 30 m. The facility footprint was also extended to the south over failed waste rock debris and lifts of CR placed as part of the Kilmarnock / Toe Berm spoil.

A significant expansion of the Blake reject spoil was developed in 2008 (Golder 2008c), which included expanding the spoil to the north and east of the Upper Blake reject spoil. Two options were developed and based on a review of LiDAR data in 2019, it is inferred that Option 2 was implemented. The Option 2 design proposed a spoil at an approximate elevation of 1,850 m with 15 m bench heights and an overall design slope of 16°.

Geotechnical assessments (Golder 2002, 2007, 2008b, 2011a, 2012a, 2013a) indicate that the spoil was generally constructed using the bottom-up method including free dumping of CR/CCFR and spread using earthwork equipment. Geotechnical assessments (Golder 2011a, 2012a, 2013a) also noted that approximately 93,000 m^3 of waste rock was placed in the spoil between 2010 and 2012.

The southern extent of the Upper Blake reject spoils (above the Kilmarnock / Toe Berm spoil) are noted to be burning (Golder 2011a, 2012a, 2013a). To limit the burning, lift thicknesses were reduced to increase compaction (decrease oxygen).

A cross-section of the facility is shown in Figure 7 based on the section location shown in Figure 3.

2.8.3 Foundation Conditions

A geotechnical assessment was completed by Golder (2002) and noted that portions of the Upper Blake spoil were to be placed over waste rock debris resulting from a failure of the Blaine spoil in mid-July 1986. As such, the foundation may contain loose material that could re-mobilize.

A test pit investigation was completed by Golder (2008c) to assess the subsurface conditions for the North Blake spoil. Test pits (up to 5 m deep) were located along the proposed facility toe and on the natural slopes within the facility footprint. The investigation indicated the following (from top to bottom):

- silt and peat topsoil
- gravelly sand with a silt and clay layer
- gravel with sand and some silt

Possible bedrock was encountered in one location (2.0 to 3.1 m deep) where material was reported as possible weathered Fernie Formation bedrock (Golder 2008c).

Groundwater was observed at relatively shallow depths within one test pit.

The Blake spoil was constructed on sloped original ground (elevation approximately 1,400 m) at an angle between 5° and 15° (Golder 1997b, 2002, 2007).

Review of geological mapping (MEMPR 1987) indicates that the bedrock consists of shale and sandstone of the Fernie Formation.

2.9 Turnbull West Spoil

2.9.1 Description

The Turnbull West spoil is located on the west side of Fording River, at the western edge of the Swift North spoil. The spoil is approximately 1,505 m wide, 1,250 m long, and 130 m high, based on a top elevation of 1,830 m and a natural ground elevation of approximately 1,700 m. The spoil has a footprint area of approximately 1,200,000 m^2 and stores approximately 110,000,000 m^3 of co-mingled waste rock and CCFR. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be approximately 24° (Golder 2021).

The Turnbull West spoil is not currently receiving CCFR. Waste rock is being placed as the Swift North waste rock spoil, which is being developed over the Turnbull West spoil.

2.9.2 Design and Development History

Golder (2003) completed a geotechnical assessment of the original design of the Turnbull West spoil including an assessment of pore-water pressures at the base of the spoil. The assessment also noted that where soft foundation soils were encountered at the southern corner of the proposed spoil, the toe should be pulled back to avoid loading this isolated area.

The design was revised in 2011 (Golder 2011b) to an increased elevation of 1,830 m and in 2012 (Golder 2012b) to elevation 1,900 m (Golder 2012b). The facility was designed based on bottom-up placement with lifts ranging in thickness from 15 to 30 m. The revised 2012 design also included a maximum facility height of approximately 190 m at an overall slope angle of approximately 2H:1V with individual lifts at an angle of 37°. Geotechnical assessments (Golder 2011a, 2012a, 2013a) indicate the Turnbull West spoil was constructed as per design with setbacks or horizontal benches incorporated at height intervals of approximately 30 m.

Golder understands that CCFR was sent to Turnbull West spoil from approximately 2009 or 2010 until about 2014, when coal rejects began being sent to the Taylor Rejects spoil. Based on an annual volume of coal rejects produced on site of approximately 3,500,000 m^3 (Gaebel 2021, pers. comm.) the assumed volume of CCFR stored in Turnbull is between approximately 14,000,000 to 17,500,000 m^3. Teck reported that when CCFR was placed, it was free dumped with waste rock at a minimum ratio of about 2:1 waste rock to CCFR.

The volumes of waste rock reported to have been placed in Turnbull West spoil from 2009 to 2015 (approximately 67,000,000 m^3) confirm that the Turnbull West spoil is predominantly waste rock.

A cross-section of the facility is shown in Figure 4 based on the section location shown in Figure 5.

2.9.3 Foundation Conditions

In total, four geotechnical test pit investigations of the Turnbull West spoil have been completed by Golder (2003, 2008a, 2013c) and Teck (2015b). Encountered stratigraphy included the following (from top to bottom):

- topsoil
- loose to compact gravel and silt
- very soft to firm silt to clayey silt, or loose gravel
- sand layer

Shallow groundwater was encountered in investigations, with the shallowest encountered at approximately 1.4 m below ground surface (Teck 2015b).

Glacial till is expected on ridges and higher elevations and underlying some of the alluvial deposits, based on investigations elsewhere on site. Bedrock was encountered in two investigations at an approximate depth of 0.8 m below ground surface (Golder 2013c; Teck 2015b). Review of geological mapping (MEMPR 1987) noted the bedrock geology to be the Mist Mountain formation.

2.10 Taylor Rejects Spoil

2.10.1 Description

The Taylor Rejects spoil is located south of Turnbull Ridge, east of 2-Spoil and west of the Eagle 6 North pit.

The Taylor Rejects spoil is part of the larger Taylor waste rock spoil, both of which are inactive. The Taylor waste rock spoils includes the Taylor Rejects, North Taylor Backfill spoil, the Upper Taylor West spoil, the Eagle 6 West Backfill spoil, Taylor Pit spoil, and the Taylor Extension spoil. This report distinguishes between the Taylor Rejects spoil and the surrounding waste rock spoils that are referred to collectively as the Taylor waste rock spoils.

The spoil is circular with an approximate diameter of 400 m and a height of 30 m, based on a top elevation of 2,005 m and a waste rock pad elevation of approximately 1,975 m. The spoil stores approximately 3,500,000 m^3 of CCFR and is surrounded by a ramp constructed of breaker rock (Gaebel 2020, pers. comm).

The Taylor Rejects spoil is not currently receiving CCFR and has been dormant since 2017.

2.10.2 Design and Development History

No information was available on the design and operation of the Taylor Rejects spoil. However, based on a review of survey data provided by Teck and air photos from 2014 through 2018, the Taylor Rejects spoil appears to have been developed using the bottom-up method in at least two lifts. Teck also confirmed that during construction the perimeter of the Taylor Rejects spoil was encapsulated by breaker rock. By 2018 the coal rejects appeared to be mostly encapsulated by waste rock, placed around the outer edge of the spoil.

Teck reports that the Taylor Rejects spoil was developed similarly to the active Eagle 4 South Backfill spoil, that is, the CCFR was free dumped by haul truck and spread by dozer in approximately 2 m high lifts.

CCFR was placed in the Taylor Rejects spoil from 2014 to approximately February 2017.

2.10.3 Foundation Conditions

No known field investigations have been completed; however, the Taylor Rejects spoil was founded on a relatively flat platform of the Taylor / Eagle 6 West Backfill waste rock spoil, approximately 200 m south of the northern face of the spoil. The Taylor / Eagle 6 West Backfill waste rock spoil comprise a combination of pit backfill waste rock and unconfined waste rock spoils.

Review of geological mapping (MEMPR 1987) indicates that the bedrock is the Mist Mountain formation (MEMPR 1987); however, the bedrock is likely an older formation at the base of the pit due to mining.

2.11 Eagle 4 South Backfill Spoil

2.11.1 Description

The Eagle 4 South Backfill spoil is located in the Eagle Mountain area near the active Eagle 6 Pit.

The spoil is approximately 460 m wide, 570 m long, and 25 m high, based on a top elevation of 1,980 m. The spoil has a footprint area of approximately 390,000 m^2 and stored approximately 9,900,000 m^3 up to July 2021. Based on LiDAR data from 2019, the overall slope angle of the spoil was interpreted to be approximately 34° (Golder 2021).

The Eagle 4 South Backfill spoil is an active facility and is currently used for the storage of plant-generated CCFR. It is the only coal rejects spoil currently active at FRO.

2.11.2 Design and Development History

The Eagle 4 South Backfill spoil was initially designed in late 2016 (Teck 2016b) with a revised design completed in early 2017 (Teck 2017a). The spoil was designed to hold 12,300,000 m^3 of CCFR and to be buttressed on three sides (east, west, and south) by existing waste rock spoils (Teck 2016a). A geotechnical assessment completed by Teck (2016b) indicated an overall slope design angle of 2H:1V (approximately 26°) or less with a maximum lift height interval of 15 m. Eagle 4 South spoil was designed to be developed in two phases (Teck 2016a):

- **Phase 1**—to elevation 1,985 m with a design capacity of 7,100,000 m^3 of CCFR and buttressed on three sides (east, west, and south) by existing waste rock spoils.
- **Phase 2**—on top of Phase 1 to elevation 2,015 m with a design capacity of 5,200,000 m^3 of CCFR.

Development of Phase 1 commenced in February 2017, and approximately 9,900,000 m^3 of CCFR has been placed between August 2018 and July 2021. As such, Phase 2 of the Eagle 4 South Backfill spoil had been initiated at the time of the 2021 site inspection.

Teck (2016a, 2018) indicates that the spoil is developed using the bottom-up method, with CCFR material free dumped by haul truck and spread by dozer in approximately 2 m high lifts. Benches are incorporated every 15 m in height to achieve an overall slope of 2H:1V.

A wireline extensometer was installed at the northeast corner of the spoil after it was discovered that one lift in the area exceeded the maximum 15 m permitted height.

Water at the facility is managed by directing runoff to ditches and local sumps to minimize ponding. Drainage of ponded water is accelerated by ripping channels in the area, as required (Teck 2016a).

A cross-section of the facility is shown in Figure 3 based on the section location shown in Figure 8.

2.11.3 Foundation Conditions

No known field investigations have been completed. However, Teck (2016a) indicated that the Eagle 4 South Backfill spoil was constructed on top of waste rock used to backfill the Eagle South Pit. The placement of the waste rock ceased in November 2016. Based on an available section (Teck 2016b), the backfilled rock is approximately 100 m thick and mostly flat with side slopes up to approximately 2H:1V. Backfilled waste rock is underlain by the mined-out bedrock surface. The backfilled waste rock underlying the CCFR is expected to be free draining and have relatively high strength in comparison with the placed CCFR.

Review of geological mapping (MEMPR 1987) indicates that the bedrock is the Mist Mountain formation (MEMPR 1987); however, the bedrock is likely an older formation at the base of the pit due to mining.

2.12 Key Personnel

Key personnel associated with the FRO coal reject spoils during the 2020/2021 operating period are:

- **Senior Engineering Supervisor**—Ross Roseingrave, P.Eng., an employee of Teck
- **Qualified Person (QP) / Responsible Tailings Facility Engineer (RTFE)**—James Campbell, P.Eng., an employee of Teck
- **EoR**—Julia Steele, P.Eng., an employee of Golder

The EoR role has been accepted, with some limitations, pending the completion of works to gather sufficient information and complete analyses to align with Teck's tailings storage facility (TSF) requirements.

2.13 Quantifiable Performance Objectives

Velocity QPOs for extensometers (wirelines), including the one installed at the Eagle 4 South Backfill spoil, and the associated Trigger Action Response Plan (TARP) have been developed and are documented in Teck's Standard Practices and Procedures (SP&P) EN.020.R6, Waste Dump Management (Teck 2020b). These QPOs are summarized as follows:

- **Green Normal Operations**—"End Dump": 0 to 1,200 mm/day
- **Yellow Warning**—"Dump Short and Push": 1,200 to 2,000 mm/day
- **Red Alarm**—"Closed": 2,000 to 5,000 mm/day
- **Black Critical**—"Failure Closure": >5,000 mm/day

These generic QPOs and TARPs were developed for top-down waste rock spoils and should be reviewed in consultation with the EoR to determine if they are generally applicable to bottom-up coal reject spoils or specifically to the Eagle 4 South Backfill spoil (Recommendation 2021-03).

In addition, based on values within the GeoExplorer instrumentation monitoring system, it is understood that the following 3D velocity QPOs are used for GPS monitors installed at the A-Spoil and Blake spoils:

- **Yellow Warning**—150 mm/day
- **Red Alarm**—300 mm/day

These QPOs are not documented in Teck's SP&P EN020.R6, Waste Dump Management (Teck 2020b), which states that action is required "if GPS units in critical areas are found to be in a sustained warning state."

No further details, including a definition of "sustained" or which instruments are in critical areas, are provided. It is also noted that the rationale for the adopted values is not documented. Further details on the rationale of the adopted QPO values as well as the actions to be taken following exceedance should be provided and documented in operational documentation including the TARPs (Recommendation 2021-03).

3.0 OPERATIONS AND MAINTENANCE FROM 1 SEPTEMBER 2020 TO 31 AUGUST 2021

The following spoils were dormant in the 2020/2021 reporting period and no new CR or CCFR materials were placed:

- A-Spoil
- Box Yard spoil
- Kilmarnock / Toe Berm spoil
- Impact Berm spoil
- Turnbull West spoil
- Taylor Rejects spoil

Fresh CCFR was observed to have been placed at Blake spoil during the 2021 site inspection (Section 5.5.7). Teck reports that the fresh CCFR was being temporarily stockpiled at this location.

Activities at the dormant spoils comprised routine inspections, as detailed in Teck's SP&P EN.020.R6, Waste Dump Management (Teck 2020b), as well as the following:

- A portion of the top platform of the A-Spoil was developed for the storage of earthmoving equipment shovels in 2020/2021.
- It is estimated by Teck that approximately 830,000 m^3 (92%) of the CR material had been removed from the Box Yard spoil as of July 2021 and placed within the PAG area of the Swift North spoil.
    - It is estimated that as of July 2021 approximately 70,000 m^3 of the CR remained in the Box Yard spoil.

The Eagle 4 South Backfill spoil was active in 2020/2021 and was developed as detailed in Teck's SP&P EN.020.R6, Waste Dump Management (Teck 2020b) by free dumping and using the bottom-up method with lift heights between 15 and 30 m and overall slope angles no greater than 26°. Golder understands that placement of materials is managed using the Wenco GPS machine guidance system.

Based on a comparison between the 2020 and 2021 LiDAR survey data, it is estimated that approximately 1,200,000 m^3 of CCFR was placed in the Eagle 4 South Backfill spoil from 26 July 2020 to 22 July 2021. Maintenance activities comprised routine inspection, as detailed in Teck's SP&P EN.020.R6, Waste Dump Management (Teck 2020b).

4.0 REVIEW OF PRECIPITATION DATA

Increased precipitation, particularly during a short period of time, can be an indicator for the expected number and extent of external erosion features on the FRO coal reject spoils. Coal rejects are relatively erodible material and high intensity rainfall or rapid snow melt (more precipitation over a short period of time) is more likely to result in erosion features.

Three local climate monitoring stations are present at FRO: waste-water treatment plant, A-Spoil, and Brownie spoil. Records were available from the waste treatment plant and Brownie spoil weather stations during the reporting period of 1 September 2020 to 31 August 2021. Only limited precipitation data were available for the A-Spoil station, and climate data were therefore excluded from this review.

The Fording River Cominco station is the closest regional Environment and Climate Change Canada station to the FRO site; however, the station has not published precipitation data since 2017. The waste-water treatment plant station has been used as the main source of precipitation data and has been used to develop the Fording River Cominco dataset including infilling data from other stations since December 2013. As a result, a new combined dataset, hereafter referred to as the Fording River (infilled) dataset, has been used for this climate review. The waste-water treatment plant station precipitation data were used over the majority of the reporting period with the exception of 28 April to 4 May 2021 (inclusive), where missing data were infilled with data from the Sparwood CS regional station.

The total precipitation recorded at the Fording River (infilled) and Brownie spoil stations over the reporting period is shown in Table 3, and monthly total precipitation is presented in Chart 2. For comparison purposes, the long-term (1970 to 2020) average monthly precipitation at FRO (from the Fording River Cominco infilled dataset) is also presented in Chart 2. Note that data presented in Table 3 and Chart 2 are raw data; no adjustments for station elevation or undercatch factors have been applied.

Table 3: Total Precipitation from 1 September 2020 to 31 August 2021

Weather Station / Dataset	Total Annual Precipitation (mm)
Fording River (infilled)	532
Brownie spoil	858
Long term (1970 to 2020)	632

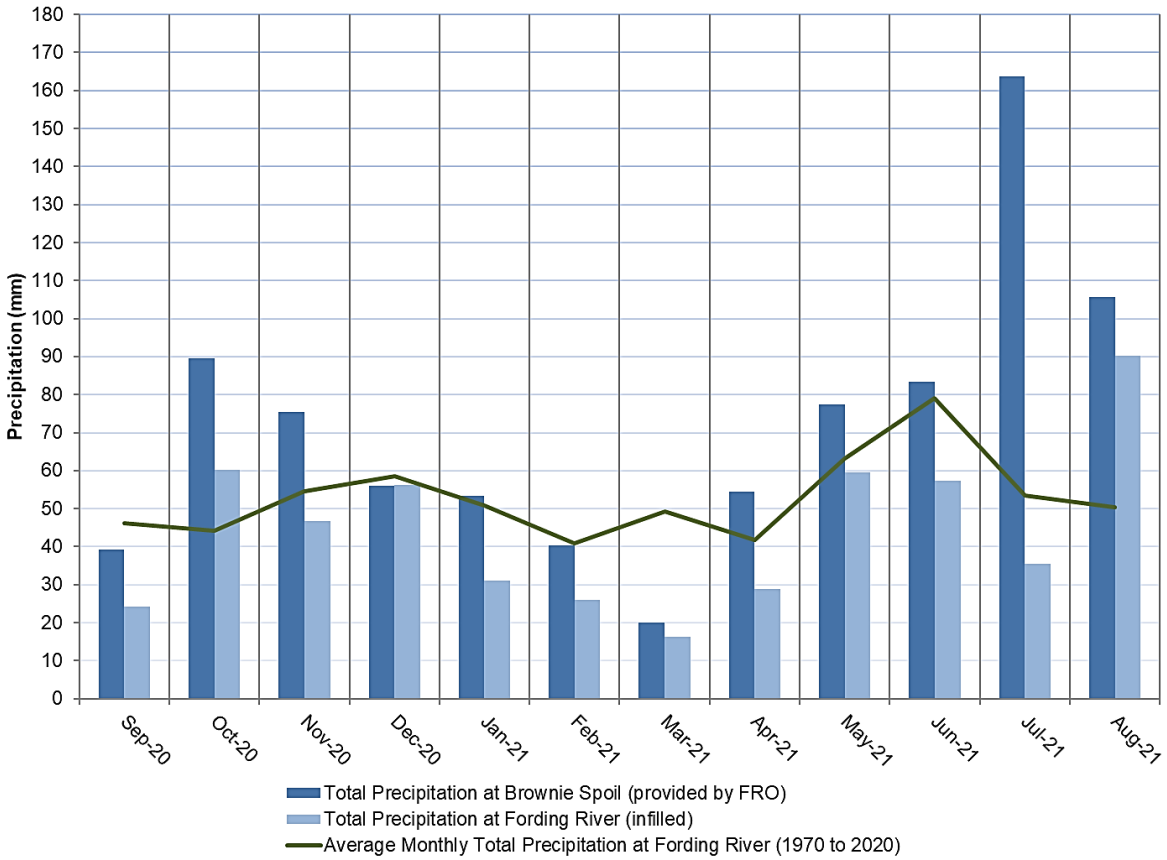


Chart 2: Monthly Precipitation Data from 1 September 2020 to 31 August 2021

Precipitation data in Table 3 and Chart 2 indicate the following:

- Annual precipitation based on the Fording River (infilled) dataset from 1 September 2020 to 31 August 2021 was lower than the long-term average of 632 mm but was generally consistent with the average monthly trend.
- Annual precipitation based on the Brownie spoil weather station from 1 September 2020 to 31 August 2021 was higher than the long-term annual average of 632 mm with July being a particularly high precipitation month.

The extent of erosion of the spoils during the reporting period is consistent with the reported climate data. Two additional external erosion features were identified during the site inspection (Recommendations 2021-14 and 2021-19).

5.0 SAFETY ASSESSMENT

This section presents an assessment of the safety of the coal reject spoils based on observations from the 2021 site inspection and review of data for each of the facilities, in comparison with potential credible failure modes.

This AFPR is the first AFPR completed for the coal reject spoils at the FRO mine site. Previously, major spoils were included in annual spoils reports.

5.1 Site Visit

An inspection of the coal reject spoils was carried out on 30 August and 1 September 2021 by the EoR, Julia Steele, P.Eng., and Sophie Bainbridge, both of Golder. The visit was accompanied by the senior engineering supervisor, Ross Roseingrave, P.Eng., of Teck.

The Taylor Rejects spoil was not inspected as part of the annual visit as this spoil was mostly encapsulated within 20 to 40 m of waste rock and not readily accessible.

Appendix A presents a summary of photographs taken during the August/September 2021 inspection and photograph locations and directions are presented in Figures 2 to 4. A summary of observations made during the annual visit are included in Appendix B.

Based on visual observations during the annual 2021 site visit the coal reject spoils appeared generally safe with minor maintenance issues that require action.

5.2 Background Information

Teck provided the following information for this AFPR:

- 2021 FRO site LiDAR topographic data and orthophoto
- GPS and extensometer instrumentation data
- Site climate data from 1 September 2020 to 31 August 2021

In addition, available historical data was also reviewed as part of this AFPR.

5.3 Consequence of Failure

Teck has advised that they are aligned with the Global Industry Standard on Tailings Management (GISTM, GTR 2020), which, in turn, is consistent with their safety culture. Teck has further advised they will adopt the extreme consequence case design loading for any facility with a credible catastrophic flow-type failure mode. For facilities without a credible catastrophic flow-type failure mode, Teck will reduce credible risks based on the As Low As Reasonably Practicable (ALARP) principle. Adopting this approach meets or exceeds regulatory requirements, aligns with Teck's goal to eliminate any risk for loss of life, and is consistent with the GISTM (GTR 2020).

A risk assessment, including an assessment of failure consequence, has not been previously completed for the coal reject spoils. A failure consequence assessment should be completed for each facility (Recommendations 2021-08, 2021-10, 2021-13, 2021-16, 2021-18, 2021-21, 2021-23, 2021-24).

5.4 Review of Operational Documents

Operation, maintenance, and surveillance (OMS) procedures for the coal reject spoils are documented in Teck's Standard Practices and Procedures (SP&P) EN.020.R6, Waste Dump Management (Teck 2020b).

The requirements of an OMS manual are generally met, but that a detailed review by the EoR should be completed and that a specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils and include QPOs and associated TARPs (Recommendations 2021-03, 2021-05).

The FRO erosion and sediment control plan (Teck 2020a) provides overall site wide procedures for the management of erosion. This document references SP&P EN.038.R6 (Teck 2015a), which provides specific details related to CCFR spoils. It is recommended that these procedures be reviewed in consultation with the EoR in relation to current coal reject spoil practices (Recommendation 2021-02).

Closure plans and general reclamation activities for the dormant coal reject spoils are outlined in Teck's five-year reclamation plan (Teck 2021).

Emergency response actions in the event of a failure or data indicating an impending failure of the coal reject spoils are documented in Teck's SP&P EN.020.R6, Waste Dump Management (Teck 2020b), including Trigger Action Response Plans (TARPs) and a roles and responsibilities matrix. It is recommended that these procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils (Recommendation 2021-05).

Emergency preparedness documentation is prepared on a site-wide basis (i.e., covers activities for emergency response at the mine site) and is documented in EP.001.R7, dated 14 October 2014 (Teck 2014).

5.5 Review of Potential Hazards and Failure Modes, Design Basis, and Facility Performance

This section summarizes potential failure modes generally considered for coal reject spoils. A comparison of performance against spoil-specific potential failure modes is also provided.

A design basis has not been set for each facility. The design criteria for each facility are to be documented and informed by the results of risk assessments for each facility (Recommendation 2021-04).

5.5.1 Failure Modes

Two potential failure modes (stability and erosion) that are commonly associated with coal reject spoils have been identified. These are assessed for each facility in Sections 5.5.4 through 5.5.10, relative to available facility data and performance.

Instability

The following pathways that could result in failure due to instability were identified:

- Inadequate design or construction of the spoil could lead to insufficient strength in the spoil materials or in the foundation. High phreatic levels within the spoil or excessive strain could contribute to this failure mode.
- Rapid development of the spoil could cause excessive loading of the foundations. Soft, organic, fine-grained materials (such as those found in floodplains) are susceptible to this failure mode.

- A seismic event could cause loss of strength of spoil materials or the foundation materials.
- A seismic event could trigger liquefaction of foundations. Loose / saturated materials (such as alluvial deposits in the foundations) are susceptible to this failure mode.
- The foundations or toe could be undermined by unauthorized construction or excavation.

External Erosion of Slope Face or Toe

Erosion leading to failure of the facility could be caused by loss of materials from the slope face or toe as a result of rainfall, snowmelt, or surface water flows. The coal rejects material is relatively erodible, compared to waste rock. The following potential pathways were identified:

- High surface water flows, likely during a storm event or from snow melt, that overcome the surface water management infrastructure(s), if present.
- Lack of, or poorly maintained, surface water management infrastructure which promote runoff to the spoil face or along the toe. This failure mode is likely progressive.
- Negligent or unintentional release of water (e.g., water truck) on spoil face or at toe; this failure mode would likely only result in a limited area of erosion.
- A flood event causing water level rise in an adjacent watercourse could erode the toe of the spoil or foundation soil.

5.5.2 Existing Controls

Instability

QPOs and TARPs are used, as detailed in section 2.13, for the Eagle 4 South Backfill spoil extensometers (wirelines) and A-Spoil and Blake spoil GPS monitors.

External Erosion of Slope Face or Toe

The FRO erosion and sediment control plan (Teck 2020a) provides overall site wide procedures for the management of erosion. This document references SP&P EN.038.R6, which provides specific details related to CCFR spoils. It is recommended that these procedures be reviewed in consultation with the EoR in relation to current coal reject spoil practices (Recommendation 2021-02).

The Eagle 4 South Backfill spoil is operated in accordance with Surface water management guidelines for active CR/CCFR spoils Teck (2020c). Surface water management guidelines for the dormant spoils are not known.

5.5.3 A-Spoil

A-Spoil was observed to be in good condition during the 2021 inspection with no signs of instability or erosion (Photographs 1 to 3, Appendix A).

Instability

Stability analyses were completed in 2016 both prior to (Golder 2016b) and following (Golder 2016c) the placement of a restoration soil stockpile on top of the facility.

- Static stability assessments partially met a FoS of 1.5, with FoS ranging from 1.4 to 2.1.

- Pseudo-static stability assessments used the 1 in 975 seismic loading. The pseudo-static FoS exceeded 1.1.
- Stability analyses did not consider the potential for undrained failure in the glaciofluvial material encountered during site investigations (AMECFW 2015).

Following confirmation of design criteria, updated stability analyses should be completed, using current geometry and conditions. In addition, the impact of potential undrained behaviour of the glaciofluvial material should be assessed (Recommendation 2021-07).

GPS data for the single instrument (A_Spoil), located at the crest of the angle of repose slope above the Liverpool ponds, was provided for review. Data were available from 1 September 2020 to the end of July 2021 (Figures C-1 and C-2). Data were not available from the end of July to the end of the reporting period. Measured 3D velocities were low (generally less than 50 mm) in the reporting period, consistent with expected performance, and are not indicative of instability. Data readings from the A-Spoil GPS were reinstated on 23 September 2021.

External Erosion of Spoil Face or Toe

A-Spoil was observed to be in good condition during the 2021 inspection with minor erosion rills noted. These are not considered to represent a risk to the facility at this time and observed performance was within that expected for normal conditions. The facility has been partially revegetated.

A failure mode due to external erosion of materials at the toe of the spoil as a result of surface water flows is not applicable to A-Spoil as there are no water courses in the immediate vicinity.

5.5.4 Box Yard Spoil

The remaining portion of the Box Yard spoil above the Swift Pit appears to be over-steepened, Teck have reported that safety mitigations are in place for the Swift Pit and details should be provided to the EoR.

Instability

There is no information available on the initial design of the Box Yard spoil and no stability assessments have been completed.

Work to remove the Box Yard spoil has left the excavated face of the material over-steepened (Photograph 4, Appendix A). The remaining coal rejects in the Box Yard spoil should be removed or existing practices to mitigate risk to personnel downslope should be submitted to the EoR for review (Recommendation 2021-11). Should a portion of the facility remain, a stability analyses should be completed (Recommendation 2021-09).

External Erosion of Spoil Face or Toe

There is a remaining and ongoing risk for erosion of the face of Box Yard due to being over-steepened.

A failure mode due to external erosion of materials at the toe of the spoil, as a result of surface water flows is not applicable to Box Yard spoil as there are no water courses in the immediate vicinity.

5.5.5 Kilmarnock / Toe Berm Spoil

The Kilmarnock / Toe Berm spoil was observed to generally be in good condition with minor maintenance issues that require action.

Instability

Stability analyses were completed in 1990 and 1994 (Golder 1990b, 1994) and are generally out of date. An updated stability assessment should be completed (Recommendation 2021-12).

- Static stability assessments partially met a FoS of 1.5, with FoS ranging from 1.2 to greater than 1.8. The lowest FoS was encountered at the eastern limit of the spoil along the edge of the Kilmarnock floodplain, where ground conditions included isolated surficial peat soils (Golder 1990b). Updates based on current geometry are required.
- No pseudo-static analyses have been completed.
- Stability analyses did not consider the potential for undrained failure in lenses of soft organic material and fine-grained material, which may be present due to the spoil being located partially on the Kilmarnock Creek flood plain (1990b). Golder (1990b) recommended that isolated surficial peat soils, identified within the spoil footprint, be removed prior to development of the spoil. However, there is no information available to confirm foundation preparation was completed or that deeper lenses of poor material were considered.
- Liquefaction of the saturated alluvial soils in the foundation have not been assessed.

Golder (2005a) assessed the impact that burning rejects may have on the long-term stability. Samples of burned rejects were recovered and tested. The shear strength of the burned rejects was assessed to be comparable to that of unburned rejects. As such, the presence of burning rejects was not deemed to impact stability.

No sinkholes or evidence of other stability issues were observed during the 2021 inspection. Historical creeping / settlement was seen at the crest of the first lift above Kilmarnock Creek (Photograph 5, Appendix A); conditions did not appear to have progressed since the 2020 annual inspection. This does not present a risk to facility safety at this stage but should be monitored for progressive increases and may require maintenance in the future.

External Erosion of Spoil Face or Toe

Three historical erosion gullies were present on the western side of the spoil, which were caused by ponding on the crest during the 2013 flood event (Photograph 6, Appendix A). The gullies appear to be stable when compared with photos from previous years and should continue to be monitored.

The southern portion of the Kilmarnock / Toe Berm spoil is located within the Kilmarnock Creek flood plain (Golder 1990b) and there are no known criteria set to protect the Kilmarnock / Toe Berm spoil against toe erosion from the Kilmarnock Creek, due to increased surface water flows. There is no evidence of toe erosion being considered in the design (i.e., no riprap or set back).

Erosion was observed at the toe of the facility due to water flowing out of the Old South spoil and along the road (Photograph 7, Appendix A). The water flowing out of the Old South spoil is to be redirected into the Kilmarnock Creek channel to prevent water eroding the toe of the spoil (Recommendation 2021-14).

5.5.6 Impact Berm Spoil

The Impact Berm spoil was observed to be in good condition during the 2021 inspection and performance was within that expected for normal conditions (Photograph 9, Appendix A).

Instability

Stability analyses were completed in 1994 (Golder 1994) but did not include a section through the Impact Berm spoil, only the Kilmarnock / Toe Berm spoil.

- The spoil is located within the Kilmarnock Creek flood plain and as such there is a potential for lenses of soft organic, fine-grained lenses, and/or saturated, sorted sands and gravel, which could be susceptible to undrained and/or liquefaction failure (Golder 1989).
- Golder (1990b) indicated that the foundations of the nearby Kilmarnock / Toe Berm spoil include surficial peat material, which based on proximity, could be present under the Impact Berm spoil.
- Stability analyses are required to assess existing stability based on current geometry as well as evaluate potential failure due to undrained behaviour and /or liquefaction of the foundation materials (Recommendation 2021-15).

External Erosion of Spoil Face or Toe

The Impact Berm spoil was observed to be in good condition during the 2021 inspection with some minor rills observed (Photograph 9, Appendix A). The facility has been partially revegetated.

The northern portion of the Impact Berm spoil is located within the Kilmarnock Creek flood plain. There are no criteria set to protect the Impact Berm spoil against toe erosion from the Kilmarnock Creek due to increased surface water flows. There is no evidence of toe erosion being considered in the design (i.e., no riprap or set back).

No evidence of current or historical toe erosion due to increased surface water flows was observed in the 2021 site inspection.

5.5.7 Blake Spoil

The Blake spoil was observed to be in generally good condition during the 2021 inspection with minor maintenance issues that require action.

During the 2021 annual inspection, freshly dumped CCFR material was observed at the dormant Blake spoil (Photograph 14, Appendix A). It is understood that this was used as a short haul location for CCFR and is a temporary stockpile. However, Golder understands that Teck engineering staff at FRO were not aware of this practice at the time of the 2021 site inspection and no records of this practice are available. Teck should review the notification procedures for changes in operations (Recommendation 2021-06). Teck should review the current and future use of the North Blake spoil; if the intent remains to temporarily stockpile materials, additional work may be required to confirm the stability of the facility (Recommendation 2021-17).

Instability

The initial design of the Blake spoil is summarized in Golder (1997b) with updated information provided as part of revised design configurations in Golder (2002, 2004, 2008c). The latest stability analyses were completed in 2008 (Golder 2008c) based on an expanded facility with a maximum elevation of 1,850 m.

- Static stability assessments met a FoS of 1.5.

- Pseudo-static stability assessments used the 1 in 475 seismic loading. The pseudo-static FoS exceeded 1.1, however the seismic loading used is out of date. Following confirmation of design criteria, the seismic load and return period used to assess pseudo-static stability should be reviewed, and the analyses should be updated (Recommendation 2021-17).
- Stability analyses did not consider the potential for undrained failure as a result of topsoil and silt encountered during the field investigation along with a high groundwater phreatic surface in the area (Golder 2008c).
- Additional stability analyses are required to assess the current geometry as well as the potential for undrained behaviour and / or liquefaction of topsoil and silt materials identified in the foundation (Recommendation 2021-17).

GPS data for the single instrument (SRD_GPS) during the 2020/2021 reporting period were reviewed as part of this AFPR (Figures C-3 and C-4). Measured deformations were generally less than 100 mm in the reporting period. Some isolated (single data point) readings above the Yellow warning rate of 150 mm/day were recorded between June and July 2021. The cause for these is unknown.

There were no signs of instability during the site inspection (Photographs 10, 11, and 13, Appendix A).

External Erosion of Spoil Face or Toe

At the south end of the Blake spoil along the western crest of the 1,780 m platform, a new erosion gully caused by surface water had developed. This erosion gully was approximately 4 m wide and 2 m deep and had caused the loss of the safety berm and a minor runout onto the 1,730 m lift (Photograph 12, Appendix A). A berm around the gully scarp at the crest has been created to prevent additional ponded surface water from eroding the gully further. However, the platform slopes down towards the low point where the gully formed. As such, the berm around the scarp is considered to be a temporary measure that could be breached. Additional erosion of this gully could lead to local bench instability and further mobilization of material downslope. The platform is to be re-graded in this area so water does not continue to pond and progressively erode the existing gully (Recommendation 2021-19).

A failure mode due to external erosion of materials at the toe of the spoil as a result of surface water flows is not applicable to Blake spoil as there are no water courses in the immediate vicinity.

5.5.8 Turnbull West Spoil

The Turnbull West spoil was observed to be in good condition during the 2021 inspection with no signs of instability or erosion.

Instability

Stability analyses were completed by Golder (Golder 2011b, 2012b, 2019).

- Static stability assessments met a FoS of 1.5.
- Pseudo-static stability assessments used the 1 in 2,475 seismic loading. The pseudo-static FoS exceeded 1.1. The seismic loading applied to the stability analyses should be confirmed with Teck for this facility.

- Stability analyses did not consider the potential for undrained behaviour and / or liquefaction failure of fine-grained and saturated material encountered in the foundation during field investigations along with a high groundwater phreatic surface in the area (Golder 2003, 2008a, 2013c). The toe of the facility is located along the Fording River flood plain which has liquefaction susceptible soils. The stability analysis should be updated to consider these failure modes (Recommendation 2021-20).

The Turnbull West spoil was observed to be in generally good condition during the 2021 inspection with no signs of instability (Photograph 15, Appendix A).

External Erosion of Spoil Face or Toe

The Turnbull West spoil was observed to be in good condition during the 2021 inspection with some minor rills observed. The south side of the Turnbull West spoil has been re-sloped to approximately 2H:1V and has been reclaimed, reducing the risk of external erosion in this area.

The Fording River meanders around the extent of the Turnbull West spoil, and there are no criteria set to protect the Turnbull West spoil against toe erosion from the Fording River due to increased surface water flows. However, the toe of Turnbull West spoil comprises waste rock, which will be resistant to flood erosion. No evidence of current or historical toe erosion due to increased surface water flow was observed in the 2021 site inspection.

5.5.9 Taylor Rejects Spoil

The Taylor Rejects spoil was not inspected by the EoR during the 2021 inspection, as it was mostly buried under waste rock and stored behind free-dumped waste rock piles resulting in difficult access.

Instability

There is no stability analysis for the Taylor Rejects spoil, but due to the location of the Taylor Rejects spoil, instability is unlikely. Stability analyses are required to assess the current geometry and the potential for a failure surface to reach the outer face of the waste rock spoil (Recommendation 2021-22).

External Erosion of Spoil Face or Toe

This failure mode is not applicable to the Taylor Rejects spoil as the spoil is largely buried by waste rock, and there are no water courses in the immediate vicinity.

5.5.10 Eagle 4 South Backfill Spoil

The Eagle 4 South Backfill spoil was observed to be in generally good condition during the 2021 inspection.

It was noted that some breaker rock had been placed in the Eagle 4 South Backfill spoil (Photograph 17, Appendix A), this is outside of expected normal operations, but does not impact facility safety. Golder understands that Teck engineering staff at FRO were not aware of this practice at the time of the 2021 site inspection and no records of this practice are available. Teck should review the notification procedures for changes in operations (Recommendation 2021-06).

Instability

Stability analyses were completed in 2016 (Teck 2016b) and 2017 (Teck 2017a). The results should be reviewed following confirmation of design criteria but are generally anticipated to be adequate for the facility.

- Static stability assessments met a FoS of 1.5.

- Pseudo-static stability assessments used up to date 1 in 10,000 seismic loading. The pseudo-static FoS exceeded 1.1.

Data from an extensometer (101) during the 2020/2021 reporting period (Figure C-5) were available. Measured velocities were low (generally less than 50 mm) in the reporting period and were within the Green Normal Operations range QPO (0 to 1,200 mm/day).

The Eagle 4 South Backfill spoil had no signs of significant instability observed during the 2021 inspection. Minor cracking and settlement at the northeast corner of the spoil was first observed during the 2020 annual site inspection. The extensometer installed in early 2020 is still in place (Photograph 18, Appendix A). Conditions at the time of the 2021 inspection were not observed to have progressed.

Some lifts of the Eagle 4 South Backfill spoil have been placed without dozer compaction, which is required per Teck's SP&P EN.020.R6 (Teck 2020a). In addition, some lifts had been placed at twice the design height (30 m), which does not meet the permit conditions for the Eagle 4 South Backfill spoil (MEMNG 2017; permit C-3, section B.1(b) and B.1(c)(ii)). A review of current procedures and permit conditions, along with an investigation to determine the cause of variances from these should be undertaken. The investigation should identify procedures to prevent reoccurrence, and these procedures should be implemented (Recommendation 2021-25).

External Erosion of Spoil Face or Toe

The Eagle 4 South Backfill spoil is currently active and is the only active coal rejects spoil at FRO with equipment available to maintain the surface water management infrastructure. No external erosion concerns were observed at the Eagle 4 South Backfill spoil during the 2021 inspection.

A failure mode due to external erosion of materials at the toe of the spoil, as a result of surface water flows is not applicable to Eagle 4 South spoil as there are no water courses in the immediate vicinity.

6.0 SUMMARY AND RECOMMENDATIONS

Summary of Activities

The following activities were completed during the reporting period:

- Visual inspections with photograph documentation were completed by Teck of select spoils on an irregular basis. Details of historical inspections of dormant facilities have not been provided to the EoR for review (Recommendation 2021-01).
- Approximately 830,000 m^3 (92%) of CR material from the Box Yard spoil was removed and placed within the PAG area of the Swift North spoil. This area of the Swift North spoil should be included in future annual reporting (Recommendation 2021-26).
- A portion of the top platform of the A-Spoil was developed for the storage of earthmoving equipment shovels.
- Approximately 1,200,000 m^3 of new CCFR material was placed within the active Eagle 4 South Backfill spoil.

Summary of Precipitation

The number and extent of erosion of the spoils during the reporting period are consistent with the reported climate data. Some additional external erosion features were identified during the site inspection one associated with the channelling of surface water at the toe (Recommendation 2021-014) and the other associated with precipitation collecting at a low point on a crest (Recommendation 2021-019).

Summary of Performance and Changes

Based on visual observations during the annual 2021 site visit the coal reject spoils appeared generally safe with minor maintenance issues that require action.

There were no significant changes in the operation or performance of the coal reject spoils during the reporting period.

Recommended Actions

Deficiencies and recommendations identified during this 2021 AFPR are presented in Table 4.

Table 4: 2021 Recommended Actions for Fording River Operations Coal Reject Spoils

ID Number	Facility	Deficiency	Applicable Code / Guideline Reference / Potential Safety Hazard	Recommended Action	Priority	Deadline	Status
2021-01	All	Dormant spoil inspection reports not available to EoR for review	Section 7.2 (Teck 2020a)	Provide the dormant spoil inspection reports to the EoR.	4	Q2 2022	New
2021-02		Current CCR practices not aligned with SP&P EN.038.R6.	Teck staff unaware of erosion control measures for dormant CR / CCFR spoils	Review SP&P EN.038 R6 in consultation with EoR and compare against current erosion control procedures adopted for CR and CCFR spoils.	4	2023	New
2021-03		Spoil QPOs not set or require update	HSRC Section 10.1.13	Determine or update existing QPOs for the spoils in consultation with the QP/RTFE. QPOs should be defined for each coal rejects spoil and documented in the OMS manual / TARPs.	3	2022	New
2021-04		Design criteria has not been set or documented	HSRC Section 10.1.14	Determine and document design criteria for each facility, subject to Teck's approach to adopting extreme design loading for any facility with a credible catastrophic flow-type failure mode, which will be informed by the risk assessments for each facility.	4	2023	New
2021-05		OMS manuals and TARPS do not account for CR/CCFR spoils being designated as TSFs	HSRC Section 10.5.2	Review the operational, maintenance, and surveillance documents with respect to TSF requirements. Consideration should be made for separating the waste rock spoil operational documents from those that are considered a TSF spoil.	4	2023	New
2021-06		Placement of materials without notification	Potential breakdown in site procedures.	Review notification procedures for changes in operations.	3	Q3 2022	New
2021-07	A-Spoil	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	3	Q3 2023	New
2021-08		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-09	Box Yard	Stability assessment requires update	HSRC Sections 10.1.4	Remove remaining material or complete a stability analysis for the Box Yard spoil for current conditions.	3	Q3 2023	New
2021-10		No failure consequence assessment	HSRC Section 10.1.11	Remove remaining material or risk consequence assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-11		Over-steepened slopes from excavation of spoil	Over-steepened slopes increase potential for runout in the active Swift Pit	Remove remaining material or document existing practices to mitigate risk to personnel downslope during mining for Swift Project. Provide documentation to the EoR.	3	Q2 2022	New
2021-12	Kilmarnock / Toe Berm	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	2	Q4 2022	New
2021-13		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2022	New
2021-14		Erosion of toe of southeast extent of spoil	Potential for undermining spoil toe	Redirect water from exiting Old South spoil into Kilmarnock channel to prevent erosion of Kilmarnock / Toe Berm spoil toe.	2	Q2 2022	New
2021-15	Impact Berm	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	3	Q3 2023	New
2021-16		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-17	Blake	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Determine the future for the North Blake spoil area and expected future geometry. Assess potential need for additional subsurface investigations.	2	Q4 2022	New
2021-18		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2022	New
2021-19		Erosion gully at low point	Potential for regressive erosion into spoil potentially leading to instability	Re-slope 1,780 m platform along western crest around new erosion scarp to prevent further erosion.	3	Q3 2022	New

Table 4: 2021 Recommended Actions for Fording River Operations Coal Reject Spoils

ID Number	Facility	Deficiency	Applicable Code / Guideline Reference / Potential Safety Hazard	Recommended Action	Priority	Deadline	Status
2021-20	Turnbull West	Stability assessment requires update	HSRC Section 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	3	Q3 2023	New
2021-21		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-22	Taylor Rejects	Stability assessment requires update	HSRC Sections 10.1.4	Update stability analysis to confirm current conditions and geometry meet design criteria. Assess potential need for additional subsurface investigations.	3	Q4 2023	New
2021-23		No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-24	Eagle 4 South Backfill	No failure consequence assessment	HSRC Section 10.1.11	Complete risk assessment informed by the stability analyses. If required, complete a runout assessment to assess the potential runout distance.	3	Q4 2023	New
2021-25		Potential non-compliance with design and permit	HSRC Section 10.1.5, Permit C-3, section B.1(b) and B.1(c)(ii))	Review current procedures and permit conditions and undertake a review of the cause of variances. Identify and implement procedures to prevent reoccurrence.	3	Q3 2022	New
2021-26	Swift North	Facility not inspected or AFPR completed	HSRC Section 10.5.3	Include newly placed coal rejects spoil located within Swift North spoil in the 2022 AFPR.	3	2022	New

Priority	Description
1	A high probability or actual spoil safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
2	If not corrected, could likely result in spoil safety issues leading to injury, environmental impact, or significant regulatory enforcement; or a repetitive deficiency that demonstrates a systematic breakdown of procedures.
3	Single occurrences of deficiencies or non-conformances that alone would not be expected to result in spoil safety issues.
4	Best Management Practice – Further improvements are necessary to meet industry best practices or reduce potential risks.

Source: HSRC Guidance Document, Section 4.2 (Ministry of Energy and Mines 2016).

EoR = Engineer of Record; CR = coarse rejects; CCFR = combined coarse and fine rejects; HSRC = Health, Safety and Reclamation Code; OMS = operation, maintenance, and surveillance; QP = Qualified Person; QPO = quantifiable performance objectives; RTFE = responsible tailings facility engineer; TARP = Trigger Action Response Plan; TSF = tailings storage facility.

7.0 CLOSURE

The reader is referred to the Study Limitations section, which follows the text and forms an integral part of this report.

We trust that this report meets your present requirements. If you have any questions or additional requirements, please contact the undersigned.

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https://golderassociates.sharepoint.com/sites/142564/project files/6 deliverables/issued/2021-254-r-rev0-600 coal reject spoils afpr/21456080-2021-254-r-rev0-600 coal reject spoils afpr 30mar_22.docx

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REFERENCES

AMECFW (Amec Foster Wheeler Environment and Infrastructure). 2015. Fording River Operations water management plan Swift Project 2015 geotechnical investigation. Prepared for Teck Coal Limited. AMECFW Doc. No. CW2234. 24 November 2015.

BCMWRPRC (British Columbia Mine Waste Rock Pile Research Committee). 1991. Investigation and design manual – interim guidelines. Mine Rock and Overburden Piles 1. Prepared by Piteau Associates Engineering Ltd, May 1991.

CDA (Canadian Dam Association). 2013. Dam safety guidelines, 2007. Original 2007, revised 2013. Canadian Dam Association.

EMLI (Ministry of Energy, Mines and Low Carbon Innovation). 2021. Health, Safety and Reclamation Code for Mines in British Columbia. Under the Mines Act. Victoria, BC: British Columbia Ministry of Energy and Mines. February 2021. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/code-review/feb2021_health_safety_reclamation_code_2021_rev.pdf.

Hawley M, Cunning J, editors. 2017. Guidelines for mine waste dump and stockpile design. Clayton South Victoria: CSIRO Publishing.

Gaebel R. 2020. Tailings Engineer, Teck Coal Limited. Taylor rejects object. Email to Ascencio F, Golder Associates Ltd. 26 August 2020.

Gaebel R. 2021. Tailings Engineer, Teck Coal Limited. Question about annual spoiled rejects volume. Email to Jupp H, Golder Associates Ltd. 13 April 2021.

Geoghegan B. 2015. Tailings Engineer, Teck Coal Limited. 1968 survey information. Email to Steele J, Golder Associates Ltd. 8 December 2015.

Golder Brawner (Golder Brawner & Associates Ltd.). 1976. Suitability of coarse wash plant waste for backfill material. Prepared for Fording Coal Ltd. Burnaby BC: Golder Brawner & Associates Ltd. Golder Brawner Project No. V76066. April 1976.

Golder (Golder Associates Ltd.). 1981. 'A' Spoil at Fording Operations, Fording Valley, British Columbia. Prepared for Fording Coal Ltd. Vancouver BC: Golder Associates Ltd. Golder Project No. 812-1118. September 1981.

Golder. 1989. Stability assessment for stages 2 and 3 South spoil revision 1 (amendment to South spoil approval-in-principle submission). Prepared for Fording Coal Ltd. Vancouver, BC: Golder Associates Ltd. Golder Project No. 892-1034C. May 1989.

Golder. 1990a. Geotechnical reports in support of the Fording Coal Ltd. South spoil stages 2 and 3, section 6 permit application amendment. Prepared for Fording Coal Ltd. Vancouver, BC: Golder Associates Ltd. Golder Project No. 892-1034. January 1990.

Golder. 1990b. Report to Fording Coal Ltd. re, stability assessments for the proposed Kilmarnock reject spoil. Prepared for Fording Coal Ltd Elkford, BC. Vancouver BC: Golder Associates Ltd. Golder Project No. 902-1272. December 1990.

Golder. 1994. Stability assessment for the proposed Kilmarnock Coarse reject spoil. Prepared for Fording Coal Ltd. Burnaby BC: Golder Associates Ltd. Golder Project No: 942-1421. February 1994.

Golder. 1997a. A brief summary of the engineering properties of compacted coarse coal rejects. Prepared for Golder record purposes. Burnaby BC: Golder Associates Ltd. Golder Project No. 972-1413,.18 January 1997.

Golder. 1997b. Letter report presenting a stability assessment for the proposed Blake coarse reject spoil. Prepared for Fording Coal Ltd., Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 972-1471. 19 November 1997.

Golder. 2002. Geotechnical assessment for the proposed Upper Blake reject spoil at Fording River Operations. Prepared for Fording Coal Ltd., Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 022-1519. December 2002.

Golder. 2003. Geotechnical assessments for the proposed spoils associated with Turnbull South Open Pit Fording River Operations. Prepared for Elk Valley Coal Corporation. Burnaby BC: Golder Associates Ltd. Golder Project No. 03-1413-061. 29 October 2003.

Golder. 2004. Geotechnical assessment for Upper Blake reject spoil. Prepared for Elk Valley Coal Corporation, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 04-1413-050. 15 October 2004.

Golder. 2005a. The burning of coarse rejects related to the security of the main access corridor at Fording River operations. Prepared for Elk Valley Coal Corporation, Fording River Operations. Golder project ref: E/06/0486, Golder Project No. 06-1413-005. 18 April 2006.

Golder. 2005b. The results of laboratory tests to determine the engineering properties of combined coarse and fine rejects. Prepared for Elk Valley Coal Corporation, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 05-1413-005. 4 May 2005.

Golder. 2007. Review of the revised configuration Upper Blake Reject spoil Fording River Operations, Elkford, BC. Prepared for Elk Valley Coal Corporation Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. E/07/3345. Golder Project No. 06-1413-0722. 6 July 2007.

Golder. 2008a. 1795 NW Turnbull spoil toe investigation. Prepared for Elk Valley Coal Corporation, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. E/07/4371. Golder Project No. 07-1413-0098/2000. 28 January 2008.

Golder. 2008b. Summary of in situ density and laboratory testing on combined coarse and fine rejects, Upper Blake Reject Spoil, Fording River Operations, Elkford, BC. Burnaby BC: Golder Associates Ltd. Golder Project No. 06-1413-072/3000. 11 February 2008.

Golder. 2008c. Geotechnical assessment for the proposed North Blake combined coarse and fine rejects spoil. Prepared for Elk Valley Coal Corporation, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. 06-1413-072/4000. 23 May 2008.

Golder. 2008d. Technical memorandum re: tailings disposal into 3-pit south. Prepared for Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project. No. 08-1427-0098-2000. Golder Doc. No. TM 0911_08. 11 September 2008.

Golder. 2009. Geotechnical construction monitoring, South Tailings Dam, Fording River Operations, Elkford, British Columbia. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. 08-1343-0011. 18 November 2009.

Golder. 2011a. Fording River Operations 2010 annual spoil review. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 10-1427-0098/5000. Golder Doc. No. 013 Ver. 0. 29 April 2011.

Golder. 2011b. Geotechnical assessment of Turnbull West Spoil. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 11-1427-0098/4000. Doc No. 2011-129-Ver.0. 18 November 2011.

Golder. 2012a. Fording River Operations, 2011 annual spoils review. Prepared for Teck Coal Limited. Burnaby BC: Golder Associates Ltd. Golder Project No. 11-1427-0098/5000. Golder Doc. No.2012-151 Rev.1. 16 May 2012.

Golder. 2012b. Geotechnical assessment of Turnbull West Spoil. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. 12-1427-098/7000-2012-200-Rev0. 18 July 2012.

Golder. 2013a. Fording River Operations, 2012 annual spoils review. Prepared for Teck Coal Limited. Burnaby BC: Golder Associates Ltd. Golder Project No. 12-1427-0098/5000. Golder Doc No. 2013-319 Rev.0. 20 March 2013.

Golder. 2013b. Fording River Operations Swift Project pit slope stability assessment. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Doc. No. 1114260002-2012-142-R-Rev0-12000. 6 June 2013.

Golder. 2013c. Fording River Operations Swift Project – spoils stability assessment. Prepared for Teck Coal Limited, Fording River Operations. Burnaby BC: Golder Associates Ltd. Golder Project No. 11-1426-0002/13000. Golder Doc. No. 2011-131-Rev0. 19 July 2013.

Golder. 2014. North Tailings Pond dam 2013 Flood repairs construction summary. Prepared for Teck Coal Limited. Burnaby BC: Golder Associates Ltd. Golder Doc. No. 1314270098-2014-554-R-Rev0-7000. 30 October 2014.

Golder. 2016a. Site specific probabilistic seismic hazard assessment. Prepared for Teck Coal Limited. Vancouver BC: Golder Associates Ltd. Golder Doc. No. 1522835-2015-149-R-Rev0-4000. 19 February 2016.

Golder. 2016b. Permit amendment support: geotechnical assessment for North Spoil rehandle dump. Prepared for Teck Coal Limited, Fording River Operations. Vancouver BC: Golder Associates Ltd. Golder Doc. No. 1540440-2016-024-R-Rev1-1000. 5 May 2016.

Golder. 2016c. Stability assessment for soil spoil at A-Spoil. Prepared for Teck Coal Limited, Fording River Operations. Vancouver BC: Golder Associates Ltd. Golder Doc. No. 1655335-2016-093-TM-Rev0-8000. 23 November 2016.

Golder. 2019. Swift North spoil phases 1 and 2 geotechnical assessment. Prepared for Teck Coal Limited, Fording River Operations. Vancouver BC: Golder Associates Ltd. Golder Doc. No. 18107150-2019-001-R-Rev0-3000. 4 June 2019.

Golder. 2020. Site investigation and laboratory testing factual report, Swift Spoil co-management facility. Prepared for Teck Coal Limited, Fording River Operations. Golder ref. no. 19127181-2020-167-R-RevA-3000. 17 July 2020.

Golder. 2021. Gap analysis and 2020 site inspection for the coal rejects spoils. Prepared for Teck Coal Limited, Fording River Operations. Vancouver, BC: Golder Associates Ltd. Golder Doc. No. 19133778-2021-267-R-Rev0-1000. 11 June 2021.

GTR (Global Tailings Review). 2020. Global Industry Standard on Tailings Management. August 2020. https://globaltailingsreview.org/global-industry-standard/.

MAC (Mining Association of Canada). 2019. A guide to management of tailings facilities, version 3.1. The Mining Association of Canada.

MEMNG (British Columbia Ministry of Energy, Mines and Natural Gas). 2017. C-3 permit, approving work system and reclamation program. Mine no. 120004. 19 January 2017.

MEMPR (British Columbia Ministry of Energy, Mines and Petroleum Resources). 1981. Approval of raising the “A” Spoil rejects pile to elevation 1780 m. Letter from the Chief Inspector of Mines to Fording Coal Limited. Permit Amendment PR-3959. 3 November 1981.

MEMPR. 1987. Geological setting of the south half of the Elk Valley coalfield. [Geological map]. Grieve DA and Price RA. Preliminary Map 63.

Ministry of Energy and Mines. 2016. Health, Safety and Reclamation Code for Mines in British Columbia, Guidance Document. Version 1.0. July 2016. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/part_10_guidance_doc_10_20july_2016.pdf/.

NRCC (National Research Council of Canada). 2010. National Building Code of Canada 2010. https://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2010_national_building_code.html.

SRK (SRK Consulting [Canada] Inc.). 2017. Geochemical source term methods and inputs for the 2017 update of the Elk Valley regional water quality model. Prepared for Teck Coal Limited. Technical Report 1CT017.135. October 2017.

Teck (Teck Coal Limited). 2014. Emergency Response Procedure. Fording River Operations. Teck ref: EP.001.R7. 14 October 2014.

Teck. 2015a. Standard practice and procedure – combined coarse and fine rejects. Fording River Operations. Teck ref: EN.038.R2. 27 March 2015.

Teck. 2015b. Swift water management project – test pit summary. Elkford BC: Teck Resources Ltd. 23 April 2015.

Teck. 2016a. Application for an amendment to *Mines Act* C-3 permit for the Eagle 4 South Backfill CCFR Spoil. 12 August 2016.

Teck. 2016b. FRO Eagle 4 South Backfill CCFR spoil – geotechnical assessment. 7 December 2016.

Teck. 2017a. FRO Eagle 4 South Backfill CCFR spoil – geotechnical assessment addendum – seismic stability analysis. 9 January 2019 [addendum to Teck 2016b].

Teck. 2017b. Fording River Operations 2016 annual spoils review. April 2017.

Teck. 2018. Fording River Operations Eagle 4 South Backfill CCFR spoil August 2018 inspection. 7 September 2018.

Teck. 2020a. Erosion and sediment control management plan. Fording River Operations. 24 June 2020.

Teck. 2020b. Standard practice and procedure – waste dump management. Fording River Operations. Teck ref: EN.020.R6. 15 September 2020.

Teck. 2020c. Mine water management plan. Fording River Operations. 18 September 2020.

Teck. 2021. Five year mine plan and reclamation plan. Fording River Operations. September 2021.

STUDY LIMITATIONS

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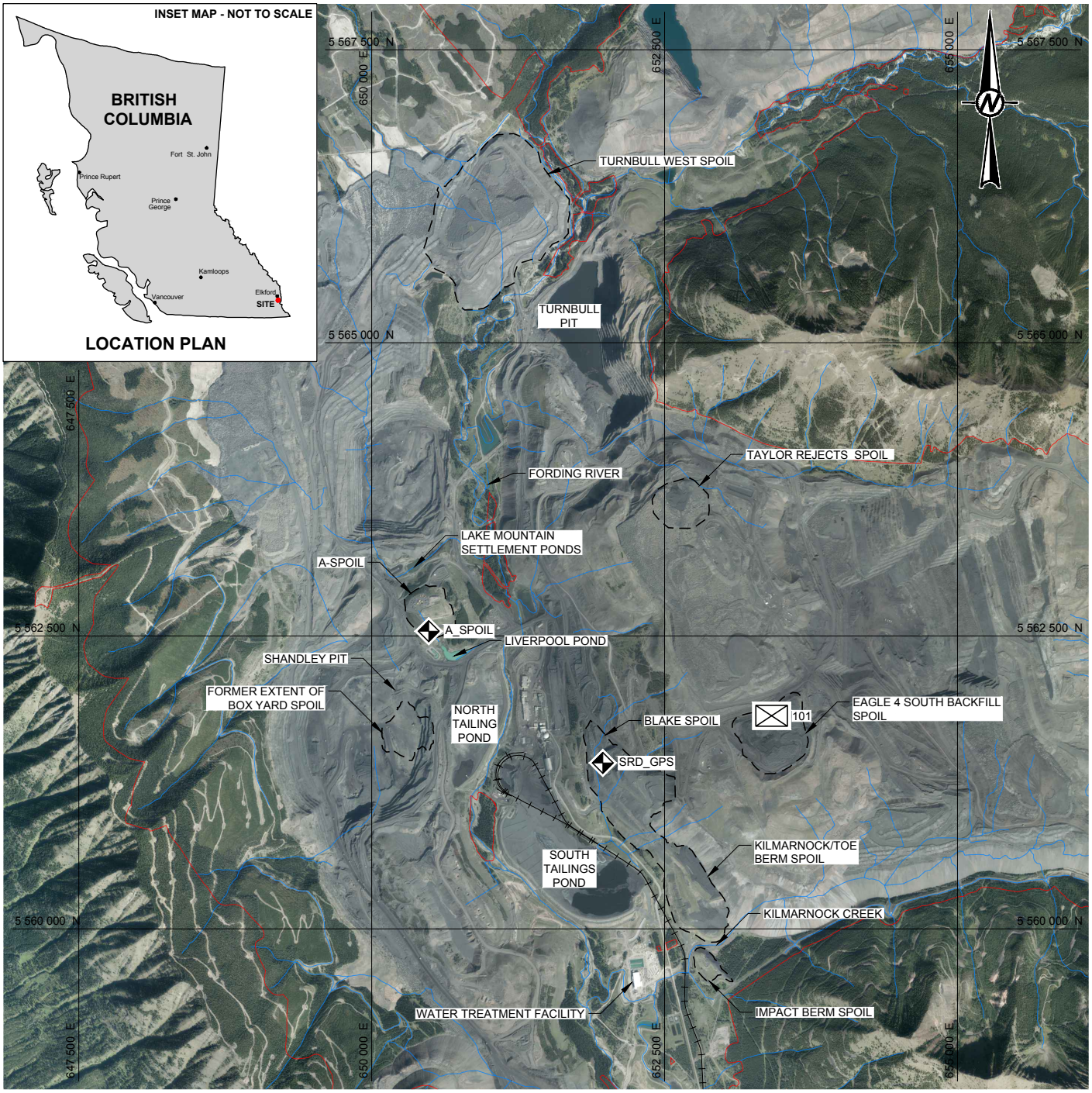

LEGEND

- C3 PERMIT BOUNDARY
- WATERCOURSE
- APPROXIMATE SPOIL FOOTPRINT
- RAILWAY
- 2021 GPS LOCATION
- 2021 EXTENSOMETER LOCATION

NOTES

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2. WATERCOURSE DATA PROVIDED BY TECK COAL FORDING RIVER OPERATIONS. FILE NAME: WATERNETWORK_ALL.dxf, RECEIVED: 29 AUGUST 2018.

0 1,000 2,000
1:50,000 METRES

CLIENT
TECK COAL LIMITED
FORDING RIVER OPERATIONS
ELKFORD, B.C.

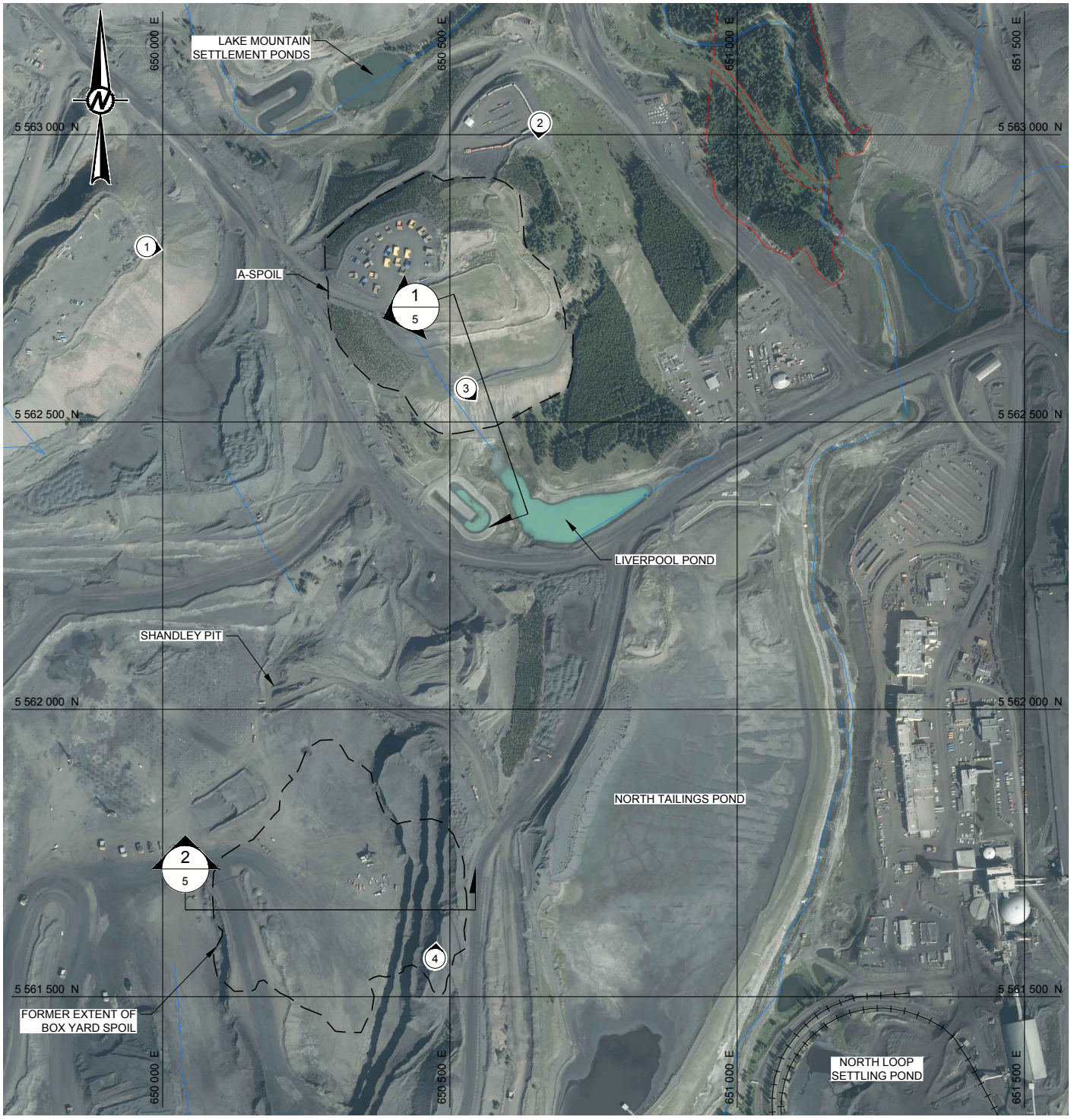
PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2022-03-28
DESIGNED	M.WILLAN
PREPARED	M.HEAL
REVIEWED	M.WILLAN
APPROVED	J.STEELE

TITLE
SITE PLAN AND INSTRUMENT LOCATIONS

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
21456080	600/603/2021-254	0	1



LEGEND

- C3 BOUNDARY
- WATERCOURSE
- APPROXIMATE SPOIL FOOTPRINT
- RAILWAY
- (#) 2021 SITE VISIT PHOTO LOCATION

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0 250 500
1:10,000 METRES

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TITLE
PHOTOGRAPH AND CROSS-SECTION LOCATIONS 1 OF 3

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
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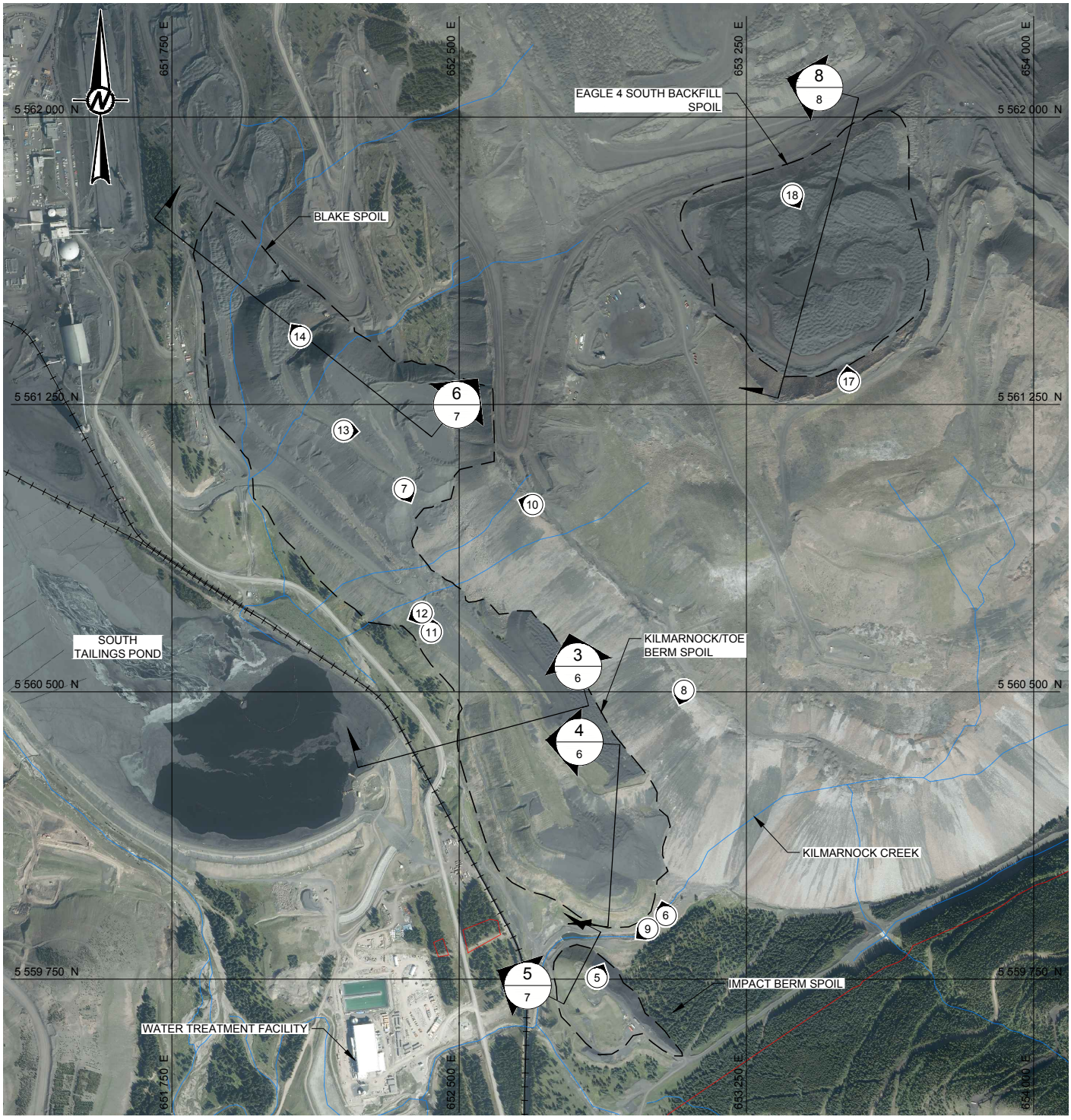

LEGEND

- C3 BOUNDARY
- WATERCOURSE
- APPROXIMATE SPOIL FOOTPRINT
- RAILWAY
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0 250 500
1:15,000 METRES

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TITLE
PHOTOGRAPH AND CROSS-SECTION LOCATIONS 2 OF 3

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
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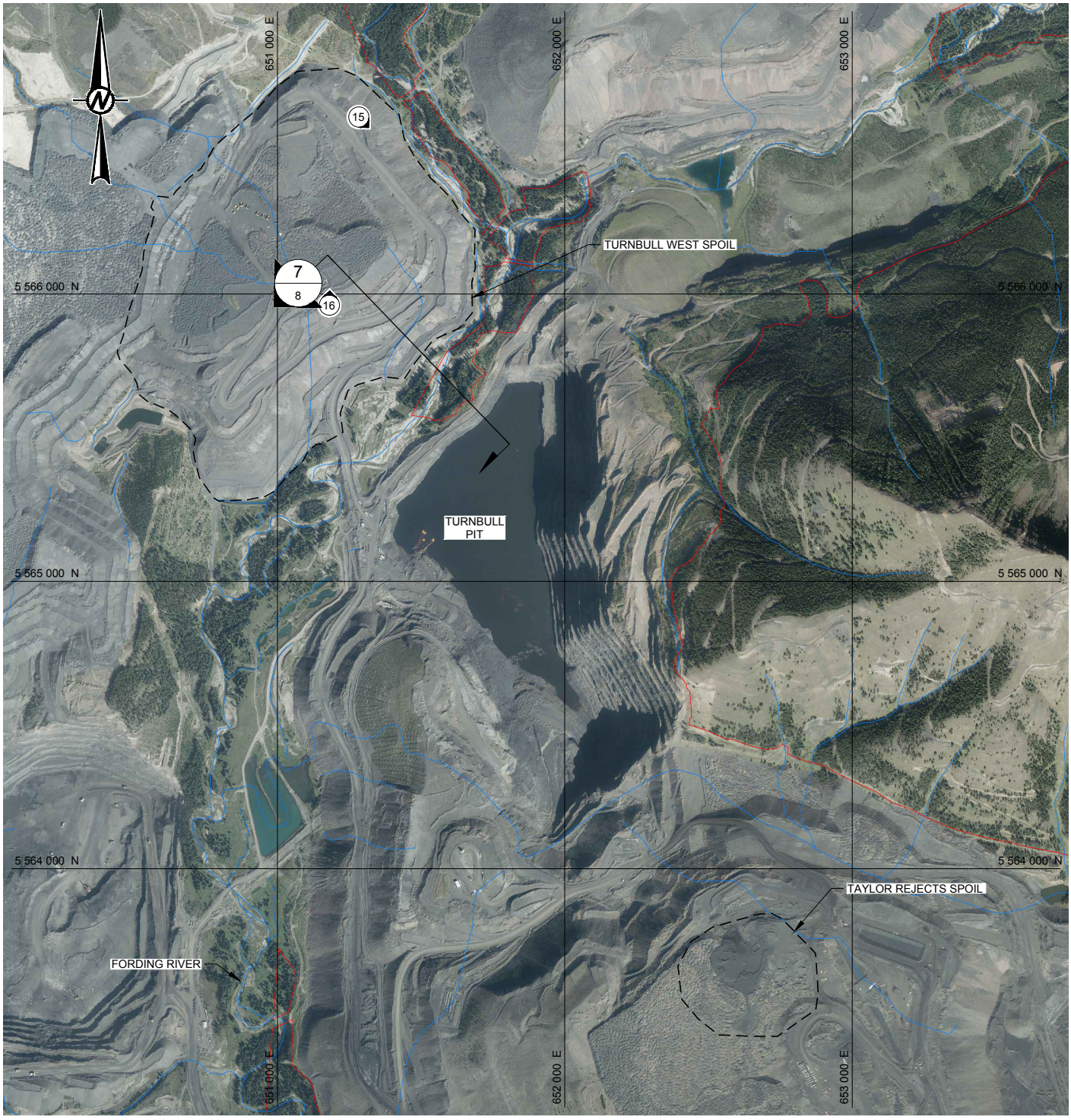

LEGEND

- C3 BOUNDARY
- WATERCOURSE
- APPROXIMATE SPOIL FOOTPRINT
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- (#) 2021 SITE VISIT PHOTO LOCATION

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0 500 1,000
1:20,000 METRES

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TITLE
PHOTOGRAPH AND CROSS-SECTION LOCATIONS 3 OF 3

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
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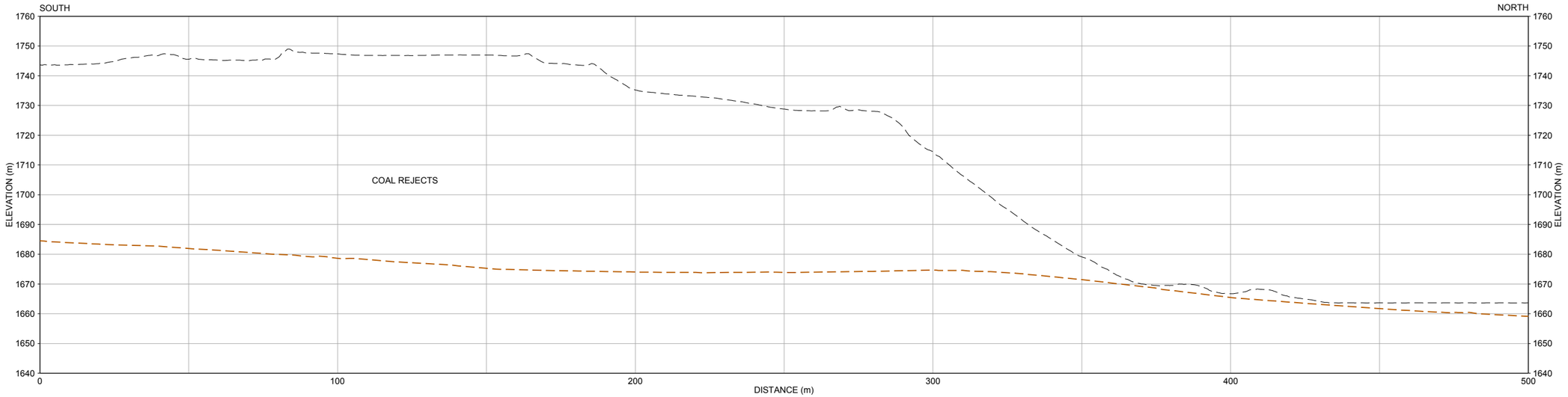
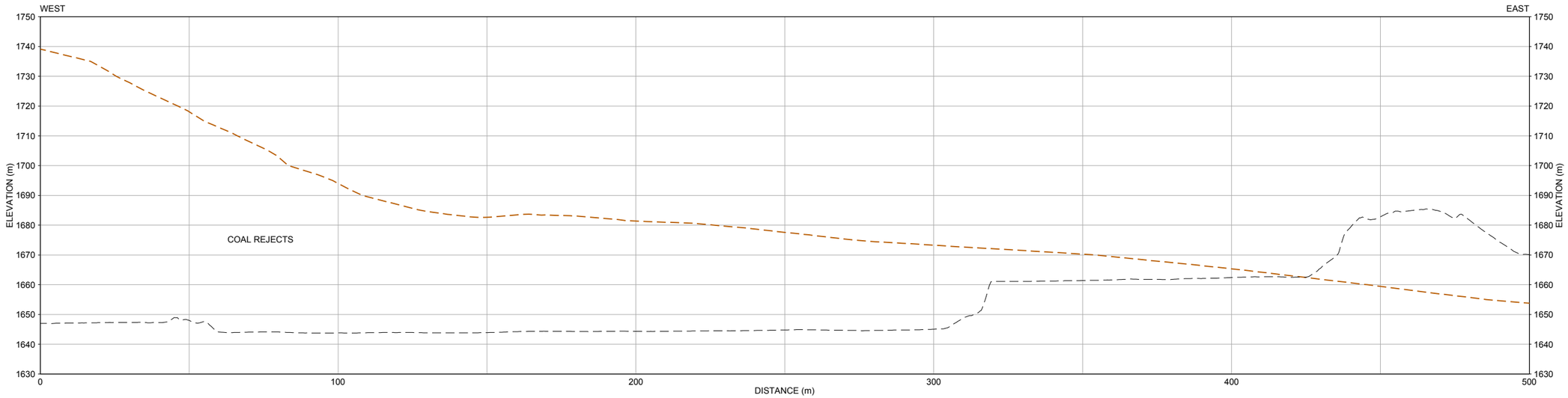


SCALE 1:1,500 m — 1/2 — A-SPOIL CROSS-SECTION



SCALE 1:1,500 m — 2/2 — FORMER EXTENT OF BOX YARD SPOIL CROSS-SECTION

0 25 50
1:1,500 METRES

LEGEND

- 1968 ORIGINAL GROUND SURFACE
- 2021 LIDAR EXISTING GROUND SURFACE

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COAL REJECT SPOILS

TITLE
CROSS-SECTIONS 1 OF 4

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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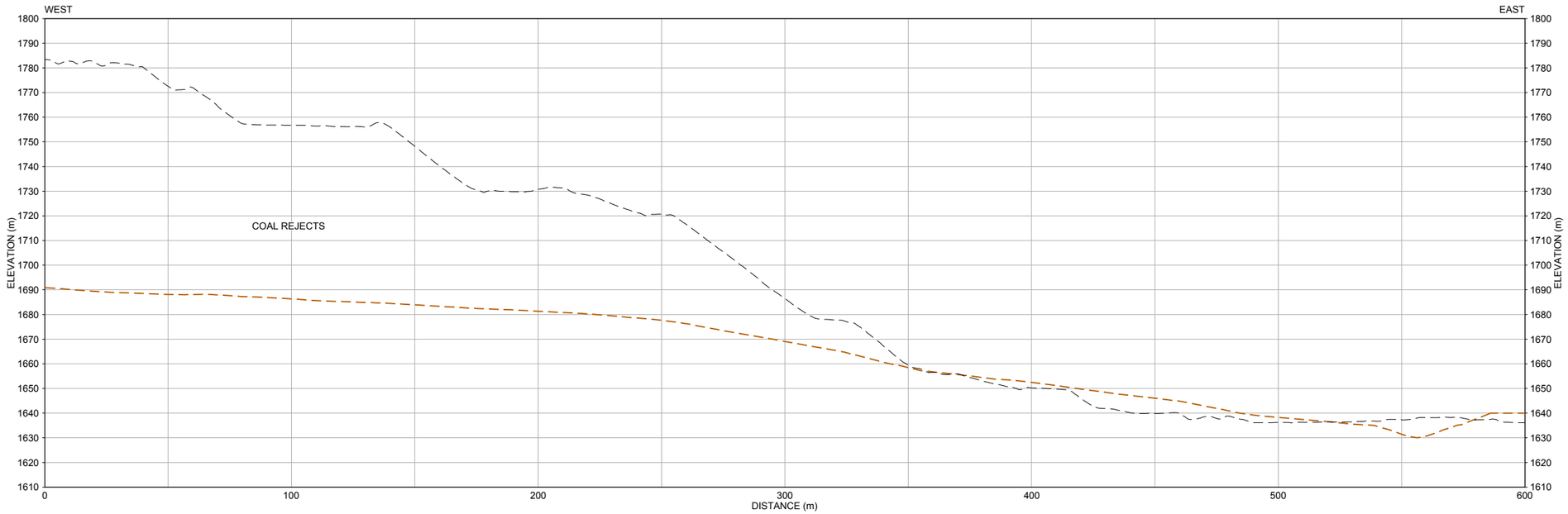
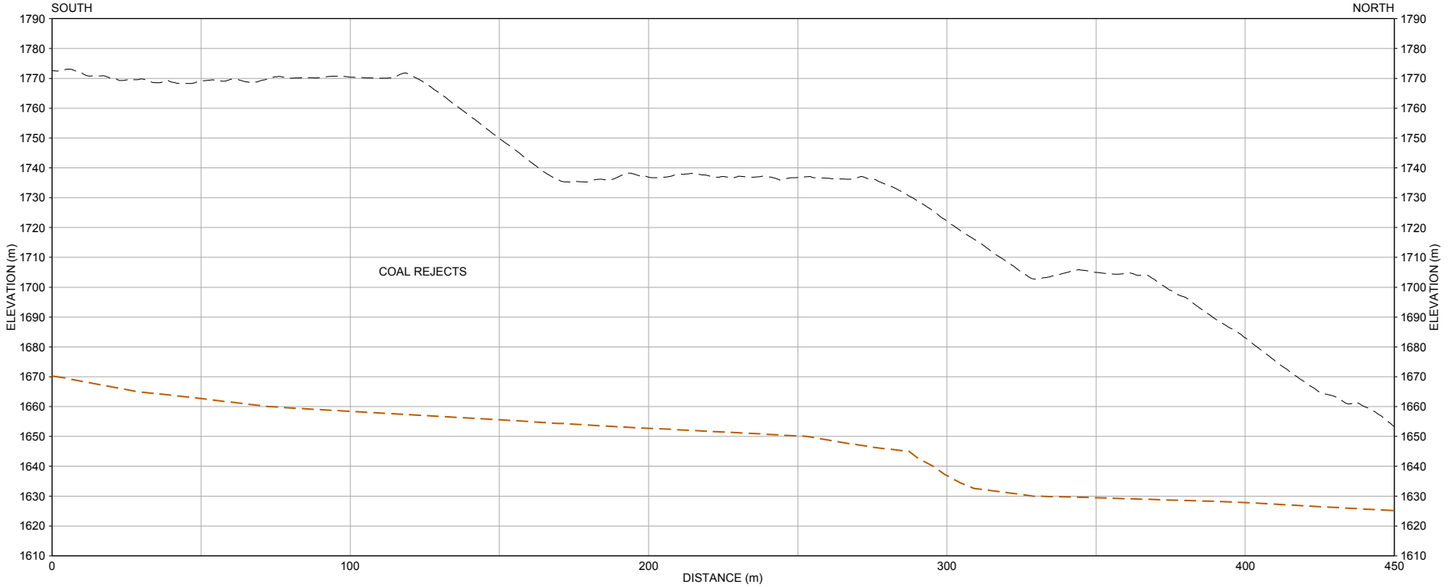


SCALE 1:2,000 m 3/3 KILMARNOCK/TOE BERM SPOIL CROSS-SECTION



SCALE 1:2,000 m 4/3 KILMARNOCK/TOE BERM SPOIL CROSS-SECTION

0 50 100
1:2,000 METRES

LEGEND

- 1968 ORIGINAL GROUND SURFACE
- 2021 LIDAR EXISTING GROUND SURFACE

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PREPARED	M.HEAL
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PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
CROSS-SECTIONS 2 OF 4

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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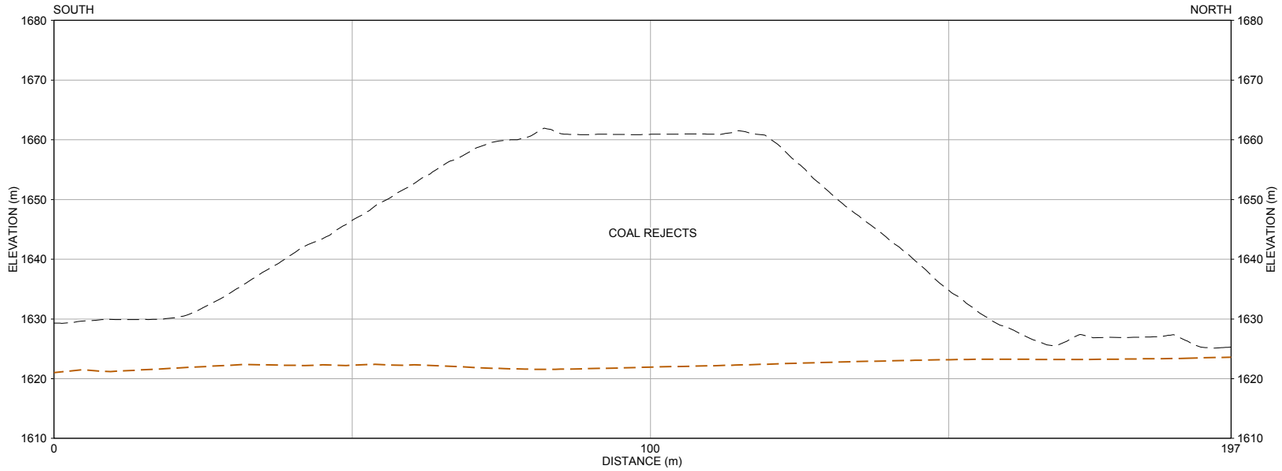

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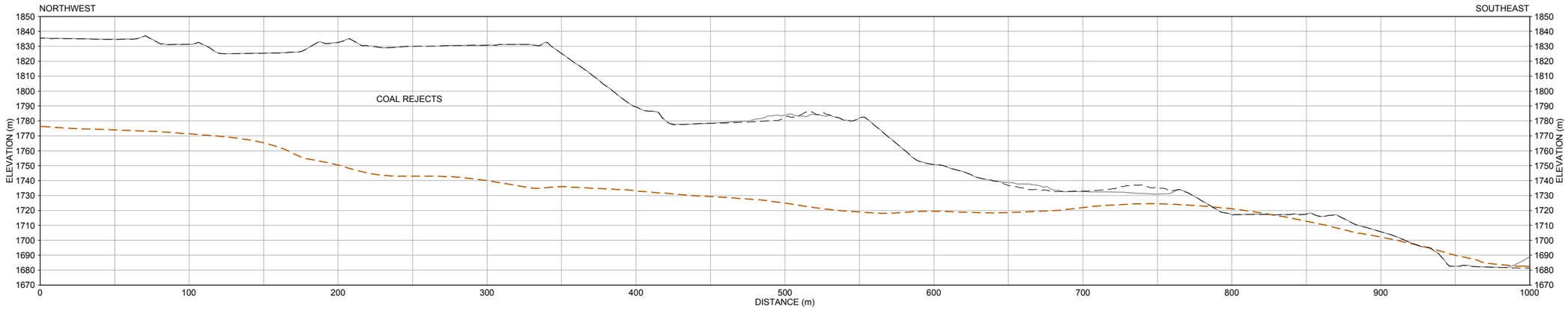

SCALE 1:3,000 m — 6/3 — BLAKE SPOIL CROSS-SECTION

0 25 50
1:1,000 METRES

0 50 100
1:3,000 METRES

LEGEND

- 1968 ORIGINAL GROUND SURFACE
- 2020 LIDAR EXISTING GROUND SURFACE
- 2021 LIDAR EXISTING GROUND SURFACE

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3. 2020 TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 01 DECEMBER 2020, FLOWN: 15-26 JULY 2020

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PROJECT
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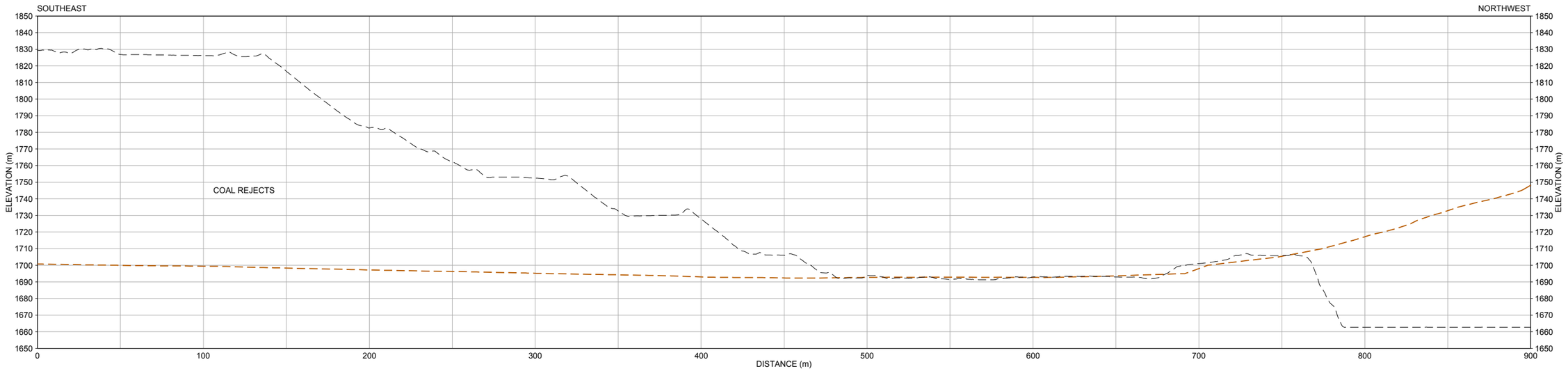
COAL REJECT SPOILS

TITLE
CROSS-SECTIONS 3 OF 4

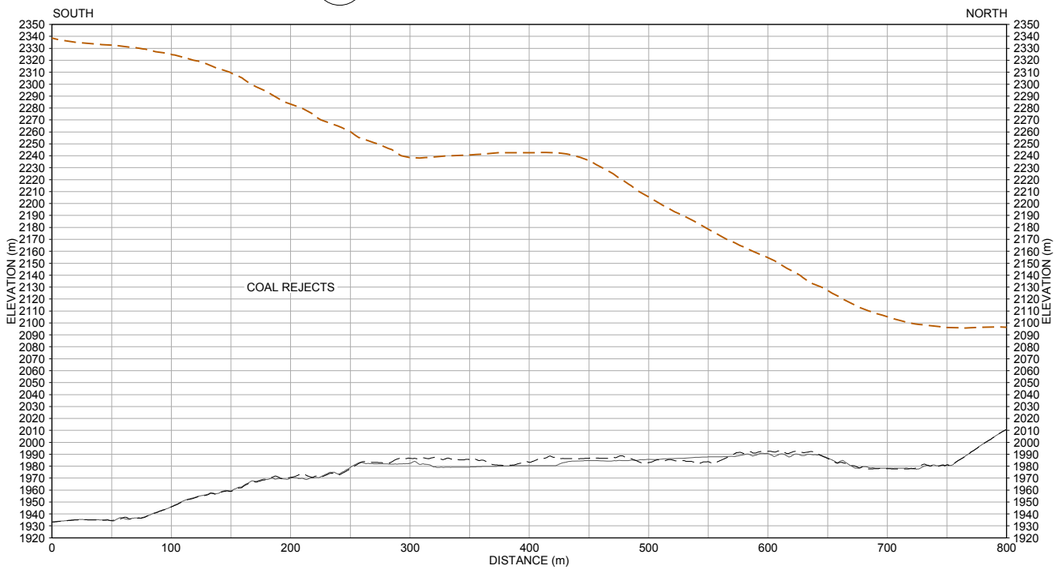
PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
21456080	600/603/2021-254	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm



SCALE 1:2,500 m — 7/4 — TURNBULL WEST SPOIL CROSS-SECTION



SCALE 1:5,000 m — 8/3 — EAGLE 4 SOUTH BACKFILL SPOIL CROSS-SECTION

0 50 100
1:2,500 METRES

0 100 200
1:5,000 METRES

LEGEND

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- 2020 LIDAR EXISTING GROUND SURFACE
- 2021 LIDAR EXISTING GROUND SURFACE

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TITLE
CROSS-SECTIONS 4 OF 4

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
21456080	600/603/2021-254	0	8

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

APPENDIX A

2021 Annual Inspection Photographs

PHOTOGRAPH A-1 **31 August 2021**

A-Spoil - Overview of crest including new shovel yard constructed in 2020/2021, looking east

PHOTOGRAPH A-2

31 August 2021

A-Spoil - North side, revegetated, looking northeast

PHOTOGRAPH A-3

31 August 2021

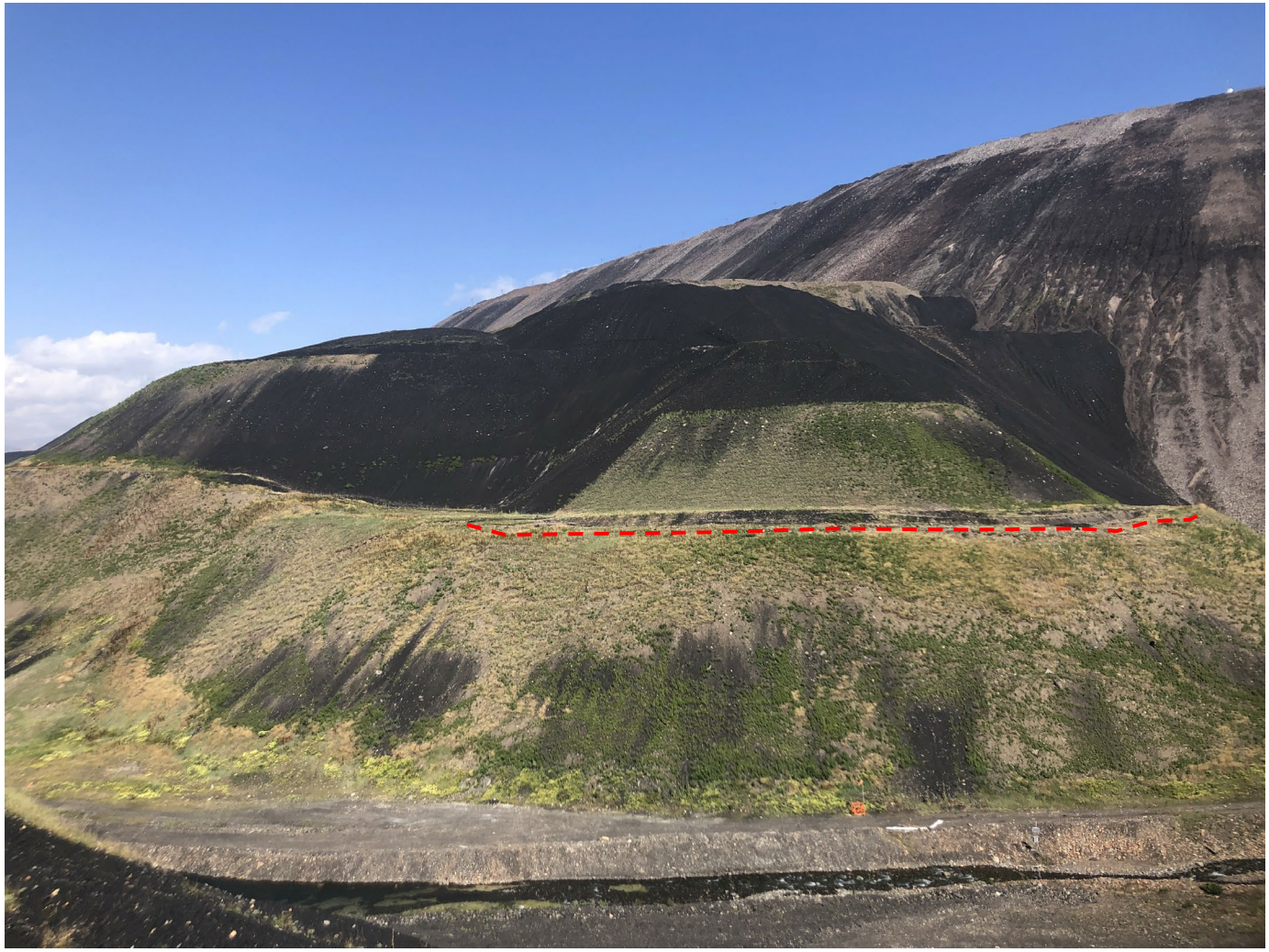
A-Spoil - South side on angle of repose slope above Liverpool Settling ponds, looking south

PHOTOGRAPH A-4 **31 August 2021**

Box Yard spoil – Excavated Spoil (white arrow), looking northeast

PHOTOGRAPH A-5

31 August 2021



Kilmarnock /Toe Berm spoil - overview, crest settlement noted in red, looking north

PHOTOGRAPH A-6 **31 August 2021**

Kilmarnock /Toe Berm spoil - erosion gullies from the 2013 flood, looking south from Blake spoil (top left) and looking east from the South Tailings Pond (bottom right)

PHOTOGRAPH A-7 **31 August 2021**

Kilmarnock / Toe Berm spoil - new erosion feature (shown in red) due to water seepage from Old South spoil, looking north

PHOTOGRAPH A-8

31 August 2021

Kilmarnock / Toe Berm spoil (red arrow) and Impact Berm spoil (white arrow) - looking southwest from Old South spoil

PHOTOGRAPH A-9 **31 August 2021**

Impact Berm spoil - eastern slope and toe, looking southwest from Kilmarnock Creek

PHOTOGRAPH A-10 **31 August 2021**

Blake spoil - Overview from Old South spoil, looking northwest

PHOTOGRAPH A-11 **31 August 2021**

Blake spoil (white arrow) - North end of Kilmarnock / Toe Berm spoil looking northeast

PHOTOGRAPH A-12

31 August 2021

Blake spoil - Erosion channel and loss of berm on western lift due to surface water. Run out of coal rejects onto 1,730 lift of Kilmarnock / Toe Berm spoil

PHOTOGRAPH A-13 **31 August 2021**

Blake spoil - Upper lift with minor erosion rilling, looking south

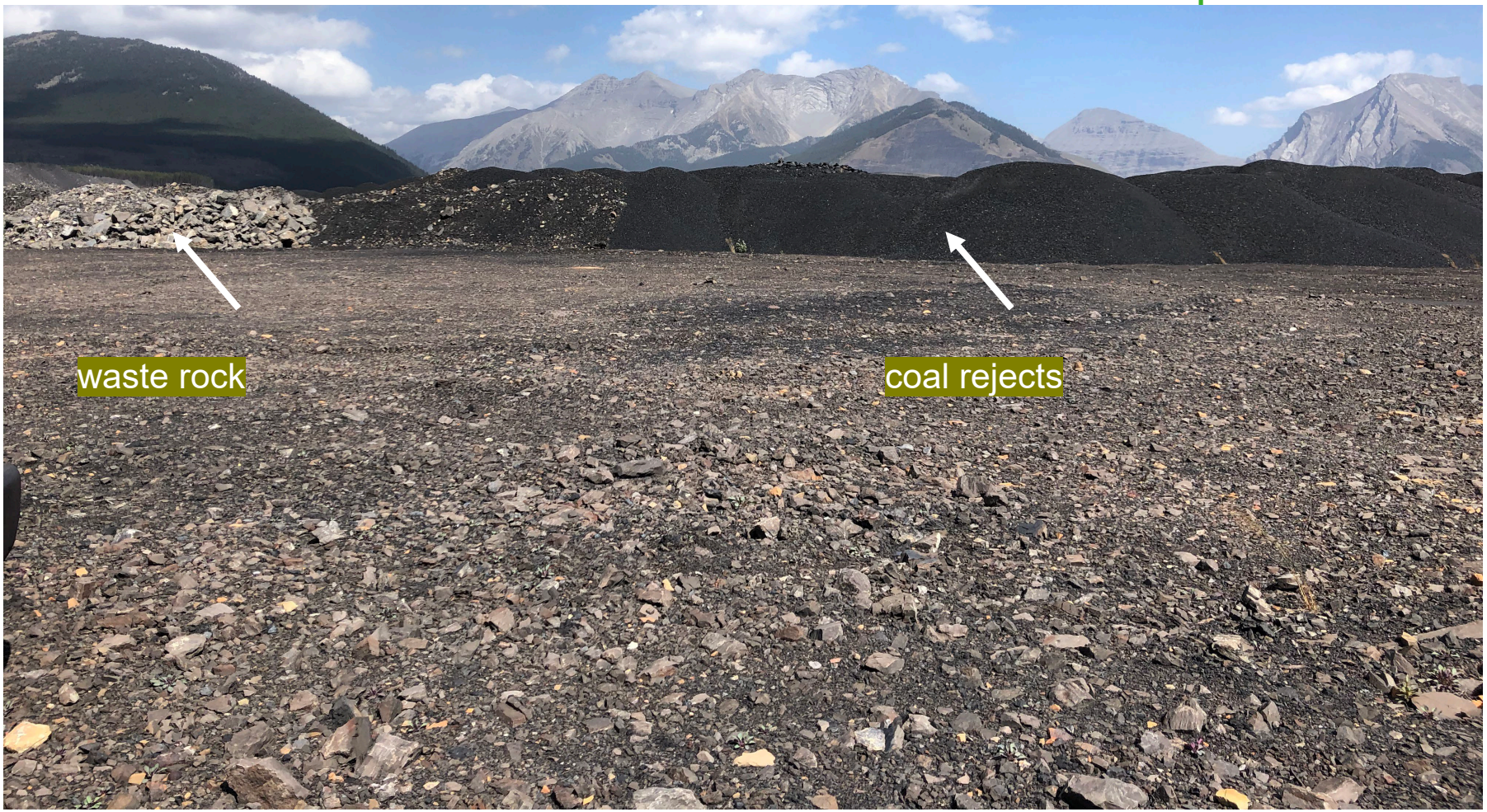
PHOTOGRAPH A-14 **31 August 2021**

Blake spoil - Freshly dumped combined coarse and fine rejects, looking northwest

PHOTOGRAPH A-15 **1 September 2021**

Turnbull West spoil - looking west towards Fording River at toe

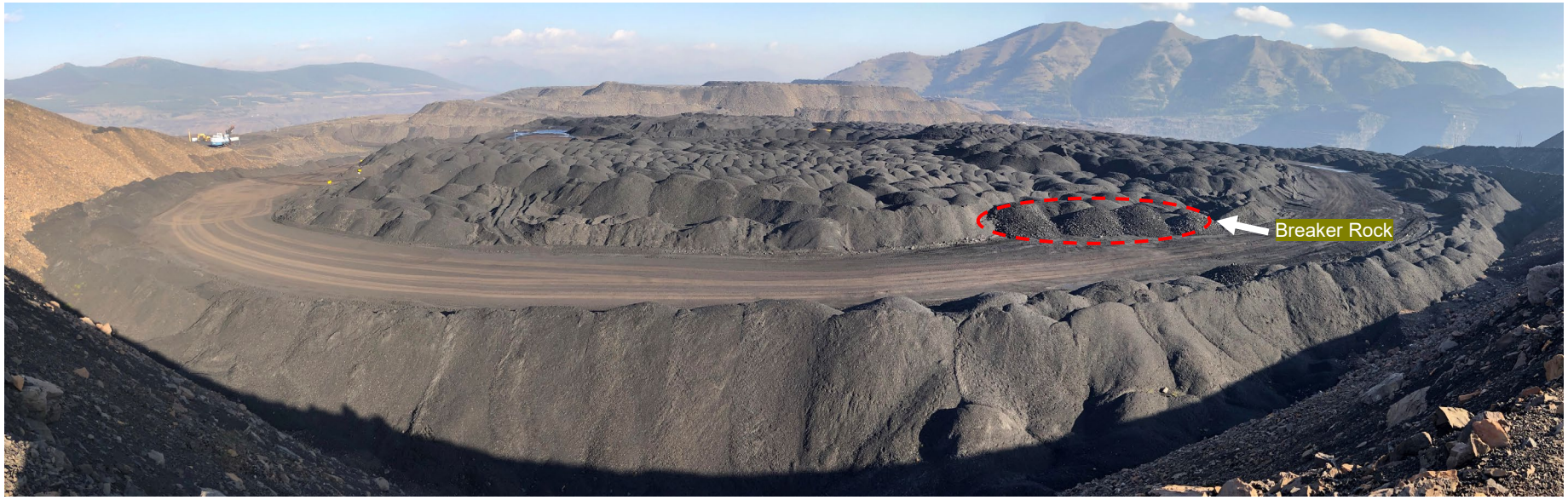
PHOTOGRAPH A-16 **1 September 2021**



Turnbull West spoil - platform, looking northeast

PHOTOGRAPH A-17

31 August 2021



Eagle 4 South Backfill spoil - Overview, looking north

PHOTOGRAPH A-18 **31 August 2021**

Edge of Eagle 4 South Backfill spoil - west side of active platform with extensometer, looking southeast

APPENDIX B

2021 Annual Inspection Reports

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	31 August 2021
Location:	**A-Spoil, Fording River**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant since 2014)

Weather Conditions:	Partially overcast	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	1	1,750 m
1.2 Placed Material		Coarse rejects.
1.3 Construction Method (top down/bottom up)		Bottom-up development with free-dumped material being spread by dozers in approximately 1 m thick lifts.
1.4 Surface Cracking		No surface cracking was observed or reported.
1.5 Unexpected Settlement		No unexpected settlement was observed or reported.
1.6 Lateral Movement		No lateral movement was observed or reported.
1.7 Other Unusual Conditions		A-Spoil has become a shovel yard within the reporting period.
2. Slope Face		
2.1 Slope Angle	2 and 3	37 deg. Overall interlift at 2 horizontal:1 vertical, single lift on south side.
2.2 Signs of Erosion		Minor surficial erosion.
2.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
2.4 Cracks		No signs of cracking were observed or reported.
2.5 Other Unusual Conditions		The facility has been partially revegetated.
3. Toe		
3.1 Slope Angle	-	37 deg. Overall interlift at 2 horizontal:1 vertical, single lift on south side
3.2 Signs of Erosion	-	Minor surficial erosion.
3.3 Signs of Movement (Deformation)	-	No signs of movement were observed or reported.
3.4 Cracks	-	No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas	-	No signs of seepage were observed or reported.
3.6 Vegetation Growth	2	A-Spoil has been partially revegetated.
3.7 Other Unusual Conditions	-	
4. Advancement Pattern	-	NA – no advancement over reporting period. Dormant.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	31 August 2021
Location:	**Box Yard Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil

Weather Conditions:	Partially overcast	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions	4	Box yard spoil has been almost completely mined out during the reporting period. Coarse rejects from this facility have been transported and placed within the Swift North Spoil within PAG designated zone. The remnants of the box yard are over-steepened. The facility could not be accessed. However, review of drone footage shows cracking and erosion of the remaining facility.
1.1 Crest Elevation		
1.2 Placed Material		
1.3 Construction Method (top down/bottom up)		
1.4 Surface Cracking		
1.5 Unexpected Settlement		
1.6 Lateral Movement		
1.7 Other Unusual Conditions		
2. Slope Face		
2.1 Slope Angle		
2.2 Signs of Erosion		
2.3 Signs of Movement (Deformation)		
2.4 Cracks		
2.5 Other Unusual Conditions		
3. Toe		
3.1 Slope Angle		
3.2 Signs of Erosion		
3.3 Signs of Movement (Deformation)		
3.4 Cracks		
3.5 Seepage or Wet Areas		
3.6 Vegetation Growth		
3.7 Other Unusual Conditions		
4. Advancement Pattern		
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	31 August 2021
Location:	**Kilmarnock / Toe Berm Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant since 2002)

Weather Conditions:	Sunny	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	-	1,770 m
1.2 Placed Material	-	Coarse rejects.
1.3 Construction Method (top down/bottom up)	-	Conveyor and spread (limited information regarding construction).
1.4 Surface Cracking	5	Creeping / settlement was seen at the crest of the first lift above Kilmarnock Creek; conditions did not appear to have progressed since the 2020 annual inspection.
1.5 Unexpected Settlement		
1.6 Lateral Movement		
1.7 Other Unusual Conditions	-	The facility is reported to contain burning coarse rejects.
2. Slope Face		
2.1 Slope Angle	-	25 deg., lifts at 37 deg.
2.2 Signs of Erosion	7	Three historical erosion gullies were present on the western side of the spoil, which were caused by ponding on the crest during the 2013 flood event. Conditions did not appear to have progressed since the 2020 annual inspection.
2.3 Signs of Movement (Deformation)	5	Creeping / settlement was seen at the crest of the first lift above Kilmarnock Creek; conditions did not appear to have progressed since the 2020 annual inspection.
2.4 Cracks		
2.5 Other Unusual Conditions	-	The facility is reported to contain burning coarse rejects.
3. Toe		
3.1 Slope Angle	-	37 deg.
3.2 Signs of Erosion	6	Erosion was observed at the toe of facility due to water flowing out of the Old South Spoil and along the road located at the toe.
3.3 Signs of Movement (Deformation)	-	No signs of movement were observed or reported.
3.4 Cracks	-	No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas	-	No signs of seepage were observed or reported.
3.6 Vegetation Growth	5	Some grass growing on lower lifts.
3.7 Other Unusual Conditions		None.
4. Advancement Pattern	-	NA – no advancement over reporting period. Dormant.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele. P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	31 August 2021
Location:	**Impact Berm Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant)

Weather Conditions:	Sunny	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	8	1,660 m
1.2 Placed Material		Coarse rejects.
1.3 Construction Method (top down/bottom up)		Limited information regarding construction, appears to have been developed in a single lift by end tipping material.
1.4 Surface Cracking		No surface cracking was observed or reported.
1.5 Unexpected Settlement		No unexpected settlement was observed or reported.
1.6 Lateral Movement		No lateral movement was observed or reported.
1.7 Other Unusual Conditions	-	None.
2. Slope Face		
2.1 Slope Angle	8 and 9	36 deg.
2.2 Signs of Erosion		Minor rilling observed.
2.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
2.4 Cracks		No signs of cracking were observed or reported.
2.5 Other Unusual Conditions	-	None.
3. Toe		
3.1 Slope Angle	9	36 deg.
3.2 Signs of Erosion		No signs of erosion at the toe were observed or reported.
3.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
3.4 Cracks		No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas		No signs of seepage were observed or reported.
3.6 Vegetation Growth		Partially revegetated slope.
3.7 Other Unusual Conditions		None.
4. Advancement Pattern	-	NA – no advancement over reporting period. Dormant.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	1 September 2021
Location:	**Blake Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant)

Weather Conditions:	Partially overcast	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	10, 11	1,850 m
1.2 Placed Material		Freshly dumped CCFR was observed to be placed at the spoil, it is understood that this was used as short haul location. No records of the quantity or timeline of material placed in the Blake spoil were provided.
1.3 Construction Method (top down/bottom up)		Bottom-up development.
1.4 Surface Cracking		No surface cracking was observed or reported.
1.5 Unexpected Settlement		No unexpected settlement was observed or reported.
1.6 Lateral Movement		No lateral movement was observed or reported.
1.7 Other Unusual Conditions	-	Small berm around gully scarp (See 2.2) to prevent further water inflow.
2. Slope Face		
2.1 Slope Angle	12, 13	23 deg (overall slope angle).
2.2 Signs of Erosion		There is a significant erosion feature on western crest of the 1,780 m platform, caused by surface water run off. This erosion was approximately 4 m wide and 2 m deep and had caused the loss of the safety berm and a minor run out onto the 1,730 m lift.
2.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
2.4 Cracks		No signs of cracking were observed or reported.
2.5 Other Unusual Conditions		None.
3. Toe		
3.1 Slope Angle	12	37 deg. lifts.
3.2 Signs of Erosion		Minor surficial erosion.
3.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
3.4 Cracks		No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas		No signs of seepage were observed or reported.
3.6 Vegetation Growth		No signs of vegetation were observed.
3.7 Other Unusual Conditions		
4. Advancement Pattern	14	Free dumping in small area at north end (not permitted). Should be dormant.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	1 September 2021
Location:	**Turnbull West Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant)

Weather Conditions:	Sunny	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	-	1,830 m
1.2 Placed Material	16	Combined coarse and fine rejects co-mingled with waste rock.
1.3 Construction Method (top down/bottom up)	-	The facility was designed based on bottom-up placement with lifts ranging in thickness from 15 to 30 m.
1.4 Surface Cracking	-	No surface cracking was observed or reported.
1.5 Unexpected Settlement	-	No unexpected settlement was observed or reported.
1.6 Lateral Movement	-	No lateral movement was observed or reported.
1.7 Other Unusual Conditions		None.
2. Slope Face		
2.1 Slope Angle	15	37 deg. each lift, overall 2H:1V
2.2 Signs of Erosion		Minor rilling was observed.
2.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
2.4 Cracks		No signs of cracking were observed or reported.
2.5 Other Unusual Conditions		The south side of the Turnbull West spoil has been resloped to approximately 2H:1V and has been reclaimed.
3. Toe		
3.1 Slope Angle	15	37 deg.
3.2 Signs of Erosion		No signs of erosion at the toe were observed or reported.
3.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
3.4 Cracks		No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas		No signs of seepage were observed or reported.
3.6 Vegetation Growth		Reclaimed south side.
3.7 Other Unusual Conditions	-	None.
4. Advancement Pattern	-	NA – no advancement over reporting period.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	1 September 2021
Location:	**Taylor Rejects Spoil, Fording River Operations**		

GENERAL INFORMATION
Facility Type: Coal rejects spoil (dormant since 2017)

Weather Conditions:	Sunny	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	-	1,975 m
1.2 Placed Material	-	Combined coarse and fine rejects.
1.3 Construction Method (top down/bottom up)	-	Bottom-up method.
1.4 Surface Cracking	-	The Taylor Reject spoil is mostly buried under waste rock and stored behind free-dumped waste rock piles, resulting in difficult access.
1.5 Unexpected Settlement	-	
1.6 Lateral Movement	-	
1.7 Other Unusual Conditions		
2. Slope Face		
2.1 Slope Angle	-	
2.2 Signs of Erosion	-	
2.3 Signs of Movement (Deformation)	-	
2.4 Cracks	-	
2.5 Other Unusual Conditions	-	
3. Toe		
3.1 Slope Angle	-	
3.2 Signs of Erosion	-	
3.3 Signs of Movement (Deformation)	-	
3.4 Cracks	-	
3.5 Seepage or Wet Areas	-	
3.6 Vegetation Growth	-	
3.7 Other Unusual Conditions	-	
4. Advancement Pattern	-	NA – no advancement over reporting period. Dormant.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

Client:	**Teck Coal Limited**	**By:**	**Sophie Bainbridge and Julia Steele, P.Eng.**
Project:	**FRO 2021 Annual Facility Performance Report**	**Date:**	31 August 2021
Location:	**Eagle 4 South Backfill Spoil, Fording River Operations**		

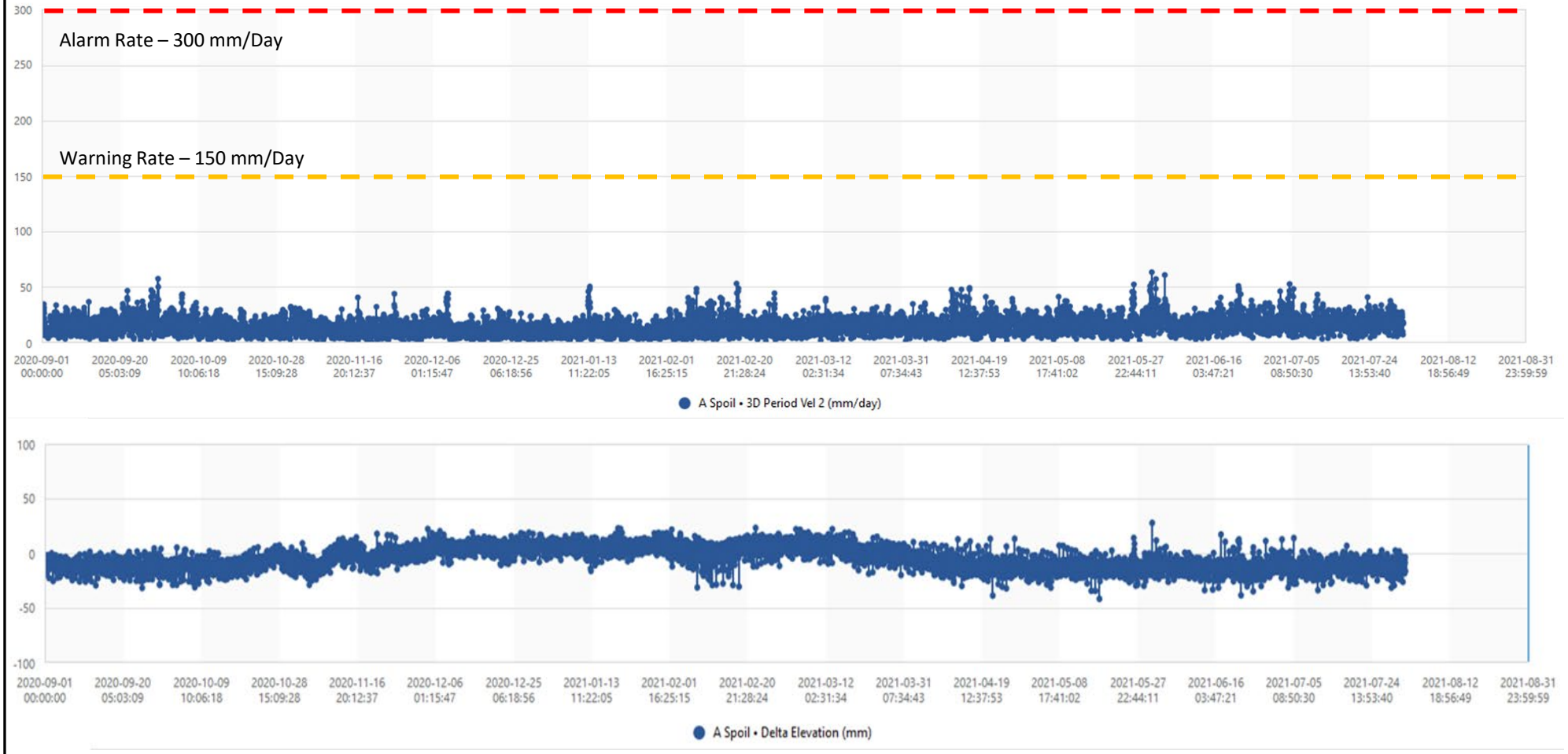
GENERAL INFORMATION
Facility Type: Coal rejects spoil (active)

Weather Conditions:	Sunny	**Temp:**	17 degrees

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. Platform Conditions		
1.1 Crest Elevation	17, 18	1,660 m
1.2 Placed Material		Combined coarse and fine rejects; it was noted some breaker rock had been placed in the spoil, which is inconsistent with the permit conditions.
1.3 Construction Method (top down/bottom up)		Bottom-up method, with CCFR material free dumped by haul truck and spread by dozer in approximately 2 m high lifts.
1.4 Surface Cracking		Surface cracking was observed at the edge of the active platform in section built over-height and is being monitored by extensometer. No concerns were noted.
1.5 Unexpected Settlement		No unexpected settlement was observed or reported.
1.6 Lateral Movement		No lateral movement was observed or reported.
1.7 Other Unusual Conditions	-	
2. Slope Face		
2.1 Slope Angle	17	34 deg.
2.2 Signs of Erosion		Minor rilling observed.
2.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
2.4 Cracks		No signs of cracking were observed or reported.
2.5 Other Unusual Conditions	-	
3. Toe		
3.1 Slope Angle	17	34 deg.
3.2 Signs of Erosion		No signs of erosion at the toe were observed or reported.
3.3 Signs of Movement (Deformation)		No signs of movement were observed or reported.
3.4 Cracks		No signs of cracking were observed or reported.
3.5 Seepage or Wet Areas		No signs of seepage were observed or reported.
3.6 Vegetation Growth		None.
3.7 Other Unusual Conditions		None.
4. Advancement Pattern	17	Some lifts of the Eagle 4 South Backfill spoil have been placed without dozer compaction, which is required per Teck's SP&P (EN.020.R6). Further, some lifts had been placed double height (30 m) which does not meet the permit conditions for the Eagle 4 South Backfill spoil.
5. Documentation		
5.1 Operation, Maintenance and Surveillance (OMS) Manual 5.1.1 OMS Manual exists	-	Documented in (SP&P) EN.020.R6.
5.1.2 OMS Plan reflects current spoil conditions	-	Requirements of an OMS manual are generally met. Detailed review by the EoR required. Specific operational document for coal reject spoils should be developed to account for potential differences between waste rock spoils and coal reject spoils.
5.1.3 Date of last revision	-	15 September 2020
5.2 Emergency Preparedness Plan (EPP) 5.2.1 EPP Exists	-	Documented in Teck's SP&P EN.020.R6, including TARPs and a roles and responsibilities matrix. Site-wide emergency response documented in EP.001.R7.
5.2.2 EPP Reflects Current Conditions	-	Procedures be reviewed in consultation with the EoR in relation to potential differences between waste rock spoils and coal reject spoils.
5.2.3 Date of Last Revision	-	15 September 2020 (EN.020) 14 October 2014 (EP.001)
Inspector's Signature		Julia Steele, P.Eng.

APPENDIX C

Instrumentation Data



CLIENT
TECK COAL LIMITED
FORDING RIVER OPERATIONS
ELKFORD, B.C.

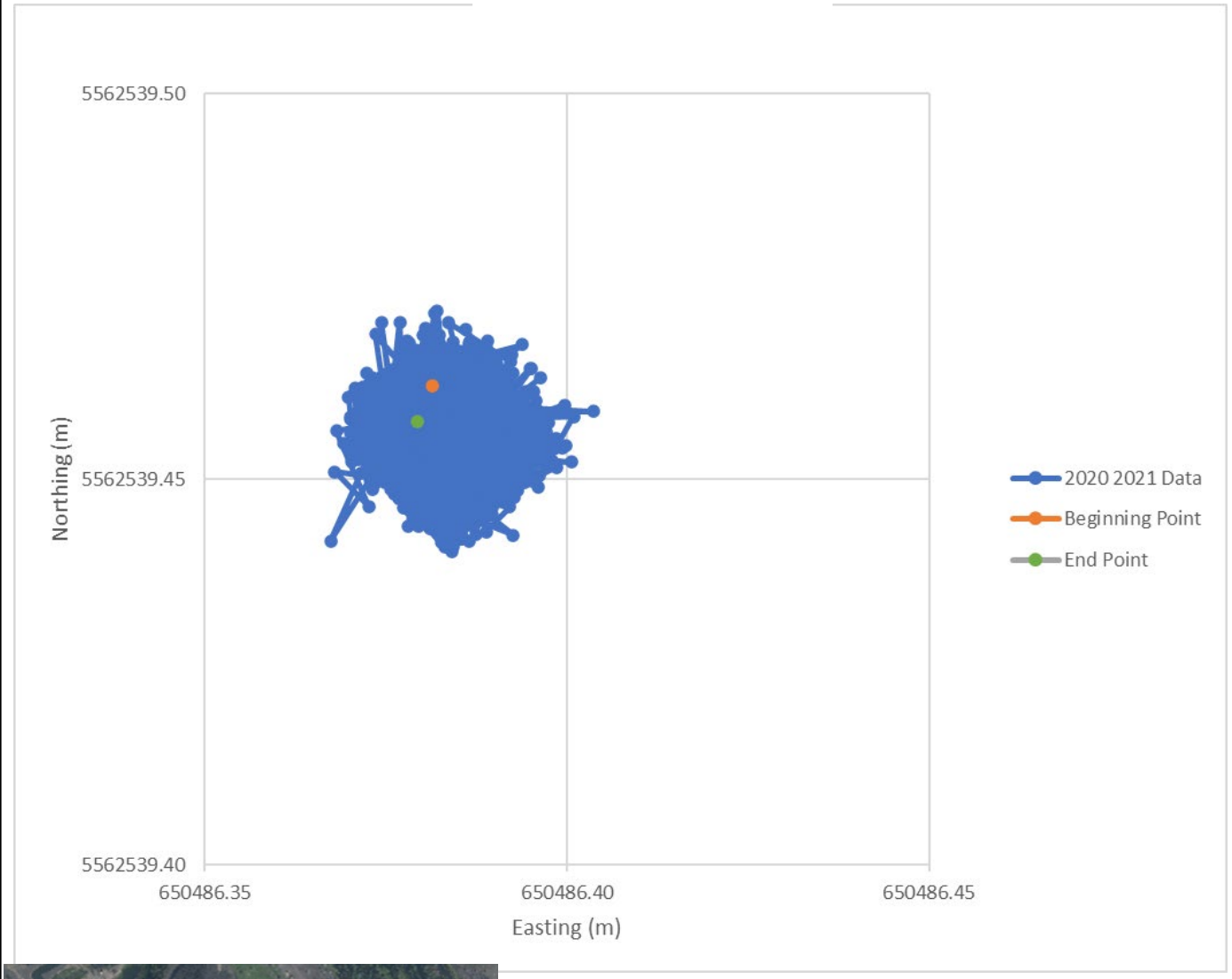
CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-11-23
PREPARED	M. BARTON
DESIGN	M. BARTON
REVIEW	M. WILLAN
APPROVED	J.STEELE

PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
GPS MONITORING DATA
A-SPOIL

PROJECT No.	Phase/Task/Doc.	Rev.	SHEET
21456080	**600/603/2021-254**	**0**	**C-1**



CLIENT
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PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
GPS MONITORING DATA
A-SPOIL

PROJECT No.	Phase/Task/Doc.	Rev.	SHEET
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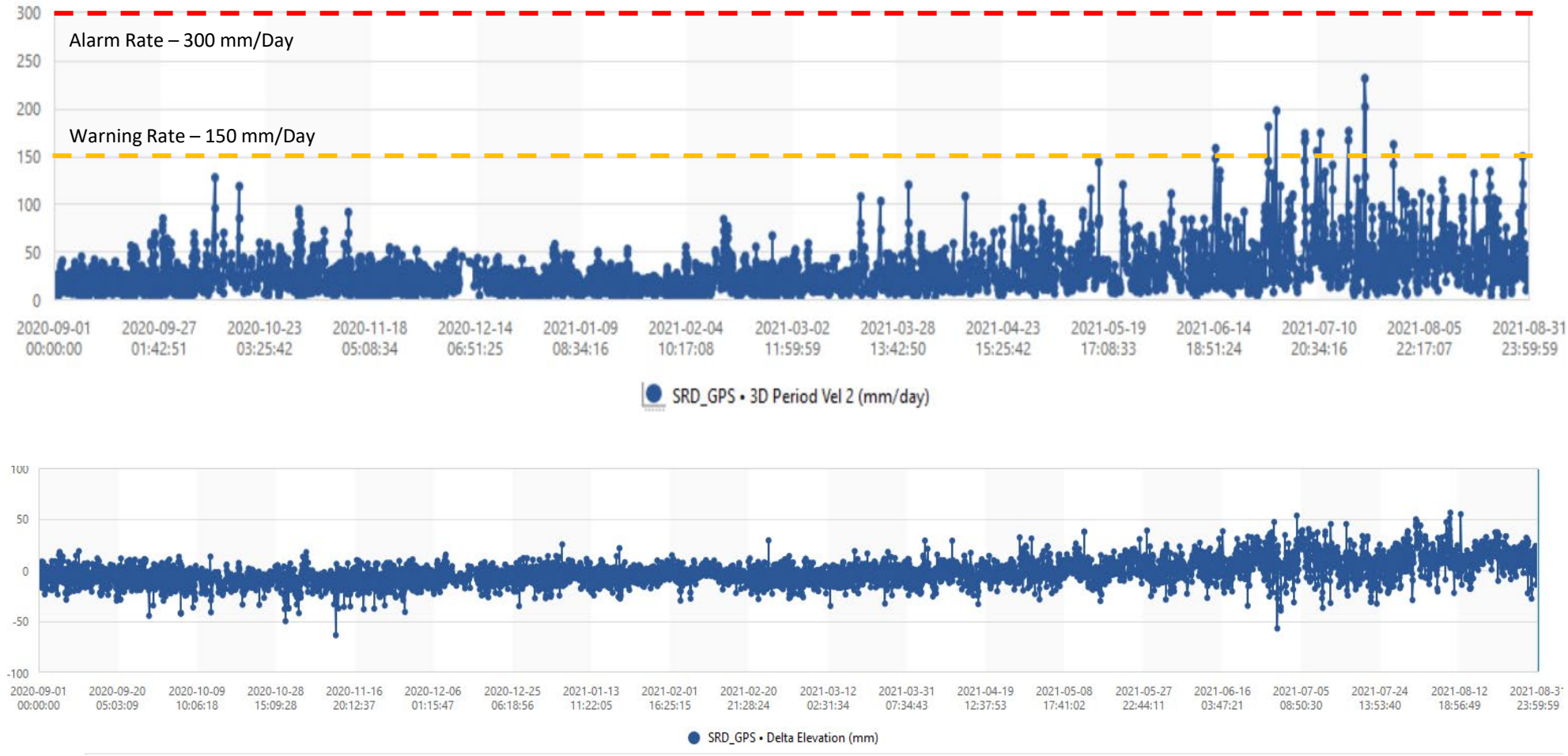

CLIENT
TECK COAL LIMITED
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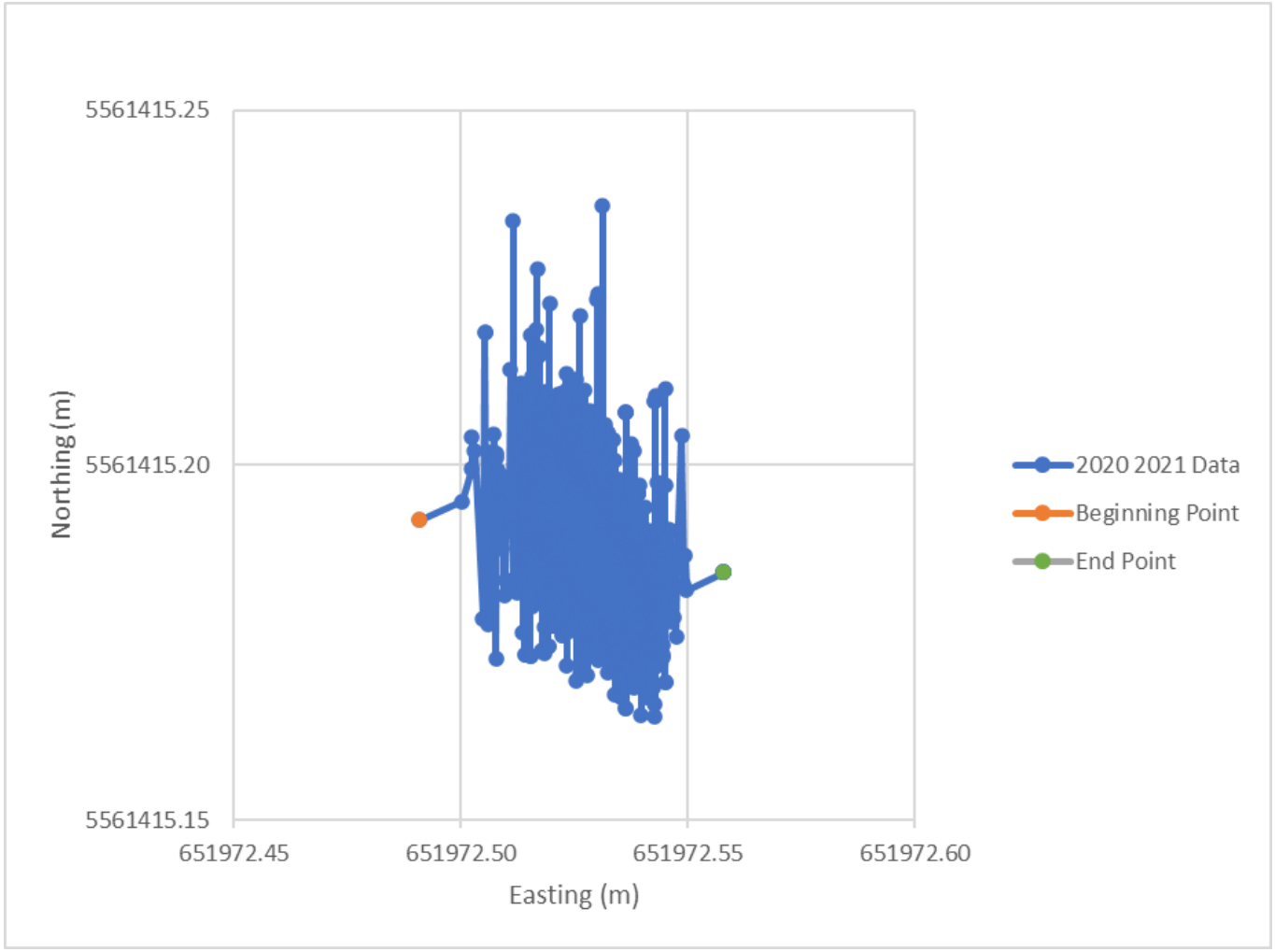
PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
GPS MONITORING DATA
BLAKE SPOIL

PROJECT No.	Phase/Task/Doc.	Rev.	SHEET
21456080	**600/603/2021-254**	**0**	**C-3**



CLIENT
TECK COAL LIMITED
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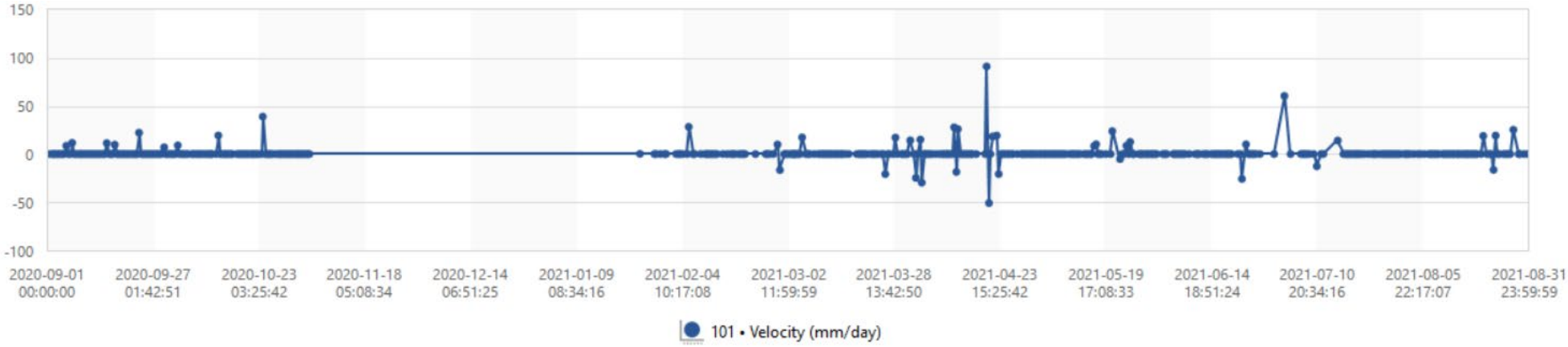
PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
GPS MONITORING DATA
BLAKE SPOIL

PROJECT No.	Phase/Task/Doc.	Rev.	SHEET
21456080	**600/603/2021-254**	**0**	**C-4**



CLIENT
TECK COAL LIMITED
FORDING RIVER OPERATIONS
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YYYY-MM-DD	2021-11-23
PREPARED	M. BARTON
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REVIEW	M. WILLAN
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PROJECT
2021 ANNUAL FACILITY PERFORMANCE REPORT
COAL REJECT SPOILS

TITLE
EXTENSOMETER MOINTORING DATA - 101
EAGLE 4 SOUTH BACKFILL SPOIL

PROJECT No.	Phase/Task/Doc.	Rev.	SHEET
21456080	**600/603/2021-254**	**0**	**C-5**

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