Klohn Crippen Berger

Teck Resources Limited

Quintette Coal Operations

2021 Annual Facility Performance Review

Plantsite Tailings Storage Facility and Plantsite Seepage Collection Pond Dam

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March 2022

March 25, 2022

Teck Resources Limited
Legacy Properties
601 Knighton Road
Kimberley, British Columbia
V1A 1C7

Mr. Mark Slater, P.Eng.
Supervisor, Geotechnical Engineering
Dear Mr. Slater:

Quintette Coal Operations
2021 Annual Facility Performance Review
Plantsite Tailings Storage Facility and Plantsite Seepage Collection Pond Dam

We are pleased to submit the 2021 Annual Facility Performance Review for the Plantsite Tailings Storage Facility and Plantsite Seepage Collection Pond Dam.

Please contact us if you have any questions regarding this report.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Max Cronk, P.Eng.
Project Manager

MC/RWC:jc

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Teck Resources Limited

Quintette Coal Operations

2021 Annual Facility Performance Review

Plantsite Tailings Storage Facility and Plantsite Seepage Collection Pond Dam

EXECUTIVE SUMMARY

Klohn Crippen Berger Ltd. (KCB) were engaged by Teck Resources Limited (Teck) to complete the 2021 Annual Facility Performance Review (AFPR) for the Plantsite Tailings Storage Facility (PTSF) and Plantsite Seepage Collection Pond (PSCP) at the Quintette Coal Operations (QCO) mine site.

The site visit was completed on July 13, 2021, by Mr. Bob Chambers, P.Eng. of KCB, Mr. Max Cronk, P.Eng. of KCB, and Mr. Mark Slater, P.Eng., of Teck. Mr. Chambers is the Engineer of Record (EoR) representing KCB for the PTSF. Mr. Slater is the Responsible Tailings Facility Engineer (RTFE) for Teck.

This report covers the period from September 2020 to August 2021, herein referred to as the "review period".

This summary section is provided in accordance with the Health, Safety and Reclamation Code (HSRC), and Teck's "Guideline for Tailings and Water Retaining Structures" (Teck 2019b). We also understand that Teck makes these annual reports available for public viewing prior to their full conformance with the Global Industry Standard on Tailings Management (GISTM) in 2023. This summary is provided solely for purposes of overview. Any party who relies on this report must read the full report. This summary omits a number of details, any one of which could be crucial to the proper application of this report.

Summary of Facility Description

QCO is an idle open pit coal mine located in the Peace River District in the foothills of the Rocky Mountains, approximately 16 km south of Tumbler Ridge, British Columbia. The site was operated from 1982 until 2000, at which time operations were suspended. Portions of the site have been reclaimed, but otherwise the site has been under care and maintenance status since operations were suspended. Teck have full-time staff on site for environmental sampling, inspections, and maintenance activities.

The PTSF was commissioned in 1984 and received tailings until 1997, at which time tailings deposition transitioned to the Shikano North Tailings Storage Facility (SNTSF). The PTSF is a side-hill tailings facility, with tailings retained by the Plantsite Tailings Dam (PTD). The PTD is a zoned earthfill embankment with minimum crest elevations from El. 882 m to El. 883 m, crest length of approximately 2,600 m, maximum height of 52 m, and average downstream slope of 2H:1V. The embankment consists of an upstream low permeability zone of compacted glacial till, a chimney drain, and a downstream shell of compacted coarse coal rejects (CCR). Water discharges via the closure spillway located on the southern end of the facility. The spillway discharges into M17 Creek which eventually reports to the Murray River downstream.

The Plantsite Seepage Collection Pond (PSCP) is located approximately 200 m west of the PTSF and was constructed in 1982 to collect seepage and runoff from the PTSF. The pond is retained by an earthfill embankment approximately 15 m high from crest to toe, with 3H:1V downstream slopes. The embankment shell was constructed of compacted weathered bedrock (siltstone and shale) (Golder 1984b). Water is discharged to the north via an open-channel spillway which eventually reports to the Murray River via a forested area.

Summary of Key Potential Hazards and Failure Modes

KCB understands that Teck's long-term goal for all of their tailings facilities is to reach landform status, with all potential failure modes that could result in catastrophic release of tailings and/or water being either not present or having been reduced to non-credible. Commensurately, given the nature of the PTSF, Teck's long-term goal for the PTSF is for all potential failure modes to be non-credible based on extreme loading conditions, or loading conditions appropriate using the principles of ALARP (i.e., As Low as Reasonably Practicable) when it is not practical to consider extreme conditions. KCB also support Teck's long-term goal to decommission sedimentation and seepage collection ponds, and remove potential safety risks once the facilities are no longer required. Evaluation of failure modes with respect to these goals is ongoing, however the PTSF is not seen as having the potential for a catastrophic flow failure in its current configuration under design flood and earthquake loading.

The risk assessment for the PTSF was reviewed by Teck and KCB representatives in 2021. There have been no changes to the key hazards and existing controls were adequate to manage potential failure modes within compliance and risk limits.

The key hazard for the PTSF is slope instability under extreme seismic loading. The facility meets current HSRC requirements for seismic stability; however, Teck are planning to assess the performance during a 10,000-year event as part of their efforts to align with the most extreme loadings noted within GISTM as well as meeting their own long-term goals noted above.

The key hazard for the PSCP is the potential for blockage of the spillway by beaver activity, which is being managed with the existing design and operational controls. There have been no changes to the key hazards, and the existing controls were adequate to manage potential failure modes within compliance and risk limits.

Potential Consequence of Failure

Plantsite Tailings Storage Facility

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck are aligned with the most conservative interpretation of the GISTM which, in turn, is consistent with their safety culture. Commensurately, Teck has advised that consequence classification is not a part of their tailings management governance and has asked that it not be reported in this AFPR. Instead, Teck will adopt the extreme consequence case design loading for any facility with a credible catastrophic flow failure mode. For facilities without a credible failure mode in terms of a life safety issue, Teck will reduce credible risks to As Low As Reasonably Practicable (ALARP). This consequence case applies for both earthquake and flood scenarios for all tailings facilities, consistent with the GISTM. Adopting this approach meets or exceeds any regulatory requirements, aligns with Teck's goal to eliminate risk for loss of life, and is consistent with the GISTM. This approach is consistent with industry-leading best practices and has an added benefit of providing accurate narratives to communities about the safety of tailings facilities that could impact them and who share Teck's approach of one life is one too many to be at risk.*

The PTSF meets HSRC requirements, and as noted in an earlier section, evaluations under extreme loading scenarios are on-going.

Plantsite Seepage Collection Pond

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck will no longer broadly adopt a classification system that has levels of potential human loss of life, but will instead aim to eliminate credible risk of loss of life and reduce credible risks to As Low As Reasonably Practicable (ALARP). Teck understand that, for the purposes of alignment with water dam safety regulations and if there are no life safety concerns, then use of reputable classification systems (e.g. CDA/ICOLD) is acceptable. Adopting this approach meets or exceeds regulatory requirements and aligns with Teck's goal to eliminate risk for loss of life. The past CDA classification and the confirmation of such is provided in this document for consistency with previous work but we understand that continuation of classification using CDA (2019) or similar will not be used in the future at Teck.*

The PSCP is not a tailings facility and was classified as a "Low" consequence facility based on the CDA (2019) category system (KCB 2020). There have been no changes to the downstream environment, the structures, or the operation of the facilities that would require a revision to this classification.

Notwithstanding the above, and as previously indicated, Teck's stated long-term goal is for seepage collection ponds to be decommissioned, so that the structure can be declassified as a "dam". KCB fully supports Teck towards achieving this long-term goal.

Instrumentation and/or Visual Monitoring

Visual monitoring was performed in accordance with the frequency specified in the OMS Manual, and there were no observations of concern noted.

Piezometers were read during the site visit, and readings were consistent with typical post-operation readings. Piezometer readings were all below their threshold values.

The survey monuments were not read in 2021, and this is not a concern as Teck are continuing to trial alternative methods for monitoring embankment displacements. KCB support this initiative.

KCB considers the level of instrumentation and surveillance at the facility to be adequate for the facility under current conditions.

Surface Water Management

There were no changes to surface water management and estimated seepage rates during the review period are consistent with estimates made since 2013 (KCB 2013).

Operations, Maintenance, and Surveillance Manual

The Operation, Maintenance and Surveillance (OMS) Manual, which was updated in March 2019 (Teck 2019a), remains appropriate for the facility. An update to the OMS Manual was in progress at the time of writing.

Emergency Preparedness and Response Plan

Teck updated the Emergency Preparedness and Response Plan (EPRP) for the PTSF in March 2019 (Teck 2019c), and the plan is considered appropriate for the facility.

Dam Safety Review

Teck engaged Thurber Engineering Ltd. to perform a Dam Safety Review (DSR) for the PTSF in 2020. The site visit was completed in September 2020 and the evaluation and reporting were in progress at the time of writing this annual review report. The HSRC requires that DSRs be performed at least once every 5 years. The next DSR should be scheduled to be initiated by 2025 to comply with HSRC requirements.

Summary of Recommendations

The observed performance of the PTSF and PSCP is consistent with past behavior and expectations, and there were no safety concerns related to facility performance noted during the review period.

Recommendations are summarized in Table E-1. There are no new recommendations for this AFPR. Any preliminary recommendations issued following the site visit that were closed before this report was issued have not been included in Table E-1. Each recommendation has been assigned a priority using the HSRC Guidance Document priority definitions:

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

Table E-1 Summary of Recommendations

ID Number	Deficiency or Non-Conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Recommended Deadline
Previous Recommendations Closed / Superseded – None					
Previous Recommendations Ongoing					
PTD-2019-02	Vegetation on dam slopes	OMS Manual (Section Titled "Items Requiring Maintenance")	Clear trees from the upstream and downstream slopes of the dam.	4	Q4 2022 (OPEN – Vegetation partially removed from crest and toe areas, additional clearing planned in 2022 priority reduced to 4 given that the remaining vegetation is not impacting dam safety but should be removed to reduce the potential for further growth)
2021 Recommendations – no new recommendations					

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LIST OF ABBREVIATIONS

Acronym	Definition
AFPR	Annual Facility Performance Review
ALARP	As Low As Reasonably Practicable
CCR	Coarse Coal Rejects
CDA	Canadian Dam Association
DSR	Dam Safety Review
EDGM	Earthquake Design Ground Motion
EMLI	Ministry of Energy, Mines and Low Carbon Innovation
ENV	Ministry of Environment (BC)
EoR	Engineer of Record
EPRP	Emergency Preparedness and Response Plan
FoS	Factor of Safety
HSRC	Health, Safety and Reclamation Code for Mines in BC
IDF	Inflow Design Flood
InSAR	Interferometric Synthetic Aperture Radar
KCB	Klohn Crippen Berger Ltd.
LiDAR	Light Detection and Radar
MEM	Ministry of Energy and Mines
OMS	Operational, Maintenance and Surveillance
PMF	Probable Maximum Flood
PSCP	Plantsite Seepage Collection Pond
PTD	Plantsite Tailings Dam
PTSF	Plantsite Tailings Storage Facility
QCO	Quintette Coal Operations
QPO	Quantifiable Performance Objectives
RTFE	Responsible Tailings Facility Engineer
TSF	Tailings Storage Facility
TWRS	Tailings and Water Retaining Structures

CLARIFICATIONS

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Teck Resources Limited (Client) for the specific application to the 2021 Annual Facility Performance Review of the Plantsite Tailings Storage Facility and Plantsite Seepage Collection Pond, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The Executive Summary is a selection of key elements of the report. It does not include details needed for the proper application of the findings and recommendations in the report.
3. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
4. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
5. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.

1 INTRODUCTION

1.1 General

Klohn Crippen Berger Ltd. (KCB) were engaged by Teck Resources Limited (Teck) to complete the 2021 Annual Facility Performance Review (AFPR) for the Plantsite Tailings Storage Facility (PTSF) and for the Plantsite Seepage Collection Pond (PSCP) at the Quintette Coal Operations (QCO) mine site.

This AFPR was undertaken to comply with Section 10.5.3 of the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (the Code) (EMLI 2021). This report covers the period from September 2020 to August 2021, herein referred to as the "review period," and was prepared following:

- Section 4.2 "Annual Tailings Facility and Dam Safety Inspection Report" of the 2016 HSRC Guidance Document (MEM 2016); and
- Guideline for Tailings and Water Retaining Structures (TWRS) (Teck 2019b).

The site visit was completed on July 13, 2021 by KCB representatives Mr. Bob Chambers, P.Eng. and Mr. Max Cronk, P.Eng. During the site visit, KCB engineers were accompanied by Mr. Mark Slater, P.Eng. of Teck. Mr. Chambers is the Engineer of Record (EoR) as a representative of KCB for the SNTSF. Mr. Slater is the Responsible Tailings Facility Engineer (RTFE) for Teck. KCB have been involved as EoR since March 2016, with KCB representative Mr. Rick Friedel, P.Eng., serving as EoR from March 2016 to September 2016. Golder Associates and Kilborn Engineering Ltd. designed the facility, and Golder were involved with it until approximately 2005.

We understand that Teck makes these annual reports available for public viewing prior to their full conformance with the Global Industry Standard on Tailings Management (GISTM) in 2023.

1.2 Facility Description

General

QCO is an idle open pit coal mine located in the Peace River District in the foothills of the Rocky Mountains, approximately 16 km south of Tumbler Ridge British Columbia. The site location is shown in Figure 1.

The site was operated from 1982 until 2000, at which time operations were suspended. Portions of the site have been reclaimed, but otherwise the site has been under care and maintenance status since operations were suspended. Teck have full-time staff on site for environmental sampling, inspections and maintenance activities.

In 2013 and 2014, Teck received permits for a restart of mining operations at the QCO site:

- Ministry of Energy and Mines[1] (MEM), Permit No. C-156 (amended June 20, 2013); and
- Ministry of Environment (ENV), Permit No. PE-06739 (amended July 9, 2014).

[1] Now referred to as the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI).

Teck have deferred the restart of operations. The PTSF would not be used for tailings storage if operations are restarted at QCO. However, the 2014 ENV permit amendment includes provisions for water quality monitoring of the PTSF.

Plantsite Tailings Storage Facility

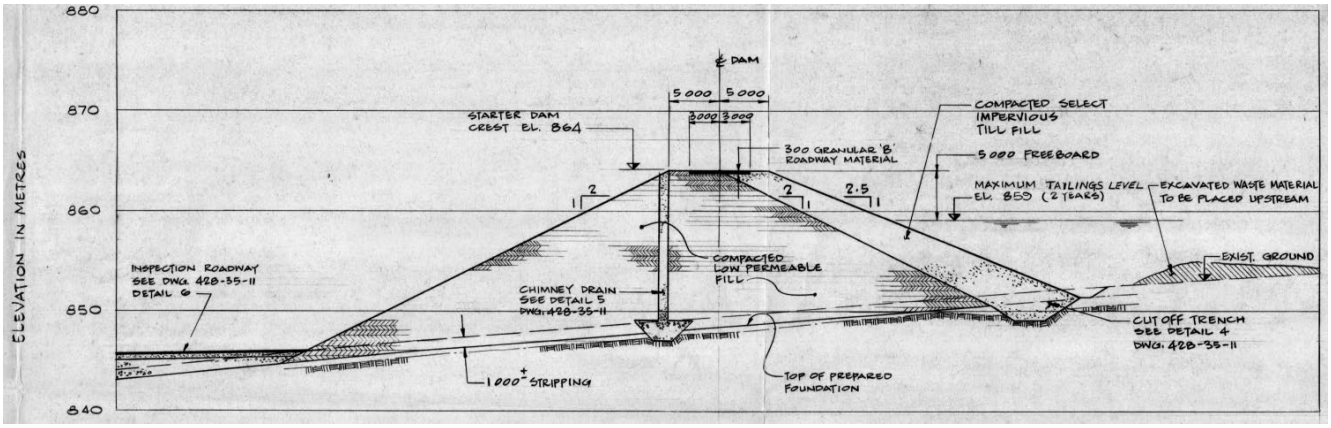
PTSF is approximately 2 km north of the QCO processing plant and gatehouse (Figure 2). A general arrangement of the facility is shown in Figure 3.

The PTSF was designed by Kilborn Engineering Ltd. and Golder Associates Ltd. (Golder) in 1982, with Golder continuing as the design engineer of the facility during operations. The facility was operated from approximately 1984 (Golder 2003) until 1997. During operations, tailings were discharged from the northeastern edge of the impoundment which formed a tailings beach that sloped away from the discharge point. Ponded water was pumped back to the plant by a reclaim barge. The impoundment has been inactive since 1997 when it reached capacity, and tailings deposition shifted to the Shikano North Tailings Storage Facility. A closure spillway was constructed between 2001 and 2002. Since 2002, there has been no construction (raises, upgrades, or repairs) at the facility. A list of available reference documents is included in Appendix III.

Tailings are retained in the facility by the Plantsite Tailings Dam (PTD), which is a zoned earthfill embankment that extends along the southwestern, western, northern, and a portion of the eastern boundary of the facility. The majority of the eastern boundary abuts the natural ground. The PTD was raised progressively throughout operations in the downstream direction.

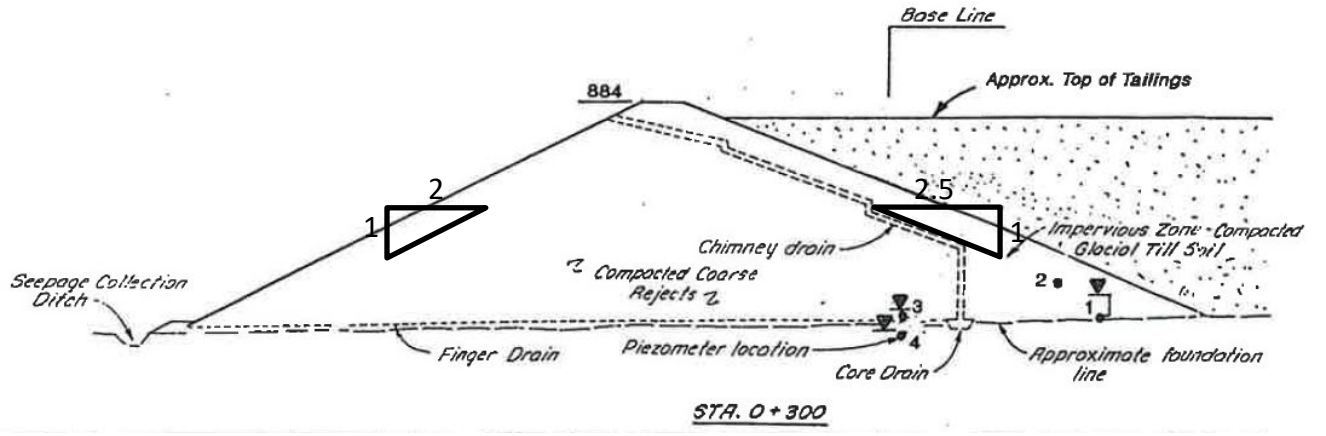
A starter embankment was constructed in 1983, and a typical design cross section is shown in Figure 1.1 (Kilborn 1982). The starter embankment was constructed primarily of locally borrowed compacted glacial till (labelled as compacted select impervious till in Figure 1.1) and weathered bedrock (siltstone/shale). The upstream glacial till zone was keyed into the in-situ glacial till or bedrock in a cut-off trench. The embankment includes a 1 m wide vertical chimney drain that is connected to series of finger drains to control pore pressures in the embankment. The finger drains convey seepage to a seepage collection ditch near the toe of the embankment, which then conveys the water to the PSCP, located approximately 200 m west of the PTSF (Figure 3).

Figure 1.1 Typical Design Section of PTD Starter Embankment (Kilborn 1982)



The PTD was raised in 1983 and 1995. The chimney drain and upstream glacial till zone were raised along with each crest raise. The glacial till zone has a minimum thickness of 3.5 m, measured perpendicular to the upstream face (Golder 1988). The crest is approximately 5 m wide, 2.6 km long, and minimum elevation of El. 882 m. The maximum downstream slope height (crest to toe) is 52 m. The downstream slope is 2H:1V. The upstream slope was built at 2.5H:1V to El. 878 m and 2H:1V from El 878 m to the ultimate crest (KCB 2015). A typical cross-section of the ultimate embankment is shown in Figure 1.2.

Figure 1.2 Typical Section of PTD Ultimate Embankment (Golder 2003) (starter embankment zonation is not shown)



The closure spillway is approximately 650 m long and has a grade of 0.5% to 0.8%. The base of the channel is approximately 20 m wide and contained by banks that are 4 m to 6 m high with 2.2H:1V side slopes. There is a low-flow channel that meanders along the bottom of the closure spillway that is approximately 2 m to 5 m wide and 0.5 m deep. The spillway is protected against erosion with vegetation (grasses and shrubs) along most of its length. There is riprap where the spillway channel makes a 90-degree bend (approximately 150 m upstream of the outlet to M17 Creek) and at the "Level Spreader" (the area within approximately 20 m of the outlet).

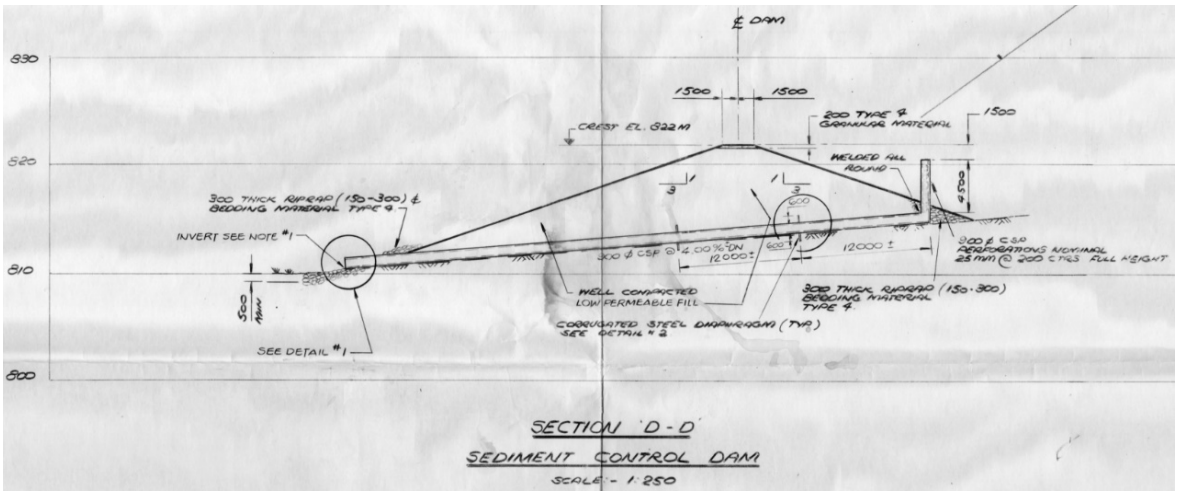
The foundation profile beneath the PTSF consists of glacial overburden of variable thickness overlying bedrock (Golder 1982a).

Plantsite Seepage Collection Pond Dam

The PSCP is retained by an earthfill embankment constructed in February 1983 (Golder 1984a) to collect seepage and runoff from the PTSF. Similar to the PTSF, the PSCP was designed by Kilborn Engineering Ltd. The shell was constructed of weathered bedrock (siltstone and shale) which was compacted to 98% standard Proctor maximum dry density (Golder 1984b). There is no internal zoning in the structure. The weathered rock was noted to be a well-graded, 75 mm minus material with a fines content typically between 10% and 30% (Golder 1982b). The embankment is approximately 15 m high (crest to toe) and has downstream and upstream slopes of 3H:1V.

The pond discharges to the north via an open-channel spillway; the spillway channel is vegetated with grass and flows through a forested area before it ultimately reaches the Murray River. The spillway invert is approximately El. 818.7 m (based on the 2019 LiDAR). A typical section of the PSCP taken from Kilborn (1982) Drawing 428-35-11 is shown in Figure 1.3. The design drawing shows a 900 mm diameter decant pipe through the embankment; however, there is no evidence that the pipe was constructed.

Figure 1.3 Typical Design Section of Plantsite Seepage Collection Pond (Kilborn 1982)



2 SUMMARY OF ACTIVITIES DURING THE REVIEW PERIOD

There were no construction or maintenance activities undertaken or required during the review period. Teck completed routine inspections of the facilities as specified in the Operation, Maintenance, and Surveillance (OMS) Manual.

3 CLIMATE, WATER MANAGEMENT AND WATER ACCOUNTING

3.1 Climate

The climate of the region is dictated by a variety of factors including latitude, altitude, and location relative to the mountain barrier (Teck 2013). The region encompassing the site is occasionally subject to intense low-pressure systems that draw warm, tropical air into the region from the Gulf of Mexico (Teck 2013).

KCB reviewed climate data from two nearby climate stations (Lower Met, and Chetwynd Airport), which are summarized in Table 3.1. The location of the Lower Met Climate Station is shown in Figure 2. Data from Upper Met station were not available for review.

Precipitation and temperature data from Lower Met and Chetwynd Airport climate stations are summarized in Table 3.2. The data has been corrected for orographic effects using the corrections from the Baseline Hydrology and Design Basis (Teck 2013). The data indicate that the review period was drier than a typical year.

The rain gauge at Lower Met Climate Station is not heated, so precipitation data during freezing conditions can be unreliable. As a result, climate data from Environment Canada Chetwynd Airport Climate Station were used to supplement the precipitation readings from September to April.

Table 3.1 Summary of Climate Stations

Climate Station	Alternate Name	Monitored By	Station No.	Location	Elevation (m)	Period of Record
Lower Met	Plantsite	Teck	n/a	On site	914	1983 to present
Chetwynd Airport	n/a	Environment Canada	1181508	86 km North of QCO	610	1982 to present

Table 3.2 Precipitation and Temperature at Plantsite Tailings Storage Facility

Month	PTSF Mean Annual Precipitation Distribution[1] (mm)	PTSF 2020-2021 Precipitation[2],[3] (mm)	Lower Met Climate Station 1991 – 2000 Average Temperature[4] (°C)	Lower Met Climate Station 2020 – 2021 Daily Average Temperatures[5] (°C)
September	45	40	10.1	9.3
October	51	70	3.6	2.8
November	56	50	-3.7	-1.0
December	39	11	-6.8	-2.7
January	45	18	-10.7	-11.3
February	34	20	-5.4	-3.3
March	34	15	-2.1	-6.9
April	28	11	3.5	1.7
May	34	79	8.3	8.6
June	73	11	12.3	12.5
July	73	50	14.5	14.8
August	51	65	13.9	13.4
Total	**563**	**440**	-	-

Notes:
1. Monthly precipitation values are based on the mean annual precipitation-elevation relationship and the monthly distribution outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
2. October 2020 to April 2021 precipitation values were based on Chetwynd Airport Climate Station (station No. 1181508; El. 610 m; and 86 km north of QCO) data, with the mean annual precipitation and elevation correction outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
3. September 2020, and May 2021 to August 2021 precipitation values were based on Lower Met Climate Station data with the mean annual precipitation and elevation correction outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
4. Average monthly temperatures at Quintette Plantsite (1991 – 2000) as outlined in the Baseline Hydrology and Design Basis Report (Teck 2013)
5. Daily maximum, minimum, average temperatures are based on temperature readings that were taken at the Lower Met Climate Station.

3.2 Water Management

Under normal and flood flow conditions, the primary inflows into the PTSF are runoff from the catchment, precipitation on the tailings beach, and precipitation on the pond. There is no active discharge of water or tailings into the facility. Water accumulates in depressions on the tailings surface and exits as either seepage, evaporation, or as flow through the spillway. Approximately 25,000 m^3 of water can collect in local depressions on the tailings surface within the impoundment before flowing out the spillway (KCB 2019b). The largest ponded areas are shown in Figure 3. The catchment for the PTSF is approximately 160 ha (KCB 2019b) and is shown in Figure 4. The catchment is broken down as follows:

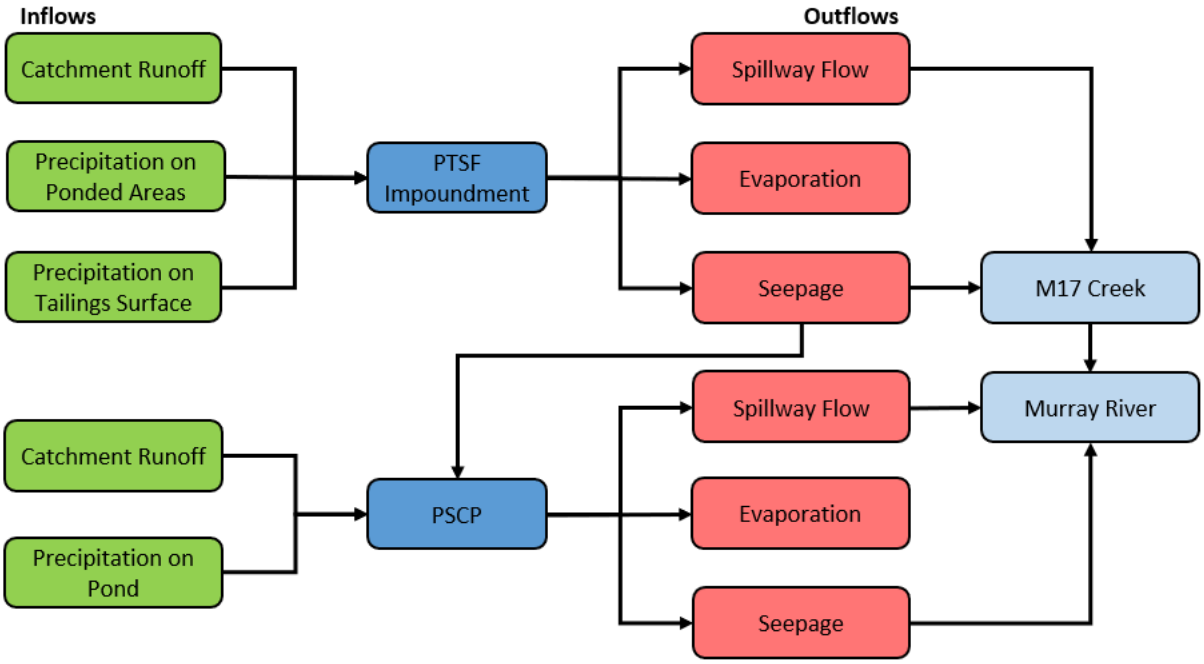
- tailings beach = 97 ha;
- ponded areas = 5 ha; and
- undiverted upstream catchment = 58 ha.

There are two roads upslope of the facility that divert runoff away from the facility under normal conditions. The catchment upstream of the two roads is approximately 22 ha. During a significant storm event, such as the Inflow Design Flood (IDF), the roads are assumed to overtop, which increases the total catchment to 182 ha.

The PSCP has a catchment area of approximately 25 ha. Under normal conditions, seepage from the PTSF and runoff from the slopes are conveyed to the PSCP via a ditch. Outflows from the facility consist of evaporation, seepage, and flow through the open-channel spillway at the right abutment. Both seepage and flow through the spillway eventually report to the Murray River.

A simplified flow schematic of both facilities is shown in Figure 3.1.

Figure 3.1 Flow Schematic for the PTSF and PSCP



3.3 Water Accounting

A simplified water accounting calculation was prepared for the review period (values rounded to the nearest thousand) and is summarized in Table 3.3. This simplified assessment omits a number of minor inputs and outputs but is considered adequate for dam safety purposes. The estimated average flow rate through the PTSF spillway was 5 L/s, which is within the range of previously calculated flows ranging from 3.5 L/s (KCB 2013) to 17 L/s (KCB 2019c).

The estimated average flow rate through the PSCP spillway was 0.6 L/s, which is slightly less than estimated in 2020 (1 L/s), and is close to the lower end of the range observed during operations, which was from 0.8 L/s (Golder 1999) to 13.9 L/s (Golder 1989).

Table 3.3 Simplified Water Accounting

Annual Inflows/Outflows		PTSF	PSCP
Inflow (m^3/year)	Runoff from Upstream Catchment[1]	103,000	43,000
	Precipitation on Tailings Beach (excluding pond)[2]	244,000	0
	Precipitation on Pond[3]	22,000	2,000
	Seepage Inflow[4]	0	20,000
Outflows (m^3/year)	Evaporation from Pond Surface[5]	27,000	3,000
	Estimated Seepage Losses[6]	182,000	44,000
	Net Average Annual Flow Through Spillway[7]	160,000 (approx. 5 L/s)	18,000 (approx. 0.6 L/s)

Notes:

1. Assumed average runoff coefficient of 0.4. For the PTSF, assumed that both roads upstream of the facility act as catchment divides under average conditions.
2. Assumed average runoff coefficient of 0.6.
3. Assumed ponds occupy approximately 5% of tailings beach based on observed localized ponds in the PTSF impoundment and at the spillway inlet.
4. Golder (2003) estimated a seepage rate of 0.6 L/s (from PTSF), measured at the PSCP spillway weir.
5. Evaporation rate for this site is 536 mm/year based on the evaporation-elevation relationship from Teck (2013).
6. Based on KCB experience with similar materials at other projects, seepage losses into the coal tailings was assumed at an approximate rate of 10 mm/day for PTSF. The seepage loss rate for PSCP was assumed at an approximate rate of 30 mm/day for losses into till foundations.
7. The remainder of inflows minus evaporation and seepage losses.

3.4 Flood Routing

Plantsite Tailings Storage Facility

During flood events, runoff is routed through the facility via the open channel spillway. KCB reviewed the PTSF closure spillway (KCB 2019b) performance during the extreme flood events and concluded that the spillway has sufficient capacity to route the 24-hour Probable Maximum Flood (PMF) while maintaining freeboard of 4.5 m along the crest adjacent to Ponded Area 2 (Figure 3). The estimated freeboard exceeds the minimum freeboard (0.4 m) based on the method of calculation proposed by CDA (2013) for wind setup and wave runup (KCB 2019b).

Plantsite Seepage Collection Pond Dam

The IDF for the PSCP is a 200-year, 24-hour flood, which aligns with the HSRC Guidance Document. KCB (2020) reviewed the hydrotechnical performance of the PSCP and its spillway and concluded that the PSCP could safely route the IDF and maintain a freeboard of 0.9 m during the flood. This exceeds the minimum freeboard (0.1 m) based on the CDA (2013) for wind setup and wave runup (KCB 2020),

and the minimum freeboard (0.5 m) based on “Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining” (ENV 2015) guidelines.

4 MONITORING PROGRAM AND SITE OBSERVATIONS

4.1 Overview

The monitoring program for the PTSF and PSCP is summarized in Table 4.1 with comments on activities during the review period. The monitoring program is appropriate for the existing conditions of the PTSF and PSCP given the long performance history, adequacy of instrumentation coverage, and having an open channel spillway.

Table 4.1 Summary of Monitoring Program

Surveillance Type/Task	Frequency	Responsible	OMS Manual Compliance Met?	Notes for Review Period
Water Quality	Varies (refer to ENV Permit PE-06739, 2014 Amendment)	Facility Surveillance Officer	Yes	Reported separately by Teck to ENV.
Flow measurement at Seepage Collection Pond	When water quality is measured	Facility Surveillance Officer	Yes	Completed alongside water quality sampling. Documented in a spreadsheet stored on Teck's network.
Routine Inspections	Three times per year	Facility Surveillance Officer	Yes	Routine inspections completed in May, July, and September 2021
Piezometers	Annual	Facility Surveillance Officer	Yes	Read by KCB on behalf of Teck during the annual site visit.
Survey Monuments	Annual	Teck	Yes	The survey monuments were not read in 2021. An InSAR survey was conducted instead, covering the time period from 2016 to 2020, which indicated that there are no displacements of concern. Teck are planning further InSAR surveys to further evaluate its effectiveness for use at QCO.
Event-Driven Inspections	As required	Facility Surveillance Officer	Yes	No event-driven inspections were required during the review period
Annual Facility Performance Review	Annual	EoR	Yes	This report
Dam Safety Review	Every 5 years	Third Party Consultant/ Qualified Registered Professional Engineer	Yes	Site visit was completed by Thurber Engineering Ltd. In September 2020. Preliminary findings were provided to Teck and no immediate concerns noted. The report was in progress at the time of writing.

4.2 Visual Inspection

Routine visual inspections were completed by the Facility Surveillance Officer. Teck reported that there were no concerns observed during the review period. Inspection observations are documented on a standard form and uploaded to Teck's SharePoint site and are provided to the RTFE and EoR for review.

4.3 Annual Site Visit Observations and Photographs

The site visit was completed on July 13, 2021, by Mr. Bob Chambers, P.Eng. and Mr. Max Cronk, P.Eng., of KCB, who were accompanied by Mr. Mark Slater, P.Eng. of Teck. The weather was sunny and the temperature was 21°C. No precipitation was recorded 24 hours prior to the site visit. No material changes related to dam safety were observed during the site visit. The following is a summary of the key features observed during the site visit. Photographs are provided in Appendix I.

Plantsite Tailings Storage Facility

- **Crest**: Good condition with minor rutting due to vehicle traffic. No signs of cracking, settlement, sinkholes, erosion, excessive vegetation, or animal activity.
- **Downstream Slope and Toe**: Good condition. No signs of cracking, sloughing, slumping, seepage, excessive vegetation, or animal activity. The minor depression on the east embankment slope observed in 2018, which was attributed to animal activity, did not show signs of change. This feature is not considered a dam safety concern. Rilling was observed on the downstream slope, similar to previous site visits; however, there was no visually discernable change in rill size. Refer to Section 4.6 for discussion of rill erosion and Appendix II for rill photographs.
- **Tailings Impoundment**: Similar to previous site visits, there was locally ponded water in the northeast and northwest corners of the impoundment, and near the spillway inlet. The tailings surface is partially vegetated and well-drained, except in the ponded areas. No sinkholes or depressions on tailings surface adjacent to the crest were observed. Water levels in the ponded areas generally appeared lower than those observed in 2020.
- **Closure Spillway Channel**: Good condition. The vegetation cover, primarily grasses and bushes, is well-established. No signs of erosion or scouring were noted. The riprap on the natural slope bank continues to show signs of particle breakdown but is not considered a dam safety concern at this time.
- **Closure Spillway Outlet to M17 Channel**: Good condition. Vegetation is well established. No signs of obstruction or debris blocking the outlet.
- **Seepage**: Minor seepage was observed from the finger drains at several locations along the toe. Where seepage was flowing from the finger drain, the water was clear.

Plantsite Seepage Collection Pond

- **Crest:** Good condition. No signs of cracking, settlement, sinkholes, erosion, excessive vegetation, or animal activity.
- **Downstream Slope and Toe:** Good condition. No signs of displacement, no slumping, and no erosion. Slope is vegetated with grasses and small trees.
- **Abutments:** Good condition. No signs of seepage or erosion observed.
- **Spillway:** Good condition. The spillway was unobstructed and dry at the time of the site visit.

4.4 Piezometers

There are 19 functional pneumatic piezometers installed (Table 4.2) in the fill (upstream and downstream of the chimney drain) and foundation of the PTSF. Most of the piezometers are located along the southern and southwestern portion of the facility, as shown in Figure 3. There are no piezometers at the PSCP.

The piezometers were read on July 13, 2021, during the annual site visit, and the data are plotted in Figures 5 to 11. KCB reviewed the 2021 piezometer readings and noted the following:

- All piezometer readings are below the established threshold values, and no changes to thresholds are required.
- In general, piezometers showed similar or slightly lower water levels compared to 2020 readings, except P15 at Sta. 0+800 which shows a gradual increasing trend over the last three years. Despite the trend, the piezometer reading is 3.5 m below the threshold level and is within the range of post-operations readings observed in this instrument.
- The chimney drain appears to be performing as designed based on lower pore pressures measured in the downstream shell of the embankment compared to readings upstream of the chimney drain.
- Piezometer P2 did not stabilize, which is consistent with past observations. The instrument was noted as being plugged in 2003. This is not a concern given that P1, P3, and P4 remain functional and are along the same instrument section.
- Piezometer P16 could not be read because of a build-up of mineral deposits on the instrument tip. The tip should be replaced as part of routine maintenance, however this is not a concern given that P15 and P17 remain functional and are located along the same instrument section.

Based on the PTSF performance to date, the piezometers and reading frequency are considered sufficient for on-going monitoring of the facility under current conditions.

Table 4.2 Summary of 2021 Piezometer Readings

Stn.	Inst. ID	Piezometer Type	Installation Unit	Tip El. (m)	Historical Maximum Since Instrumentation Re-Initiation in July 2014[2]		Threshold Level 1 "Warning Level"		2021 Readings	
					Pressure (psi)	Piezometric Level (m)	Pressure (psi)	Piezometric Level (m)	Pressure (psi)	Piezometric Level (m)
0+188	1A	Pneumatic	Below fill/foundation contact	867.0	2.2	868.5	2.9	869.0	0.1	867.1
0+300	P1	Pneumatic	Below fill/foundation contact	854.8	5.3	858.5	6.0	859.0	2.7	856.7
	P2	Pneumatic	Fill – compacted glacial till	859.8	10.2	867.0	10.9	867.5	Did Not Stabilize(1)	-
	P3	Pneumatic	Fill/foundation contact	854.6	5.5	858.5	6.2	859.0	3.1	856.8
	P4	Pneumatic	Below fill/foundation contact	852.2	7.9	857.8	8.6	858.2	3.8	854.9
0+475	P5	Pneumatic	Fill/foundation contact	853.4	12.2	862.0	12.9	862.5	7.8	858.9
	P6	Pneumatic	Fill – compacted glacial till	858.6	8.3	864.4	9.0	864.9	5.6	862.5
	P7	Pneumatic	Below fill/foundation contact	855.7	3.9	858.4	4.6	858.9	0.4	856.0
0+575	P8	Pneumatic	Below fill/foundation contact	849.9	3.6	852.4	4.3	852.9	0.6	850.3
	P9	Pneumatic	Fill – compacted glacial till	855.4	17.8	867.9	18.5	868.4	0.2	855.5
	P10	Pneumatic	Fill/foundation contact	847.8	0.7	848.3	1.4	848.8	DRY	-
	P11	Pneumatic	Below fill/foundation contact	845.5	1.6	846.6	2.3	847.1	0.1	845.6
0+696	P12	Pneumatic	Fill – compacted glacial till	855.1	10.9	862.8	11.6	863.3	3.3	857.4
	P13	Pneumatic	Fill/foundation contact	843.0	1.2	843.8	1.9	844.3	DRY	-
	P14	Pneumatic	Below fill/foundation contact	841.1	0.8	841.7	1.5	842.2	DRY	-
0+800	P15	Pneumatic	Below fill/foundation contact	846.2	10.3	853.4	11.0	853.9	6.0	850.4
	P16	Pneumatic	Fill – compacted glacial till	854.8	7.4	860.0	8.1	860.5	COULD NOT READ(2)	-
	P17	Pneumatic	Fill – CCR	848.3	3.0	850.4	3.7	850.9	0.8	848.9
2+040	P31	Pneumatic	Foundation	864.0	6.9	868.9	-	-	1.2	864.8

Notes:

1. Reading did not stabilize which is consistent with past observations. The instrument was noted as being plugged in 2003.
2. Piezometer could not be read due to a build-up of mineral deposits on the fitting.

4.5 Survey Monument Pins

There are eight survey monuments (pins) along the crest of the PTSF (refer to Figure 3) to monitor displacements. The monuments were not surveyed in 2021, and instead an InSAR survey was completed covering the period from 2016 to 2020. Teck are trialing alternative methods to monitor displacements, including LiDAR surveys and InSAR, with additional InSAR monitoring scheduled for 2022. KCB agree with this approach, and there is no concern with the survey monuments not being read in 2021.

There are no survey monuments at the PSCP.

4.6 Downstream Slope Erosion

Ongoing rill erosion has been observed on the slope of the PTSF since operations ceased. The rills are up to 1 m deep in some cases, however they have not impacted the crest. The rills are observed during routine inspections for signs of change. Photographs are taken from selected locations and compared to previous site visits. Rill monitoring locations and photographs are included in Appendix II.

Based on comparison of photographs and previous annual performance reports, changes in the rill erosion of the downstream slope have been negligible since 2016. The rills do not represent a dam safety concern; rather, they represent a maintenance issue that will need to be incorporated as part of developing long-term closure plans for the facility.

4.7 Pond Level

Water collects in three ponded areas on the surface of the impoundment, as indicated in Figure 3:

- Ponded Area 1 at northwest corner of the impoundment;
- Ponded Area 2 along the west side of the impoundment; and
- Ponded Area 3 at the northeast corner of the impoundment.

Water levels in each of the ponded areas are observed during routine and event-driven inspections. During the 2021 site visit, the pond levels were below the pond level thresholds defined in the OMS Manual and were lower than those observed in 2020.

4.8 Aerial Survey

Teck are trialing aerial surveys to track embankment displacements at the PTSF and potentially replace the survey monument pins. Pending completion of the trial, Teck will update their OMS Manual to include the selected technology. In 2020, Teck retained TRE Altamira to complete a historical InSAR survey of the QCO site to estimate displacements at each facility. The InSAR trial reviewed data from 2016 to 2020 which showed no displacement trends or magnitudes of concern (e.g., slumping or bulging) over that period. The survey comparison does show localized settlement on the tailings beach (up to 170 mm) which is to be expected and does not indicate a concern with

the facility. Settlement of the embankment surface was less than 20 mm, which is consistent with survey monument data. This survey did not include any data points at the PSCP.

4.9 Water Quality

Teck monitor water quality downstream of the PTSF at monitoring points M17A and M17B as per ENV Permit No. PE-06739. Seepage flows from the PTSF are one of multiple inflows into M17A and M17B; therefore, the water quality at monitoring points M17A and M17B is not directly representative of PTSF seepage water quality. Teck have indicated that there are no permit limits for these sites, but that there are periodic exceedances above BC Water Quality Guidelines for certain parameters. Teck submit reports on their water quality monitoring program to ENV. Monitoring programs at these locations include:

- M17A:
  - Weekly from April to October: flow rate; dissolved oxygen; TSS; and field turbidity.
  - Monthly, November to March: flow rate.
  - Quarterly: field turbidity; lab turbidity and total suspended solids; total extractable hydrocarbons (I); and metal and non-metal parameters as defined by the permit.
- M17B:
  - Quarterly: flow rate; metal and non-metal parameters as defined by the permit.

5 TAILINGS FACILITY SAFETY ASSESSMENT

5.1 Design Basis Review

KCB have performed engineering assessments of the existing facilities (KCB 2019a, 2019b, 2020), which confirmed that the facilities meet the key design criteria for flood and earthquake loading required under the HSRC. There were no changes to the design basis during the review period.

5.2 Dam Safety Review

The latest DSR was performed in 2020 by Thurber Engineering Ltd. The site visit was completed in September 2020 and the report was in progress at the time of writing this report. The HSRC requires that DSRs be performed at least once every 5 years; the next DSR should be scheduled to be initiated in 2025.

5.3 Failure Modes Review

Plantsite Tailings Storage Facility

KCB understands that Teck's long-term goal for all of their tailings facilities is to reach landform status with all potential failure modes that could result in catastrophic release of tailings and/or water being either not present or having been reduced to non-credible. Teck's long-term goal for the PTSF is for all potential failure modes to be non-credible based on extreme loading conditions, or loading conditions appropriate using the principles of ALARP (i.e., As Low as Reasonably Practicable) when it is not practical to consider extreme conditions. Evaluation of failure modes with respect to these goals is ongoing.

The most recent failure modes review was conducted in November 2021. There were no changes to the key hazards and the existing controls were adequate to manage potential failure modes. The following is a summary of the controls in place to manage the three key hazards / failure modes for tailings facilities identified in the ICMM Good Practice Guide (ICMM 2021):

- **Overtopping:** There have been no reported incidents of overtopping, nor any signs that it has occurred during the operation of the facility. Water is drained passively from the facility by the closure spillway, which is capable of routing the PMF while maintaining greater than 4.5 m of freeboard along the embankment adjacent to Ponded Area 2 (KCB 2019b). The spillway base width is 20 m, making it very unlikely to become blocked. The spillway and freeboard are effective controls to manage overtopping risks.
- **Internal Erosion and Piping:** The facility has a long performance record with no indicators of internal erosion during operations, both when hydraulic gradients were higher, and under current conditions. The embankment has a chimney drain between the low permeability glacial till upstream blanket and downstream CCR shell to prevent internal erosion. Filter compatibility was reviewed and no deficiencies requiring follow up activities were identified (KCB 2015). Piezometer readings confirm that the phreatic surface in the embankment is low,

indicating that the internal drainage system is performing as intended and is an effective control to manage the risk of internal erosion.

- **Slope Instability:**
  - There have been no reported incidents of slope instability, nor any signs that it has occurred during the operation of the facility. As noted above, piezometer readings continue to show that the phreatic surface in the embankment is low. Stability evaluations of the existing condition indicate that the facility has adequate Factors of Safety (FoS) under static conditions (KCB 2019a).
  - Under extreme earthquake loading, the calculated post-earthquake FoS is greater than 1.1 (KCB 2019a), which indicates that the facility would remain stable under these conditions. Simplified deformation analyses indicate that under the Earthquake Design Ground Motion (EDGM), potential deformations would be less than 1 m during the design earthquake, which is significantly less than the available freeboard under normal conditions and can therefore be accommodated by the facility (KCB 2019a).

Based upon the review of potential failure modes that could exist for the PTSF facility, key hazards related to the PTSF are being managed effectively, and the PTSF is not seen as having the potential for a catastrophic flow failure in its current configuration under design flood and earthquake loading.

Plantsite Seepage Collection Pond Dam

KCB understand and support Teck's long-term goal to decommission sedimentation and seepage collection ponds, and remove potential safety risks, once the facilities are no longer required.

- **Overtopping:** There have been no reported incidents of overtopping, nor any signs that it has occurred during the operation of the facility. Water is drained passively from the facility by the open channel spillway, which is capable of routing the IDF (200-year flood, 24-hour) while maintaining 0.9 m of freeboard (KCB 2020). Routine and event-driven inspections of the spillway are performed to check for signs of blockage and erosion.
- **Internal Erosion and Piping:** Internal erosion and piping were reported during operations and were treated with the construction of a toe buttress and granular drain along the abutment (Golder 1984b). Since that time, there have been no reports of internal erosion or piping related issues, and recent inspections have not observed seepage daylighting from the embankment.
- **Slope Instability:**
  - There have been no reported incidents of slope instability (e.g., cracking, slumping) at the structure, and engineering assessments indicate that the facility has adequate FoS under static and post-earthquake loading conditions (KCB 2020).
  - A simplified deformation analysis indicates that deformation due to the EDGM would be less than 0.1 m, which is significantly less than the available freeboard in the facility under normal conditions (1.1 m), and indicates that the estimated deformations under the EDGM can be tolerated by the structure without releasing the pond (KCB 2020).

Based upon the review of potential failure modes for the PSCP, the facility meets the applicable HSRC requirements and KCB has no concerns with the existing facility and Teck's long-term plans.

5.4 Upstream and Downstream Conditions Review

There have been no changes to the upstream or downstream conditions during the review period.

5.5 Potential Consequence of Failure

5.5.1 Plantsite Tailing Storage Facility

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck are aligned with the most conservative interpretation of the GISTM which, in turn, is consistent with their safety culture. Commensurately, Teck has advised that consequence classification is not a part of their tailings management governance and has asked that it not be reported in this AFPR. Instead, Teck will adopt the extreme consequence case design loading for any facility with a credible catastrophic flow failure mode. For facilities without a credible failure mode in terms of a life safety issue, Teck will reduce credible risks to As Low As Reasonably Practicable (ALARP). This consequence case applies for both earthquake and flood scenarios for all tailings facilities, consistent with the GISTM. Adopting this approach meets or exceeds any regulatory requirements, aligns with Teck's goal to eliminate risk for loss of life, and is consistent with the GISTM. This approach is consistent with industry-leading best practices and has an added benefit of providing accurate narratives to communities about the safety of tailings facilities that could impact them and who share Teck's approach of one life is one too many to be at risk.*

The PTSF meets HSRC requirements, and as noted in an earlier section, evaluations under extreme loading scenarios are on-going.

5.5.2 Plantsite Seepage Collection Pond

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck will no longer broadly adopt a classification system that has levels of potential human loss of life, but will instead aim to eliminate credible risk of loss of life and reduce credible risks to As Low As Reasonably Practicable (ALARP). Teck understand that, for the purposes of alignment with water dam safety regulations and if there are no life safety concerns, then use of reputable classification systems (e.g., CDA/ICOLD) is acceptable. Adopting this approach meets or exceeds regulatory requirements and aligns with Teck's goal to eliminate risk for loss of life. The past CDA classification and the confirmation of such is provided in this document for consistency with previous work but we understand that continuation of classification using CDA (2019) or similar will not be used in the future at Teck.*

The PSCP is not a tailings facility and was classified as a “Low” consequence facility based on the CDA (2019) category system (KCB 2020). There have been no changes to the downstream environment, the structures, or the operation of the facilities that would require a revision to this classification.

5.6 Physical Performance

5.6.1 Geotechnical

The facilities have performed adequately for nearly 40 years and have shown no indications of geotechnical instability. There were no changes to the geotechnical characteristics of the facilities during the review period. As noted in Section 4, there were no threshold exceedances or unusual conditions observed during the review period, and instrumentation readings were consistent with historic trends and expected behaviour.

5.6.2 Hydrotechnical

The hydrotechnical performance of the facility during the review period was consistent with historic trends and expectations. There have been no changes to the water management system since operations ceased in 2000. As noted in Section 4.7, there were no pond level exceedances or unusual conditions observed during the review period.

5.7 Operational Performance

The PTSF and PSCP have both been inactive since 1997 and there are no operations at either facility under current conditions.

5.8 Documentation Review

The Operations, Maintenance and Surveillance (OMS) Manual was reviewed in 2021 and remains appropriate for the facility. The most recent update to the OMS Manual was in 2019 (Teck 2019a). An update was in progress at the time of writing to bring the document into the new Teck template for OMS manuals.

The Emergency Preparedness and Response Plan (EPRP) was incorporated into the Mine Emergency Response Plan (MERP) for QCO in 2019 and remains appropriate for the facility (Teck 2019c).

6 SUMMARY AND RECOMMENDATIONS

The observed performance of the PTSF and PSCP is consistent with past behavior and expectations, and no dam safety concerns were noted by Teck or KCB during the review period.

Recommendations related to the PTSF and PSCP are shown in Table 6.1. There are no new recommendations for this AFPR. Any preliminary recommendations issued following the site visit that were closed before this report was issued have not been included in Table 6.1. Each recommendation has been assigned a priority using the HSRC Guidance Document priority definitions:

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

Table 6.1 Summary of Recommendations

ID Number	Deficiency or Non-Conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Recommended Deadline
Previous Recommendations Closed / Superseded – None					
Previous Recommendations Ongoing					
PTD-2019-02	Vegetation on dam slopes	OMS Manual (Section Titled "Items Requiring Maintenance")	Clear trees from the upstream and downstream slopes of the dam.	4	Q4 2022 (OPEN – Vegetation partially removed from crest and toe areas, additional clearing planned in 2022, priority reduced to 4 given that the remaining vegetation is not impacting dam safety but should be removed to reduce the potential for further growth)
2021 Recommendations – no new recommendations					

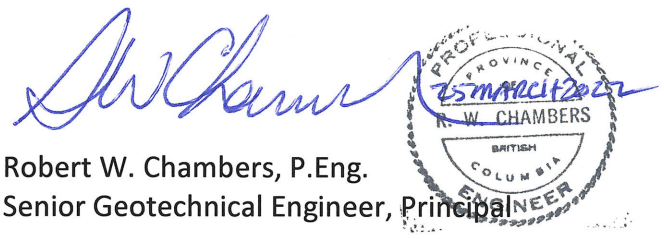
7 CLOSING

Thank you for the opportunity to work on this project. Should you have any questions, please contact the undersigned.

Yours truly,

KLOHN CRIPPEN BERGER LTD.
B.C. Permit to Practice No. 1000171

Max Cronk, P.Eng.
Project Manager
Civil Engineer



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MC/RWC:jc

REFERENCES

British Columbia Ministry of Environment (ENV). 2015. "Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining". Version 1.0. December.

Canadian Dam Association (CDA). 2013. "Dam Safety Guidelines 2007 – Revised 2013", January.

Canadian Dam Association (CDA). 2019. Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams Canada.

Golder Associates Ltd. (Golder). 1982a. "Proposed Tailings Retention Area Quintette Coal Project", January.

Golder Associates Ltd. (Golder). 1982b. "Tailings Dam Design Review Quintette Coal Project", October.

Golder Associates Ltd. (Golder). 1984a. "Stability of Sediment Control Dam and Tailing Starter Dam at Quintette Coal Project". February.

Golder Associates Ltd. (Golder). 1984b. "Stability Assessment of Settling Pond Dykes and Tailing Retention Structure". October.

Golder Associates Ltd. (Golder). 1988. "Construction and Performance of Tailings Dam", February.

Golder Associates Ltd. 1989. "Tailings Dam as at End of 1988 Construction Season", July.

Golder Associates Ltd. 1999. "Annual Inspection of the North Tailings Pond", September.

Golder Associates Ltd. (Golder). 2003. "Stability Assessment for North Tailings Pond at Quintette Operating Corporation", March.

Kilborn Engineering Ltd. (Kilborn). 1982. "Quintette Coal Project Surface Plant Tailings Disposal Starter Dam, Plan Sections & Details". Issued for Tender October 4.

Klohn Crippen Berger Ltd. (KCB). 2013. "Quintette Coal Operations – Plantsite Tailings Dam – 2013 Dam Safety Inspection Report", December 12.

Klohn Crippen Berger Ltd. (KCB). 2015. "Quintette Coal Operations – Plantsite Tailings Dam – Response to February 3, 2015 MEM Memorandum", June.

Klohn Crippen Berger Ltd. (KCB). 2019a. "Quintette Coal Operations – Plantsite Tailings Dam – 2016 Stability Assessment – Draft Rev.1", May 27.

Klohn Crippen Berger Ltd. (KCB). 2019b. "Quintette Coal Operations – Plantsite Tailings Dam Hydrotechnical Review – Rev.1", June 7.

Klohn Crippen Berger Ltd. (KCB). 2019c. "Quintette Coal Operations – Plantsite Tailings Dam – 2018 Dam Safety Inspection Report", March 25.

Klohn Crippen Berger Ltd. (KCB). 2020. “Consolidated Factual Report – Mesa A Sedimentation Pond and Plantsite Seepage Collection Pond”. August 14.

Ministry of Energy and Mines (MEM). 2016. “Health, Safety and Reclamation Code for Mines in British Columbia Guidance Document”, July.

Ministry of Energy, Mines, and Low Carbon Innovation (EMLI). 2021. “Health, Safety and Reclamation Code for Mines in British Columbia”, April.

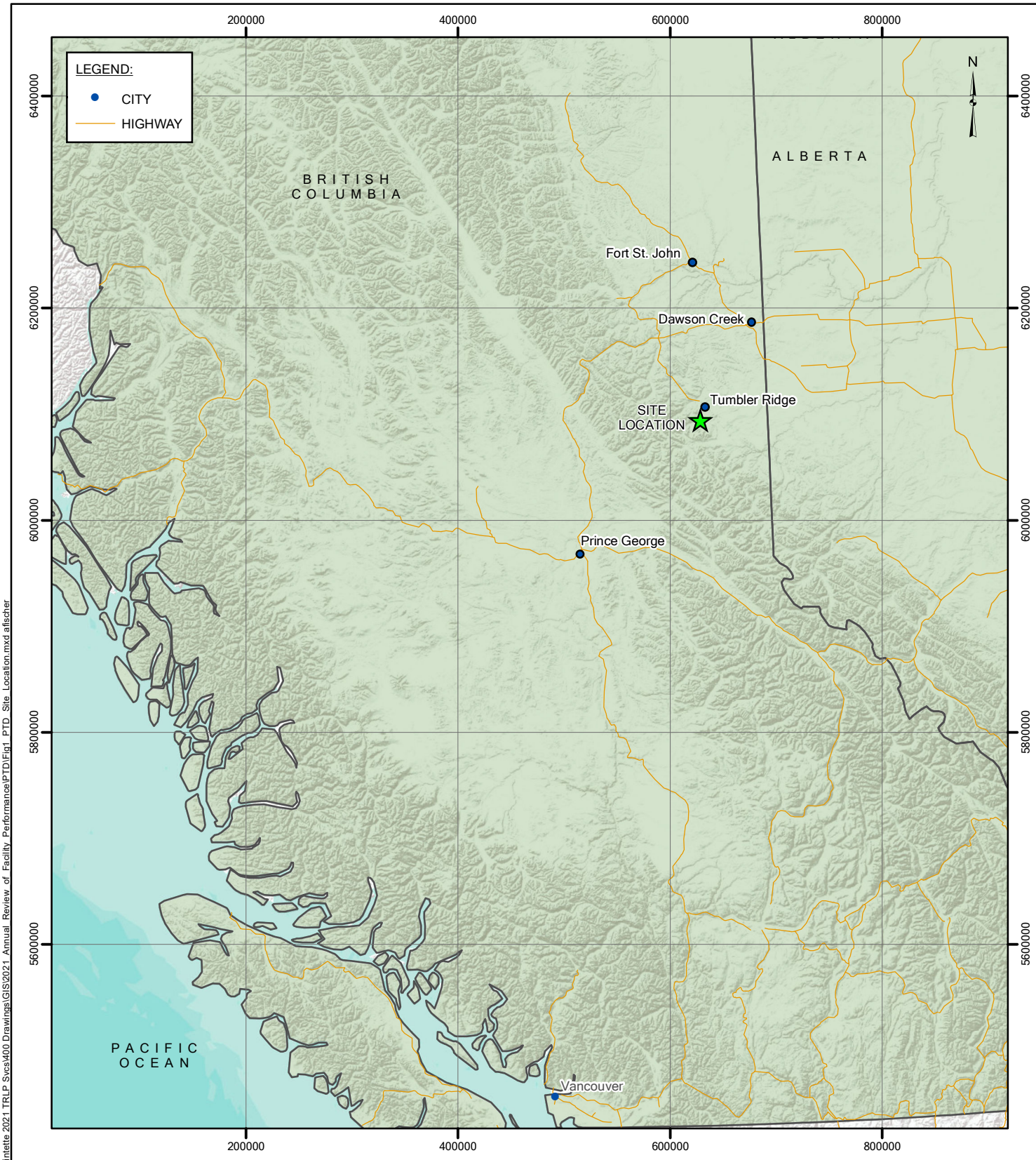
Teck Coal Ltd. (Teck) 2013. “Baseline Hydrology and Design Basis”, January.

Teck Coal Ltd. (Teck) 2019a. “Quintette Coal Operations – Plantsite Tailings Dam – Operation, Maintenance and Surveillance Manual”, March.

Teck Resources Ltd. (Teck). 2019b. “Guideline for Tailings and Water Retaining Structures”. January

Teck Coal Ltd. (Teck). 2019c. “Quintette Coal Operations Tailings Storage Facilities Emergency Preparedness and Response Plan”, March.

FIGURES



NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. BASE DATA: ESRI.

SCALE 0 100,000 m

CLIENT: Teck

Klohn Crippen Berger

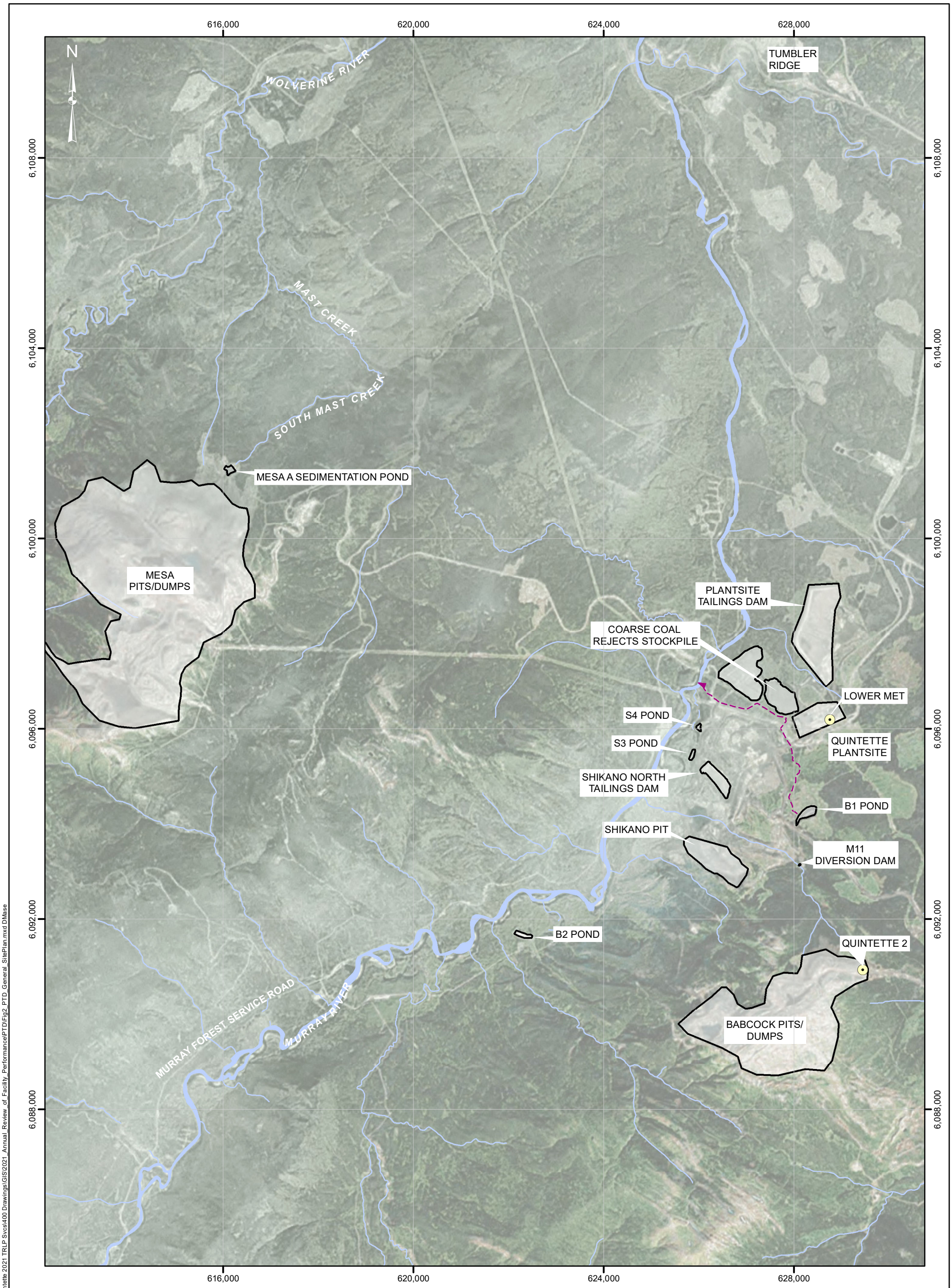
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: SITE LOCATION

PROJECT No. M09684A21

FIG No. 1

Path: \\int.klohn.com\ProjData\MVCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\400 Drawings\GIS\2021 Annual Review of Facility Performance\PTD\Fig1 PTD Site Location.mxd afischer



NOTES:
1. DATUM, PROJECTION: NAD83, UTM ZONE 10N.
2. IMAGERY: ESRI.

LEGEND:

- CLIMATE STATION
- M11/M15 CHANNEL
- CREEK/RIVER
- STRUCTURE BOUNDARY

SCALE 0 2,500 m

CLIENT: Teck

Klohn Crippen Berger

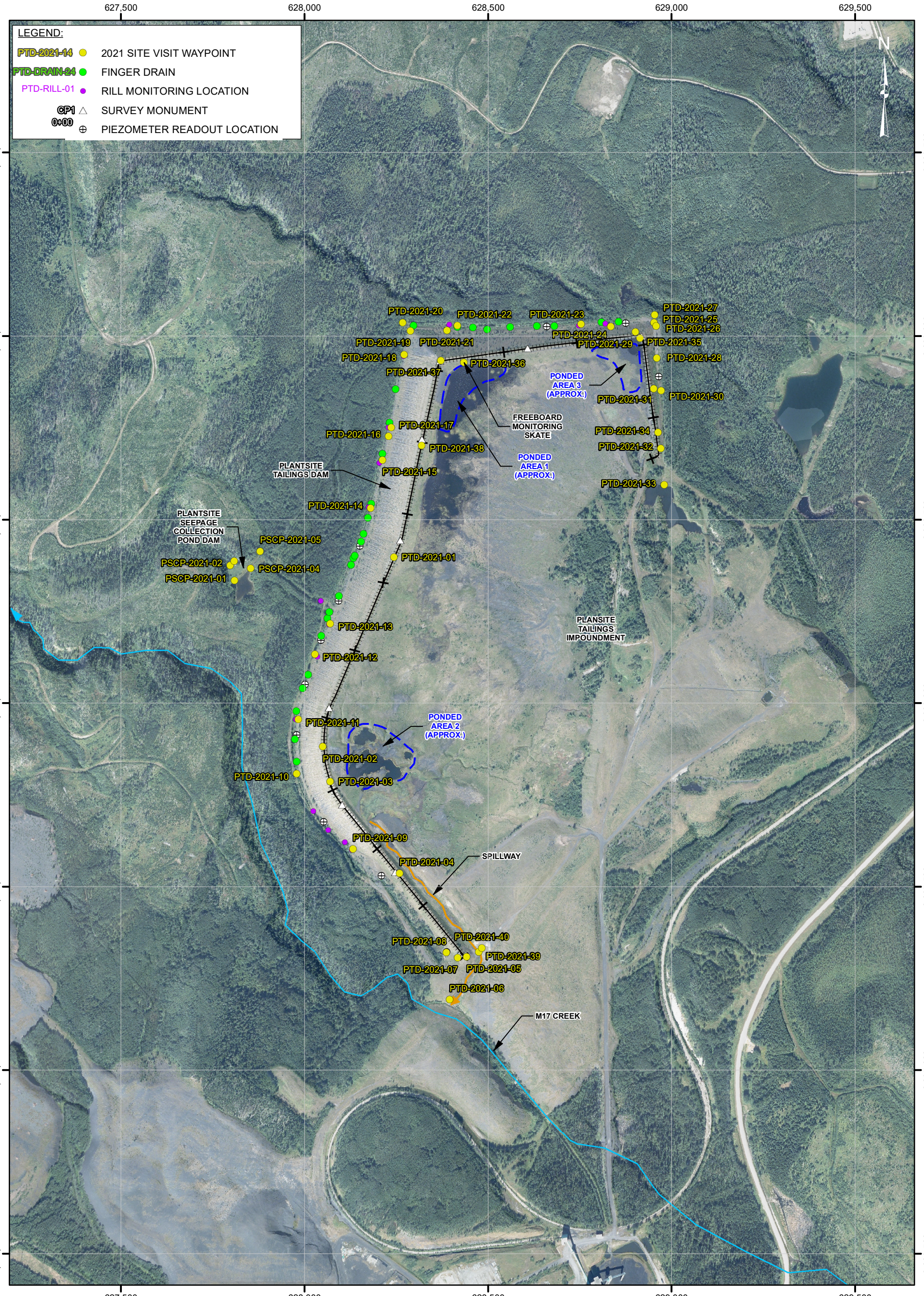
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: GENERAL SITE PLAN

PROJECT No. M09684A21

FIG No. 2

Path: \\nt.klohn.com\ProjData\MVCRM\09684A21 - TCL-Quintette 2021 TRLP Svcs\400 Drawings\GIS\2021_Annual_Review_of_Facility_Performance\PTD\Fig2_PTD_General_SitePlan.mxd DMase



NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. ORTHOPHOTO PROVIDED BY TECK.
   SOURCE: AIRBORNE IMAGING. 2020. "FINAL SURVEY REPORT: 15997 QUINETTE/BULLMOOSE FOR TECK METALS". AUGUST 20.

SCALE 0 500 m

CLIENT Teck

Klohn Crippen Berger

PROJECT
QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE
PLANTSITE TAILINGS DAM
GENERAL ARRANGEMENT

PROJECT No. M09684A21

FIG No. 3

Path: \\int.klohn.com\Proj\Data\MV\CRM\09684A21 - TCL-Quinette 2021 TRLP Svcs\400 Drawings\GIS\2021_Annual_Review_of_Facility_Performance\PTD\Fig3_PTD_General_Arrangement.mxd DMase

627,500 628,000 628,500 629,000 629,500

6,099,500 6,099,000 6,098,500 6,098,000 6,097,500 6,097,000 6,096,500

N

PLANTSITE TAILINGS DAM

PLANTSITE SEEPAGE COLLECTION POND DAM

PLANTSITE TAILINGS IMPOUNDMENT

M17 CREEK

NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. ORTHOPHOTO PROVIDED BY TECK.
   SOURCE: AIRBORNE IMAGING. 2020. "FINAL SURVEY REPORT: 15997 QUINETTE/BULLMOOSE FOR TECK METALS". AUGUST 20.

LEGEND:

- PLANTSITE TAILINGS DAM CATCHMENT – NORMAL CONDITIONS
- ADDITIONAL PLANTSIDE TAILINGS DAM CATCHMENT – FLOOD CONDITIONS
- PLANTSITE SEEPAGE COLLECTION POND CATCHMENT

SCALE 0 500 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

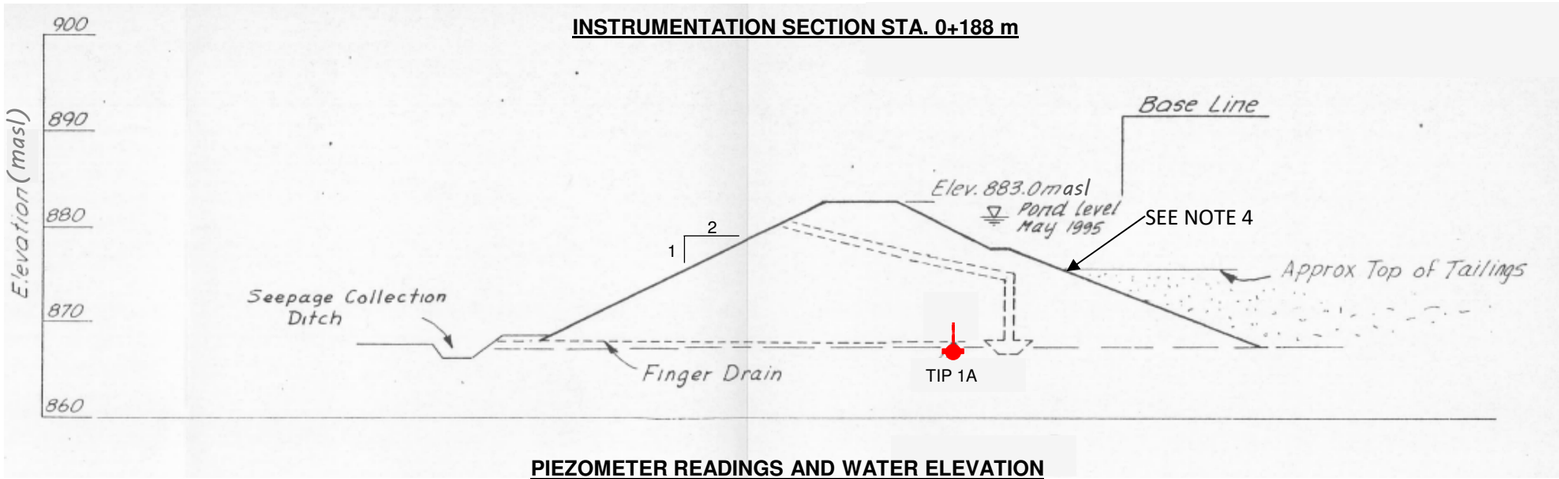
TITLE: PLANTSITE TAILINGS DAM CATCHMENT

PROJECT No. M09684A21

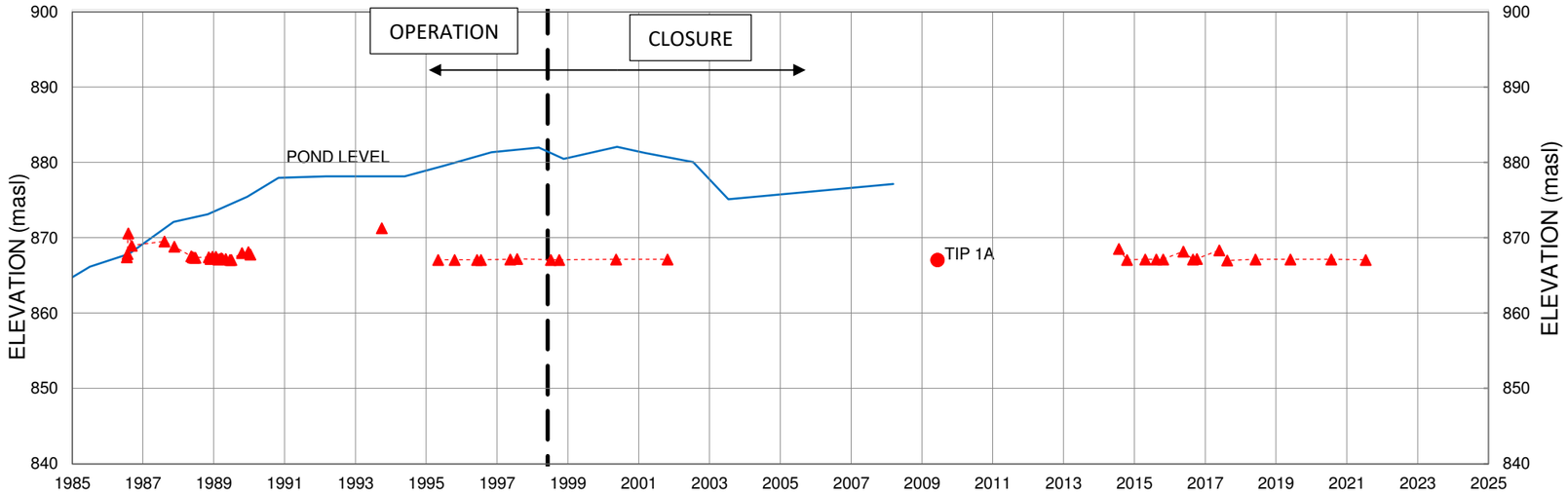
FIG No. 4

Path: \\nt.klohn.com\ProjData\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\400 Drawings\GIS\2021_Annual_Review_of_Facility_Performance\PTD\Fig4_PTD_Catchment.mxd DMase

INSTRUMENTATION SECTION STA. 0+188 m



PIEZOMETER READINGS AND WATER ELEVATION



DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+188	1A	PNEUMATIC	867.0	0.1	0.1	867.1

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP 1A WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (1995).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1995).
4. UPSTREAM SLOPE AT 2.5H:1V TO EL. 878 masl AT WHICH UPSTREAM SLOPE BECOMES 2H:1V TO THE FINAL CREST EL. 883 masl.

CLIENT: Teck

Klohn Crippen Berger

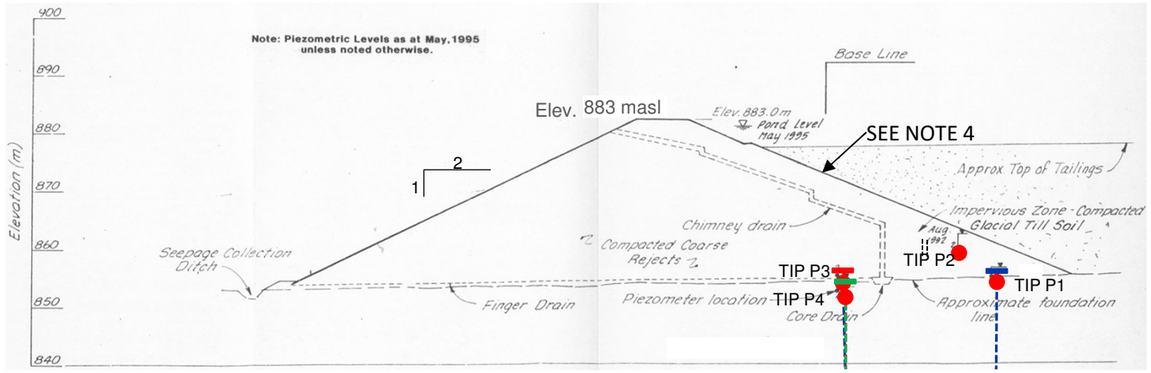
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+188 m

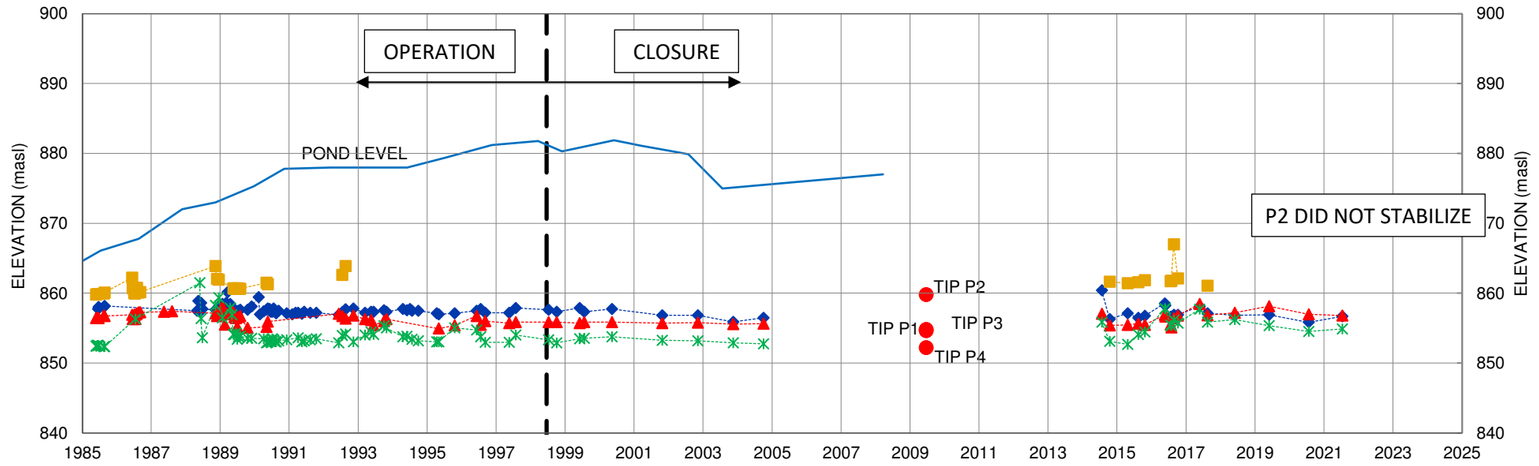
PROJECT No. M09684A21

FIG. No. 5

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+300 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+300	P1	PNEUMATIC	854.8	2.7	1.9	856.7
		P2	PNEUMATIC	859.8	SEE NOTE 5	-	-
		P3	PNEUMATIC	854.6	3.1	2.2	856.8
		P4	PNEUMATIC	852.2	3.8	2.7	854.9

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP P1 WATER ELEVATION
- TIP P2 WATER ELEVATION
- TIP P3 WATER ELEVATION
- TIP P4 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).
4. UPSTREAM SLOPE AT 2.5H:1V TO EL. 878 masl AT WHICH UPSTREAM SLOPE BECOMES 2H:1V TO THE FINAL CREST EL. 883 masl.
5. INSTRUMENT DID NOT STABILIZE. THIS IS CONSISTENT WITH OBSERVATIONS IN PREVIOUS ANNUAL PERFORMANCE REPORTS. THE INSTRUMENT WAS NOTED AS PLUGGED IN 2003 (GOLDER 2003).

CLIENT: Teck

Klohn Crippen Berger

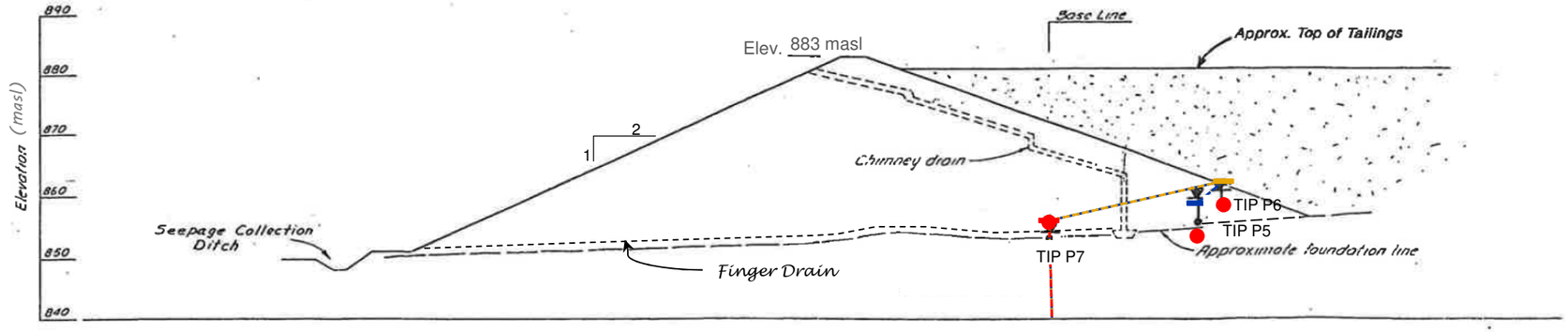
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+300 m

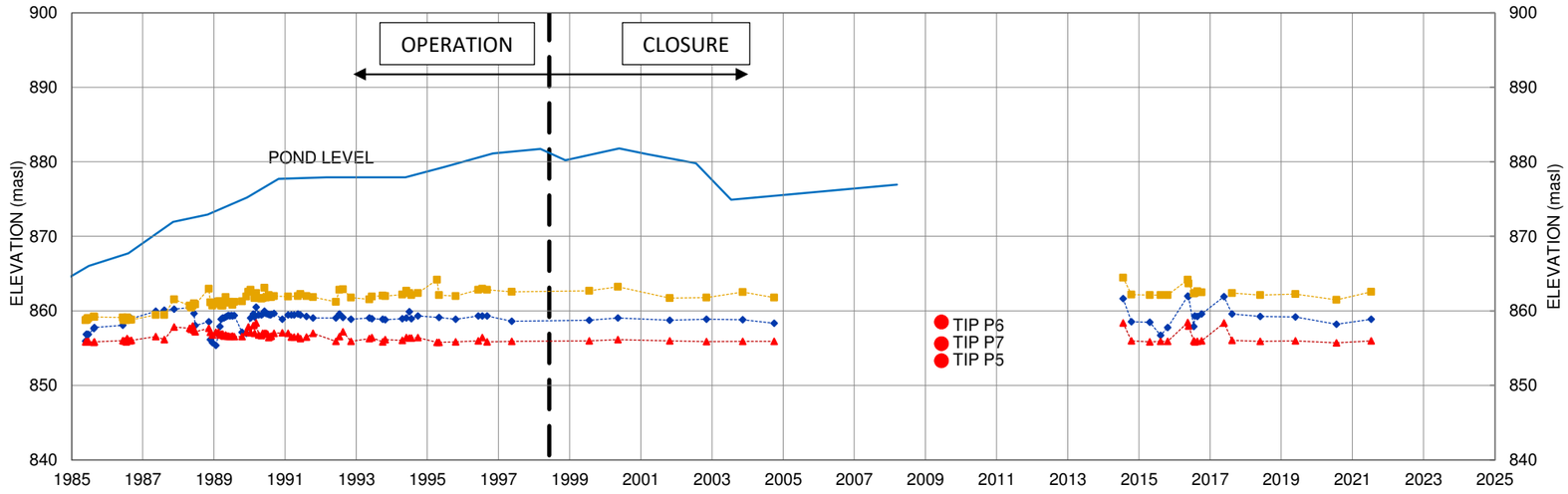
PROJECT No. M09684A21

FIG. No. 6

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+475 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+475	P5	PNEUMATIC	853.4	7.8	5.5	858.9
		P6	PNEUMATIC	858.6	5.6	3.9	862.5
		P7	PNEUMATIC	855.7	0.4	0.3	856.0

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP P5 WATER ELEVATION
- TIP P6 WATER ELEVATION
- TIP P7 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

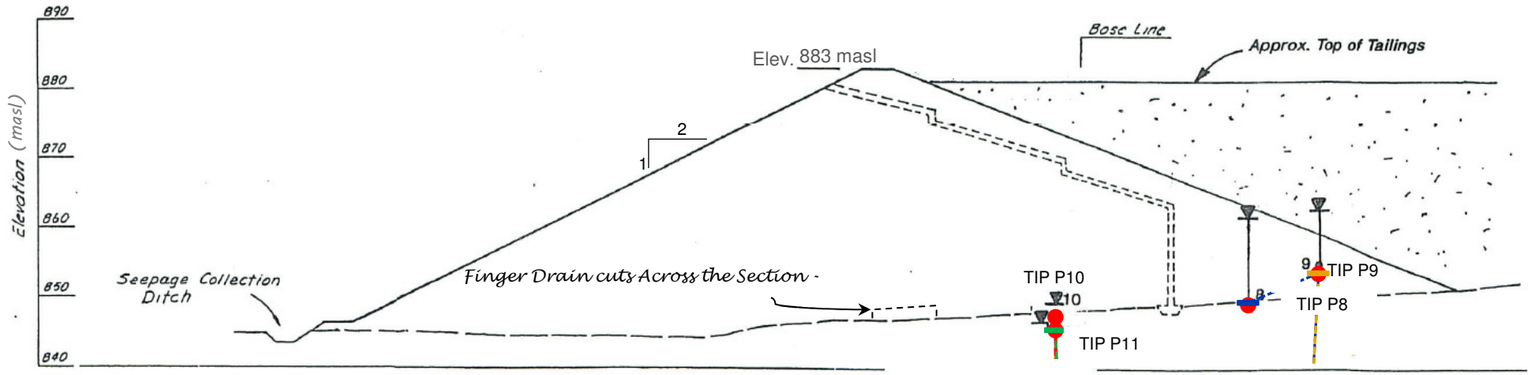
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+475 m

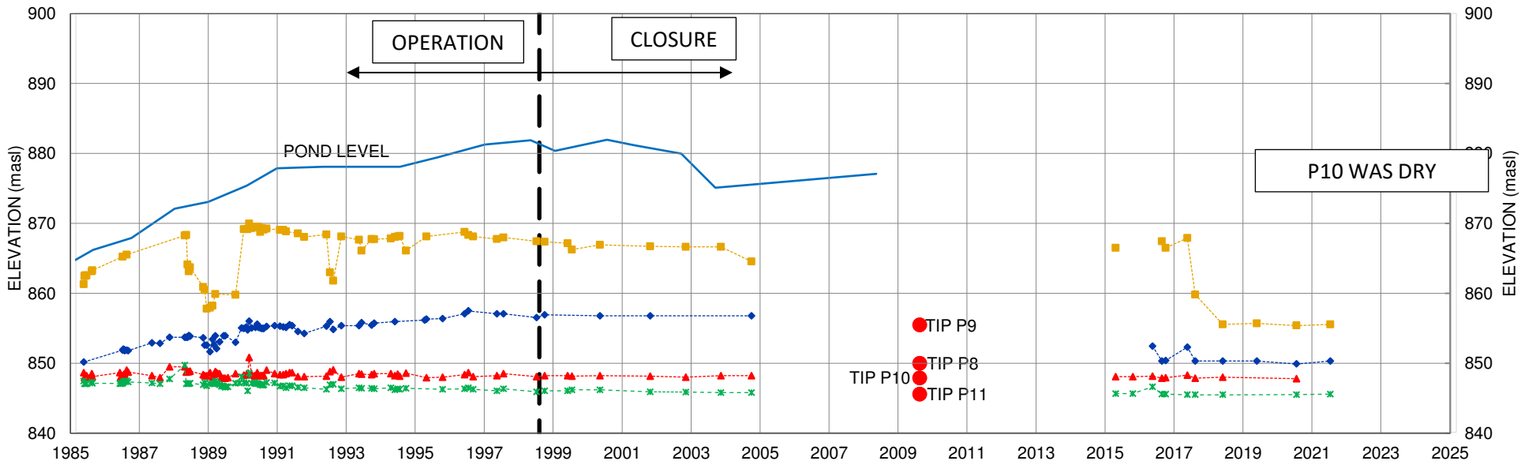
PROJECT No. M09684A21

FIG. No. 7

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+575 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+575	P8	PNEUMATIC	849.9	0.6	0.4	850.3
		P9	PNEUMATIC	855.4	0.2	0.1	855.5
		P10	PNEUMATIC	847.8	DRY	DRY	
		P11	PNEUMATIC	845.5	0.1	0.1	845.6

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP P8 WATER ELEVATION
- TIP P9 WATER ELEVATION
- TIP P10 WATER ELEVATION
- TIP P11 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

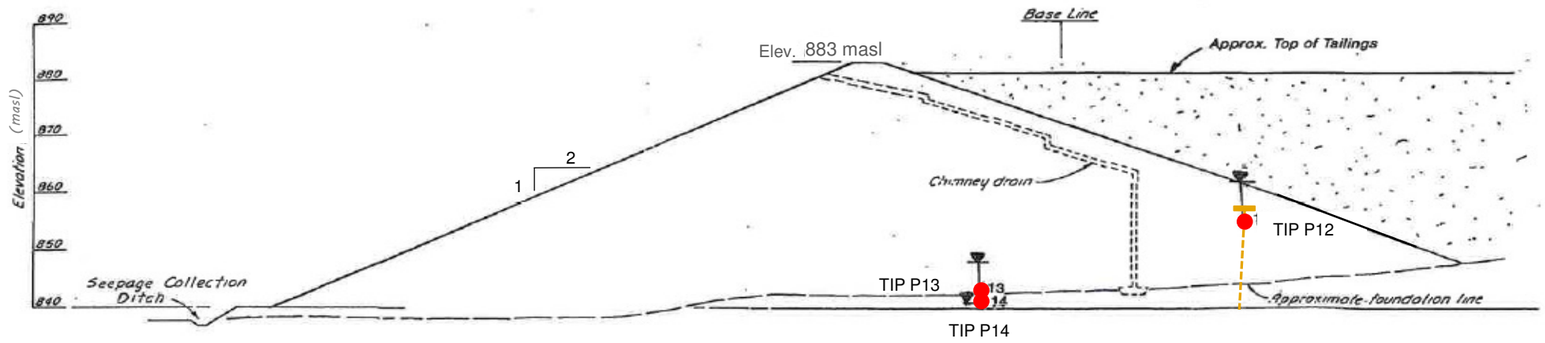
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+575 m

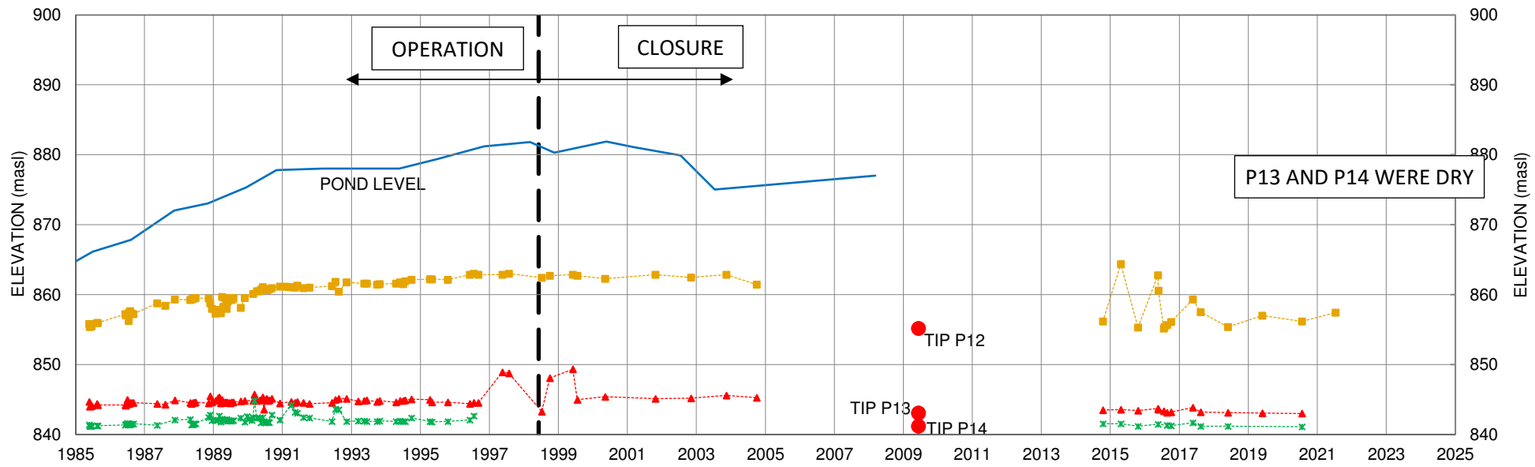
PROJECT No. M09684A21

FIG. No. 8

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+696 m



PIEZOMETER READINGS AND WATER ELEVATIONS

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+696	P12	PNEUMATIC	855.1	3.3	2.3	857.4
		P13	PNEUMATIC	843.0	DRY	DRY	
		P14	PNEUMATIC	841.1	DRY	DRY	

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP P12 WATER ELEVATION
- TIP P13 WATER ELEVATION
- TIP P14 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

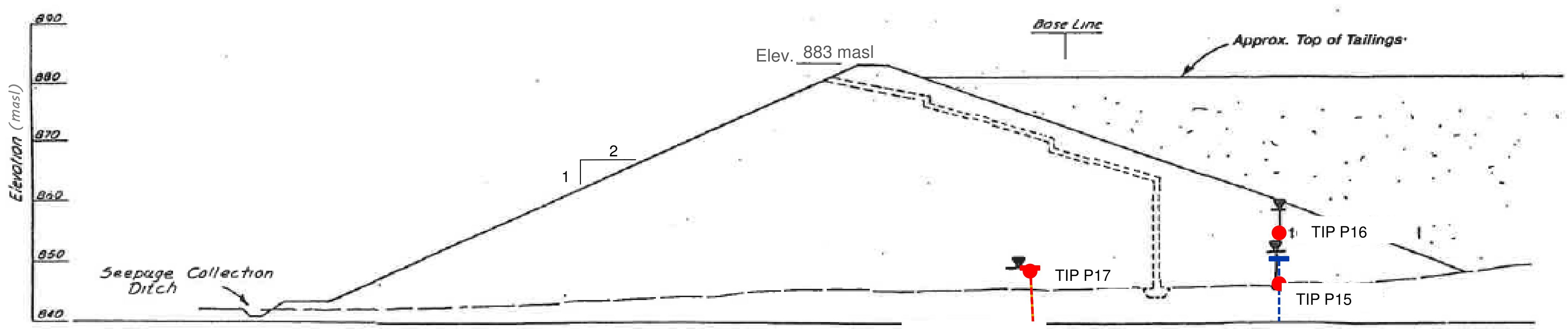
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+696 m

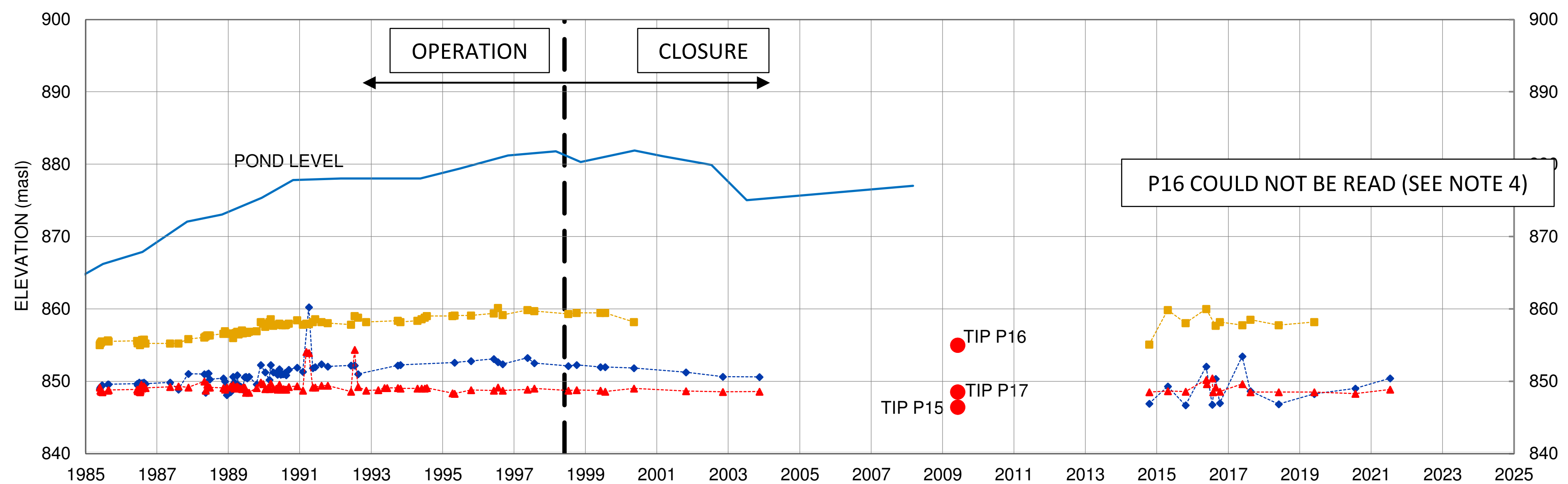
PROJECT No. M09684A21

FIG. No. 9

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUCTION SECTION STA. 0+800 m



PIEZOMETER READINGS AND WATER ELEVATIONS

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	0+800	P15	PNEUMATIC	846.2	6.0	4.2	850.4
		P16	PNEUMATIC	854.8	SEE NOTE 4		
		P17	PNEUMATIC	848.3	0.8	0.6	848.9

LEGEND:

- PIEZOMETER TIP ELEVATION
- 12-JULY-2021 WATER LEVEL
- TIP P15 WATER ELEVATION
- TIP P16 WATER ELEVATION
- TIP P17 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).
4. PIEZOMETER TIP WAS COVERED IN MINERAL DEPOSITS AND COULD NOT BE READ.

CLIENT: Teck

Klohn Crippen Berger

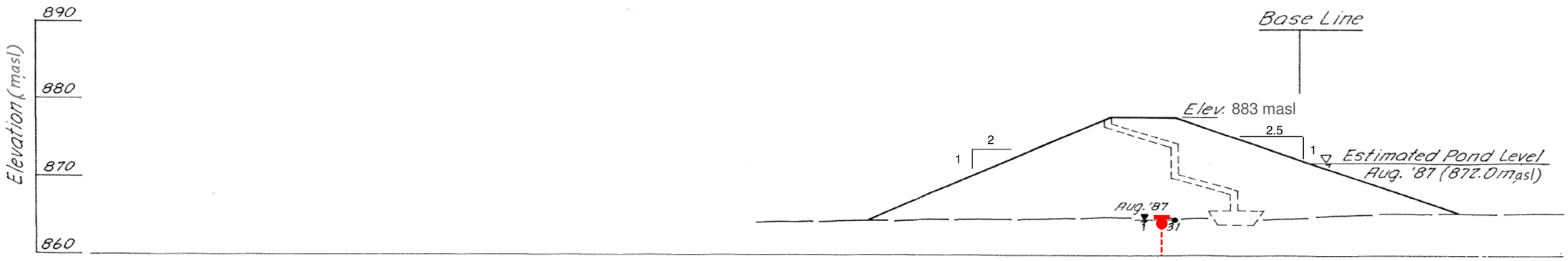
PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 0+800 m

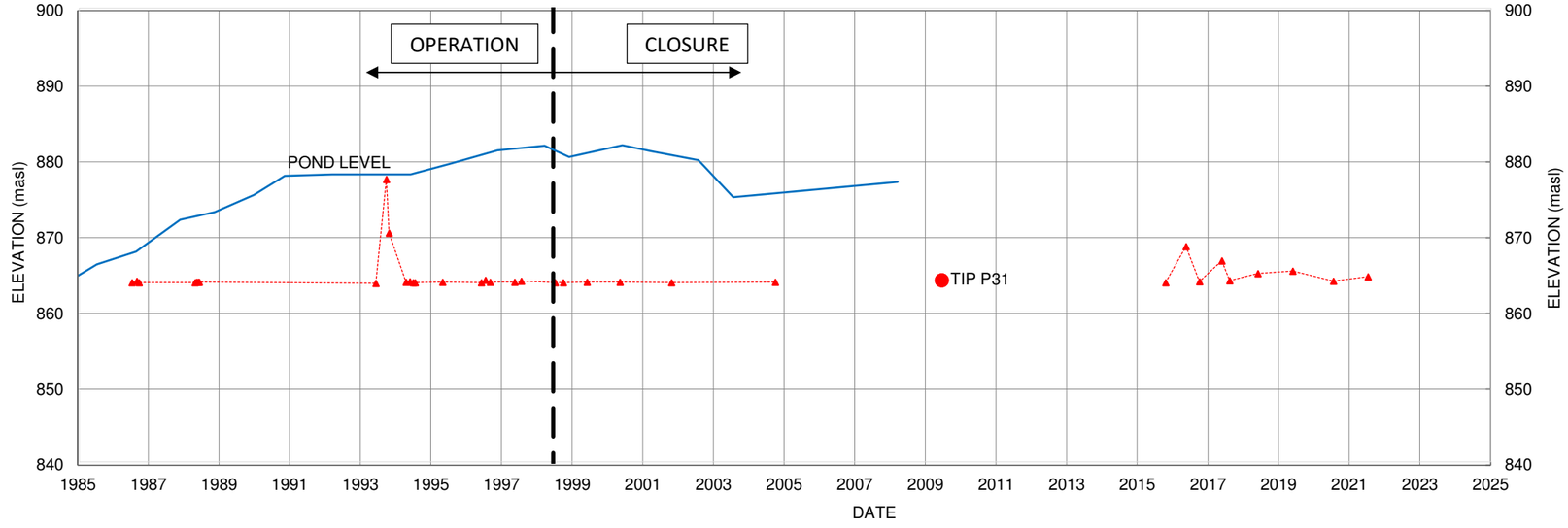
PROJECT No. M09684A21

FIG. No. 10

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 2+040 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2021-07-13	2+040	P31 (NOTE 3)	PNEUMATIC	864.0	1.2	0.8	864.8

LEGEND:

- PIEZOMETER TIP ELEVATION
- TIP P31 WATER ELEVATION
- 12-JULY-2021 WATER LEVEL

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (1988).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE TAILINGS DAM
2021 PIEZOMETER READINGS
STA. 2+040 m

PROJECT No. M09684A21

FIG. No. 11

Date & Time: 2021-11-03 16:57
Figure File: Z:\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\300 Design\01 AFPR\Piezometers\[Plantsite Piezometer.xlsx]Figure F

NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. ORTHOPHOTO PROVIDED BY TECK.
   SOURCE: AIRBORNE IMAGING. 2020. "FINAL SURVEY REPORT: 15997 QUINETTE/BULLMOOSE FOR TECK METALS". AUGUST 20.

SCALE 0 100 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2021 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE: PLANTSITE SEEPAGE COLLECTION POND GENERAL ARRANGEMENT

PROJECT No. M09684A21

FIG No. 12

Path: \\int.klohn.com\ProjData\M\VCR\M09684A21 - TCL-Quintette 2021 TRLP Svcs\400 Drawings\GIS\2021 Annual Review of Facility Performance\PTD\Fig16 PTD SeepagePond.mxd DMase

APPENDIX I

Inspection Photographs

Appendix I
Inspection Photographs

LEGEND:

- PTD = Plantsite Tailings Dam
- PSCP = Plantsite Seepage Collection Pond
- PTD-2021-## & PSCP-2021-## refers to 2021 site visit photograph location, as shown on Figure 3.

Photographs were taken during site inspection on July 13, 2021.

Photo I-1 PTD Crest – looking south (PTD-2021-01)

Photo I-2 PTD Crest – looking north (PTD-2021-01)

Photo I-3 PTD Impoundment – looking east (PTD-2021-01)

Photo I-4 PTD Crest – looking north (PTD-2021-02)

Photo I-5 PTD Impoundment – looking east (PTD-2021-02)

Photo I-6 PTD Impoundment & Crest – looking southeast (PTD-2021-03)

Photo I-7 PTD Impoundment – looking east (PTD-2021-03)

Photo I-8 PTD Spillway – looking east (PTD-2021-04)

Photo I-9 PTD Spillway – looking north (PTD-2021-05)

Photo I-10 PTD Spillway – looking northeast (PTD-2021-05)

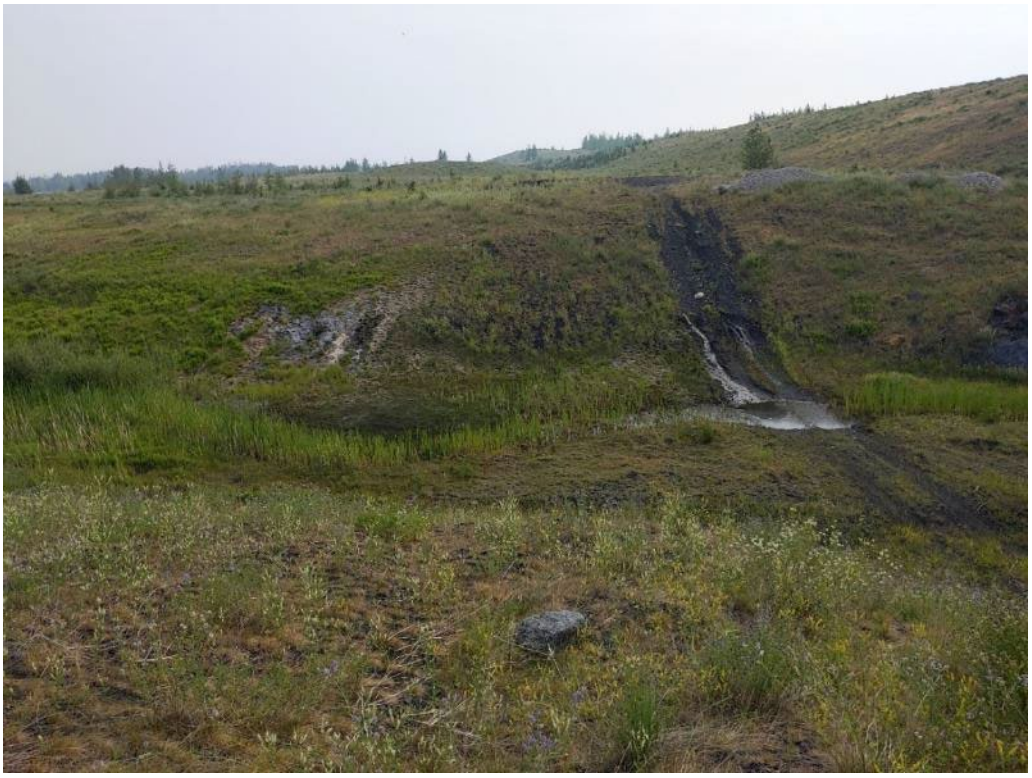


Photo I-11 PTD Spillway – looking east (PTD-2021-05)

Photo I-12 PTD Spillway – looking south (PTD-2021-05)

Photo I-13 PTD Spillway – looking south (PTD-2021-40)

Photo I-14 PTD Spillway – looking north (PTD-2021-06)

Photo I-15 PTD Spillway riprap (PTD-2021-06)

Photo I-16 PTD Spillway & M17 Creek – looking southeast (PTD-2021-06)

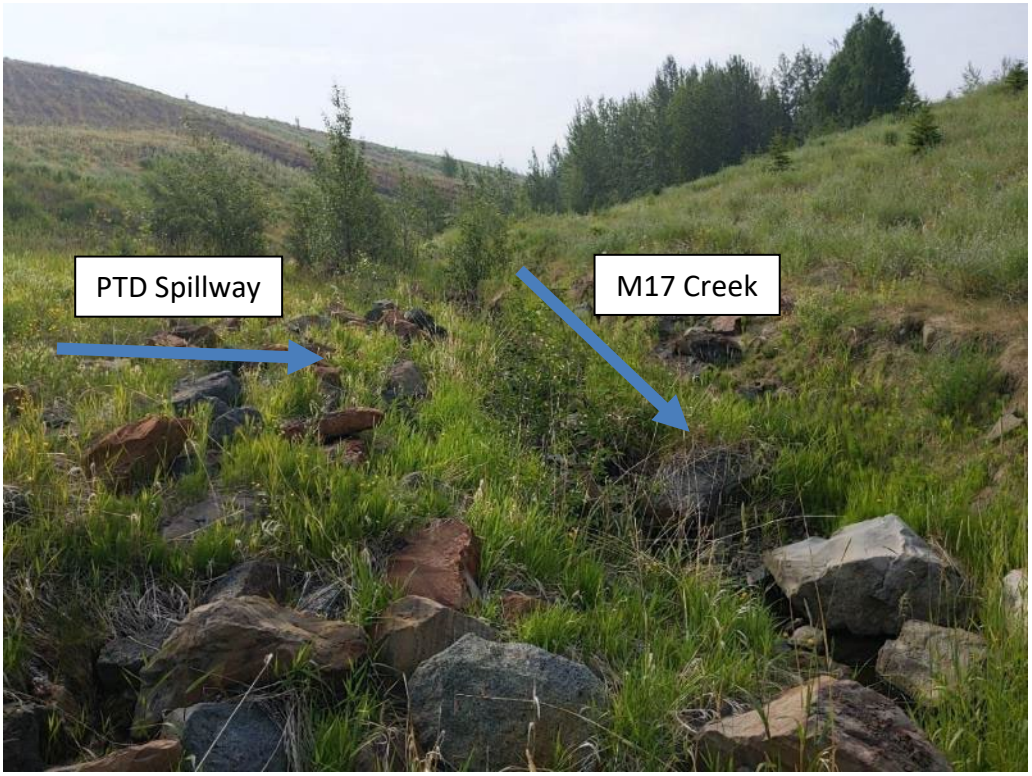


Photo I-17 PTD Downstream Slope from Spillway – looking northwest (PTD-2021-07)

Photo I-18 Piezometer at downstream toe missing tip (PTD-2021-08)

Photo I-19 Erosion gulley at the toe – looking southeast (PTD-2021-09)

Photo I-20 Shallow ponded water in Seepage Collection Ditch (PTD-2021-10)

Photo I-21 PTD Downstream Slope – looking east (PTD-2021-12)

Photo I-22 PSCP – looking southeast (PSCP-2021-01)

Photo I-23 PSCP Embankment – looking southeast (PSCP-2021-02)

Photo I-24 PSCP Embankment gravel drainage blanket – looking east (PSCP-2021-03)

Photo I-25 PSCP Spillway – looking north (PSCP-2021-04)

Photo I-26 PSCP Spillway – looking northeast (PSCP-2021-05)

Photo I-27 PTD Downstream Slope erosion rills – looking east (PTD-2021-14)

Photo I-28 PTD Downstream Slope erosion rills – looking east (PTD-2021-16)

Photo I-29 PTD Downstream Slope erosion rills – looking east (PTD-2021-18)

Photo I-30 PTD Downstream Slope – looking south (PTD-2021-19)

Photo I-31 Outlet of Seepage Collection Ditch along north wingwall (PTD-2021-20)

Photo I-32 PTD Downstream Slope – looking south (PTD-2021-21)

Photo I-33 Seepage daylighting at toe of north wingwall (PTD-2021-22)

Photo I-34 PTD Downstream Slope – looking south (PTD-2021-23)

Photo I-35 PTD Downstream Slope – looking west (PTD-2021-24)

Photo I-36 PTD Downstream Slope – looking west (PTD-2021-25)

Photo I-37 Seepage Collection Ditch - looking south (PTD-2021-26)

Photo I-38 Seepage Collection Ditch Outlet along west wingwall – looking north (PTD-2021-27)

Photo I-39 Seepage Collection Ditch – looking north (PTD-2021-28)

Photo I-40 Depressions on Embankment Slope, presence of a spoil pile adjacent to the depressions suggests that these were caused by animal activity (PTD-2021-29)

Photo I-41 PTD Downstream slope (PTD-2021-30)

Photo I-42 Seepage Collection Ditch with weathered rock exposed at base – looking south (PTD-2021-32)

Photo I-43 Pond east of facility – looking south (PTD-2021-33)

Photo I-44 PTD Crest – looking north (PTD-2021-34)

Photo I-45 Ponded Area 3 – looking south (PTD-2021-35)

Photo I-46 PTD Impoundment – looking west (PTD-2021-35)

Photo I-47 Ponded Area 1, freeboard monitoring stake had fallen over – looking south (PTD-2021-36)

Photo I-48 Ponded Area 2 – looking southeast (PTD-2021-37)

Photo I-49 PTD Crest – looking south (PTD-2021-37)

APPENDIX II

Rill Monitoring Photographs

Appendix II
Rill Monitoring Photos

LEGEND:

- PTD-RILL-## refers to proposed rill monitoring point, plan location is shown on Figure 3

Coordinates for monitoring points are summarized in Table II-1. All photographs were taken during inspection on July 13, 2021.

Table II-1 Rill Monitoring Point Locations

Rill Monitoring Point PTD-Rill-##	Northing (m)	Easting (m)
01	6097603.6	628135.4
02	6097599.6	628128.6
03	6097654.1	628064.7
04	6097706.1	628024.0
05	6097955.8	627976.7
05A	6098126.4	628034.7
05B	6098213.7	628067.3
06	6098278.2	628044.4
06A	6098533.6	628174.1
07	6098654.2	628204.4
07A	6098725.7	628219.6
07B	6098750.8	628228.3
08	6098945.2	628270.2
09	6099031.2	628394.9
10	6099029.1	628747.9
11	6099034.7	628820.0

II-1 PTD-RILL-01

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

II-2 PTD-RILL-02

2015	2016	2017	2018
			
2019 (looking northwest)	**2020**	**2021**	
	No photograph taken		

II-3 PTD-RILL-03

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken	No photograph taken	

II-4 PTD-RILL-04

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

II-5 PTD-RILL-05

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

II-6 PTD-RILL-05A

2016	2017	2018	**2019**
			
2020	**2021**		
			

II-7 PTD-RILL-05B

2016	2017	2018	**2019**
			
2020	**2021**		
			

II-8 PTD-RILL-06

2015	2016	2017	2018
			
2019	**2020**	**2021**	
			

II-9 PTD-RILL-06A

2016	2017	2018	**2019**
			
2020	**2021**		
			

II-10 PTD-RILL-07

2015	2016	2017	2018
			
2019	**2020**	**2021**	
			

II-11 PTD-RILL-07A

2016	2017	2018	**2019**
			
2020	**2021**		
			

II-12 PTD-RILL-07B

2016	2017	2018	**2019**
			
2020	**2021**		
			

II-13 PTD-RILL-08

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

2015

2018

II-14 PTD-RILL-09

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

II-15 PTD-RILL-10

2015	2016	2017	2018
			
2019	**2020**	**2021**	
	No photograph taken		

II-16 PTD-RILL-11

2015	2016	2017	2018
		No photograph taken	
2019	**2020**	**2021**	
	No photograph taken		

APPENDIX III

Register of Reference Documents

Appendix III
Register of Reference Documents

Document Title	Author	Date of Issue
Geotechnical Conditions at the Proposed Quintette Coal Development Site Near Chetwynd B.C.	Golder Associates Ltd.	Jan-78
Hydrology Design Memorandum for Quintette Coal Limited	Ker, Priestman & Associates Ltd.	May-81
Proposed Tailings Retention Area Quintette Coal Project	Golder Associates Ltd.	Jan-82
Quintette Coal Project Physical Properties of Coal Tails	Golder Associates Ltd.	11-May-82
Hydrogeology of the Quintette Project British Columbia Volume I - Main Text	Golder Associates Ltd.	May-82
Hydrogeology of the Quintette Project British Columbia Volume II - Appendices A to E	Golder Associates Ltd.	May-82
Design, Construction, Operation and Abandonment of the Tailings Impoundment	Kilborn Engineering (B.C.) Ltd. and Golder Associates	09-Jun-82
Drawing No. 428-35-2 - Surface Plant Tailings Disposal General Arrangement	Kilborn Engineering (B.C.) Ltd.	Sep-82
Drawing No. 428-35-8 - Surface Plant Tailings Disposal Clearing Plan	Kilborn Engineering (B.C.) Ltd.	Sep-82
Drawing No. 428-35-9 - Surface Plant Tailings Disposal Impoundment Area & Access Road Details	Kilborn Engineering (B.C.) Ltd.	Sep-82
Tailings Dam Design Review Quintette Coal Project	Golder Associates Ltd.	Oct-82
Drawing No. 428-35-11 - Surface Plant Tailings Disposal Starter Dam, Plan Sections and Details	Kilborn Engineering (B.C.) Ltd.	Jan-83
Drawing No. 428-35-12 - Surface Plant Tailings Disposal Starter Dam Sections and Profile	Kilborn Engineering (B.C.) Ltd.	Jan-83
Stability of Sediment Control Dam and Tailings Starter Dam at Quintette Coal Project	Golder Associates Ltd.	Feb-84
Assorted Daily Construction Inspection Reports	Golder Associates Ltd.	May to Sep-84
Letter Report to Quintette Coal Ltd. On Retention Dam	Golder Associates Ltd.	Jun-84
Tailings Retention Dam Placement of Coarse Rejects During Winter Weather	Golder Associates Ltd.	Oct-84
Stability Assessment of Settling Pond Dykes and Tailing Retention Structure	Golder Associates Ltd.	Oct-84
Performance of Tailings Dam and Other Impoundment Structures Quintette Coal Operations	Golder Associates Ltd.	May-85
Volumes Operations and Material Properties at the Tailings Retention Structure	Golder Associates Ltd.	Jul-85
Stability of Impoundment Structures at Quintette Coal Property	Golder Associates Ltd.	Sep-85
Drawing No. 85-901-76-002 - 1985 Tailings Dam Construction Program As-Built Details	Quintette Operating Corporation	Nov-85
Dawing No. 85-901-76-001 - 1985 Tailings Dam Construction Program As-Built Details	Quintette Operating Corporation	Nov-85
Application of Polymeric Liner in Tailings Dam Construction	Golder Associates Ltd.	Nov-85
Inspection of Tailings Dam	Golder Associates Ltd.	Dec-85
Drawing No. 86-901-76-1 - 1986 Tailings Dam Construction Program General Layout (Rev. 3)	Golder Associates Ltd.	18-Jun-86
Drawing No. 86-901-76-2 - 1986 Tailings Dam Construction Program Plan (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-3 - 1986 Tailings Dam Construction Program Plan (Rev. 2)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-4 - 1986 Tailings Dam Construction Program Cross-Sections (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-5 - 1986 Tailings Dam Construction Program Cross-Sections (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Stability of Impoundment Structures at Quintette Coal Property	Golder Associates Ltd.	Oct-86
Drawing No. 86-901-76-001 - 1987 Tailings Dam Construction Program General Layout (Rev. A)	Golder Associates Ltd.	09-Jul-87
Drawing No. 86-901-76-002 - 1987 Tailings Dam Construction Program Plan Sheet 1 of 2 (Rev. A)	Golder Associates Ltd.	09-Jul-87
Drawing No. 86-901-76-003 - 1987 Tailings Dam Construction Program Plan Sheet 2 of 2 (Rev. A)	Golder Associates Ltd.	08-Jul-87
Drawing No. 86-901-76-004 - 1987 Tailings Dam Construction Program Cross-Sections (Rev. A)	Golder Associates Ltd.	08-Jul-87
Drawing No. 86-901-76-005 - 1987 Tailings Dam Construction Program Cross-Sections (Rev. O)	Golder Associates Ltd.	08-Jul-87
Construction and Performance of Tailings Dam	Golder Associates Ltd.	Feb-88
Geotechnical Investigation for a Porposed Borrow Source	Peace Country Materials Testing Ltd.	23-Mar-88
Stability of Outside Fill Slope Tailings Retention Embankment	Golder Associates Ltd.	Dec-88
1989 Tailings Dam Construction Production of Chimney Drain Material	Golder Associates Ltd.	10-Apr-89
Tailings Dam As At End of 1988 Construction Season	Golder Associates Ltd.	Jul-89
1989 Tailings Dam Construction Program Excerpt from QOC July 1990 Report to EMPR on Tailings Dam	Quintette Operating Corporation	Jul-90
Tailings Retention Embankment As At The End of 1989	Golder Associates Ltd.	Jan-91
Geotechnical Assessment of Shikano North Alternative Dump	Golder Associates Ltd.	Mar-91
Tailings Retention Embankment As At The End of 1990	Golder Associates Ltd.	Apr-91
Synopsis Excerpt from QCO May 1991 Report to EMPR on 1990 Construction.	Quintette Operating Corporation	May-91
Tailings Dam Repair	Golder Associates Ltd.	07-Aug-92
Tailings Dam Instrumentation	Golder Associates Ltd.	10-Sep-92
1991/1992 Tailings Dam Performance	Golder Associates Ltd.	Oct-92
1992/1993 Tailings Dam Performance	Golder Associates Ltd.	Nov-93
1994 Inspection of the Tailings Retention Dam	Golder Associates Ltd.	Sep-94
1995 Inspection of the Tailings Retention Dam	Golder Associates Ltd.	Aug-95
1995 Tailings Dam Raising	Peace Country Materials Testing Ltd.	Sep-95
Operation and Upkeep of the Tailings Impoundment - August 1994 to July 1995	Quintette Operating Corporation	May-96
Operation and Upkeep of the Tailings Impoundment - August 1995 to July 1996	Quintette Operating Corporation	Mar-97
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Aug-97
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Oct-98
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Sep-99
Closure Drainage for North Tailings Pond	Golder Associates Ltd.	30-Sep-00
Permanent Spillway for Closure of the North Tailings Pond	Golder Associates Ltd.	07-Mar-01
Stability Assessment for The North Tailings Pond	Golder Associates Ltd.	Feb-02
Operation and Upkeep of the Plantsite Tailings Impoundment - August 1999 to October 2001	Golder Associates Ltd.	Mar-02
Stability Assessment for The North Tailings Pond	Golder Associates Ltd.	Mar-03
North Tailings Pond Spillway Review of As-Built Channel	Klohn Crippen	14-Jan-05
Annual Dam Safety Inspection Report Plantsite North Tailings Impoundment - 2005	Quintette Operating Corporation	Mar-06
Quintette 2010 Dam Safety Inspection and Consequence Classification	Klohn Crippen Berger Ltd.	01-Mar-11
Quintette Project - Baseline Climate & Hydrology Conditions	Clearwater Consultants Ltd.	17-Aug-11
2012 Dam Inspections: Plantsite Tailings Dam, M11 Diversion Dam, Shikano North Tailings Dam	Klohn Crippen Berger Ltd.	19-Dec-12
Plantsite Tailings Dam - 2013 Dam Safety Inspection Report	Klohn Crippen Berger Ltd.	12-Dec-13
Quintette Dam Safety Review - Plantsite Tailings Storage Facility	Klohn Crippen Berger Ltd.	27-May-14
Quintette Coal Operations - Plantsite Tailings Dam - 2014 Dam Safety Inspection - Revision 1	Klohn Crippen Berger Ltd.	26-Nov-14
Plantsite Tailings Dam - Response to February 3, 2015 MEM Memorandum	Klohn Crippen Berger Ltd.	29-Jun-15
Quintette Coal Operations - Plantsite Tailings Dam - Hydrotechnical Review	Klohn Crippen Berger Ltd.	22-Dec-15
Quintette Coal Operations - Plantsite Tailings Dam - 2015 Dam Safety Inspection	Klohn Crippen Berger Ltd.	03-Mar-16
Quintette Coal Operations - Plantsite Tailings Dam - 2016 Stability Assessment Report	Klohn Crippen Berger Ltd.	17-May-16
Quintette Coal Operations - Plantsite Tailings Dam - 2016 Dam Safety Inspection	Klohn Crippen Berger Ltd.	22-Dec-16
Quintette Coal Operations - Plantsite Tailings Dam - Water Management, Water Balance, and Quantified Performance Objectives	Klohn Crippen Berger Ltd.	22-Dec-16
Quintette Coal Operations - Plantsite Tailings Dam - Consolidated Facility Report	Klohn Crippen Berger Ltd.	18-Jan-18
Quintette Coal Operations - Plantsite Tailings Dam - 2017 Dam Safety Inspection	Klohn Crippen Berger Ltd.	16-Mar-18
Quintette Coal Operations - Plantsite Tailings Dam - Hydrotechnical Review - Rev. 1 - Draft	Klohn Crippen Berger Ltd.	19-Oct-18